DISTRICT OF SECHELT SUBDIVISION AND DEVELOPMENT CONTROL SERVICING STANDARDS BYLAW No. 430, 2003

Consolidated for convenience August 2024

This Consolidation includes the following Bylaw Amendments:

430-1, 2007
430-2, 2008
430-3, 2008
430-4, 2008
430-5, 2013
430-5, 2019
430-6, 2024

DISTRICT OF SECHELT

Bylaw No. 430, 2003

A bylaw to regulate the Subdivision and Development of land in the District of Sechelt

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WHEREAS the Local Government Act provides that a local government may by bylaw regulate and require the provision or works and services in respect of the subdivision of land;

AND WHEREAS the District of Sechelt wishes to guide development to in an orderly and aesthetically pleasing way, to preserve the established amenities of the District and to ensure that subdivisions and developments are appropriately service and best suited to the use for which they are intended;

NOW THEREFORE the Council of the District of Sechelt in open meeting assembled **ENACTS AS FOLLOWS**:

1. TITLE

1.1 This Bylaw may be cited for all purposes as "District of Sechelt Subdivision and Development Control Servicing Standards Bylaw No. 430, 2003"

2. PROVISIONS

2.1 Subdivision and Development Control Bylaw No. 30, 1988 and all amendments thereto are hereby repealed.

2.2 The following Parts of the Subdivision and Development Control Servicing Standards Bylaw are attached to and form part of this Bylaw:

Part 1 – Preface
Part 2 – Definitions and
Interpretation Part 3 –
Administration
Part 4 – Application Requirements and Approval Process
Part 5 – Works and Services Required
Part 6 – Schedule A – Servicing Agreements
Part 7 – Schedule B – Levels of Service Guidelines
Part 8 – Schedule C – General Contract Requirements
Part 9 – Schedule D – Engineering Drawings and Submission Requirements

Supplementary Concrete
SC-1, Perforated Pipe Underdrain
SC-2, Precast Reinforced Concrete Barrier for Sidewalk End
SC-3, Precast Reinforced Concrete Barrier
SC-4, Emergency Access 4.0 m Right of Way
SC-5, Typical Tree Well
Supplementary Lighting
SL-1, Concrete Base Details for Standard Base
SL-2, Ornamental Street Lights

Part 12 -Schedule G - Forms
G-1, Permission to Construct
G-2, Certificate of Inspection
G-3, Certificate of Substantial Completion
G-4, Certificate of Acceptance
G-5, Private Well Certification
G-6, Well Pump-Field Test
G-7, Well Pump - Drawdown Graph
G-8, Well Pump-Test Summary

READ A FIRST TIME THIS	19th	DAYOF	February,	2003
READ A SECOND TIME THIS	19th	DAYOF	March,	2003
READ A THIRD TIME THIS	19th	DAY OF	March,	2003
ADOPTED THIS	2nd	DAYOF	April,	2003

Mayor

Municipal Clerk

I hereby certify this to be a true and accurate copy of "District of Sechelt Subdivision and Development Control Servicing Standards Bylaw No. 430, 2003"

Municipal Clerk

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PART 1 - PREFACE

1. PURPOSE

The purpose of this Bylaw is to regulate the subdivision and *development* of land, and to require the provision, design, and construction of *works and services* including *highway*s. Such regulation is intended to provide orderly and aesthetically pleasing *development*; to preserve the established amenities of the District of Sechelt; and to ensure that subdivisions and *development*s are appropriately serviced and best suited to the use for which they are intended.

PART 2 - DEFINITIONS AND INTERPRETATION

2. DEFINITIONS

"ACCEPTANCE" or any tense of this word when used with respect to Works and Services, shall mean the final acceptance of the Works and Services as certified by the Director of Engineering and Public Works in writing, when the maintenance period has been completed to the satisfaction of the Director of Engineering and Public Works.

"APPROVING OFFICER" means the person(s) so designated from time to time by Council in accordance with the Land Title Act.

"ARTERIAL" means a highway whose primary function is to carry through traffic from one area to another with as little interference as possible from adjacent land uses and having limited direct access.

"BOULEVARD" means a portion of land, within a highway allowance, which flanks a highway surface.

"BUILDING ENVELOPE" means that part of a parcel of land on which can be constructed a building in accordance with this Bylaw, the Zoning Bylaw, the Building Bylaw, and other relevant Bylaws.

"COLLECTOR" means a highway whose primary function is to distribute traffic between arterial highways, other collectors and local highways within an area, and may also provide full direct access to adjacent properties.

"COMMUNITY WATER SYSTEM" means a system of waterworks within the meaning of the Health Act which is owned, operated, and maintained by the Sunshine Coast Regional District.

"COMPLETE" or any variation thereof when used with respect to the works and services referred to herein means completion to the acceptance of the District of Sechelt (see Substantial Completion).

"COMMERCIAL" means commercial zoning under part six of District of Sechelt Zoning Bylaw No. 25, 1987.

"CONTRACTOR" means a person or firm having a contract with an owner or the District of Sechelt to construct highways or install municipal works or services or any other items required by this Bylaw.

"CUL-DE-SAC" means a highway, one end of which is closed and consists of a turn around.

"DEVELOPMENT" means the improvement of land requiring the installation of "works" and/or "services," including the improvement of land requiring the issuance of a Building Permit.

"DIRECTOR OF ENGINEERING AND PUBLIC WORKS" means that person or company appointed from time to time by Council as the professional engineer for the District of Sechelt or his/her duly authorized representative.

"EXCESS OR EXTENDED SERVICE" means a service as defined under the Local Government Act. "FINAL

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

"HIGHWAY" means a highway as defined under the Highway Act.

“INDUSTRIAL” means industrial zoning under part seven of District of Sechelt Zoning Bylaw No. 25, 1987.

“INSTITUTIONAL” means an ambulance station, arena, art gallery, cemetery, college, court of law, community centre, federal office, fire hall, library, municipal office, museum, park, playground, police station, provincial office, school (**excluding** private educational facilities), stadium or public swimming pool and **excludes** a public storage yard or works yard;

"LANE" means a public thoroughfare which affords only a secondary means of vehicular access to a lot, at the side or rear thereof.

"LATECOMER" means the owner of real property within an area benefiting from an excess or extended service, other than the owner.

"LIMITED LOCAL HIGHWAY" means a highway that provides direct access to individual parcels but which is limited in its ability to provide for traffic circulation within subdivisions.

"LOCAL HIGHWAY" means a highway designed to provide direct access to individual parcels and to provide for circulation of traffic within subdivisions.

"MASTER MUNICIPAL SPECIFICATIONS" means the Master Municipal Specifications and Standard Detail Drawings document, as revised from time to time.

"MEDICAL HEALTH OFFICER" means the official appointed under the Health Act who has jurisdiction over the area in which the subdivision is located.

“MINIMUM BUILDING ELEVATION (MBE)” means the lowest elevation at which the habitable floor of any building can be serviced by a gravity connection to the storm and sanitary sewer mains.

"OFFICIAL COMMUNITY PLAN” means an Official Community Plan or Neighbourhood Plan adopted by the District of Sechelt in accordance with the Local Government Act.

"OFF-SITE" means those works and services located on or in streets adjacent to or external to the subdivision or development.

"ON-SITE" means those works and services located on the parcel or lands being subdivided or developed.

"OWNER" means a person registered in the records as owner of land or of a charge on land, whether entitled to it in the person’s own right or in a representative capacity or otherwise, and includes a registered owner.

"OWNER'S ENGINEER" means the Professional Civil Engineer, or a duly authorized representative, engaged by the owner to design and/or prepare drawings for the construction of works and services in relation to a subdivision or a building permit.

"P-LOOP" means a loop street from a single access point.

"PARCEL" means any lot, block or other area in which land is held or into which land is subdivided.

“PEDESTRIAN PATH” means a public allowance, other than a sidewalk, designed exclusively for pedestrians and shall include nature trails and walkways.

"PRELIMINARY LAYOUT APPROVAL (PLA)" means written notification by the Approving Officer of conditional approval of a proposed subdivision plan, and includes the general requirements which shall be fulfilled to obtain “Final Approval.”

"PRIVATE ROAD" means any right-of-way which provides vehicular access over private property to more than two parcels of land.

"PROFESSIONAL ENGINEER" means a Professional Engineer as defined under the Interpretation Act.

"PROVIDE" in relation to works or services, means doing all that is necessary to make a service available and functioning in a proper manner, and shall include design, construction or installation, and testing.

"REPLOTTING SCHEME" means the proposed plan for re-subdivision of an area under the replotting provisions of the Local Government Act.

“RURAL” means rural zoning under part nine of District of Sechelt Zoning Bylaw No. 25, 1987.

“SEDIMENT CONTROL PLAN” means a plan which demonstrates how works will be undertaken and completed so as to prevent the release of silt, raw concrete, concrete leachate and other deleterious substances into any ditch, storm sewer, watercourse, or ravine.

"SIDEWALK" means an improved area adjacent to the roadway for the use of pedestrian traffic. “SINGLE

AND TWO FAMILY RESIDENTIAL AREAS AND MULTIPLE FAMILY RESIDENTIAL
AREAS” means residential zoning under part five of District of Sechelt Zoning Bylaw No. 25, 1987.

"STANDARD DRAWINGS" means the standards specified in the Master Municipal Specifications and Standard Drawings or the Standards in Part 18 of this bylaw.

"STATUTORY RIGHT-OF-WAY" means an easement as defined under the Land Title Act.

“STORM WATER MANAGEMENT PLAN” means a plan indicating the means by which storm water will be managed within or through the subdivision and will consider both upstream and downstream flows.

"STREET" means a public highway, road, square or thoroughfare to which parcels of land abut, but not lanes, walkways or bridges;

“SUBDIVISION” means a subdivision as per the Land Title Act.

"SUBSTANTIAL COMPLETION" means works and services which have been certified by a Professional Engineer as being designed and constructed in substantial compliance with Part 6 of this bylaw and have been inspected and approved by the District of Sechelt.

"SUPERINTENDENT" means the person appointed to the position of Superintendent of Public Works of the District of Sechelt, or a duly authorized representative.

"SURVEYOR" means a land surveyor licensed in the Province of British Columbia. "WATERCOURSE" means any

natural or artificial stream, river, creek, ditch channel, canal, conduit,
culvert, drain, waterway, gully or ravine in which water flows in a definite direction or course,

either continuously or intermittently, and has a definite channel, bed and banks and includes any area adjacent thereto subject to inundation by reason of overflow or floodwater.

"WORKS AND SERVICES" means all the design and construction that is required by this Bylaw, and includes any private or public service, facility or utility which is required by this Bylaw and without restricting the generality of the foregoing includes: the supply and distribution of water; collection and disposal of sewage; collection and disposal of drainage water; street lighting; access roadways, curbs, gutters, and sidewalks; and the underground supply and distribution of electrical power, telephone, gas and cablevision: upgrading or construction on the adjacent highway to bring it to the standards specified in this Bylaw, including roadworks, sidewalks, streetlighting, storm sewer, water mains, sanitary sewer, and underground wiring.

"ZONE" means a zone or area designated as such in the District of Sechelt Zoning Bylaw No. 25, 1987, as amended from time to time.

Unless otherwise defined herein, any word or expression in this bylaw shall be the same meaning as any similar word or expression in the BC Motor Vehicle Act, the Local Government Act, the District of Sechelt Zoning Bylaw, or any regulation or schedule pursuant thereto and in case of conflict the Local Government Act.

3. INTERPRETATION

(1) In this Bylaw whenever words are used implying the subdividing or subdivision of land, those words shall be deemed to refer to the division of land into two or more *parcels*, whether by plan, metes and bounds description, *replotting scheme*, or otherwise.

(2) Where the text refers to the word 'subdivision' it shall be deemed that the requirements also apply to '*developments*', where applicable, which may not involve the subdivision of land.

PART 3 - ADMINISTRATION

4. RECORD OF APPLICATIONS

The *Approving Officer* shall maintain a record of all applications submitted under this Bylaw, which shall indicate the final disposition of each application.

5. COMPLIANCE WITH RELEVANT LEGISLATION

No person shall subdivide or undertake *development* of land in the District of Sechelt except in compliance with this Bylaw, and the relevant Municipal and Provincial legislation.

6. AUTHORITY TO ENTER LANDS

The *Approving Officer*, and other duly authorized representatives of the District of Sechelt, are hereby authorized to enter at all reasonable times upon any property or premises to undertake inspections in connection with their duties under this Bylaw and to ascertain whether the provisions of this Bylaw are being complied with.

7. OWNERS RESPONSIBILITY, OTHER LEGISLATION

Nothing in this Bylaw shall relieve the *owner* from the responsibility to seek out and comply with applicable legislation. Neither the granting of a permit nor the issuance of any plans, specifications or documents, or any inspection made by any municipal employee shall in any way relieve the *owner* from full responsibility of all requirements.

8. SEVERABILITY

The provisions of this Bylaw are severable. If any provision 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 provisions of this Bylaw.

9. VIOLATION

Every person who:

(1) Violates this Bylaw;

(2) Causes or permits any act or thing to be done in contravention or violation of any of the provisions of this Bylaw;

(3) Neglects or omits to do anything required under this Bylaw;

(4) Carries out, causes, or permits to be carried out any *development* in a manner prohibited by or contrary to any of the provisions of this Bylaw;

(5) Fails to comply with an order, direction, or notice given under this Bylaw;

(6) Prevents or obstructs or attempts to prevent or obstruct the authorized entry of an officer on property under Part 8;

shall be deemed to be guilty upon summary conviction of an offence under this Bylaw.

10. OFFENCE

Each day's continuance of an offence under Section 9 constitutes a new and distinct offence.

11. PENALTY

Any person who violates any of the provisions of this Bylaw shall, on summary conviction, be liable to a penalty not exceeding $2,000 plus the cost of prosecution for each offence.

PART 4 - APPLICATION REQUIREMENTS AND APPROVAL PROCESS

12. APPLICATION FOR A SUBDIVISION

(1) The *owner* shall *provide*, on the appropriate forms, at the time application is made for *Preliminary Layout Approval* of any subdivision:

(a) Proof that the *owner* is the *owner* of the lands proposed for subdivision, or the *owner*'s duly authorized agent;

(b) A current State of Title Certificate (Title Search) AND copies ofany notices on title;

(c) A statement in writing of the intended use of each *parcel* to be created;

(d) Key plan showing location of proposed subdivision, abutting parcels, roads, easements/rights- of-ways, and general topography;

(e) Three copies of a site plan drawn at a scale not less than 1:2000:

(i) The full legal description of all existing *parcel*s;

(ii) The arrangement of the *parcel*s and *highway*s (internal access routes for strata plans) which would be created by the subdivision including the widths of the proposed *highway*s and the approximate dimensions and areas of the existing and proposed *parcel*s;

(iii) Existing property lines and *highway*s to be eliminated by the proposed subdivision.

(f) A preliminary servicing proposal including the relationship of the proposed subdivisionto:

(i) Adjacent *highway*s and the connections of proposed new *highway*s thereto;

(ii) Adjacent sidewalks and *pedestrian paths*;

(iii) Adjacent sanitary and storm sewers;

(iv) Adjacent water pipes;

(v) Adjacent utilities;

(vi) Adjacent residences and fixed improvements.

(g) Proposed driveways and grades;

(h) Proposed building envelopes;

(i) Existing buildings accurately located and identified;

(j) Utility easements and rights-of-way;

(k) Contour lines in 2 metre contour intervals;

(l) *Watercourse*s and water-frontages and steep banks or slopes;

(m) Proposed phasing of the subdivision;

(n) Storm water management plan addressing *on-site* and downstream drainage;

(o) Submission of a site profile in accordance with the Contaminated Sites Regulation of the Waste Management Act (Note: the Act only requires site profiles for land previously used for industrial or commercial purposes).

(2) In accordance with Section 86 of the Land Title Act and Strata Title Act, the *Approving Officer* may require, at the cost of the owner, additional environmental, geo-technical, and planning studies in order to properly assess the suitability of the area for subdivision or the suitability of the size, shape, and orientation of the *parcel*s.

(3) The *Approving Officer* may require the *owner* tofurnish:

(a) Profiles and plan views of every *highway* shown with such topographical detail including horizontal and vertical curvature required to assess the engineering requirements;

(b) A preliminary *storm water management plan*;

(c) A geotechnical slope stability study;

(d) A traffic impact analysis;

(e) An *off-site* utilities impact analysis;

(f) Profiles showing the gradients of access driveways;

(g) The *building envelope* of each lot on difficult topography, or irregularly shaped lots;

(h) An Environmental Impact Assessment;

(i) Any other information deemed to be appropriate;

(j) The posting of an informational sign accurately illustrating the proposed development.

(4) Notwithstanding the above submissions, the applicant should have regard to Part 9: (Engineering Drawings and Submission Requirements) which will be required as part of the detailed design drawing submission.

13. APPLICATION FEES

The *owner* shall submit with his application, fees pursuant to District of Sechelt Application Fee Bylaw No. 333 and subsequent amendments.

14. BYLAWS ADOPTED AFTER APPLICATION

(1) Once an application for a subdivision is received in a form satisfactory to the *Approving Officer*", no subsequent local government bylaw adopted under Part 26 of the Local Government Act will affect that subdivision for a period of 12 months in accordance with Section 943 of the Local Government Act.

(2) Once an application for a Building Permit is received in a form satisfactory to the Chief Building Official", no subsequent local government bylaw adopted under Part 26 of the Local Government Act will affect the *development* authorized by that Building Permit.

15. PAYMENT OF TAXES ON SUBDIVISION

(1) The *owner* shall pay all school and municipal taxes, rates, and charges levied against the lands to be subdivided. Where those taxes, rates, and charges for the current year have not been imposed on the lands at the time that approval of the subdivision is signed by the *Approving Officer*, the *owner* shall pay the prorated amount estimated by the District of Sechelt for the current year.

(2) Payments made in accordance with clause (1) above shall be applied at a future date in payment of taxes pursuant to Part 11 of the Local Government Act and the payments deposited shall be accepted by the District of Sechelt subject to the provisions of Part 11 of the Local Government Act.

16. SUITABILITY OF PROPOSED SUBDIVISION

(1) *Final Approval* shall not be given by the *Approving Officer* to an subdivision application unless the proposed lot layout:

(a) Is suited to the configuration of the land being subdivided;

(b) Is suited to the use to which it is intended;

(c) Does not make impractical the future subdivision of the land within the proposed subdivision or the subdivision of any adjacent land.

(d) Satisfies the provisions of the Land Title Act.

(2) In determining the suitability of the subdivision, the *Approving Officer* may consider comments from, but not limited to:

(a) The *Department of Fisheries and Oceans*;

(b) The *Ministry of Water, Land, and Air Protection*;

(c) The *Medical Health Officer* with respect to water supply and sewage disposal;

(d) The *Ministry of Transportation*;

(e) The *Archaeology Branch of BC;*

(f) The *Director of Engineering and Public Works*;

(g) The *Sunshine Coast Regional District*;

(h) The public or a public advisory group;

(i) The *Sechelt Fire Department*;

(j) The *Canada Post* office;

(k) School District #46

(l) Sechelt Indian Government District of Sechelt

(m) The Royal Canadian Mounted Police.

17. PARCEL STANDARDS

(1) The minimum area, width, depth, and frontage of *parcel*s to be created by subdivision shall be as provided in District of Sechelt, Zoning Bylaw No. 25, 1987, as amended.

(2) Where acceptable to the *Approving Officer*, the minimum *parcel* frontage may be reduced in accordance with the Local Government Act.

(3) *Parcel*s shall provide a minimum *building envelope* of at least 7.5 metres by 13.5 metres exclusive of the building setback requirements of the Zoning Bylaw.

(4) No subdivision shall be approved which would cause any existing building or structure to contravene any zoning, building, or other regulation in force unless approved by Council through a Development Variance Permit.

(5) Provision of frontage by means of a panhandle access strip may be considered only where no practical or suitable alternative exists. The area occupied by any such panhandle shall be in addition to the *parcel* size minimum as required in the Zoning Bylaw, and shall have a minimum width of 6.0 metres.

18. HIGHWAY ACCESS

(1) Every *parcel* to be created shall be provided with necessary and reasonable access and shall abut on a public *street* or road. *Parcel*s shall not be given direct driveway access to major *arterial street*s, except for existing lots in special circumstances where the configuration of the *development* prevents the construction of either an interior *highway* or a rear access *lane*.

(2) Section 18(1) does not apply to bare land strata plans or to phased strata plans when the lots abut on a *private road* or a private right-of-way, on privateland.

(3) In accordance with Section 75(1)(a) of the Land Title Act, the *Approving Officer* may, in circumstances that may be defined by regulation, grant relief in whole or in part, from access requirements under Subsection 18(1).

19. PARKLAND DEDICATION ON SUBDIVISION

(1) In accordance with Part 26, Division 11 of the Local Government Act, the *owner* shall dedicate, without compensation, 5% of the land proposed for subdivision for parkland at locations approved by Council in accordance with the requirements of the Local Government Act and the District of Sechelt *Official Community Plan*.

(2) Where parkland dedication is not required, as determined by Council in accordance with the District of Sechelt *Official Community Plan*, the *owner* shall pay cash-in-lieu of parkland dedication. The amount to be paid shall be equivalent to 5% of the market value of all the land proposed for subdivision in accordance with the Local Government Act.

20. EXCEPTIONS TO PARKLAND DEDICATION

(1) In accordance with the Local Government Act, parkland dedication does notapply:

(a) To a subdivision of less than three new lots;or

(b) To a subdivision where the smallest lot being created is larger than two (2) hectares; or

(c) To the consolidation of existing *parcel*s.

21. WATER COURSE DEDICATION

(1) Proper consideration shall be given to the preservation of natural drainage courses by rights-of-way or dedication of land to ensure that upstream and downstream drainage problems or environmental degradation do not occur as a result of subdivision ordevelopment.

(2) Statutory rights-of-way of a width to be determined by the *Approving Officer* shall be deposited in the Land Title Office for the purposes of the preservation, installation, or maintenance of water courses and drainage ways, and shall run with theland.

22. SCHOOL SITE ACQUISITION CHARGES/LAND DEDICATION

In accordance with the Local Government Act, every person who obtains subdivision approval or a building permit in respect of an eligible development in an eligible school district shall pay to the District of Sechelt, for each eligible development unit that is authorised or will be created, the school site acquisition charge applicable to that category of eligible development.

23. DEVELOPMENT COST CHARGES (DCC'S)

(1) PAYMENT OF DCC's:

(a) The *owner* shall pay to the District of Sechelt DCC's pursuant to District of Sechelt and Sunshine Coast Regional District DCC Bylaws.

(b) In the case of subdivision, DCC's are payable prior to the *Approving Officer* signing the final plan of subdivision.

(c) In the case of construction, DCC's are payable at the time of issuance of the Building Permit.

(d) In accordance with the regulation pursuant to Local Government Act, an *owner* may pay DCC's in instalments.

(2) DCC CREDITS:

(a) Where *works and services* are to be installed pursuant to this Bylaw, and those *works and services* are part of a program covered by a DCC Bylaw, the *Approving Officer* may refuse to approve the subdivision and the Building Inspector may refuse to issue a Building Permit, until such time as the District of Sechelt has DCC funds available to pay for its share of the cost of such *works and services*, unless the *owner* agrees to *provide* the services in which case the costs shall be deducted from the DCC's normally payable for thatservice.

(b) In no case will a DCC credit for a particular work or service exceed the *owner*'s cost of providing that particular work or service.

(c) DCC's collected for a particular classification of work or service may not be used to pay a credit for a different classification of work or service.

24. PRELIMINARY LAYOUT LETTER

(1) Prior to *final approval* of a subdivision, the *owner* shall obtain a *Preliminary Layout Approval (PLA)* from the *Approving Officer* which outlines the subdivision servicing requirements and other conditions of *final approval*.

(2) *Preliminary Layout Approval* for any subdivision shall not be construed as *final approval* for land registration or any other purpose. It shall not be considered as *acceptance* by the District of Sechelt or its *Approving Officer* of anything except the general layout of the proposed subdivision and a list of conditions which would be taken into consideration on an application for *final approval*. The *Preliminary Layout Approval* is amendable or revocable by the *Approving Officer* at anytime.

(3) A Preliminary Layout Approval is valid for eighteen calendar months. The Approving Officer, with agreement of the Director of Engineering and Operations, may consider extensions to this date, if:

i. In the opinion of the Approving Officer, at no time has the progression of the application lapsed;

ii. The Owner makes a written request to the Director of Engineering and Operations, prior to the Preliminary Layout Approval expiry; and,

iii. In the opinion of the Director of Engineering and Operations the requirements for completing the conditions of the Preliminary Layout Approval entail additional processes which may include, but not be limited to:

a. Complex off-site servicing requirements;

b. Additional planning approvals; or,

c. Additional reviews or approvals from external agencies or government ministries.

(4) Subdivisions not completed and submitted for Final Approval prior to the expiry date, or the extended expiry date, of the Preliminary Layout Approval letter shall be re-submitted as a new subdivision application.

25. REFUSAL OF SUBDIVISION

(1) The *Approving Officer* may, at any stage of the subdivision application process, refuse to approve the subdivision plan if refusal to approve the subdivision is considered to be in the public interest.

(2) Without affecting the generality of Section 23(1) of this Bylaw, the *Approving Officer* may, at any stage of examining the subdivision plan, refuse to approve the plan:

(a) If the subdivision does not conform to other applicable legislation and bylaws including, but not limited to:

(i) All applicable provisions of the Local Government Act;

(ii) All applicable provisions of the Land Title Act;

(iii) District of Sechelt bylaws regulating the subdivision and *development* of land and zoning;

(iv) District of Sechelt *Official Community Plan*(s) and Neighbourhood Plan(s);

(v) The requirements of agencies having jurisdiction.

(b) If the subdivision makes financial demands on the District of Sechelt which cannot be met by the District.

26. SUBMISSION OF THE FINAL PLAN OF SUBDIVISION

(1) The *owner* shall tender a final subdivision plan in the form of one mylar transparency and three paper prints prepared by a BCLS for examination by the *Approving Officer* and the Plan shall be accompanied by:

(a) Any charges as set out in the PLA and Servicing Agreement;

(b) A receipt indicating that all taxes assessed on the subdivided land have beenpaid;

(c) Confirmation that all other conditions specified in the *PLA*, as amended, have been fulfilled, including, without limiting the generality of this clause, the ServicingAgreement.

27. REJECTION OR APPROVAL AND REGISTRATION OF SUBDIVISION

(1) Upon receipt and review of the materials required in Section 26, the *Approving Officer* shall in writing:

(a) Grant *final approval* by signing the subdivision survey plan; or

(b) Notify the *owner* in writing that the application has been rejected, stating briefly, the reason.

(2) Final approval shall be certified by the return to the *owner* of the subdivision plan signed and dated by the *Approving Officer* in accordance with the provisions of the Land Title Act.

(3) A subdivision plan shall be tendered by the *owner* for deposit in the Land Title Office within 2 months from the date of approval, or within such other period as may be prescribed under the Land Title Act, after which time approval is revoked unless the Registrar grants an extension of time.

(4) Approval of a subdivision plan does not imply that the District of Sechelt will expend funds or construct services in support of the subdivision.

PART 5 – WORKS AND SERVICES REQUIRED

28. PROVISION OF WORKS AND SERVICES

(1) Owners are required, as a condition of subdivision approval or building permit issuance, to provide the Works and Services in accordance with the requirements and standards prescribed in this Bylaw, on the portion of a highway immediately adjacent to the site being subdivided or developed, up to the centreline of the highway.

(2) Owners are required, as a condition of building permit issuance, to provide the Works and Services on the site being developed in accordance with the standards prescribed in this Bylaw.

(3) Requirements under Clauses (1) and (2) shall be applicable only insofar as they are directly attributable to the subdivision or development and shall not include specific works or services that are covered by a development cost charge, subject to Part 16, 17 and 18 of this Bylaw. Failure to provide the required Works and Services will result in subdivision approval not being granted or a building permit not being issued.

29. COMPLETION OF THE WORKS AND SERVICES

(1) All Works and Services required to be constructed and installed at the expense of the Owner shall be constructed and installed to the standards prescribed in this Bylaw before the Approving Officer approves the subdivision or the Chief Building Official issues the building permit unless the Owner;

(a) Deposits with the Municipality a cash deposit, or a irrevocable letter of credit from a financial institution, acceptable to the Municipality, in the amount 110% of the estimated construction cost, as estimated by the Municipal Engineer, for installing and paying for Works and Services required under the Bylaw; and

(b) Enters into a Servicing Agreement with the Municipality, pursuant to Part 6, to construct and install the required Works and Services by a specified date or forfeit to the Municipality the amount secured by the Security Deposit.

(2) Where the physical construction of part or all of the Works and Services required under this Bylaw is considered by the Municipal Engineer to be premature, the requirement may be fulfilled by the payment of a non-refundable cash deposit equal to 110% of the amount estimated by the Municipality at a future time when construction of the Works and Services becomes feasible. In addition, the Owner shall pay an administration fee, based on the estimatedcost

30. EXCESS OR EXTENDED CAPACITY

The District of Sechelt may require that all or parts of a water, sewage, drainage, and *highway* system, required in conjunction with a subdivision or Building Permit, provide *excess or extended service*.

31. EXCESS OR EXTENDED SERVICES AND LATECOMER PAYMENTS

In accordance with the Local Government Act, and where an *owner* has been required to pay all or part of the cost of an *excess or extended service*, the District of Sechelt shall, at the owner's request, enter into a Latecomer Agreement to pay back the owner all or a corresponding proportion of the costs of the excess or the *extended service*.

32. APPLICATION FOR LATECOMER COST SHARING

(1) An *owner* may apply to Council for cost sharing of a water, sewer, drainage or *highway* system

extension which provides *excess or extended service*s pursuant to the Local Government Act and the Council may enter into an agreement with the *owner* to share all or part of the cost of the said works between the *owner* and the *owner* of any other land that will benefit from such works.

(2) An agreement made pursuant to the provisions of Sections 32 and 33 of this Bylaw, shall not require any payment to be made by the District of Sechelt; rather all amounts required shall be advanced by the *owner* to be later reimbursed by the District of Sechelt from *latecomer* fees later collected from the *owner*s of benefiting lands upon approval of subdivision or Building Permit.

(3) Where an *owner* benefits from trunk water mains, trunk sanitary sewer mains, trunk storm sewer mains, or highways installed pursuant to the terms of an agreement made under Sections 32 and 33 of this Bylaw, the *owner* shall be required to pay to the District of Sechelt a pro-rated share of the cost (*latecomer* fee) for the subdivision or building, including interest thereon.

33. SUBDIVISION AND DEVELOPMENT BYLAW SERVICING REQUIREMENTS - GENERAL

(1) All *highway* construction/reconstruction adjacent to the *development* shall be extended up to the centreline of the *highway* allowance and all *works and services* shall be constructed to allow for connection to lands and systems beyond the proposed *development*.

(2) Unless otherwise approved by a Development Permit or a Development Variance Permit issued by Council in accordance with the Local Government Act, servicing shall be as set out in Section 32 of this Bylaw and all construction and installation shall be carried out in accordance with Part 6.

(3) Notwithstanding anything contained in this Bylaw, *works and services* on *highway*s immediately adjacent to lands being subdivided or the lands being developed:

(a) Shall only be required if they are directly attributable to the subdivision; or building permit; and;

(b) Shall not include any works or services included in the calculations used to determine Development Cost Charges payable on the subdivision of the land, or on the approval of a Building Permit;

unless the *owner* of the land being subdivided agrees to *provide* such works or services, in which case, the cost of such works or services shall be deducted from the applicable class or classes of Development Cost Charges that would otherwise be payable in connection with the subdivision or the Building Permit.

(4) All *works and services* constructed and installed prior to entering into a Servicing Agreement with the District of Sechelt shall be maintained by the *owner* for a minimum period of 5 years.

(5) *Street* trees shall be planned and planted by the owner consistent with Part 17 of this Bylaw. Trees shall be watered, fertilized, pruned, and otherwise maintained by the *owner* for a period of 2 years from the date that they are planted. At the end of the maintenance period the *owner* shall provide a certificate from a qualified individual stating that all trees are healthy. Sick or dying trees shall be replaced and maintained for another 2 years when a report by a qualified individual shall be provided to the District of Sechelt regarding the health of the trees.

(6) Notwithstanding the exceptions provided under Section 38, the *owner* of any lands which are proposed to be subdivided or developed shall *provide* each *parcel* of land within the proposed subdivision or *development* with:

(a) Highways

(i) All existing *highway*s immediately adjacent to lands being subdivided or developed and all new *highway*s within or required in connection with a proposed subdivision or *development* shall be dedicated and cleared/constructed as set out in Table 1 and Part 6, and shall be graded, drained, surfaced, and otherwise constructed in accordance

with the standards contained in Part 6.

(b) *Sidewalk*s, *pedestrian pathways, boulevard*s, *street* trees, and *street* lighting on all *highway*s in and immediately adjacent to the lands in accordance with the standards contained in Part 7.

(i) Without limiting the generality of clause (b)(i), the *Approving Officer* may require *sidewalk*s within 500 m of a public destination expected to generate substantial pedestrian traffic.

(ii) Street trees shall consist of more than one variety and shall be planted with 6-7 m spacing.

(c) Water Distribution System

(i) A water distribution system and fire hydrant system including the standard service connection, which shall be constructed in accordance with the requirements of the Sunshine Coast Regional District.

(d) Sanitary Sewage System

(i) Where a community sanitary sewer is presently constructed, a sanitary sewage collection and disposal system including the standard service connection, constructed in accordance with the standards contained in Part 6, and the sewerage system shall be connected by trunk sewer mains to an existing community sanitary sewerage system, OR,

(ii) A self-contained *on-site* disposal system approved by the Coast Garibaldi Health Unit or the Ministry of Water, Land, and Air Protection where a community sewer system is not present.

(e) Storm Drainage Collection System

(i) A storm drainage collection system including the standard service connection, constructed in accordance with the standards contained in Part 6, and the drainage system shall be connected by trunk drainage mains to an existing drainage system of the District of Sechelt; OR,

(ii) A storm drainage collection system which disposes of storm water on site through the use of "alternative" engineering practises. Any on-site system will be subject to the approval of the District Engineer or their designate who may require various engineering reports to verify the long term viability of the system.

(f) Integrated Survey Monuments

(i) Survey control monuments in the subdivision in the locations, and in accordance with, the Standards prescribed in Part 6.

(ii) Where a subdivision survey is carried out within an area declared an integrated survey area, all existing and new monuments pertinent to the survey of the subdivision shall be tied by survey to the nearest co-ordinate control monuments according to the procedures and regulations made by the *Surveyor General*.

(g) District Neighbourhood Plans

(i) Materials and specifications may be varied at the discretion of the Approving Officer, in order to conform to District Neighbourhood Plans.

(ii) Streetscaping requirements will be at the discretion of the Approving Officer and shall conform to "Geometric Design Standards for Canadian Roads and Streets'.

34. UTILITY WIRING

(1) All lands proposed to be subdivided or developed shall install underground all electrical and telecommunications wiring within the subdivision or *development*, and on any *highway* which fronts or flanks the subject lands in accordance with Part 7.

(2) Existing Overhead Distribution Wiring: Where overhead electrical and telecommunications wiring

exists on the fronting or flanking *highway* right-of-way, the *owner* is required to replace such existing wiring underground, except where:

(a) It is a single or two family dwelling, or

(b) For other *developments*, the Building Permit value does not exceed $50,000 and *all* of the following conditions are met.

(i) The existing wiring is adequate to serve the subdivision or *development*;

(ii) No new poles will be added;

(iii) Existing poles will be relocated as necessary to suit any new property lines;

(iv) No new overhead service lines will cross any highway rights-of-way.

(c) In the opinion of the Approving Officer underground distribution and service is not required.

(3) Service Wiring: New and existing service wiring to buildings or lots shall be placed underground or provided via dip service from existing poles.

(4) All subdivisions or *developments* creating the need for additional transformers shall install them *on- site* with underground wiring.

(5) All signs, kiosks, canopies etc. associated with the subdivision or *development* shall have underground wiring.

35. STATUTORY RIGHTS-OF-WAY

(1) For the purpose of installing or maintaining *works and services*, statutory rights-of-way shall be provided where necessary and shall be deposited in the Land Title Office and shall run with the land. It is the responsibility of the *owner* to negotiate and secure any Rights-of-Way or Easements deemed necessary to the application and to process the legal documentation to its finalization at Land Titles Office, and pay all costs including:

(a) B.C. Land *Surveyor* costs;

(b) Legal fees;

(c) Registration costs and fees at the Land Titles Office.

(2) The *Approving Officer* shall require the *owner*'s solicitor to provide a Letter of Undertaking prior to *Final Approval* to ensure registration of these documents is *complete*d.

36. GENERAL SERVICING REQUIREMENTS FOR BUILDING PERMITS

(1) Existing *works and services* abutting or serving a *development* shall be upgraded to meet the standards of this Bylaw, except that, the upgrading is waived for a Building Permit to construct or modify a building in a single-family residential or rural *zone*.

(2) On-Site Services

(a) *Owner*s will be required to *provide* engineered design plans together with Letters of Assurance of professional design and commitment for field review for *on-site* storm water management, water, sanitary sewer services, electrical services, driveways, parking area design, and inspection. All plans and inspections are to be certified by a *Professional Engineer*.

(3) Paving of parking areas and driveways

(a) All driveways and parking areas shall be finished so as to *provide* a smooth and dust free surface and shall be serviced by drainage installations in a manner satisfactory to the District of

Sechelt.

(b) A Building Permit is required for all paved parking or drivewayareas.

37. GENERAL SERVICING REQUIREMENTS FOR STRATA DEVELOPMENT

(1) All *private road*s within or required in connection with a proposed strata subdivision or *development* shall:

(a) Be provided with adequate storm sewer drainage;

(b) Be constructed to a loading standard of at least H-20 as specified by the regulations of the American Association of State Highway Officials;

(c) Be cleared to a width of at least 7 metres with a paving minimum of 7 metres except where they provide frontage to residential, commercial or industrial building units, in which case they shall be cleared to a width of at least 9metres;

(d) Have a paved surface of at least 6 metres inwidth;

(e) Have a centre-line turning radius of at least 12metres;

(f) Have an overhead clearance of at least 5metres;

(g) Have a maximum centre-line grade of 15% and a maximum change of grade of 8% over a minimum distance of 15 metres;

(h) Have paved turnaround facilities as required by the District of Sechelt in consultation with the Sechelt Fire Department for any dead-end portion of the highway which exceeds 90 metres in length;

(i) Be located and aligned to the satisfaction of the *ApprovingOfficer*;

(j) Be connected to a public *highway*.

(k) Street lights within the strata are required pursuant to this Bylaw, and must also meet the requirements of the District of Sechelt Dark SkyPolicy.

(2) All systems within a strata plan shall be built in accordance with the applicable codes including but not limited to the BC Building Code, the Health Act, the Canadian Electrical Code, the Canadian Gas Association Standards, the Safe Drinking Water Regulations, and the Sewage Disposal Regulations. Where these codes do not provide standards, construction shall be in accordance with good engineering practice.

38. EXCEPTIONS TO SERVICING REQUIREMENTS

(1) In accordance with the Local Government Act, Council, through the issuance of a Development Variance Permit or a Development Permit, may authorize provisions which are not in compliance with this bylaw.

(a) Council delegates the authority to vary the requirements of Section 76 Fire Flow Demands to the Approving Officer in accordance with criteria established in Section 76.4 where a proposed subdivision application does not meet the required fire flows identified in Section 76.2.

(b) Council delegates the authority to vary the requirements of Section 76 Fire Flow Demands to the Chief Building Official in accordance with criteria established in Section 76.4 where a proposed building permit application does not meet the required fire flows identified in Section 76.2.

(2) In accordance with the Local Government Act, if the subject lands are *zone*d for agriculture or industrial use, the *owner* may apply to the Board of Variance claiming undue hardship as a result of the subdivision servicing requirements with respect to waterworks, sewers, or drainage.

(3) Where the *Works and Services* Exist

(a) Despite highway improvement requirements under Section 32, a two lot single family residential subdivision undertaken on a paved *street*, where each new lot has no further potential for subdivision, shall only be required to provide cash-in-lieu equivalent to the cost of providing a half-road asphalt cap where the asphalt is less than 75 mm thick or replacement where the road is showing visible signs of deterioration.

(4) Where Subdivision Creates Three Lots or Less

(a) Where a subdivision creates a total of three lots or less, each with no sub dividable potential under current zoning; or the smallest lot created by subdivision is 1 hectare, or larger; the improvement to existing roads and the construction of dedicated subdivision roads shall be to the same existing road standards in the subject area.

(5) Where *Works and Services* are Premature

(a) Without limiting the generality of Section 38, a two lot subdivision undertaken such that each lot created has subdivision or *development* potential, shall not be required to construct newly dedicated or existing highways, if, in the opinion of the *Approving Officer*, such construction is premature and can be postponed to a future subdivision or *development*.

(b) All subdivisions approved under Section 38(4)(a) the Approving Officer may require security in the form of a restrictive covenant, to be registered on the title of the land, which shall require the *owner* to enter into a Servicing Agreement for works required under this bylaw prior to receipt of for a Building Permit or subsequent subdivision.

(6) Phased Subdivisions and Developments

(a) For phased subdivisions, *works and services* required under Section 30 may be phased in accordance with each phase of subdivision so that each lot available for *development* is serviced in accordance with this bylaw.

(b) For phased *developments*, *works and services* required under Section 30 may be phased in accordance with each phase of *development* so that each phase is serviced in accordance with this bylaw.

(c) Works and services shall not be required for improvements or additions to an existing building, where the value of construction is less than $50,000.

(7) Subdivisions for a Specific Purpose

(a) The *works and services* requirements of this Bylaw do not apply to a subdivision which creates only:

(i) A *highway* dedication;

(ii) Park land;

(iii) A *parcel* for the installation of public utilities and related structures and equipment;

(iv) A consolidation or a lot line adjustment, in which the number of buildable lots is not increased.

(8) Alternate Servicing Systems

(a) In any *zone*, where a *community water system* is not available, well water may be permitted if each *parcel* in the *development* is provided with a proven source of potable water which meets the "Canadian Drinking Water Standards, 1989" or latest edition AND satisfies the *Medical Health Officer* and the *Approving Officer*. (An *owner* for a subdivision or building permit under this provision shall submit a written report prepared by a certified Hydrogeologist registered in the Province of British Columbia including a site plan of the subject property locating and numbering each test hole, and detailing the number of litres of water per minute and the corresponding draw down of each test hole, to meet a minimum flow capacity of 2,500 litres per day, for each *parcel*).

(b) In any zone, where a *community water system* is not available, a water supply for the purposes of fire protection shall be provided to the satisfaction of the *Approving Officer.*

(c) In any *zone*, where a community sanitary sewerage system is not available, an alternative system may be permitted if each *parcel* in the *development* is provided with a means for

collecting and disposing of sanitary sewage to the satisfaction of the *Medical Health Officer*, and/or the Ministry of Environment.

(d) In any *zone*, where a community storm sewerage system is not available, an alternative system may be permitted if each *parcel* in the *development* is provided with a means for collecting and disposing of storm water to the satisfaction of the *Director of Engineering and Public Works* and authorities having jurisdiction.

(e) All *development*s serviced with an alternative servicing system shall be connected by, and at the expense of, the property *owner* within ninety days of the District of Sechelt mailing a registered letter instructing that a connection be made to a community system designed to serve the property.

PART 6 – SERVICING AGREEMENTS

39. SERVICING AGREEMENTS

(1) All *works and services* shall be designed, constructed, and installed as prescribed in Part 6 to the satisfaction of the *Director of Engineering and Public Works* at the expense of the *owner* prior to issuance of final subdivision approval, or building permit, or *development* approval, unless the *owner*:

(a) Deposits with the District of Sechelt a security deposit in the form of cash or an irrevocable Letter or Credit satisfactory to the District of Sechelt, in an amount equal to 110% of the cost of designing, constructing, installing, and paying for all *works and services* pursuant to this Bylaw as estimated by the *Owner's Engineer* and accepted by the *Director of Engineering and Public Works*;

(b) Enters into an agreement with the District of Sechelt to construct and install the prescribed *works and services* by a specified date or forfeit the amount secured;

(c) Pays to the District of Sechelt all required taxes and fees;

(d) Indemnifies and saves harmless the District of Sechelt against:

(i) All actions, proceedings, costs, damages, expenses, claims and demands whatsoever brought by reason of the construction and installation of all *works and services* described in this bylaw;

(ii) All expenses and costs which may be incurred by reason of the execution of the said work resulting in damage to any property owned in whole or in part by the District of Sechelt or which the District of Sechelt by duty or custom is obliged, directly and indirectly, in any way or to any degree, to construct, repair or maintain;

(iii) All expenses and costs which may be incurred by reason of liens for non-payment of labour or materials, workmen's compensation assessments, unemployment insurance, Federal or Provincial Taxes, and for encroachments;

(e) Ensures that all *works and services* to be designed, constructed, and installed at his expense are to the standards prescribed in Part 6;

(f) Retains as his agent a *Professional Engineer*, competent in the field of municipal engineering and who is registered as a member in good standing with the Association of *Professional Engineers and Geoscientists of B.C.* (A.P.E.G.B.C.), to prepare, sign, and seal design (construction) drawings, and to *provide* "General and Resident Engineering Services" during construction both as defined in the current A.P.E.G.B.C. "Outline of Service and Scale of Recommended Fees for General Engineering Projects", including but not limited to, field inspection and, preparing and certifying as-constructed drawings.

(g) Acknowledges that the District of Sechelt does not confirm the *completeness* or accuracy of the design (construction) drawings nor accept responsibility for any costs or damages resulting from errors, omissions, or deficiencies in said drawings;

(h) Upon written notice that construction completion has been certified by the *Director of Engineering and Public Works*, maintains all of the said *works and services* for at least one year;

(i) Applies for final acceptance of works and services upon the termination of the maintenance period and the *owner's engineer completes* the one year inspection;

(j) Arranges and pays for the connection to the District of Sechelt's existing *works and services* or utilities;

(k) Remedies any defects appearing within the maintenance period and reimburses the District of

Sechelt for any resultant damage to others *works and services* or properties;

(l) Deposits with the District of Sechelt for the maintenance period, on or before the date of issuance of the Certificate of Completion of said *works and services*, security in the form of a bond in an amount equal to at least fifteen (15) percent of the first $200,000, plus ten (10) percent of any remaining amount, of the total construction costs including taxes, of the said *works and services*, as signed, sealed and submitted by the owner's engineer and approved by the *Director of Engineering and Public Works*, with a minimum Maintenance Holdback of Two Thousand Five Hundred ($2,500) Dollars, from which the District of Sechelt may deduct the cost of maintaining the works and remedying any defects or damages should the *owner* fail to do so;

(m) Deposits with the District of Sechelt prior to the issuance of the Certificate of Completion such inspection reports, test results, or other documentation acceptable to the *Director of Engineering and Public Works*, to confirm compliance with the plans and Part 6, as prepared by, and certified as correct by, a *Professional Engineer*, and within two months of the date of the issuance of the Certificate of Completion for the *works and services*, deposit with the District of Sechelt one set of paper prints and one set of transparencies of the drawings showing the *works and services* as actually constructed, and as prepared by and certified as correct by, a *Professional Engineer*;

(n) Assigns, transfers, and conveys the *works and services*, upon issuance of a Certificate of Completion by the District of Sechelt, together with all lands dedicated for highways upon or in which the *works and services* are located;

(o) Supplies and registers with the Land Titles Office, all rights-of-way, easements, restrictive covenants, or other documentation pursuant to plan registration necessary for construction or ultimate access required for the subdivision, or building;

(p) Arranges for B.C. Hydro, B.C. Gas, B.C. Telephone, and Cablevision companies to perform all work required to allow the provision of these services within alignments approved by the *Director of Engineering and Public Works*.

40. FAILURE TO CONSTRUCT WORKS AND SERVICES

(1) Where the *owner* has failed to construct the work and services within the period as prescribed in the "Servicing Agreement" the District of Sechelt may elect:

(a) At the request of the *owner*, to extend the period of the Servicing Agreement on such terms and conditions, including security that it may deem reasonable, or

(b) To enter onto the site to *complete* the *works and services* and to use such security as it deems necessary, and, should such security be insufficient, to recover such additional amount from the *owner*.

41. SAMPLE SERVICING AGREEMENT

SERVICING AGREEMENT

DISTRICT OF SECHELT

and

«OwnerName»
«Address1»
«CityProv»
«PostalCode»

SERVICING AGREEMENT

THIS AGREEMENT made this **«AgreementDate»**, BETWEEN:

THE DISTRICT OF SECHELT, a District Municipality incorporated under the "Local Government Act" of the Province of British Columbia, and having its Municipal Offices at 2nd Floor, 5797 Cowrie Street, Sechelt, British Columbia.

(hereinafter called the "Municipality")

OF THE FIRST PART

AND: **«OwnerName»**

(hereinafter called the "Owner")

OF THE SECOND PART

WHEREAS:

A. The Owner holds an interest in lands and premises within the District of Sechelt, in the Province of British Columbia, more particularly known and described as follows:

«LegalDesc»

(hereinafter called the "Lands")

B. The Owner desires to subdivide the Land or Develop on the Land.

C. The Approving Officer or the Municipality has agreed to approve the subdivision of the Lands or the Development respectively subject to the terms and conditions contained in this contract, and the posting with the Municipality of the security deposit described herein.

NOW THEREFORE THIS AGREEMENT WITNESSETH that in consideration of the promises, covenants and agreements hereinafter set forth, the parties hereto covenant, agree, represent and promise as follows:

APPENDICES

1. The following Appendices will be read with and form part of this Agreement:

Appendix "A" - A copy of the Subdivision Plan

Appendix "B" - A List of the "Works" and an Estimate of their respective construction costs.

Appendix "C" - Construction Drawings to be used for the construction of the "Works" **OWNER TO**

DO WORK

2. The Owner covenants and agrees to construct and provide all the works and services listed and shown on Appendix "B", "C", "D" and "E" attached hereto.

TRANSFER OF INTEREST IN WORKS

3. The Owner covenants and agrees with the Municipality to assign, transfer and convey to the Municipality all of its right, title interest in the works on any and all of the lands, upon or in which the works are situate, upon the completion of the works, (as witnessed by the issuance of a Certificate of Substantial Completion). The Owner will from time to time and at all times so long as it exercises any rights of ownership in the "said lands" upon the request of the Municipality, make, do and execute or cause or procure to be made, done and executed, all such further acts, deeds, rights-of-way, easements and easements assurances for the more effectual carrying out of this Agreement.

PERMISSION TO DO WORK

4. The Municipality covenants and agrees to permit the Owner to construct the "Works", including that portion of the "Works" to be constructed on dedicated highways controlled by the Municipality; on the terms and conditions herein, and in the manner required by and at the places specified in the Plans and Specifications; provided that nothing in this Agreement shall be construed as an undertaking, promise or covenant on the part of the Municipality to make available the use of or access to the "Works" for any purpose, and without limiting the foregoing, for the purpose of serving the Lands or any other real property whatsoever either owned or controlled by the Owner or its associates or otherwise, but rather the Municipality reserves the right in its sole and absolute discretion to make available, operate, alter, use, extend, diminish, discontinue, tear up, sell, rent or otherwise dispose of the "Works" as its Council from time to time deems fit.

CHANGES TO THE BYLAW

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

LOT GRADING

6. The Owner covenants and agrees to adhere in all respects to the contours, elevations and drainage patterns indicated on the lot grading plan or storm water management plans prepared by the Engineer and/or Engineering Company indicated in Clause 11, and

provide copies of all covenants and agreements to purchasers. All covenants in respect of drainage matters shall be registered on title.

START OF WORK

7. The Owner covenants and agrees not to commence work until the Director of Engineering and Public Works provides the Owner with written permission to proceed with construction in the form provided in Part 6 to the Subdivision and Development ControlBylaw.

COMPLETION OF WORKS

8. The Owner shall complete the construction of the works, specified in Appendix "C" as **Project No. «AgreementNo»** of the Municipality by the_____**.**

OWNER TO GRANT RIGHTS-OF-WAY

9. The Owner to grant to the Municipality all necessary road dedications, statutory rights-of- way and easements over the said lands to accommodate the said works and, where the said works are located upon or under privately owned lands other than the said lands, to obtain at the Owner's expense, all necessary road dedications, statutory rights-of-way and easements over such lands, in favour of the Municipality where applicable, to accommodate the said works.

DESIGN BY P. ENG.

10. The Owner covenants and agrees that all works required herein shall be designed by a Professional Engineer, who shall be registered with the Association of Professional Engineers of British Columbia and retained by the Owner. Plans and specifications for the said works shall be prepared by or under the direct supervision of the said Professional Engineer and all plans shall bear his professional seal and signature.

The Owner covenants and agrees to retain a Professional Engineer during the construction period for the purposes of inspection to ensure compliance with the approved design and to provide certification of the as-built records.

ENGINEERING DRAWINGS

11. The Owner covenants and agrees that he will construct fully completed works, and grant all necessary easements as shown in the plans and specifications prepared by **«Engineer»**.

under Drawing Nos.:

and as received for the purposes of this agreement by the Engineering Department of the Municipality on the_____.

DESIGN CHANGES

12. The Director of Engineering and Public Works may alter the plans because of conditions on site so that the works function and operate in a manner satisfactory to the Director of Engineering. Should the works, as provided herein, prove to be in any way defective or should they not operate to the satisfaction of the Director of Engineering and Public Works,

then the Owner 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 Director of Engineering.

SUBSTANTIAL COMPLETION

13. A Certificate of Substantial Completion, shall be provided by the Director of Engineering on the completion of the construction listing all the deficiencies. This Letter of Substantial Completion shall not be construed as acceptance of the works.

"AS-BUILT" SUBMISSION

14. The Owner covenants and agrees to submit to the Municipality the final "as-built" drawings and records of construction, as accepted by the Director of Engineering, pursuant to Part 6 of the Subdivision and Development Control Bylaw, within sixty (60) days of the date of the Letter of Substantial Completion.

MAINTENANCE PERIOD AND RESPONSIBILITY

15. The Owner covenants and agrees to maintain every part of the "Works" in good order and in complete repair for a period of one (1) year from the date shown on the Certificate of Substantial Completion in accordance with the requirements of the Subdivision and Development Control Bylaw. Should the Owner, for any reason, fail to maintain when ordered, then the Director of Engineering, at his option, after giving the Owner seven (7) days written notice (emergencies excepted), may do so, and the whole costs, charges and expenses so incurred by the Municipality will be payable by the Owner, as provided by herein. The decision of the Director of Engineering will be final with respect to the necessity for repairs, or the adequacy of any work done.

CERTIFICATE OF ACCEPTANCE

16. The Municipality covenants and agrees that upon satisfactory completion by the Owner of all of the covenants in this Agreement, including the maintenance of the works in complete repair for a period of one (1) year, to provide the Owner with a Certificate of Acceptance which will be in the form outlined in Part 6 to the Subdivision and Development Control Bylaw. All such works and services remain at the risk of the Owner until the "Certificate of Acceptance" for the work has been issued.

FINAL BUILDING INSPECTION WITHHELD

17. The Owner covenants and agrees that the Municipality will withhold the granting of an occupancy permit of any building or part thereof constructed upon the lands until all the services herein have been completed and tested to the satisfaction of the Director of Engineering.

OWNER INDEMNIFIES MUNICIPALITY

18. The Owner covenants and agrees to save harmless and effectually indemnify the Municipality against:

(a) All actions and proceedings, costs, damages, expenses, claims, and demands whatsoever and whomsoever brought by reason of the construction of the works required by this Agreement. All such claims recoverable from the Municipality or the property by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain, during the term of the owner's work, shall be paid by the owner, and if recoverable from the Municipality, shall, together with any costs and expenses incurred in connection therewith, be charged and paid forthwith by the Owner.

(b) All expenses and costs which may be incurred by reason of the construction of the required works by this Bylaw, resulting in damage to any property owned in whole or in part by the Municipality for which the Municipality by custom or duty is obliged, directly or indirectly, in any way or to any degree, to construct, repair, or maintain, shall be paid by the Owner, and if paid by the Municipality shall, together with any costs and expenses incurred in connection herewith, by charged to and paid forthwith by the Owner.

(c) All expenses and costs which may be incurred by reason of liens for non-payment of labour or materials, Workmen's Compensation assessments, unemployment insurance, federal or provincial tax, and for encroachments due to mistakes in survey, and all such claims recoverable from the Municipality, or the property of the Municipality, or any property which the Municipality by duty or custom is duly obliged directly or indirectly, in any way or to any degree, to construct, repair or maintain, shall be paid by the Owner, and if recovered from the Municipality shall, together with any costs and expenses incurred in connection therewith, be charged to and paid forthwith by the Owner.

(d) All expenses and costs which may be incurred by the Municipality as a result of faulty workmanship and defective material in any of the works installed by the Owner.

The above clauses shall not be construed as to extinguish any rights which the Municipality would have were it not for the inclusion of Clause l8 in this Agreement.

INSURANCE BY OWNER

l9. The Owner will at his sole expense throughout the currency of the work carry Comprehensive Liability Insurance acceptable to the Municipality in the amount of at least Five Million ($5,000,000.00) Dollars with insurance companies licensed to carry on business in the Province of British Columbia in partial discharge of its obligation under Clauses l8 (a), (b), (c) and (d).

INSURANCE COVERAGE

20. The Owner covenants and agrees to provide the following insurance coverage, and to provide the Municipality with a copy of the insurance policy prior to the commencement of any construction of the works:

(a) To protect the Owner and the Municipality against all claims arising out of:

i) Death or injury to persons; and

ii) Damage to, or loss of use of, any property of third persons, including without limiting the foregoing; the following classes of property: Real property, chattels, land, works, buildings, structures, wires, conduits, pipes, mains, shafts, sewers, tunnels, and apparatus in connection therewith, even when the damage or loss of use is caused by vibration, moving, shoring, underpinning, raising, rebuilding or demolition of any building, structure or support, or by excavation, tunnelling or other work below the surface of the ground or water; and

iii) Damage to or loss of all buildings, structures, stores, equipment and materials included in or required for the carrying out of the "Works".

(b) Every policy of insurance required will:

i) Name "THE DISTRICT OF SECHELT" as an additional insured; and

ii) State that the policy applies to each insured in the same manner and to the same extent as if a separate policy had been issued to each insured; and

iii) State that the policy cannot be cancelled, lapsed or materially changed without at least thirty (30) days written notice to the Municipality, delivered to the District of Sechelt's Municipal Clerk.

(c) Every policy of insurance required will be reviewed by Municipal Insurance Agents.

SECURITY DEPOSITS

21. As security for the due performance of all of the covenants and promises contained in this agreement, the Owner has forthwith deposited with the Municipality a security deposit in the amount of **$**_____, in the form of cash or a Letter of Credit acceptable to the Municipality (herein called the Security Deposit").

FORFEIT OF SECURITY DEPOSIT

1. In the event that the Owner fails to construct and install the Works and Services prescribed herein within the time specified in Clause 8, the said Security Deposit of **$«SecurityDeposit»** will be forfeited to the Municipality.

DESIGN BOND

23. Where security is provided in lieu of approved working drawings, (hereinafter called a "Design Bond") the Owner agrees to have the working drawings completed to the satisfaction of the Director of Engineering within sixty (60) days of the date of this Agreement. Failure to do so will result in forfeiture of the Design Bond in the amount of **$**_____ which will be used by the municipality to complete the design. Once forfeited the bond becomes non-refundable in whole or in part.

USE OF SECURITY

24. The Owner agrees that if all the works or obligations are not completed, installed or performed pursuant to this Agreement, the Municipality may complete or fulfil the works or obligations at the cost of the Owner and deduct from the security deposit held by the Municipality the cost of such completion, and the balance of the deposit shall be returned to the Owner, less any additional administration fees or costs incurred. If there is insufficient money on deposit with the Municipality then the Owner will pay such deficiency to the Municipality immediately upon receipt of the Municipality's bill for completion. It is understood that the Municipality may do such work either by itself or by the Contractors employed by the Municipality. If the works are completed as herein provided, then the deposit shall be returned to the Depositor.

RELEASE OF SECURITY

25. When the Director of Engineering is of the opinion that the "Works" or any portion thereof have been adequately completed, and the Owner's covenants performed in compliance with this Agreement, and if there is not litigation pending or threatened by any third party against the Municipality as a result of, or arising from, the construction of the "Works", the Director of Engineering and Public Works shall return all, or any portion of the Security Deposit to the Owner at such times and in such amounts as he may deem proper, provided that he will retain an amount equal to fifteen (15) percent of the first $200,000 of the total construction costs, including taxes, plus ten (10 percent of any remaining amount, with a security minimum of Two Thousand Five Hundred ($2,500) Dollars to secure the performance of the maintenance required of the Owner (hereinafter called the "Maintenance Holdback").

RETURN OF MAINTENANCE SECURITY

26. When the Director of Engineering is satisfied that the Owner has complied with the covenants contained in this agreement and if there is not litigation pending or threatened by any third party against the Municipality as a result of, or arising from, the construction of the "Works", the Director of Engineering may direct that the Maintenance Deposit be returned to the Owner and thereinafter the Owner's responsibility for the "Works" shall cease.

ADMINISTRATION FEE

27. The Owner covenants and agrees to pay to the Municipality a non-refundable fee in the amount of **$** to cover Municipal administration and processing costs. These fees are payable prior to the signing of this agreement or the commencement of construction of the works.

NO OTHER REPRESENTATIONS

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

DEVELOPMENT COST CHARGES

29. The Owner covenants and agrees to pay to the Municipality and/or the Sunshine Coast Regional District all applicable Development Cost Charges required by Municipal Bylaws and Sunshine Coast Regional District Bylaws.

COMPLIANCE WITH BYLAWS

30. Subject to this Agreement, the within works and the development herein shall comply with all of the Bylaws of The District of Sechelt.

NO WAIVER

31. The Owner covenants and agrees that nothing contained or implied herein shall prejudice or affect the rights and powers of the Municipality in the exercise of its functions under any public and private statutes, bylaws, orders and regulations all of which may be fully and effectively exercised in relation to the said lands as if the Agreement had not been executed and delivered by the Owner.

WHENEVER the word "will" is used in this Agreement it will be construed as imperative (mandatory).

WHENEVER the singular or the masculine is used in this Agreement it will be construed as meaning the plural or the feminine body corporate or politic where the context or the parties hereto so require.

THIS CONTRACT SHALL ENURE TO THE benefit of and be binding upon the parties hereto, their respective successors and assigns.

IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first above written.

FOR THE OWNER

Signed, Sealed and Delivered by the Owner:)
)
)
_____)
Signature of Owner)
)
)
_____)
)
_____)
Name and Address of Owner)
)
)
_____)
Signature of Witness)
)
)
_____)
)
_____)
Name and Address of Witness)

FOR THE MUNICIPALITY

The Corporate Seal of the District of Sechelt)
was duly affixed in the presence of:)
)
)
_____)
Signature of the Mayor) **SEAL**
)
)
_____)
Signature of the Clerk

IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first above written.

FOR THE OWNER

The Corporate Seal of the Owner was hereunto affixed in the presence of its duly authorized Signatories:

_____

Authorized Signature of 1st Officer of Corporation

_____

Name and Title of 1st Officer of Corporation

_____

Authorized Signature of 2nd Officer of Corporation

_____

Name and Title of 2nd Officer of Corporation

CORPORATE SEAL

FOR THE MUNICIPALITY

The Corporate Seal of the District of Sechelt was duly affixed in the presence of:

_____

Signature of the Mayor

_____

Signature of the Clerk

SEAL

IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first above written.

FOR THE OWNERS

The Corporation is hereby bound by the authorized signature of the following Officers	)	
_____	)	_____
Signature of Officer	)	Signature of Officer
_____	)	_____
_____	)	_____
Name and Title of Officer	)	Name and Title of Officer
_____	)	_____
Signature of Notary Public as Witness to the above Officer's Signature	)	Signature of Notary Public as Witness to the second Officer's Signature
_____	)	_____
_____	)	_____
Name and Address of above Notary Public as to above Officer's Signature	)	Name and Address of above Notary Public as to second Officer's Signature

FOR THE MUNICIPALITY

The Corporate Seal of the District of Sechelt was duly affixed in the presence of:	)	
_____	)	
Signature of the Mayor	)	**SEAL**
_____	)	
Signature of the Clerk	)	

APPENDIX "A"

COPY OF SUBDIVISION PLAN

APPENDIX “B”

LIST OF THE WORKS AND ESTIMATE OF CONSTRUCTION COST

APPENDIX “C”

LIST OF CONSTRUCTION DRAWINGS FOR THE WORKS

PART 7 – LEVELS OF SERVICE GUIDELINES

This table is a guide only for minimum requirements. Please refer to MMDA drawings and the "Geometric Design Standards for Canadian Roads" published by the Transportation Association of Canada (TAC) for design standards.

SERVICE (To be used as a guideline only)	**Single and Two Family Residential Areas**		**Commercial, Institutional, and Multiple Family Areas***		**Industrial Areas**		**Rural Areas**	
HIGHWAYS	**Min. ROW***	**Min. Paving**	**Min. ROW***	**Min. Paving**	**Min. ROW***	**Min. Paving**	**Min. ROW***	**Min. Paving**
Lane	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Limited Local	16	7.3	20	8.5	20	11	20	6.8
Local	18	7.3	20	11	20	11	20	7.3
Collector	20	11	20	11	20	11	20	11
Arterial	20	11	20	11	20	11	20	11

*** N.B. ACTUAL ROW WIDTH SHALL BE DETERMINED IN ACCORDANCE WITH DESIGN REQUIREMENTS OUTLINED IN PART 7. WHERE NECESSARY ADDITIONAL RIGHT OF WAY WIDTH MAY BE REQUIRED BY THE APPROVING OFFICER TO ACCOMMODATE ROAD STRUCTURE AND UTLITIES.**

CURBS AND GUTTERS	**Single and Two Family Residential Areas**	**Commercial, Institutional, and Multiple Family Areas***	**Industrial Areas**	**Rural Areas**
Lane	(Downtown/Village Neighbourhood) X			
Limited Local	(Downtown/Village Neighbourhood) X	X		
Local	(Downtown/Village Neighbourhood) *X*	X		
Collector	X	X	X	X
Arterial	X	X	X	X

	Single and Two Family Residential Areas	Commercial, Institutional, and Multiple Family Areas*	Industrial Areas	Rural Areas
HYDRO AND TELEPHONE	Underground distribution and service.	Underground distribution and service.	Overhead distribution and service.	Over-head distribution and service.
STREET TREES	X	X	X	
BOULEVARD LANDSCAPING	X	X	X	X
BUS AND MAILBOX PULLOUTS	As identified by BC Transit or the Sunshine Coast Regional District and Canada Post.			
PARKING LANES	As required to support development. Minimum width of 2.6 m.			
BIKE PATHS	If identified within a local or regional plan as a designated bike route. Minimum width of 1.8 m.			
PEDESTRIAN ROUTE	If identified within a local or regional plan as a designated pedestrian route.			
WATER SUPPLY	Community water supply if available – otherwise an *on-site* source approved by the Ministry of Health			
SANITARY	Community sewer system if available – otherwise an *on-site* disposal system approved by the Ministry of Health or Ministry of Environment.			
TRAFFIC CALMING	Upon approval by the *Approving Officer* or Council, traffic calming measures may be installed in accordance with the Neighbourhood Traffic Calming guidelines prepared by the Transportation Association of Canada and the Canadian Institute of Transportation Engineers.			

LEGEND: x = Required

***** For areas located in the **Streetscape Design Area** identified within the **Downtown Village Plan**, the following streetscape elements shall be incorporated where appropriate:

- Public seating, bollards, street trees in constructed tree pits, landscape areas, bus shelters, pedestrian lighting, garbage receptacles, and raised planters in high-use pedestrian areas and streets (number and type to be approved by the Municipal Engineer);
- Bike racks adjacent to major offices, stores, and government buildings (number and type to be approved by the Municipal Engineer);
- Concrete sidewalks having a minimum width of 2.0 m or greater (not including reduced use areas) complete with decorative edges of stamped coloured concrete;
- Crosswalks which use stamped coloured concrete, or stamped asphalt.

SERVICE	Single and Two Family Residential Areas	Commercial, Institutional, and Multiple Family Areas*	Industrial Areas	Rural Areas
SIDEWALKS				
Local	X (Downtown/Village Neighbourhood)	X (1-2 sides)		
Limited Local	X (Downtown/Village Neighbourhood)	X (2 sides)		
Collector	X (1 side)	X (2 sides)	X	X
Arterial	X (1-2 sides)	X (2 sides)	X (1-2 sides)	X
STORM DRAINAGE				
Local	• Underground community storm sewer system. • Open channel system. • On-site disposal method approved by the Building Inspector. (supplement to the above)	• Underground community storm sewer system • On-site disposal method approved by the Building Inspector. (supplement to above)	• Open Channel System • On-site disposal method approved by the Building Inspector. (supplement to the above)	Open Channel System
Limited Local	• Underground community storm sewer in system. • Open channel system • On-site method approved by the Building Inspector. (supplement to the above)	• Underground community storm sewer system • On-site disposal method approved by the Building Inspector. (supplement to above)	• Open Channel System • On-site disposal method approved by the Building Inspector. (supplement to the above)	
Collector	• Underground community storm sewer system • Open channel system On-site disposal method approved by the Building Insp. (supplement to the above)	• Underground community storm sewer system • On-site disposal method approved by the Building Inspector. (supplement to above)	• Open Channel System • On-site disposal method approved by the Building Inspector. (supplement to the above)	Open Channel System
Arterial	• Underground community storm sewer system • Open channel system • On-site disposal method approved by the Bldg. Insp. (supplement to the above)	• Underground storm sewer system. • On-site disposal method approved by the Building Inspector. (supplement to the above)	• Open Channel System • On-site disposal method approved by the Building Inspector. (supplement to the above)	Open Channel System

SERVICE	Single and Two Family Residential Areas	Commercial, Institutional, and Multiple Family Areas*	Industrial Areas	Rural Areas
ORNAMENTAL STREETLIGHTS			.	
Limited Local	At intersections and road ends unless required elsewhere by the *Approving Officer*.	X	At intersections unless required elsewhere by the *Approving Officer*.	At intersections unless required elsewhere by the *Approving Officer*.
Through Local	At intersections and road ends unless required elsewhere by the *Approving Officer*.	X	At intersections unless required elsewhere by the *Approving Officer*.	At intersections unless required elsewhere by the *Approving Officer*.
Collector	X	X	At intersections unless required elsewhere by the *Approving Officer*.	At intersections unless required elsewhere by the *Approving Officer*.
Arterial	X	X	At intersections unless required elsewhere by the *Approving Officer*.	At intersections unless required elsewhere by the *Approving Officer*.

PART 8 – GENERAL CONTRACT REQUIREMENTS

42. ENGINEER AND OWNER/CONTRACTOR PERFORMANCE RESPONSIBILITY

(2) Preamble

When Engineering works within existing, or proposed, rights-of-way/easements are to be constructed and installed, as required by *development* and/or as proposed for construction, the *Owner*/*Contractor* shall be aware of the areas and degrees of performance and responsibility.

(3) Director of Engineering and Public Works Status

The *Director of Engineering and Public Works*, or his duly authorized representative, shall be the District of Sechelt's representative during the construction period and shall observe the work in progress on behalf of the District of Sechelt.

(4) Work Performance

The whole of the Work, and the manner of performing the same, shall be done to the *acceptance* of the *Director of Engineering and Public Works*, and he shall be the sole judge of the Work and materials in respect to both quantity and quality and his decision with regard to work and materials shall be final and binding.

(5) Variation of Work(s) at *Owner*'s/*Contractor*'s Request

Any variation to the Work(s) previously proposed, or as previously accepted in design, shall be subject to review by the *Director of Engineering and Public Works*. All or any requests for variation(s) to Work(s) designed and sealed by a *Professional Engineer* on behalf of a *Owner* and accepted by the District of Sechelt shall be made in writing by the *Owner's Engineer*. Any requests for variation(s) from the *Owner's Engineer* shall include a signed, sealed and dated revision to the previously accepted drawing(s). The *Director of Engineering and Public Works* decision as to the acceptability of any proposed revision(s) shall be final and binding.

(6) Unforeseen Conditions

(a) If at any time after the drawings have been accepted for construction, unforeseen conditions or circumstances become known which make it necessary that changes in he design or extra works be done in order to *complete* the project in an acceptable manner, the *Director of Engineering and Public Works* shall have the right to order such changes or extra work as he deems necessary to *complete* the work in an acceptable manner.

(b) All costs of such extra work shall be borne by the *Owner*/*Contractor*.

(7) Verbal Agreements

No verbal instruction, objection, claim or notice by any party to the other shall change or modify any of the terms or obligations contained in any of the Specifications and none of the Specifications shall be held to be waived or modified by reason of any act whatsoever, other than by an agreed waiver or modification thereof in writing, signed by the *Director of Engineering and Public Works*.

(8) Service of Notices

Any notice, order, direction, request or other communication given by the District of Sechelt to the *Owner*/*Contractor* shall be deemed to be well and sufficiently given to the *Owner*/*Contractor* if the same be left at any office used by the *Owner*/*Contractor* or be delivered to any of his officers, clerks, or servants, including the *Owner*'s/*Contractor*'s (Consultant) Engineer, or be mailed in any Post Office addressed to the *Owner*'s/*Contractor*'s last known place of business.

43. CONDUCT OF WORK

(1) Responsibility

(a) The *Owner* shall be held as fully responsible to the District of Sechelt for the acts and omissions of his agent and of persons directly or indirectly employed by him. The *Owner* agrees to bind all agents or employees to the specifications and drawings applicable to his work.

(b) No work may start without written permission from the *Director of Engineering and Public Works* in the form of a permit as outlined in Form 1 as attached to this schedule.

(c) The *Owner*, the *Owner*'s Consultant and the General *Contractor*s shall arrange for a pre-construction meeting with the Director of Planning and the *Director of Engineering and Public Works* prior to the construction of the requiredworks.

(2) Materials and Workmanship

The whole of the Work shall be done in a substantial and workmanlike manner with materials, articles and workmanship of the best quality and description and as required by and in strict conformity with this Manual. Unless otherwise approved by the *Director of Engineering and Public Works*, all materials shall be new.

(3) Survey Monuments and Legal Postings

(a) All legal posts, stakes and monuments within and outside the area of the work, and all construction stakes and marks on adjoining works, shall be preserved, undisturbed, and visible. In the event any of the above are disturbed, lost, or destroyed they shall be replaced to the *acceptance* of the *Director of Engineering and Public Works*. All costs for replacement shall be borne by the *Owner*.

(b) All surveys within integrated areas of the District of Sechelt shall be tied to the monument system based on the *Surveyor* General's Instructions.

(c) Additional survey monuments will be required to achieve a minimum density level as areas become developed. Integrated survey monument locations will be established by the *Director of Engineering and Public Works* in accordance with provincial standards. A non-refundable deposit is to be paid to the District of Sechelt at the time of subdivision to cover the cost of the monument densification. The amount of the non-refundable deposit will be established by the *Director of Engineering and Public Works*.

(4) Work of Others

The Municipalities, servants, and agents shall be at liberty to enter upon the site of the work with its workmen and materials to do other work, and the *Owner*/*Contractor* shall afford any such workmen all reasonable facilities to the *acceptance* of the *Director of Engineering and Public Works*. The *Owner*/*Contractor* shall arrange his work and dispose of his materials in such a manner as will not interfere with the work or storage of materials of others upon the site of the Work. The *Owner*/*Contractor* shall join his work to that of others and perform his work in proper sequence in relation to that of others to the *acceptance* of the *Director of Engineering and Public Works*.

44. EXISTING STRUCTURES AND UTILITIES

(1) Any plans or descriptions, verbal or otherwise, of existing piping or structures that are given to the *Owner*/*Contractor* are intended only as an aid in the location of these items. Measurements and locations of the existing underground piping and structures shown on the drawings are compiled from the most reliable information available, and shall be verified by the *Owner*/*Contractor* in the field prior to proceeding with construction.

(2) The District of Sechelt accepts no responsibility for the accuracy of any plans, maps, or elevations provided to the Consultant/*Director of Engineering and Public Works*/*Owner*/*Contractor*.

45. STORMWATER RUNOFF

(1) The *Owner*/*Contractor* shall properly manage stormwater from all portions of the site until final *acceptance* by the District of Sechelt. The *Owner*/*Contractor* shall be held responsible for all damage which may be caused or result from water backing up or flowing over, through, from or along any part of the Work, or which any of his operations may cause to flow elsewhere.

(2) Existing culverts, drains, and ditches affected by the Work shall be kept clear of excavated material at all times during construction. When it is necessary to temporarily remove an existing drainage structure, the *Owner*/*Contractor* shall *provide* suitable temporary ditches or other means of handling the drainage as accepted by the *Director of Engineering and PublicWorks*.

(3) Culverts and drain pipes shall be replaced at the time of trench backfilling and shall be adequately supported such that trench settlement does not disrupt the flow of water. Culverts, drains, and ditches shall be replaced in a condition which is at least equal to that which existed before construction commenced and ditch walls shall be reinstated so as to prevent any erosion or seepage.

(4) At all times during the course of construction and to the end of the Maintenance Period, there shall be no discharge of any silt, dirt, or debris into any existing drainage facility or *watercourse*. *Street*s, catch basins, manhole sumps, and siltation controls shall be cleaned and maintained as often as the *Director of Engineering and Public Works* deemsnecessary.

46. WORK TO FIT WITH OTHERS

(1) The *Owner*/*Contractor* shall do all cutting, fitting, or patching of his work that may be required to properly fit or receive existing structures and utilities.

(2) The *Owner*/*Contractor* shall not endanger any existing work by cutting, digging, or otherwise and shall not cut or alter the work of any other except with the written consent of the *Director of Engineering and Public Works*.

47. DAMAGE TO WORK

(1) The *Owner*/*Contractor* shall bear the risk of and shall bear all loss or damage which may occur on the Work until the same has been delivered to and accepted by the District of Sechelt as specified and if any loss or damage occurs before such *acceptance* by the District of Sechelt, the *Owner*/*Contractor* shall immediately, at his own expense, repair, restore, or reexcavate the work so damaged or which may have beendestroyed.

(2) All such repair, restoration, or reexecution of the work so damaged or which may have been destroyed, shall be carried out and *complete*d in accordance with this Manual, to the *acceptance* of the *Director of Engineering and Public Works* and at no cost to the District of Sechelt.

48. USE OF *COMPLETE*D PORTIONS

The District of Sechelt shall have the right to take possession of and use any *complete*d or partially *complete*d portion of the work, but such possession and use shall not be deemed an *acceptance* of such work. If such prior use increases the cost of un*complete*d work or causes refinishing or *complete*d work beyond normal wear and tear, the *Owner*/*Contractor* shall be entitled to such compensation, as the *Director of Engineering and Public Works* maydetermine.

49. DISTRICT OF SECHELT'S RIGHT TO REPAIR, RESTORE, OR REEXCAVATE THE WORKS

(1) Should the *Owner*/*Contractor* fail to perform the work to the *acceptance* of the *Director of Engineering and Public Works* by failing to begin work or to repair, restore, re-excavate or in any manner fails to comply with the Standards and Specifications of this Manual as it applies to any part or parts of the work as requested by the *Director of Engineering and Public Works* within a period of 14 days from sending of such notice in writing to do so, the District of Sechelt shall become empowered to do the work itself or to employ such works provided that the entire expense of repair, restoration, or re-execution shall be charged to the *Owner*/*Contractor*. The repair, restoration, or re- execution shall in no way affect the *Owner*'s/*Contractor*'s duties and liabilities nor in any way relieve him from the performance and fulfilment of any or all of his obligations and duties described in this Manual.

(2) All such repair, restoration, or re-excavation of the Work shall be carried out and *complete*d in accordance with this Manual and to the *acceptance* of the *Director of Engineering and Public Works*. The fact that the District of Sechelt has disapproved of or rejected any part or parts of the work or any of the materials supplied in connection at the time during the execution of the work shall not be deemed or be construed to be an *acceptance* of any such part or parts of the work or any such materials.

(3) The provisions of this clause shall remain in full force and effect and be applicable for the period of the execution of the Works and for a period of 12 calendar months after the date of the issuance of a notice of completion by the District ofSechelt.

50. EMPLOYEE AND PLANT SAFETY, ADEQUACY

(1) The *Owner*/*Contractor* alone shall at all times be responsible for the safety of his employees in the workplace and for the safety, adequacy, efficiency, and sufficiency of his plant, his equipment, and his method of executing the work specified herein.

(2) The *Owner*/*Contractor* shall be responsible for notification of the proposed Work(s) to the Workers' Compensation Board and shall conduct all work(s) in compliance with the regulations of the Workers' Compensation Board. A copy of the notification letter is to be forwarded to the *Director of Engineering and Public Works*.

51. PAYMENT OF ACCOUNTS BY *OWNER*

The *Owner* shall pay all accounts for labour, services, and materials incurred by the District of Sechelt, as a result of executing any or all clauses of these specifications during the execution of the works, as and when such accounts become due and payable. Should payment of such accounts not be made when they become due, the District of Sechelt shall deduct the payment from the security deposit. In the event that the amount is greater than that owing to the *Owner*, the District of Sechelt shall charge the *Owner* the difference.

52. PUBLIC CONVENIENCE, ACCESS, CLEAN-UP, DUST CONTROL

(1) In carrying out the Work, or any portion thereof, the convenience of the public shall always be considered and provided for by the *Owner*/*Contractor*, who shall not obstruct any *street*, thoroughfare, or *sidewalk* longer or to any greater extent than is absolutely necessary in the *Director of Engineering and Public Works* opinion, and shall in no case tear up or open more of any *street*, roadway, or place than is ordered or sanctioned by the *Director of Engineering and Public Works* in writing.

(2) The *Owner*/*Contractor* shall *provide* safe access to driveways, buildings, and property, both for vehicles and pedestrians, whenever necessary, and for passing along all roadways and *sidewalk*s

and for crossing the same where it is practicable to do so, both during the execution of the works and at other times, and for this purpose shall construct and maintain, in good order and serviceable condition, suitable and convenient platforms, approaches, structures, bridges, *crossing*s, or other works as required by the *Director of Engineering and Public Works*.

(3) The *Owner*/*Contractor* shall not deposit any material upon any *street*, *sidewalk*, *boulevard*, grass plot, or other public property without approval in writing from the *Director of Engineering and Public Works*, so that the least damage will be incurred, nor shall the *Owner*/*Contractor* allow material to remain thereon longer than necessary as accepted by the *Director of Engineering and Public Works*.

(4) During all phases of the operations the *Owner*/*Contractor* shall take precautions to abate nuisance caused by mud or dust by cleanup, sweeping, sprinkling with water, or other means as necessary to accomplish results acceptable to the *Director of Engineering and Public Works*.

53. TRAFFIC CONTROL, BARRIERS, LIGHTS

The *Owner*/*Contractor* shall, at his own expense, responsibility *provide*, erect and maintain all required barriers, fences or other proper protection, and shall *provide*, keep and maintain operating lights with amber globes or provide watchmen as may be necessary, in order to insure safety to the public as well as to those engaged about the premises or works, and shall (where it is practicable, in the *Director of Engineering and Public Works* opinion) keep any roadway open for travel for the use of the public for such width as the *Director of Engineering and Public Works* may direct. The *Owner*/*Contractor* shall also *provide* a sufficient number of "NO THOROUGHFARE," "DETOUR," or other signs or notices, as determined by the obstruction to serve sufficient warning to the travelling public and maintain such signs in good order in conspicuous places wherever any roadway, *sidewalk* or thoroughfare is torn up or dangerous, and so long as it traffic warning, control or barrier devices shall be subject to the *acceptance* of, or conditions of, the Ministry of Transportation and *Highway*s "Traffic Control Manual for Work on Roadways" and the *Director of Engineering and Public Works*.
Note: All full or partial highway closures required in conjunction with the construction and installation of the work(s) require written approval of the *Director of Engineering and Public Works*.

54. EASEMENT RELEASES

On completion of work on private or Municipal property or Municipal rights-of-way (and easements), the *Owner*/*Contractor* shall obtain from each property *owner* affected, a formal release in writing and over his signature, verifying that the clean-up has been performed and *complete*d to his *acceptance* and that he has no further claim upon the *Owner*/*Contractor* or the District of Sechelt as a result of such work. A Form of Release shall be required by the *Director of Engineering and Public Works*. All such releases shall be turned over by the *Owner*/*Contractor* to the *Director of Engineering and Public Works* and shall be retained by the *Director of Engineering and Public Works* as a part of the District of Sechelt's records.

55. ARBITRATION

In the case of any dispute between the District of Sechelt and the *Owner*/*Contractor* during the progress of the work or afterwards, as to any matter arising thereunder, either party may at his option give to the other notice of such dispute and demand arbitration thereof; and the parties dispute, agree to submit the same to arbitration in accordance with the laws of the Province of British Columbia; PROVIDED, however, that if arbitration has not been agreed upon either party may elect to have such dispute determined by a Court or Courts of competent jurisdiction. Arbitration shall not be a cause for the stoppage of work.

56. AGREEMENT, SECURITY DEPOSIT, ADMINISTRATION FEES, AND INSURANCE TERMS

(1) Prior to commencement of construction, the *Owner* shall execute a servicing agreement with the

District of Sechelt. The purpose of Servicing Agreements is to protect the District of Sechelt against claims (including liability) for matters arising from the construction, installation, and inspection of the required Engineering works. It also allows for provisions which enable the *Approving Officer* to consider signing of the Subdivision Plans prior to the start and/or completion of the Engineering Work(s). The Servicing Agreement makes provision for the Security Deposit, Indemnity Clause, Insurance Requirements, and Maintenance periods. The standard Servicing Agreement is Part 3 to the Subdivision and Development Control Bylaw.

(a) The following procedure shall be followed by the *Owner* in the preparation of a valid Servicing Agreement:

(b) Three copies of blank Servicing Agreements may be obtained from the *Director of Engineering and Public Works* Department. These documents shall contain the names of the *Owner*, the Consultant, the *Director of Engineering and Public Works*, and the drawing numbers. The Agreements shall be signed and sealed and returned to the Engineering Department along with the following:

(i) A Security Deposit (which may be cash or a Letter of Credit) in the amount and form specified by the Engineering Department. This deposit will be based on the estimated construction cost for the works to be constructed.

(ii) *Owner* submits a current title search showing registered *owner*ship, proper legal description and encumbrances.

(iii) A Certificate of Insurance in accordance with the requirements of the Servicing Agreements.

(iv) Three *complete* sets of drawings which shall be identical to the drawings accepted for construction.

(v) Administration fees

A non-refundable Administration Fee (which shall be cash or a certified cheque) based upon the estimated cost of construction according to the following table.

Administration Fees

Estimated Construction Cost of Engineering Works as Approved by the Director of Engineering	**Percentage of Construction Cost to be Paid as a Fee**
Up to $200,000	5% on first $200,000
$200,000 to $450,000	4% on next $250,000
Over $450,000	3% on remainder

57. SECURITY DEPOSIT

The District of Sechelt will require from the *Owner* a 100% security deposit in a form as required by this Bylaw and in an amount equal to the *Director of Engineering and Public Works* estimate of the value of the Works plus 10% from the *Owner*, to ensure the construction, installation, and maintenance of The Works as identified in the Servicing Agreement. (See Section 6).

58. INDEMNITY CLAUSE

(1) As stipulated in the Servicing Agreement, the *Owner* covenants to save harmless and effectually indemnify the District of Sechelt against:

(a) All actions and proceedings, costs, damages, expenses, claims, and demands whatsoever and by whomever, brought by reason of the performance of the said Work.

(b) All expenses and costs which may be incurred by reason of the execution of the said works resulting damage to any property owned in whole or in part by the District of Sechelt or which

the District of Sechelt 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, and for encroachments owing to mistakes in survey.

(d) All actions and proceedings, costs, damages, expenses, claims and demands arising from the *Owner*/*Contractor*'s trespass or damage to private property or properties owned by persons other than the District of Sechelt.

(2) If any monies are paid by the District of Sechelt because of failure of the *Owner* to execute this clause, then all such monies, and reasonable expenses attached, shall be chargeable to the *Owner*.

59. PUBLIC LIABILITY AND PROPERTY DAMAGE

(1) Prior to the commencement of any work, the *Owner* shall obtain and maintain, during the term of the Servicing Agreement and the Maintenance Period, a policy of insurance which is acceptable to the District of Sechelt and which contains the following:

(a) 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.

(b) 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.

(c) *Complete*d operations coverage on an 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 *complete*d or any installation or repair operations during the period of 12 calendar months next ensuing after the issuance of a certificate of *substantial completion* by the *Director of Engineering and Public Works*.

(2) In all policies of insurance providing coverage called for by this section (except motor vehicles insurance), the District of Sechelt shall be named as an additional insured, and all such insurance shall contain a provision that the insurance shall apply as though a separate policy has been issued to each named insured. In all such policies, each *contractor* engaged in the work shall be named and each such policy shall provide that no expiry, cancellation, or material change in the policy shall become effective until after thirty days notice of such cancellation or change has been given to the District of Sechelt by registered mail. The *Owner* shall maintain the insurance policy until the Work(s) have received Final *Acceptance* by the *Director of Engineering and Public Works*.

(3) As a condition precedent to the issuing of "Permission to Construct" (Form F-1), the *Owner* shall be required to deliver to the District of Sechelt an insurance certification signed by a licensed insurance agent certifying as follows:

> "I hereby certify that the attached insurance policy provides insurance coverage as required by Servicing Agreement number_____between the District of Sechelt and (the *Owner*), and that the attached insurance policy No.__is valid for the period of the Servicing Agreement."

(4) The *Owner* shall submit the certification along with a copy of the insurance policy.

(5) No work may commence or continue on the Works if this provision has not been satisfied.

60. PATENTS AND/OR COPYRIGHTS

The *Owner* shall pay all royalties, patent, and license fees and hold and save the District of Sechelt, its

officers, agents, servants and employees, harmless from liability of any nature or kind, including costs and expenses for, or on account of, any copyrighted or un-copyrighted composition, secret process, patented or unpatented invention, articles, or appliances manufactured or used in the execution of the work, including their use by the District of Sechelt, its officers, agents, servants and employees in a manner aforesaid and any monies collected from the District of Sechelt, its officers, agents, servants and employees by reason of such failure shall be recoverable from the *Owner*.

61. PERMITS

Work undertaken on a *Highway* or on a gazetted or otherwise dedicated *Highway* right-of-way or all full or partial highway closures require approval of the *Director of Engineering and Public Works* by way of a *Highway* Use Permit.

62. MAINTENANCE HOLDBACK

(1) Upon satisfactory receipt of the "as-built" submissions, the District of Sechelt shall release all security in conformance to Section 66 in regard to the work, less a "Maintenance Holdback" of fifteen (15 percent of the first $200,000 of the total construction costs, including taxes, plus ten (10) percent of any remaining amount, with a minimum maintenance holdback of $2,500, to insure payment of any maintenance or repair. The value of any deficiencies will be held in addition to the above amounts.

(2) Prior to the expiration of the maintenance period, the *Owner* shall apply for the release of the "Maintenance Holdback". The *Owner* will then arrange for a final inspection by the *Owner's Engineer* and the *Director of Engineering and Public Works*.

(3) The "Maintenance Holdback" does not apply to BC Hydro or BCTelephone approved installations.

(4) The *Director of Engineering and Public Works* shall release the "Maintenance Holdback," less the cost of any repair chargeable to the *Owner* by these specifications, twelve (12) calendar months from the date of the issuance of the Certificate of *Substantial Completion* when so requested in writing by the *Owner*.

(5) Maintenance Period for Works and Services

(a) The maintenance period shall be the year from the date of issuing the Certificate of *Substantial Completion* by the *Director of Engineering and Public Works*. Such Certificate of *Substantial Completion* shall be in the form as outlined in Form F-3 as attached to this schedule.

(b) The *Owner* shall guarantee the stability and sufficiency of the materials and workmanship supplied and the whole of the work performed and shall be responsible for and shall make good all defects, imperfections, vandalism acts and settlements which become apparent during the maintenance period.

(c) Should the *Owner* fail to make good any defects, imperfections, vandalism acts and settlements after being given at least seven (7) days notice in writing during the maintenance period, the District of Sechelt shall be entitled to make alternative arrangements for the execution of the repairs and to recover the costs from the *Owner* pursuant to Section 5(12) and/or the Servicing Agreement.

63. INSPECTION

(1) All or any part of the work and all workshops or other places where material for the work is being prepared or stored, may be inspected by the *Director of Engineering and Public Works* when and as often as the *Director of Engineering and Public Works* deems it necessary, and the *Owner*/*Contractor* shall afford every facility and access requested and shall give any and all information requested.

(2) The *Owner*/*Contractor* shall supply representative samples of materials as and when requested by the *Director of Engineering and Public Works*. Furthermore, the *Owner*/*Contractor* shall provide any available competent labour required by the *Director of Engineering and Public Works* on site in connection with survey, measurements, inspections, and testing of the works. No payment shall be made for the cost to the *Owner*/*Contractor* of any labour, material, work or delay occasioned by this requirement.

(3) The *Owner*/*Contractor* shall at the request of the *Director of Engineering and Public Works* and within such time as the *Director of Engineering and Public Works* shall designate, open for inspection any part or parts of the work that have been covered up. If the work thus uncovered is found to be to the *acceptance* of the *Director of Engineering and Public Works*, the expense of the opening up shall be paid by the District of Sechelt.

(4) Inspections by the *Director of Engineering and Public Works* are limited to ensuring that the work is in compliance with this Manual and that the finished product will be in general conformity with the intent of the accepted plans and in a condition acceptable to the District of Sechelt. They do not constitute supervision or co-ordination of the work, and neither are they intended to serve in place of proper Engineering supervision of the work.

(5) The *Owner* is responsible for hiring a professional engineer to *complete* design of the work and ensure property engineering supervision and co-ordination of the work, processing progress payments to the *Contractor*, and for ensuring that all requirements of the District of Sechelt are carried out to a satisfactory conclusion within the stipulated time limits.

(6) The *Owner's Engineer* is to *complete* a "Certificate of Inspection," as in the Form F-2 as attached to this schedule.

64. SECURITY DEPOSIT REDUCTIONS

(1) As the works progress the *Owner's Engineer* shall prepare and submit an estimate of the quantity, value, and percentage of the work *complete*d. Upon verification of the estimate, the *Director of Engineering and Public Works* may release security deposit held by the District of Sechelt to a maximum of seventy-five (75%) percent of the value of the works*complete*d.

(2) The maximum security deposit release for storm and sanitary works shall be 50% until successful testing is *complete* on the entire system. Security deposit releases for BC Hydro, BC Tel, and S.C.R.D. works shall be 50% until such time as the District of Sechelt is in receipt of letters of *acceptance* from these agencies.

(3) Reductions may be denied by the *Director of Engineering and Public Works* where in his opinion it is required to cover the remainder of the work. No release period shall be less than one month. Security reductions are for the convenience of the *Owner* and in no case shall be taken as *acceptance* of the material and/or work or as a release of the *Owner* from his responsibilities for the work.

65. CERTIFICATE OF SUBSTANTIAL COMPLETION

On the completion of the works and upon the approval of the *Owner's Engineer*, the *Owner*/*Contractor* shall notify the *Director of Engineering and Public Works*. The *Director of Engineering and Public Works* shall, on receipt of notice, inspect the works and, if necessary, issue a list of deficiencies that shall be corrected. Upon correction of the deficiencies, to the *acceptance* of the *Director of Engineering and Public Works*, a Certificate of *Substantial Completion* shall be dated and issued where upon all the monies held by the District of Sechelt shall be released, less the Maintenance Holdback as per Part 8, Section 39 (1) (l). Form F-3 forming part of Part 6 to the Subdivision and Development Control Bylaw applies.

66. RECORD DRAWING RELEASE

(1) Within 60 days of the issuance of the Certification of *Substantial Completion*, the *Owner* shall deliver to the *Director of Engineering and Public Works*:

(a) Service record cards showing the location of water, storm, and sanitary services for each lot,

(b) Record drawings consisting of 2 sets of signed and sealed paper prints, 1 set of mylars, and 1 set of drawing files in DXF format, to meet District standards, prepared using a CAD system,

(c) Inspection Certificate (Form F-2).

67. BC HYDRO, TELUS, SCRD, BONDING

Monies held by the District of Sechelt specifically marked to bond for BC Hydro, Telus and SCRD installations will be released upon written confirmation from BC Hydro, Telus, and the SCRD companies stating that those works are *complete* and satisfactory to the specifications of those companies.

68. TESTING OR CONFIRMATION OF WORKS *COMPLETE*D

(1) The District of Sechelt reserves the right to conduct independent testing of any or all works constructed or being constructed. Generally, these tests will be conducted on a random basis and are for the expressed purpose of ensuring that the work(s) being accepted by the District of Sechelt meet the minimum accepted standards as set forth in this Bylaw.

(2) In addition, to ensure the District of Sechelt has property and accurate records of the works done, survey spot-checks may be conducted from time to time to verify the authenticity of the as-built information.

(3) The cost(s) for testing or surveying shall be borne by the *Owner*.

69. ISSUANCE OF BUILDING PERMITS

(1) In new subdivisions where municipal services are being installed, all essential services shall be in place and accepted by the *Director of Engineering and Public Works* prior to the issuance of Building Permits other than permits for "show homes" as per section 71.

(2) Essential Services shall include water, sanitary and storm sewer systems, lot grading and road base construction.

70. ISSUANCE OF BUILDING PERMITS FOR SHOW HOMES

(1) Where essential services have not been installed and accepted by the Director of Engineering, show home permits may be issued to a maximum of 10% of the lots in the registered subdivision with a minimum of one (1) show home per subdivision.

(2) The developer and Builder must acknowledge in writing that there will be no request for occupancy/final inspection until such time as all essential services have been accepted by the Director of Engineering.

PART 9 – ENGINEERING DRAWINGS AND SUBMISSION REQUIREMENTS

71. INTRODUCTION

(1) This section outlines the minimum standards and requirements the District of Sechelt will accept in the design and "As-Built" submissions for engineering work(s).

(2) Whenever engineering *works and services* are required or proposed, the Consulting Engineer shall arrange for a pre-design meeting with the Municipal to ensure compliance with the latest municipal standards, specifications and policies.

(3) Incomplete or substandard submissions will be returned to the Consulting Engineer without comment on the drawings. A subsequent re-submission which remains Incomplete or sub-standard will result in a request to meet with the Consulting, Engineer and the *Owner*.

(4) All submissions shall comply with the following:

(a) All applicable requirements of this Schedule.

(b) All applicable requirements of the District of Sechelt Bylaws as amended or replaced from time to time, including, but not limited to:

(i) The Subdivision and Development Control Bylaw

(ii) The Zoning Bylaw(s)

(iii) The Building Bylaw

(iv) The Traffic Bylaw

(v) The Plumbing Bylaw

(vi) The Blasting Bylaw

72. SURVEY INFORMATION

(1) All surveys shall be conducted safely with minimal nuisance to traffic or the public. The *Owner* shall obtain permission from the registered *owner*s before entering private property.

(2) All elevations shall be from geodetic datum. Information regarding the location and elevation of existing benchmarks or monuments may be obtained from the Engineering Department.

(3) Originating benchmarks and survey monuments shall be noted on all applicable plans. Survey monuments are required in those subdivisions which are outside a 300 metre radius of existing benchmarks.

(4) Copies of legible field notes shall be made available to the District of Sechelt upon request.

(5) Centre lines (or offset lines) are to be marked and referenced in the field and all chainage shall be keyed to the legal posting.

(6) All existing items such as manholes, catch basins, culverts, fire hydrants, poles, existing dwellings, fences, trees, hedges and unusual ground shall be noted.

(7) Topographical features such as, rock outcroppings, streams, etc.

(8) Information for highway cross sections shall include locations and elevations of:

(a) Centreline of pavement;

(b) Edge of pavement;

(c) Gutter line;

(d) Top of curb;

(e) Back of *sidewalk*;

(f) Edge of shoulder;

(g) Ditch invert

(h) Top of banks and waterline;

(i) Property line; and

(j) An existing ground elevation inside the property line at the buildingline.

(9) In urban areas the chainage shall be as given by the *Director of Engineering and Public Works*ing Department. In rural areas 0 + 00 shall be at the nearest 1/2 section line and shall run south to north or west to east.

(10) Chainage shall increase from left to right and from bottom to top on a drawing. North will be at the top or right side of a drawing. All drawings shall be oriented to view plan northward or west to east.

73. DRAWINGS

(1) All drawings shall be prepared in accordance with the following requirements and all other applicable requirements of this schedule.

(2) The Municipal Project Number shall be noted in the lower right-hand corner of all drawings.

(3) All drawings shall be prepared by use of computer aided drafting compatible to AutoCAD, Release 12. All drawings shall clearly identify the *works and services* in sufficient detail for layout and construction. Highway cross-sections may be hand-drawn, provided they are of good quality and clarity.

(4) All new *works and services* are to be drafted in bold lines.

(5) Notes pertaining to the construction of *works and services* are to be shown on that service drawing or on a title page.

(6) Baselines and chainages are to be referenced to legal posting on each sheet.

(7) Off-sets are to be shown to both sides of the road allowance, or to one side with the road allowance width annotated, and tied to property lines.

(8) Information on plans shall include:

(a) The legal layout of highways and properties;

(b) All legal descriptions, lots and plan numbers;

(c) Dimensions to the nearest 0.01 m;

(d) Existing house numbers; and

(e) All registered statutory rights-of-way and easements.

(9) A *complete* set of Engineering Design drawings shall include, in the followingsequence:

(a) Cover Sheet - noting:

(i) The Consultant's name, address and phone number;

(ii) The District file number;

(iii) *Owner*'s name address and phone number;

(iv) *Surveyor*'s name, address and phone number;

(v) The legal description of the lands involved;

(vi) A site plan at 1:5000 scale showing all proposed highways and the compatibility of the proposed subdivision layouts to the existing highway system;

(vii) An index;

(viii) General notes.

(b) Key Plan - may be at a 1:1000 scale but should typically be at a 1:500 scale noting:

(i) All proposed services, including *street* lighting, post boxes, gas, electrical, telephone, cable, sewer, water, drainage and all non-standard connection off-sets,

(ii) If more than one sheet is required, note the westerly or southerly portion first and identify as Key Plan "A" with additional plans noting "B" and "C", etc.; and

(iii) The *development* site is to be outlined with a bold line.

(c) Site Grading Plan - shall be at 1:500. The Plan shallnote:

(i) The post-*development* contour lines at maximum 1 m intervals. These contour lines should match to the pre-*development* contour lines at the *development* boundary, or as designed by the Consulting Engineer. The existing topographic information shall extend a minimum 30 m outside the *development* site;

(ii) all existing corner lot elevations (not circled);

(iii) all proposed corner lot elevations (circled);

(iv) the proposed building envelope with the Minimum Building elevation (M.B.E.) noted;

(v) the slope of the lot (directional arrow), noting a minimum 1% grade on the lots:

(d) Stormwater Management Plan – shall be at a scale of 1:500, 1:1,000 or 1:2000 depending on the scope of the Plan area. A key plan system shall be used if more than one sheet is required. The *Stormwater Management Plan* shall note:

(i) The delineation of all on-site and off-site catchment and sub-catchment drainage boundaries for lands which contribute runoff to the drainage system being designed or reviewed. All sub-catchments and catchments shall be represented with a unique identification label and the area, in hectares, for each shall also be clearly noted on the Plan.

(ii) The minor (10-year return) storm sewer system with the accumulated flows noted for each reach of the conveyance system. Provision shall be made for upstream *development* potential where applicable;

(iii) The major (100-year return) stormwater system. The Plan shall note for each reach of the conveyance system whether the major system is below or above surface grade. If the major flow (or portion of) is expected to be above grade, the Plan shall show the routing and design flow rates for the overland portion;

(iv) All swales proposed to effect the submitted *Storm Water Management Plan*. It is policy in Sechelt to avoid surface drainage from one lot to cross another adjacent lot. Where grading is not feasible to direct surface drainage away from adjacent lot(s), swales shall be incorporated generally on the upstream side of the downstream lot. An easement is required over any lot accepting drainage from more than one up-stream lot. In addition, when a swale is proposed over several lots, a lawn basin, connected to a storm sewer system, is to be provided at every third lot;

(v) How the *development* proposal will affect adjacent lands. No surface drainage shall be proposed to flow *off-site* over adjacent lands. The perimeter of the site shall be made to "meet" existing elevations along the *development* boundary;

(vi) Where applicable, the proposed means of providing stormwater detention, infiltration or other forms of flow control, complete with details of the proposed control facility and sizing computations.

(vii) A legend noting all items proposed in the *Storm Water Management Plan*. Applicable "General Notes" should also be included;

(viii) A sediment control plan which describes how sediments will be contained on site during the construction process. Depending on the scale and amount of information being presented on the Stormwater Management Plan, a separate *Sediment Control Plan* drawing may be required.

(e) Highway and Water - Plan and profile drawings shall be to a minimum scale of 1:500 horizontal for plan and 1:50 vertical for profile; larger scale plans such as 1:250 may be required in some cases to show detail. The drawings shall show:

(i) All grades at centre line and gutters, vertical and horizontal curves, curve design data, inverts, radii, valves, catch basins, hydrants, bends, ground profiles at property lines, etc.;

(ii) The full pipe shall be shown on the profile;

(iii) All crossover points with sewers shall be noted. Where the invert of the water main is less than 0.3 m above the top of any sewer, protection in accordance with Ministry of Health requirements shall be noted and detailed;

(iv) The size, class, type, length and slope of each continuous pipe section;

(v) The size, type, elevation and invert of each appurtenance; and

(vi) Each appurtenance is to be itemized on plan.

(f) Storm and Sanitary Sewers - Plan and profile drawings shall be to a minimum scale of 1:500 horizontal for plan and 1:50 vertical for profile; larger scale plans such as 1:250 may be required in some cases to show detail. The drawings shall show:

(i) Grades, inverts, manholes, catch basins, etc.;

(ii) Symbols to denote the service connection elevation at the property line shall be shown on the profile;

(iii) Design flows and pipe full capacities listed for each reach of the system;

(iv) The minor and major system hydraulic grade lines (HGL) on the profile;

(v) The full pipe shall be shown on the profile;

(vi) Rim elevations are required for all manholes, catch basins and cleanouts;

(vii) The size, class, type, length and slope of each continuous pipe section;

(viii) Clearance between main and crossover points with over utilities;

(ix) Chainage and invert of each appurtenance shall be shown on profile; and

(x) Stormwater control systems, including calculations and construction details; and

(xi) A site plan identifying the catchment area for sanitary sewer.

(g) Highway Cross-Sections - These plans may be hand drawn provided they are of good quality and clarity. They shall be scaled at 1:100 horizontal and 1:50 vertical and shall show:

(i) Existing ground elevation, the proposed elevations of the highway centreline, the curb and gutter (or highway edge) and property lines;

(ii) Cross-sections every 20 m intervals; and

(iii) Additional sections may be required or requested where excessive cuts or fills are involved.

(iv) Proposed driveway details in cut and fill sections where slopes require site specific design to meet driveway slope criteria.

(h) *Street* Lighting Plan - shall be to a scale of 1:500,and:

(i) Shall be signed and sealed by a Professional Electrical Engineer;

(ii) Shall include General Notes and a legend;

(iii) The legend shall include:

(iv) Make, model and type of light standard to be used;

(v) Mounting height; and

(vi) Make, model, wattage and type of luminarie;

(vii) Shall show photometric calculations in table form on the plan;

(viii) Proposed location of service base and hydro power service box;

(ix) Off-set and chainage of each pole; and

(x) Street lights shall be located in conformance with Part 15.

(i) Construction Details - shall show all proposals for construction which are not covered or specifically detailed in the Construction Specifications and Standard Detail Drawings. Where there is a Municipal standard, refer to the standard drawing number. It is not necessary to include or provide detail when there is a standard drawing.

(j) Subdivision Landscaping Plan - at a scale of 1:500. It shall show all proposed *street* trees and *boulevard* plantings in relation to the key plan. The Consulting Engineer or Landscape Architect shall obtain *acceptance* of the outside utility agencies, where applicable. The Landscape Architect shall confirm locations of all existing and proposed rights-of-way.

(k) For small projects these drawings may be combined, provided they are of good quality and clarity.

(l) The Consulting Engineer's seal and signature shall be noted on all sheets of all design submissions. Failure to do so will result in the plans being returned without comment. The Consulting Engineer's seal and signature shall certify that all works, as proposed, are structurally sound, comply with the applicable Engineering Standards of this schedule, and good engineering practice.

(10) General Information

(a) The following additional information is to be noted in design submissions:

(i) All existing underground facilities *complete* with size, type of material inverts, off-sets and notes detailing connections and tie-ins, by whom, how, and at whose expense;

(ii) The clearance between mains at all cross-over points;

(iii) All existing structures, including houses, sheds, fences, poles, anchors, encroachments, wells, septic tanks and fields, shall be shown on the appropriate drawing(s) with annotation indicating their fate (i.e., to be removed, filled, etc.);

(iv) In semi-rural subdivisions, with an open ditch drainage system, note the size of (future) driveway culverts required to conform to the design.

(11) Submissions

(a) The first *complete* design submission shall be delivered to the Sechelt Municipal Offices and shall consist of:

(i) Two *complete* sets of drawings.

(ii) Soils report (to verify highway structure design) (Soils reports shall be required on all new highway construction design.)

(iii) Geotechnical report confirming suitability of site for lot *development*.

(iv) all applicable utility calculations (water, sanitary, storm sewer).

(v) A stormwater management report, where deemed necessary by the Director of

Engineering and Public Works, presenting all technical information used in the preparation of the stormwater management plan including, but not limited to, an initial assessment of the opportunity for on-site disposal of rainfall, the details of all hydrologic computations or modelling, sizing of stormwater management facilities, environmental and hydrogeological assessment studies.

(b) Subsequent design submissions requiring changes to the previous submission shall consist of:

(i) Two *complete* sets of drawings

(ii) A *complete* construction estimate (see Section 13)

(iii) All submissions subsequent to first submission shall have highlighted with yellow any changes made by the Consulting Engineer which are in addition to "Red Line" changes required by the District of Sechelt.

(iv) Items "Red Lined" shall be addressed by the Consulting Engineer. Failure to do so will result in submissions being returned.

(c) The final submission for municipal *acceptance* shall consist of four *complete* sets of drawings (one of which will be returned to the Consulting Engineer) and all supportingdocuments.

(12) Construction Estimate Calculation

The construction estimate shall be inclusive of all works and shall be broken down in a format as directed by the *Director of Engineering and Public Works*. The construction estimate will also be inclusive of all Engineering, Survey, Inspection, Mobilization, Hydro, Telephone and SCRD costs. These items and costs will be reviewed and amended by the *Director of Engineering and Public Works* where or if necessary. The above costs will be included in the calculation of the Administration fee.

(13) Service Connection Cards

The Engineering Department will provide, on request, a sufficient number of service connection cards for each *development*. These cards are to indicate clearly and accurately, the location and size etc., of each municipal utility connection. The municipal project number shall be required on all cards. Service Connection Cards are considered part of the "As-Built" submission.

(14) "As-Built" Submissions

The following procedures shall be followed in the submission of "As-Built" drawings for municipal *acceptance*.

(a) The Consulting Engineer shall submit two *complete* sets of paper prints and a *complete* set of connection cards for Municipal review. The submission shall include:

(i) Key plan noting water, sanitary, and storm mains, *street* lights, and roadworks. The plan shall show the as-constructed off-sets for those works, and the locations of all service connections relative to the lot lines;

(ii) Detailed plan profile drawings for water, sanitary, storm and roadworks; elevations, inverts, and off-sets to show the *works and services* as constructed. (The profile drawings for the utilities shall state the pipe materials, bedding, and backfill used);

(iii) Where required in the design submission, the *storm water management plan*;

(iv) Lot grading plan shall show:

(A) Elevations at all lot corner pins;
(B) Lawn basin, manhole, and catch basin rims;
(C) Swale inverts, GPE, and MBE for each lot;
(D) Location and elevation of *Owner* swales, Builder swales, ridge lines and flowdirections;
(E) Lots requiring engineered foundations;
(F) Lots on which fill exceeding 1.0 metre depth has beenplaced;
(G) Grade at the rear *building envelope* line (centre of lot). Uniform grades between lot corners will be assumed to a tolerance of ±200 mm;
(H) Locations of any statutory rights-of-way, or easements, and utilities running throughthe

property; and

(l) Overland flood routing.

(v) *Street* light drawings showing make, model and type of luminarie unit; locations of service bases, photocells and hydro service entrance;

(vi) Details for which there are no Municipal Standards (pump stations etc.);

(b) In all cases, notes with instructions to the *Contractor* are to be removed or amended to indicate the result(s) of construction. Previously existing *works and services* that have been deleted as a result of construction, or reconstructed in accordance with the design, shall be removed or amended to show *works and services* as constructed.

(c) The "As-built Drawings" shall show the *works and services* as they have been constructed in order to provide accurate and detailed information when adding to, or maintaining, the *works and services* shown on the plans.

(d) One set will be returned to the Consulting Engineer with any revisions noted in red;

(e) When the District of Sechelt is satisfied with the "As-Built" submission, the Consultant Engineer will be requested to submit the following:

(i) One set of mylar drawings identified in bold letters with the words "CERTIFIED AS- BUILT." Mylars shall not be taped together, and where originals are taped, every attempt should be made to match the printing densities of the component parts. Mylars will not be signed and sealed. One set of drawing files in AutoCAD format is also required.

(ii) Two sets of paper prints with the following certification:

"I certify this drawing represents the *works and services* as designed, installed, and inspected under my supervision."

(The signature and seal shall be by the *Director of Engineering and Public Works* who personally performed the required inspections. One set will be returned to the Consulting Engineer upon *acceptance* by the District of Sechelt.)

(iii) One copy of the "Certificate of Inspection" (Form F02 of Part 6 to the Subdivision and Development Control Bylaw). This form shall be signed by the Design Engineer.

(iv) *Complete* set of service connection cards.

(f) Once accepted by the District of Sechelt, the *Director of Engineering and Public Works* will automatically authorize a reduction of the security deposit, to reflect the *acceptance* of the drawings and the service connection cards.

(g) The Consulting Engineer's seal and signature shall be noted on all sheets of all design submissions. Failure to do so will result in the plans being returned without comment. The Consulting Engineer's seal and signature shall certify that all works, as proposed, are structurally sound, comply with the applicable Engineering Standards of the schedule, and good engineering practice.

PART 10 – DESIGN CRITERIA FOR MUNICIPAL SERVICES

A. WATER

74. GENERAL

(1) Water systems shall be designed to conform to the requirements of the Coast Garibaldi Health Unit, this Schedule, and requirements as set forth by the Sunshine Cost RegionalDistrict.

(2) All water main designs shall be submitted to the Sunshine Coast Regional District for review and approval prior to the beginning of construction.

(3) When private wells are required for land *development*:

(a) Each lot shall have its own well;

(b) Each well shall be tested and proven to comply with Guidelines for CanadianDrinking

(c) Water Quality - latest edition.

(d) Proof of compliance for each well shall be submitted to the *Director of Engineering and Public Works* prior to *final approval* of the subdivision.

75. PER CAPITA DEMAND

(1) Average daily domestic flow: 570 litres/capita/day

(2) Peak Day Demand:1364 litres/capita/day

(3) Peak Hour Demand: 1700 litres/capita/day

(4) Design populations used in calculating water demand shall be computed in accordance with the District of Sechelt's population predictions or with the planned *development* in the area to be served, whichever is larger.

(5) Hydraulic design computations shall be based on the Hazen-Williams formula:

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

Where:

Q	=	Rate of flow in l/s
C	=	Roughness coefficient (125 for all mains)
D	=	Internal pipe diameter in mm
S	=	Slope of hydraulic grade line in m/m

76. FIRE FLOW DEMANDS

(1) The requirements of this section are based on the publication "Water Supply for Public Fire Protection – A Guide to Recommended Practice in Canada 2020" published by the Fire Underwriters Survey (FUS), and any future amendments or newer publications.

(2) The following are minimum Fire Flows for different types of *development*s where the *development* is not protected by automatic fire sprinklers:

Developments	**Required Fire Flow**	
Single Family Residential	60	l/s
Apartments, Townhouses	90	l/s
Commercial	150	l/s
Institutional	150	l/s
Industrial	225	l/s

(3) Where each existing and future building on a lot is, or will be, constructed with an automatic fire sprinkler system protecting the entire building, the minimum fire flow provided to that lot may be reduced to the greater of:

(a) the minimum fire flow calculated in accordance with the Fire Underwriters Survey 2020 Guide allow for automatic fire sprinklers, or

(a) The minimum flow required to support the automatic fire sprinkler systems and all other water requirements for firefighting purposes on the lot.

(4) The Approving Officer and Chief Building Official may consider proposals for alternative solutions for subdivision applications and building permit applications, respectively, where a development does not meet the required fire flows. The intent is not to allow applicants to avoid necessary water infrastructure upgrades, but to provide a limited avenue to address development applications under certain circumstances.

(a) Proposed solutions must be based on a comprehensive analysis prepared by qualified professional engineers and the FUS 2020 Guide. For example, the use of sprinklers in non-designated buildings, and/or the use of Encapsulated and Rated Mass Timber, Non-Combustible Construction, and/or Fire Resistive Construction to reduce required fire flows to close the gap between that and existing fire flows.

(b) The Approving Officer and the Chief Building Official shall consider the most recent FUS evaluation of the Sechelt Fire Department along with the financial, asset management, and sustainability implications for the developer, future homeowners, the surrounding neighbourhood, and the District at large when evaluating such proposals.

77. WATER PRESSURES

(1) As per requirements of the Sunshine Coast Regional District except as noted.

Minimum pressure at Peak Hour Demand: 300 kPa

(2) All service connections where the services pressure exceeds 517 kPa shall be individually protected by pressure reducing valves in the dwelling.

78. HYDRAULIC NETWORKS

(1) Designs shall accommodate the ultimate *development* projection using either the peak Day Demand plus Fire Flow, or the Peak Hour Demand, whichever has the greater effect on pressure and flow.

(2) Depending on the complexity and extent of the proposed distribution system, the District of Sechelt may require a hydraulic analysis design showing minimum flows and pressures.

(3) Pipe segments shall not be designed to have velocities exceeding 1.5 m/s or head loss exceeding 1 m per 100 m of length under Peak Day or Peak Hour design conditions, whichever is greater.

79. WATERMAIN GRADES

The minimum grade for a main shall be 0.1%. The maximum grade shall be 15% unless provision is made to anchor the pipe to the bottom of the trench with concrete anchor blocks.

80. VALVES

(1) In general, valves shall be located as follows:

(a) At intersections, in a cluster at the pipe intersection or at hydrant tees the minimum shall be:

(i) 3 valves at "X" intersection

(ii) 2 valves at "T" intersection

(b) So that specific sections of mains may be isolated.

(c) Valves shall be provided in all legs of "X" or "T" intersections in industrial areas.

(d) Spacing of valves in industrial areas shall isolate no more than 1 hydrant or 2 service connections.

(e) Spacing of valves shall not be more than 200 m apart for single family residential areas or 150 m apart for commercial areas. All other *zone*s shall require special designs.

(f) So that not more than 1 hydrant is to be isolated per valve.

(2) Valves shall be the same diameter as the main up to 300 mm diameter. For mains larger than 300 mm in diameter, valves shall be no more than one diameter size smaller.

81. HYDRANTS

(1) Fire Hydrants shall be located, in general, at *street* intersections, and at a maximum spacing of 150 m in residential areas with no lot further than 75 m from a hydrant. In high density residential, commercial, and industrial areas, hydrants shall be located at a maximum of 75 m or as approved by the *Director of Engineering and Public Works*.

(2) In mid-block locations, fire hydrants shall be located at the property lines. It shall be the Consultants' responsibility to ensure the design and proposed locations of the fire hydrants will not conflict with existing or proposed *street* lights, power poles, driveways, kiosks, and other structures.

82. THRUST BLOCKING

Concrete thrust blocking shall be provided at valves, bends, tees, wyes, reducers, plugs, caps, and blow-offs. Thrust block sizes shall be indicated on the design drawings.

83. SERVICE CONNECTIONS

(1) Minimum 25 mm diameter service connections shall be required for all lots. These connections shall typically be located at the centreline of the lot and the curb stop located at 300 mm from the property line, or the highway right-of-way.

(2) A corporation stop and a curb stop shall be installed for each connection 50 mm diameter in size or smaller.

84. WATER SYSTEM LOCATION/CORRIDORS

(1) Watermains shall be located within the highway right-of-way as noted in the applicable *Standard Drawings* for highway cross-sections unless otherwise approved by the *Director of Engineering and Public Works*.

(2) When the watermain is required to cross private lands, the right-of-way shall be a minimum of 3 m wide.

(3) When a watermain, manholes, valve chambers, or other appurtenances are located within the right- of-way, the *Owner* may be required to provide access from a Municipal highway for maintenance vehicles. The maintenance access shall be constructed as shown in Standard Drawing and be adequate to support the maintenance vehicles for which the access is intended.

85. PRIVATE WELLS

(1) Minimum Yield

Private wells shall provide a quantity of not less than 2,500 litres per lot per day, provide a sustained yield of 9 litres per minute for a minimum of 4 hours.

(2) Well Certification

The certification required pursuant to clause 8.02.02 of the Bylaw shall be in accordance with Form F-5.

(3) Well Test Report

If there are two wells or less in the proposed *development*, a certification by a *Professional Engineer* based upon a water well *contractor*'s report or well testing *contractor*'s report will be sufficient. Where well yield is considered marginal (±10%) by the certifying engineer or where more than two wells are involved, a Hydrogeological Evaluation of the proposed *development* is required.

(4) Well Testing Procedure

(a) *Complete*d wells shall be pumped continuously at a constant rate for a minimum period of four hours. The tested rate shall be at or greater than the required 13,000 l/d (9 litres per minute). While the test is running, the following measurements shall be made and recorded on Form F- 6.

(i) Water levels in the well;

(ii) Pumping rate (shall be constant);

(iii) Time that all readings were made;

(iv) Notes on colour, smell and taste of water pumped; and

(v) Notes on weather conditions at the time of testing.

(b) Recording of well testing data shall be in accordance with the following procedure:

(i) Depths to water (or drawdown) during the pumping test and recovery after the pump is turned off are to be measured in the pumped well and in nearby observation wells. These measurements should be recorded to the nearest 0.01 m.

(ii) The time intervals for both drawdown and recovery readings should be short enough to adequately record any rapid drawdown during start of pumping and any rapid recovery immediately after pump shut down. The time interval after these initial periods can then be gradually lengthened between the readings.

(iii) The pumping rate is to be expressed in litres per minute (lpm). In the final "constant rate" test, the pumping rate is to remain constant throughout the period of pumping. This test will involve continuous pumping at a constant rate for four hours or longer, if necessary, to determine a reliable drawdown trend.

(iv) Optional step drawdown tests or "maximum drawdown" tests can be used initially to determine the ideal rate if the test is to be run at rates higher than the required 9 lpm rate. When the test has been run for 240 minutes or sufficiently long enough to determine a reliable drawdown trend the test pump is turned off. Water levels in the well should also be recorded during the recovery period in the same manner as during the pumping test.

(v) The suggested schedule for readings both during and following the test is provided in the following:

(A) Readings every minute from 1 to 10 minutes and then every five minutes from 10 to 60 minutes (one hour), then readings every 15 minutes thereafter.

(B) A preferred method for ease in plotting the data, but one that is sometimes hard to comply with, is as follows:
Readings every 30 seconds from 1 to 5 minutes;
Readings every minute from 5 to 10 minutes; Readings every 2 minutes from 10 to 20 minutes;
Readings every 5 minutes from 20 to 50 minutes;
Readings every 10 minutes from 50 to 100 minutes; Readings every 20 minutes from 100 to 200 minutes; and Readings every 60 minutes thereafter until the end of the test.

(C) If the well level does not return to the pre-test level within 240 minutes, then one reading should be made on the next day following the test.

(c) Results of the well test shall be presented as follows:

(i) Time and water level data shall be plotted on Form F-7. Water levels may be expressed in depth to water or drawdown relative to the initial water level. Normally the graph will be a straight line. Bends in the line suggest that the water-bearing *zone* is not extensive and that boundary conditions exist. If the slope of the line increases by a factor of three during the test, a *Professional Engineer* with groundwater experience will be required to interpret the test data.

(ii) The drawdown at 10 minutes (Sh1) and at 240 minutes (Sh2) shall be determined using the attached Form F-7 and the equivalent daily rate drawdown values, SL1 and SL2, calculated using the formulas provided at the bottom of Form F-7.

The formulas are:

$$SL_1 = \frac{Q_L}{Q_h} \cdot Sh_1$$

$$SL_2 = \frac{Q_L}{Q_h} \cdot Sh_2$$

QL	=	required minimum daily yield
	=	2500 litres/day
	=	1.74 litres/minute
Qh	=	pumped rate in litres per minute;
	=	Qh shall equal or exceed 9 litres per minute.

(iii) Plot the calculated values for SL1 and SL2 at each values appropriate time interval (10 minutes for SL1 and 240 minutes for SL2) on Form F-7. Draw a straight line between the two points and continue the line to the 30 day period on Form F-7. Read the long term drawdown value S30 from the vertical axis adjacent to the intersection of the drawn line at 30 days.

(iv) Initial static water level depth (DTW) plus drawdown (S30) plus seasonal water level decline (D), plus safety factor (SF) shall not exceed planned depth to pump suction (intake), as calculated on Form F-7.

(d) All relevant data on the well and the testing program shall be summarized on Form F-8.

(5) Hydrogeological Evaluation

(a) Where there are three or more wells proposed in a *development*, or where the yield is considered marginal pursuant to Clause W18.3, a Hydrogeological Evaluation of the proposed *development* shall be provided. Such evaluation shall include the following information:

(i) Geologic maps of the area and environs, showing regional surficial geologic units, location of known springs, seeps and existing wells or test holes, together with proposed subdivision layout, location of new or proposed wells and septic system tile fields.

(ii) Hydrogeologic sections drawn through the area of the proposed subdivision showing inferred major hydrogeologic units (aquifers), water tables, piezometric lines and probable groundwater flow direction.

(iii) Detailed logs of subdivision wells and summary information on existing wells on properties surrounding the subdivision.

(iv) Constant rate pump test data on all subdivision wells.

(v) Summary and interpretation of chemical and biological test results on well water samples.

(vi) Summary of hydrogeologic impact assessment considering the following factors:

(A) Impact of each proposed well on neighbours' wells, both within and adjacent to the proposed subdivision.

(B) Potential for degradation of well water quality resulting from septic tanks, agricultural commercial operations.

(C) Long term impact of the proposed wells on the source aquifer.

(vii) A certification in the form of Form F-5 is required in support of the Evaluation Report.

B. DRAINAGE DESIGN CRITERIA

86. INTRODUCTION

(1) All drainage works shall be designed with considerations for public safety, regulatory requirements, economic benefits, and the natural environment.

(2) Designers shall consult with the Engineering Department to determine what existing information may be of assistance to them.

(3) The presence of an existing municipal drainage system does not mean, or imply, that the system has adequate capacity to receive the proposed design flows, nor does it indicate that the existing system pattern is acceptable to the District of Sechelt. Existing facilities which are undersized or inadequate to accept additional drainage shall be upgraded at the *Owner*'s expense to accommodate the appropriate flows. Alternative drainage proposals may be considered.

(4) It shall be shown that all downstream drainage facilities are capable of handling the projected increase in runoff created by the proposed *development*.

(5) Proper erosion and sediment control is required for all *development*s or works discharging runoff into the municipal drainage system and/or natural *watercourse*s (Refer to Section 2.3.8.11).

87. STORMWATER MANAGEMENT

(1) General

(a) Stormwater Management is the planning, analysis, and control of storm runoff in consideration of the entire watershed. The design of the drainage system shall incorporate techniques such as minor-major systems, lot grading, surface infiltration, subsurface disposal, storage, erosion control, and other acceptable methods to mitigate the runoff impacts due to changes in land use.

(b) A comprehensive Stormwater Management Plan is required for all *development*s except in rural or agricultural areas where developed property is over 0.405 ha and over, unless otherwise approved by the Director of Engineering and Public Works. The plan shall include all drainage facilities, lot grading (showing pre and post-*development* ground elevations), major flood path routing, and all other appropriate information pertinent to the design. The plan shall address the impacts of both pre- and post-*development* upstream flows entering the *development* site, and identify all downstream improvements to accommodate the predicted post-*development* flow.

(c) The Stormwater Management Plan shall include the following information:

(i) Tributary areas in the catchment including existing and ultimate land uses.

(ii) The development area within the drainage catchment including all features such as roads, natural watercourses, drainage control structures, storm sewers, culverts, and storage facilities.

(iii) A review of the site specific opportunities to implement practical on-site features which may retain the 50% of the Mean Annual Rainfall (MAR) volume, and then incorporating such features where deemed appropriate.

(iv) Hydrologic and hydraulic calculations summarized in table form and supporting parameters.

(v) Minor and major flow routing

(2) Best Management Practices

(a) In addition to ensuring there is adequate stormwater conveyance and peak flow attenuation, there are additional measures, or Best Management Practices (BMP's), that shall be implemented to protect stormwater runoff quality in higher risk areas. Specific practices for the control of stormwater runoff quality shall be applied to all multi-family residential, industrial, commercial, parking lots, public and institutional uses, or where there is a risk of point source pollution.

(b) The table below lists potential BMP's and appropriate application which should be considered and implemented where practical. This list is not exhaustive. There may be alternatives which the Applicant's Engineer may wish to propose. All BMP's shall satisfy the Municipal Engineer.

Best Management Practice	**Typical Applications**
Coalescing Plate Oil/Water Separator or Equivalent (mandatory for noted applications)	Gas stations, automotive service facilities, auto recycling facility.
Vegetated filter strips	All uses
Biofiltration swale	All uses
Sump manholes and catch basins with trash hoods	All uses
Covered containment area	All commercial, industrial or agricultural chemical handling and storage areas.
Infiltration into ground	All uses
Constructed Wetland / Stormwater Detention	All uses

The noted Best Management Practices are intended for water quality control and do not necessarily perform a function of runoff control.

(3) Minor and Major Systems

(a) The Minor System comprises on-site retention systems, storm sewers, culverts, channels, and flow control facilities designed to collect and carry the runoffs from frequent storm events. Flow control facilities include detention/retention ponds, exfiltration trenches, dry wells, and other acceptable methods suitable for reducing the rate of runoff into the downstream drainage system.

(b) The minor system shall be designed to prevent watercourse erosion, flooding and property damage and minimize public inconvenience caused by storm events with a 1 in 10 year return frequency. The runoff from the minor storm is referred to as the minor flow.

(c) The Major System comprises surface flood paths, swales, roadways, *watercourse*s and flow control facilities designed to accommodate the runoff from rare and intense storms.

(d) The major system shall be designed to protect the public and prevent significant property damage due to floods caused by storm events with the return frequency of 1 in 100 years. The runoff from the major storm is referred to as the majorflow.

(e) Roadways, overland flow paths, channels, and *watercourse*s shall be designed to ensure that the maximum hydraulic grade line is below the lowest existing or proposed minimum building elevation of adjacent buildings. Surcharging at the inlet under the major flow is acceptable provided the headwater profile does not rise above the *Minimum Building Elevation*. Adequate erosion protection shall be required where surcharging is proposed.

(f) In the event that surface flow is not feasible or that the inlet facility is likely to be blocked or restricted, consideration shall be given to sizing the storm sewer system to accommodate the major flow.

(4) Design Frequencies

In general, the design of stormwater management system components is required to accommodate a number of variable storm runoff rates and volumes generated by storms of certain recurrence intervals. The following storm return frequencies shall be used for the design of the drainage and stormwater management system components:

Drainage System Component	Hydrologic Variables	Hydrologic Design Basis
On-site Minor Disposal System (where proven to be appropriate)	Mean Annual Rainfall (MAR) volume, infiltration rate of native soils, groundwater levels	On-site disposal features to retain 50% of the Mean Annual Rainfall (MAR) volume.
Minor conveyance system comprising the storm sewers, driveway culverts, low flow channels, and watercourses.	Peak flow rate, flow depth, duration and base flow rates.	1:10 year design storm with winter condition antecedent moisture condition.
Minor system storage facility (permanent community storage or interim on-site storage).	Runoff volume, depth, freeboard, peak inflow rate, control discharge rate, time to empty, base flow rates.	Storage capacity to reduce the post-development flows to their respective pre-development levels up to the 1:5 year event.
Major system comprising the surface flow paths, roadways, storage facility overflows and watercourses.	Peak flow rate, flow depth, duration, storage outflow and overflow rates, runoff volumes.	1:100 year design storm with winter condition antecedent moisture condition. Sufficient freeboard above the maximum hydraulic grade line shall be provided to protect buildings.
Culverts, bridges, and other crossing structures	Peak flow rate, depth and freeboard, backwater effect, fish passage.	1:100 year design storm and / or with safe overflow to protect Town infrastructure and private property.

(5) Runoff Analysis

(a) 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 and be subject to the overall drainage plan established by the District through any Master Drainage Plans (MDP), Neighbourhood Concept Plans (NCP), or other area servicing plans established for the catchment in which the subject property is located.

(b) Storm drainage systems 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 drainage system shall be signed and sealed by the design engineer and submitted to the District of Sechelt.

(c) For *development*s where the total tributary area is 10 hectares or less, the Rational Method shall be used to compute the peak runoffs.

(d) For *development*s where the total tributary area is greater than 10 hectares, the Runoff Hydrograph Method shall be used to compute the peak runoffs. The Runoff Hydrograph Method shall also be used for the design of storage facilities with tributary areas greater than 10 hectares.

Rational Method

(e) The Rational Method calculates the peak flow using the formula:

Q = RAIN

	Q	=	Flow, cubic metres/second
Where:	R	=	Runoff Coefficient x Soil Adjustment Factor (SAF)
	A	=	drainage area in ha
	I	=	rainfall intensity in mm/h
	N	=	0.00278

(f) Runoff Coefficients:

Unless otherwise specified the following runoff coefficients/guidelines can be used for the Rational Method:

Land Use	**Percent Imperv.**	**10 Yr. Runoff Coeff.**	**100 Yr. Runoff Coeff.**
Suburban Residential*	20	0.35	0.40
Low Density Residential	45	0.50	0.55
Medium Density Residential	65	0.60	0.65
High Density Residential	78	0.70	0.75
Commercial	90	0.80	0.85
Industrial	90	0.80	0.85
Institutional (i.e. Schools)	80	0.75	0.80
Parks/Grasslands	20	0.20	0.30
Cultivated Fields	30	0.30	0.40
Woodlands	5	0.10	0.30

* Average lot 0.5 ha or greater

(g) Catchment Area

(i) The tributary area used for the design of the storm drainage system shall be consistent with the actual contours of the land. Reference should also be made to the most recent District of Sechelt Drainage Study. Although minor changes in the catchment boundaries may be necessary for *development*, the total developed tributary area should not deviate from the total natural drainage area.

(ii) The Designer is responsible for obtaining true and accurate surface elevations for the analysis.

(h) Time of Concentration

The time of concentration is the time required for water to flow from the most remote part of the catchment area under consideration to the design node. For both urban and rural areas, the time of concentration consists of the following formula:

Tc = Ti + Tt

Where:	Tc	=	time of concentration (minutes)
	Ti	=	inlet or overland flow time (minutes)
	Tt	=	travel time in sewers, ditches, channels or *watercourse*s (minutes)

(i) Inlet or Overland Flow Time (Ti)

(i) Typical inlet times for urban areas are as follows:

Single Family Lot	15 minutes
Multi-Family Lot	10 minutes
Commercial/Industrial/Institutional	10 minutes

(ii) The inlet time in rural areas shall be calculated using the Airport Method:

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

Where: Ti = inlet time (minutes)
C = runoff coefficient (Section 2.3.4.1)
L = travel distance (m), maximum length = 300 m S
= slope of travel path (%)

(j) Travel Time (Tt)

(i) The travel time in sewers, ditches, channels or *watercourse*s can be estimated using the following formula:

$$Tt = \frac{C_t\,L\,n}{12\,s^{0.5}}$$

Where Tt = travel time (minutes)
Ct = flow travel coefficient (0.5)
L = length of flow (m)
n = roughness coefficient
0.050 Natural channels
0.030 Excavated ditches
0.013 Concrete lined channels
0.013 Concrete or PVC pipe
s = slope in m/m

(ii) The above equation provides an approximate travel time which shall be corrected with the actual time of flow calculated from the 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.

(k) Rainfall Intensity

The rainfall intensity for the Rational Formula shall be determined from the rainfall Intensity-Duration-Frequency (IDF) curve based on the calculated time of concentration. Figure 2.3.1 shows the IDF curve.

(l) Presentation of Rational Calculations

The Designer will be required to tabulate the rational calculations on Table 2.3.1 for submission along with the appropriate plans and other relevant information.

DISTRICT OF SECHELT

STORM SEWER DESIGN - RATIONAL METHOD

Q=RAIN

Q = Runoff(m3/s)
R = Runoff Coeff x SAF
A = Area(ha)
I = Rainfall Intensity (mm/h)
N = 0.00278

Ti = Inlet Time(min)
Tt = Travel Time(min)
Tc = Time of Conc(min)
Qcap = Capacity(m3/s)

ø = Pipe Diam (mm)
n = Roughness Coeff
s = Slope of Pipe (%)
V = Velocity (m/s)
L = Length (m)

LOCATION _____
REF No. _____
Storm Frequency ____ Year

Date: _____
Calc By: _____
Sheet: ____ of ____

Location	From	To	Tributary Area			Time of Flow			Storm		Sewer Design						Adj	Comments
			R	A ha	Σ RA	Ti min	Tt min	Tc min	I mm/h	Q m3/s	Qcap m3/s	ϕ mm	n	s %	V m/s	L m	Tt min	

TABLE 2.3.1

ATMOSPHERIC ENVIRONMENT SERVICE - ENVIRONMENT CANADA
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE - ENVIRONNEMENT CANADA
PREPARED BY - PREPARE PAR LE
SHORT DURATION RAINFALL INTENSITY-DURATION FREQUENCY DATA FOR-
DONNEES SUR L'INTENSITE,LA DUREE ET LA FREQUENCE DES CHUTES DE PLUIE DE COURTE DUREE A VANCOUVER UBC
BC
GUMBEL-METHOD OF MOMENTS
METHODE DES MOMENTS
BASED ON RECORDING RAIN GAUGE DATA FOR THE PERIOD- 1958 - 1990 33 YEARS/AN
BASEES SUR LES DONNEES DU PLUVIOGRAPHES POUR LA PERIOD
LATITUDE 49° 15'
LONGITUDE 123° 15'
ELEVATION/ALTITUDE 85 M
UNRELIABLE ESTIMATES
- - - SUJET A CAUTION
RETURN PERIODS
PERIODE DE RETOUR
YEARS/ANS
100
50
25
10
5
2
INTENSITY - MM/HOUR
INTENSITE EN MM/HEURE
DURATION DUREE
MINUTES
HOURS HEURES
FIGURE 231

)

(6) Runoff Hydrograph Method

(a) Selection of Modelling Program

For basins larger than 10 hectares, hydrologic programs shall be used for runoff analyses. Standard runoff simulations shall use models such as the OTTHYMO.89 or MIDUSS programs. The EPA-Stormwater Management Model (SWMM), the Illinois Urban Drainage Area Simulator (ILLUDAS), and other hydrologic programs may be considered if their uses are deemed necessary and approved by the *Director of Engineering and Public Works*.

(b) Design Storms

(i) Single-event design storms, with durations 30 minutes to 24 hours and various return frequencies, are listed in Table 2.3.2 to Table 2.3.4. These hyetographs were developed using AES rainfall data and rainfall distribution curves from AES and the US Soil Conservation Service (SCS). The average rainfall intensities for various duration storms are listed in Table 2.3.5.

(ii) The tabulated data are suitable for most hydrological studies. However, the simulation of large watersheds or complex drainage systems (i.e. systems involving flood boxes and pump stations) may require extended duration storms or continuous rainfall data. It is incumbent on the Designer to obtain the appropriate rainfall data for the analysis.

TABLE 2.3.2

RAINFALL HYETOGRAPHS 1:2YEAR STORM INTENSITY - VANCOUVER UBC STATION													
	MODIFIED AES SHORT STORM (mm/hr)						AES LONG STORM (mm/hr)					SCS Type 1A	
Rain (mm)	7.1	9.8	13.6	17.7	20.9	24.0		26.4	32.1	36.4	40.4		55.7
Time (min)	30min	1hour	2hour	3hour	4hour	5hour	Time (min)	6hour	8hour	10hour	12hour	Time (min)	24hr
0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	9.33	5.88	4.08	3.55	3.26	2.88	10	3.17	2.89	2.62	2.42	30	1.11
10	15.27	7.06	4.08	3.53	3.01	2.88	20	3.17	2.89	2.62	2.42	60	1.11
15	17.82	10.58	4.90	3.55	3.14	2.88	30	3.17	2.89	2.62	2.42	90	1.39
20	21.21	10.58	4.90	4.25	3.14	2.88	40	3.70	2.91	2.60	2.42	120	1.39
25	12.72	11.76	7.34	4.25	3.76	2.88	50	3.69	3.37	2.62	2.45	150	1.67
30	8.86	12.94	7.34	4.25	3.76	3.46	60	3.69	3.35	3.06	2.42	180	1.67
35		16.46	7.34	6.37	3.76	3.46	70	4.77	3.37	3.06	2.84	210	1.95
40		12.94	7.34	6.37	3.76	3.46	80	4.75	3.37	3.08	2.81	240	1.95
45		9.41	8.16	6.37	5.64	3.46	90	4.75	4.33	3.06	2.84	270	2.51
50		8.23	8.16	5.67	5.64	3.46	100	4.23	4.33	3.06	2.81	300	2.51
55		7.06	8.98	5.67	5.64	5.18	110	4.21	4.33	3.93	2.81	330	3.34
60		4.70	8.98	5.65	5.64	5.18	120	4.23	4.33	3.93	2.84	360	3.34
65			11.42	7.80	5.02	5.18	130	4.23	3.85	3.93	3.64	390	4.73
70			11.42	7.80	5.02	5.18	140	4.21	3.85	3.93	3.64	420	4.73
75			8.98	7.77	5.02	5.18	150	4.23	3.85	3.93	3.64	450	5.85
80			8.98	7.80	5.02	4.61	160	6.34	3.85	3.49	3.64	480	5.85
85			6.53	7.80	6.90	4.61	170	6.34	3.85	3.49	3.64	510	4.46
90			6.53	7.77	6.90	4.61	180	6.34	3.85	3.49	3.64	540	4.46
95			5.71	9.92	6.90	4.61	190	4.77	3.85	3.49	3.22	570	3.62
100			5.71	9.90	6.90	4.61	200	4.75	3.85	3.49	3.25	600	3.62
105			4.90	9.94	6.90	6.34	210	4.75	5.78	3.49	3.22	630	3.34
110			4.90	7.80	6.90	6.34	220	4.75	5.78	3.49	3.22	660	3.34
115			3.26	7.80	6.90	6.36	230	4.75	5.78	3.49	3.25	690	2.79
120			3.26	7.77	6.90	6.34	240	4.75	5.78	3.49	3.22	720	2.79
125				5.67	8.78	6.34	250	4.77	4.33	3.49	3.22	750	2.23
130				5.67	8.78	6.34	260	4.75	4.33	5.24	3.25	780	2.23
135				5.65	8.78	6.34	270	4.75	4.33	5.24	3.22	810	2.51
140				4.95	8.78	6.34	280	4.23	4.31	5.24	3.22	840	2.51
145				4.95	6.90	6.34	290	4.21	4.33	5.24	3.25	870	1.67
150				4.97	6.90	6.34	300	4.23	4.33	5.24	3.22	900	1.67
155				4.25	6.90	8.06	310	4.23	4.33	3.93	4.85	930	2.23
160				4.25	6.90	8.06	320	4.21	4.33	3.93	4.85	960	2.23
165				4.25	5.02	8.06	330	4.23	4.33	3.93	4.85	990	1.67
170				2.82	5.02	8.06	340	3.69	4.33	3.95	4.85	1020	1.67
175				2.82	5.02	8.06	350	3.71	4.31	3.93	4.85	1050	1.39
180				2.82	5.02	6.34	360	3.66	4.33	3.93	4.85	1080	1.39
185					4.39	6.34	370		3.85	3.91	3.64	1110	1.11
190					4.39	6.34	380		3.85	3.93	3.64	1140	1.11
195					4.39	6.34	390		3.85	3.93	3.64	1170	1.39
200					4.39	6.34	400		3.87	3.95	3.64	1200	1.39
205					3.76	4.61	410		3.85	3.93	3.61	1230	1.11
210					3.76	4.61	420		3.85	3.95	3.64	1260	1.11
215					3.76	4.61	430		3.85	3.93	3.64	1290	1.11
220					3.76	4.61	440		3.85	3.93	3.64	1320	1.11
225					2.51	4.61	450		3.37	3.93	3.64	1350	1.39
230					2.51	4.03	460		3.37	3.49	3.64	1380	1.39
235					2.51	4.03	470		3.37	3.49	3.64	1410	1.11
240					2.51	4.03	480		3.39	3.49	3.64	1440	1.11
245						4.03	490			3.49	3.61		
250						4.03	500			3.49	3.64		
255						3.46	510			3.49	3.64		
260						3.46	520			3.47	3.64		
265						3.46	530			3.49	3.64		
270						3.48	540			3.49	3.64		
275						3.46	550			3.49	3.22		
280						2.30	560			3.06	3.25		
285						2.28	570			3.06	3.22		
290						2.30	580			3.06	3.22		
295						2.30	590			3.08	3.25		
300						2.28	600			3.01	3.22		
305							610				3.22		
310							620				3.25		
315							630				3.22		
320							640				3.25		
325							650				3.25		
330							660				3.22		
335							670				2.84		
340							680				2.81		
345							690				2.81		
350							700				2.84		
355							710				2.81		
360							720				2.88		
Rain (mm)	7.1	9.8	13.6	17.7	20.9	24		26.4	32.1	36.4	40.4		55.7

TABLE 2.3.3

RAINFALL HYETOGRAPHS 1:10 YEAR STORM INTENSITY - VANCOUVER UBC STATION													
MODIFIED AES SHORT STORM (mm/hr)							AES LONG STORM (mm/hr)					SCS Type 1A	
Rain (mm)	10.9	14.6	18.2	23.2	27.1	31.4		34.3	42.6	49.6	56.2		81.2
Time (min)	30min	1hour	2hour	3hour	4hour	5hour	Time (min)	6hour	8hour	10hour	12hour	Time (min)	24hr
0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	14.32	8.76	5.46	4.65	4.23	3.77	10	4.12	3.83	3.57	3.37	30	1.62
10	23.44	10.51	5.46	4.62	3.90	3.77	20	4.12	3.83	3.57	3.37	60	1.62
15	27.35	15.77	6.55	4.65	4.07	3.77	30	4.12	3.83	3.57	3.37	90	2.03
20	32.56	15.77	6.55	5.57	4.07	3.77	40	4.80	3.86	3.54	3.37	120	2.03
25	19.53	17.52	9.83	5.57	4.88	3.77	50	4.79	4.47	3.57	3.41	150	2.44
30	13.60	19.27	9.83	5.57	4.88	4.52	60	4.80	4.45	4.17	3.37	180	2.44
35		24.53	9.83	8.35	4.88	4.52	70	6.19	4.47	4.17	3.95	210	2.84
40		19.27	9.83	8.35	4.88	4.52	80	6.17	4.47	4.20	3.91	240	2.84
45		14.02	10.92	8.35	7.32	4.52	90	6.17	5.75	4.17	3.95	270	3.65
50		12.26	10.92	7.43	7.32	4.52	100	5.49	5.75	4.17	3.91	300	3.65
55		10.51	12.01	7.43	7.32	6.78	110	5.47	5.75	5.36	3.91	330	4.87
60		7.01	12.01	7.41	7.32	6.78	120	5.49	5.75	5.36	3.95	360	4.87
65			15.29	10.22	6.50	6.78	130	5.49	5.11	5.36	5.06	390	6.90
70			15.29	10.22	6.50	6.78	140	5.47	5.11	5.36	5.06	420	6.90
75			12.01	10.19	6.50	6.78	150	5.49	5.11	5.36	5.06	450	8.53
80			12.01	10.22	6.50	6.03	160	8.23	5.11	4.76	5.06	480	8.53
85			8.74	10.22	8.94	6.03	170	8.23	5.11	4.76	5.06	510	6.50
90			8.74	10.19	8.94	6.03	180	8.23	5.11	4.76	5.06	540	6.50
95			7.64	13.00	8.94	6.03	190	6.19	5.11	4.76	4.48	570	5.28
100			7.64	12.97	8.94	6.03	200	6.17	5.11	4.76	4.52	600	5.28
105			6.55	13.03	8.94	8.29	210	6.17	7.67	4.76	4.48	630	4.87
110			6.55	10.22	8.94	8.29	220	6.17	7.67	4.76	4.48	660	4.87
115			4.37	10.22	8.94	8.33	230	6.17	7.67	4.76	4.52	690	4.06
120			4.37	10.19	8.94	8.29	240	6.17	7.67	4.76	4.48	720	4.06
125				7.43	11.38	8.29	250	6.19	5.75	4.76	4.48	750	3.25
130				7.43	11.38	8.29	260	6.17	5.75	7.14	4.52	780	3.25
135				7.41	11.38	8.29	270	6.17	5.75	7.14	4.48	810	3.65
140				6.49	11.38	8.29	280	5.49	5.73	7.14	4.48	840	3.65
145				6.49	8.94	8.29	290	5.47	5.75	7.14	4.52	870	2.44
150				6.51	8.94	8.29	300	5.49	5.75	7.14	4.48	900	2.44
155				5.57	8.94	10.55	310	5.49	5.75	5.36	6.74	930	3.25
160				5.57	8.94	10.55	320	5.47	5.75	5.36	6.74	960	3.25
165				5.57	6.50	10.55	330	5.49	5.75	5.36	6.74	990	2.44
170				3.70	6.50	10.55	340	4.80	5.75	5.39	6.74	1020	2.44
175				3.70	6.50	10.55	350	4.82	5.73	5.36	6.74	1050	2.03
180				3.70	6.50	8.29	360	4.75	5.75	5.36	6.74	1080	2.03
185					5.69	8.29	370		5.11	5.33	5.06	1110	1.62
190					5.69	8.29	380		5.11	5.36	5.06	1140	1.62
195					5.69	8.29	390		5.11	5.36	5.06	1170	2.03
200					5.69	8.29	400		5.14	5.39	5.06	1200	2.03
205					4.88	6.03	410		5.11	5.36	5.02	1230	1.62
210					4.88	6.03	420		5.11	5.39	5.06	1260	1.62
215					4.88	6.03	430		5.11	5.36	5.06	1290	1.62
220					4.88	6.03	440		5.11	5.36	5.06	1320	1.62
225					3.25	6.03	450		4.47	5.36	5.06	1350	2.03
230					3.25	5.28	460		4.47	4.76	5.06	1380	2.03
235					3.25	5.28	470		4.47	4.76	5.06	1410	1.62
240					3.25	5.28	480		4.50	4.76	5.06	1440	1.62
245						5.28	490			4.76	5.02		
250						5.28	500			4.76	5.06		
255						4.52	510			4.76	5.06		
260						4.52	520			4.73	5.06		
265						4.52	530			4.76	5.06		
270						4.56	540			4.76	5.06		
275						4.52	550			4.76	4.48		
280						3.01	560			4.17	4.52		
285						2.98	570			4.17	4.48		
290						3.01	580			4.17	4.48		
295						3.01	590			4.20	4.52		
300						2.98	600			4.11	4.48		
305							610				4.48		
310							620				4.52		
315							630				4.48		
320							640				4.52		
325							650				4.52		
330							660				4.48		
335							670				3.95		
340							680				3.91		
345							690				3.91		
350							700				3.95		
355							710				3.91		
360							720				4.01		
Rain (mm)	10.9	14.6	18.2	23.2	27.1	31.4		34.3	42.6	49.6	56.2		81.2

TABLE 2.3.4

RAINFALL HYETOGRAPHS				1:100 YEAR STORM INTENSITY -						VANCOUVER UBC STATION				
MODIFIED AES SHORT STORM (mm/hr)							**AES LONG STORM (mm/hr)**					**SCS Type 1A**		
Rain (mm)	15.7	20.6	23.8	30.2	35.6	41.0		44.1	56.5	65.8	75.9		113.0	
Time (min)	30min	1hour	2hour	3hour	4hour	5hour	Duration	6hour	8hour	10hour	12hour	Time (min)	24hr	
							Time (min)							
0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	20.63	12.36	7.14	6.05	5.55	4.92	10	5.29	5.09	4.74	4.55	30	2.26	
10	33.76	14.83	7.14	6.02	5.13	4.92	20	5.29	5.09	4.74	4.55	60	2.26	
15	39.39	22.25	8.57	6.05	5.34	4.92	30	5.29	5.09	4.74	4.55	90	2.83	
20	46.89	22.25	8.57	7.25	5.34	4.92	40	6.17	5.12	4.70	4.55	120	2.83	
25	28.13	24.72	12.85	7.25	6.41	4.92	50	6.16	5.93	4.74	4.60	150	3.39	
30	19.59	27.19	12.85	7.25	6.41	5.90	60	6.17	5.90	5.53	4.55	180	3.39	
35		34.61	12.85	10.87	6.41	5.90	70	7.96	5.93	5.53	5.33	210	3.96	
40		27.19	12.85	10.87	6.41	5.90	80	7.94	5.93	5.57	5.28	240	3.96	
45		19.78	14.28	10.87	9.61	5.90	90	7.94	7.63	5.53	5.33	270	5.09	
50		17.30	14.28	9.68	9.61	5.90	100	7.06	7.63	5.53	5.28	300	5.09	
55		14.83	15.71	9.68	9.61	8.86	110	7.04	7.63	7.11	5.28	330	6.78	
60		9.89	15.71	9.64	9.61	8.86	120	7.06	7.63	7.11	5.33	360	6.78	
65			19.99	13.30	8.54	8.86	130	7.06	6.78	7.11	6.83	390	9.61	
70			19.99	13.30	8.54	8.86	140	7.04	6.78	7.11	6.83	420	9.61	
75			15.71	13.26	8.54	8.86	150	7.06	6.78	7.11	6.83	450	11.87	
80			15.71	13.30	8.54	7.87	160	10.58	6.78	6.32	6.83	480	11.87	
85			11.42	13.30	11.75	7.87	170	10.58	6.78	6.32	6.83	510	9.04	
90			11.42	13.26	11.75	7.87	180	10.58	6.78	6.32	6.83	540	9.04	
95			10.00	16.92	11.75	7.87	190	7.96	6.78	6.32	6.06	570	7.34	
100			10.00	16.89	11.75	7.87	200	7.94	6.78	6.32	6.10	600	7.35	
105			8.57	16.96	11.75	10.82	210	7.94	10.17	6.32	6.06	630	6.78	
110			8.57	13.30	11.75	10.82	220	7.94	10.17	6.32	6.06	660	6.78	
115			5.71	13.30	11.75	10.87	230	7.94	10.17	6.32	6.10	690	5.65	
120			5.71	13.26	11.75	10.82	240	7.94	10.17	6.32	6.06	720	5.65	
125				9.68	14.95	10.82	250	7.96	7.63	6.32	6.06	750	4.52	
130				9.68	14.95	10.82	260	7.94	7.63	9.48	6.10	780	4.52	
135				9.64	14.95	10.82	270	7.94	7.63	9.48	6.06	810	5.09	
140				8.44	14.95	10.82	280	7.06	7.59	9.48	6.06	840	5.08	
145				8.44	11.75	10.82	290	7.04	7.63	9.48	6.10	870	3.39	
150				8.48	11.75	10.82	300	7.06	7.63	9.48	6.06	900	3.39	
155				7.25	11.75	13.78	310	7.06	7.63	7.11	9.11	930	4.52	
160				7.25	11.75	13.78	320	7.04	7.63	7.11	9.11	960	4.52	
165				7.25	8.54	13.78	330	7.06	7.63	7.11	9.11	990	3.39	
170				4.82	8.54	13.78	340	6.17	7.63	7.15	9.11	1020	3.39	
175				4.82	8.54	13.78	350	6.19	7.59	7.11	9.11	1050	2.83	
180				4.82	8.54	10.82	360	6.11	7.63	7.11	9.11	1080	2.82	
185					7.48	10.82	370		6.78	7.07	6.83	1110	2.26	
190					7.48	10.82	380		6.78	7.11	6.83	1140	2.26	
195					7.48	10.82	390		6.78	7.11	6.83	1170	2.82	
200					7.48	10.82	400		6.81	7.15	6.83	1200	2.83	
205					6.41	7.87	410		6.78	7.11	6.79	1230	2.26	
210					6.41	7.87	420		6.78	7.15	6.83	1260	2.26	
215					6.41	7.87	430		6.78	7.11	6.83	1290	2.26	
220					6.41	7.87	440		6.78	7.11	6.83	1320	2.26	
225					4.27	7.87	450		5.93	7.11	6.83	1350	2.83	
230					4.27	6.89	460		5.93	6.32	6.83	1380	2.82	
235					4.27	6.89	470		5.93	6.32	6.83	1410	2.26	
240					4.27	6.89	480		5.97	6.32	6.83	1440	2.26	
245						6.89	490			6.32	6.79			
250						6.89	500			6.32	6.83			
255						5.90	510			6.32	6.83			
260						5.90	520			6.28	6.83			
265						5.90	530			6.32	6.83			
270						5.95	540			6.32	6.83			
275						5.90	550			6.32	6.06			
280						3.94	560			5.53	6.10			
285						3.89	570			5.53	6.06			
290						3.94	580			5.53	6.06			
295						3.94	590			5.57	6.10			
300						3.89	600			5.45	6.06			
							610				6.06			
							620				6.10			
							630				6.06			
							640				6.10			
							650				6.10			
							660				6.06			
							670				5.33			
							680				5.28			
							690				5.28			
							700				5.33			
							710				5.28			
							720				5.42			
Rain (mm)	15.7	20.6	23.8	30.2	35.6	41.0		44.1	56.5	65.8	75.9		113.0	

Average Rainfall
Table 2.3.5

Total Rainfall (mm)

Storm Duration	AES Vancouver UBC Station		
	1:2 year	1:10 year	1:100 year
30 minutes	7.1	10.9	15.7
1 hour	9.8	14.6	20.6
2 hours	13.6	18.2	23.8
3 hours	17.7	23.2	30.2
4 hours	20.9	27.1	35.6
5 hours	24.0	31.4	41.0
6 hours	26.4	34.3	44.1
7 hours	32.1	42.6	56.5
10 hours	36.4	49.6	65.8
12 hours	40.4	56.2	75.9
24 hours	55.7	81.2	113.0

Rainfall Intensity (mm/h)

Storm Duration	AES Vancouver UBC Station		
	1:2 year	1:10 year	1:100 year
30 minutes	14.2	21.8	31.4
1 hour	9.8	14.6	20.6
2 hours	6.8	9.1	11.9
3 hours	5.9	7.7	10.1
4 hours	5.2	6.8	8.9
5 hours	4.8	6.3	8.2
6 hours	4.4	5.7	7.4
7 hours	4.0	5.3	7.1
10 hours	3.6	5.0	6.6
12 hours	3.4	4.7	6.3
24 hours	2.3	3.4	4.7

(c) Watershed Data

(i) Watershed data includes catchment areas, percent of imperviousness, lengths of flow, surface slopes, soil types, etc.

(ii) The tributary area used for the design of the storm drainage system shall be consistent with the actual contours of the land. Although minor changes in the catchment boundaries may be necessary for *development*, the total developed tributary area should not deviate from the total natural drainage area.

(iii) The Designer is responsible for obtaining true and accurate surface elevations for the analysis.

(iv) The imperviousness of common land uses are tabulated in Section 32(2).

(v) For design purposes, the drainage model shall be based on the post-*development* conditions using the most current planning information. Conservative parameters shall be selected if calibration data is not available.

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

(d) Presentation of Modelling Results

(i) The Designer will be required to submit a drainage report including the following:

(A) name and version of modelling 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

88. STORMWATER STORAGE FACILITIES

(1) The District will promote and encourage the application on infiltration features to retain frequent rainfall volumes on-site, where opportunistic site conditions exist. The application of such features shall be supported by a geotechnical evaluation which supports the long term viability of disposing of stormwater on site (see Section 92 – Groundwater Recharge). Target design parameters are listed in the previous section.

(2) The District of Sechelt will require stormwater storage facilities where the existing downstream drainage system is known, or proven, to be inadequate and which cannot be practically or cost effectively improved to accommodate the increased flow.

(3) Stormwater storage facilities shall be located off the highway right-of-way on land dedicated to the District of Sechelt by the *Owner*. The *Owner* shall provide a right-of-way for access to the site by municipal crews.

(4) Storage facilities shall be designed according to requirements of the Master Drainage Plan (if available) in consideration of the minor and major systems. The construction of a community storage facility servicing a large catchment area is preferred over small ponds servicing localized areas. The common storage facilities are:

(a) Detention (Dry) Storage

(b) Retention (Wet) Storage

(c) *On-site* Storage

(5) The Designer shall consider the site and downstream conditions and consult the Engineering Department to determine the most suitable type of storage facility.

(6) Release Rates

(a) The design release rate will be based on the predominant role of the facility in the overall drainage plan. The design release rates are determined as follows:

(i) For the exclusive purpose of mitigating environmental impacts, the storage facility shall be sized to limit all 1:2 year storm post development flows to the *pre-development* Mean Annual Rainfall level.

(ii) For the purpose of drainage and flood control, the storage facility shall be sized to limit the 1:5 year post development flow to the 1:5 year pre-*development* level.

(iii) As approved by the *Director of Engineering and Public Works,* storm events exceeding the 1:5 year level are considered an overflow condition, where supported by a risk analysis. The facility shall be designed to permit the controlled overflow release of flows up to the peak 1:100 year level.

(7) Small Lot Criteria

(a) For service areas smaller than 2 hectares in size, at the discretion of the Director of Engineering and Public Works, the Applicant may be exempt from detailed calculations provided that on-site controls be provided in accordance with the following criteria:

Land Use	Storage Rate	Max. Allowable Release Rate
Single Family Residential	200 m3/ha	5 L/s/ha
Townhouse / Apartment	250 m3/ha	5 L/s/ha
Commercial / Industrial / Institution	300 m3/ha	5 L/s/ha

89. STORM SEWERS AND APPURTENANCES

(1) Unless otherwise stated herein, all storm sewer and appurtenances shall be designed and constructed in accordance with the Master Municipal Specifications and Standard Drawings.

(2) Pipe Materials

Only the following pipe materials shall be permitted within Municipal lands and rights-of-ways:

Application	Material
Storm sewer mains: 200 mm to 300 mm 375 mm and larger	SDR PVC or Concrete
Catch basin leads	SDR PVC
Service connections	SDR PVC
Perforated drains	SDR PVC
Culverts: Driveway culverts Municipal road crossings	SDR PVC, concrete or CSP Concrete

Alternative piping materials may be considered and approved under special circumstances, at the discretion of the Director of Engineering and Public Works.

(3) Sizing of Storm Sewers

(a) The required storm sewer capacity shall be calculated using the Manning Formula under free flow (non-surcharged) conditions. The Manning formula is:

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

Where	Q	=	flow capacity (m3/s)
	A	=	cross sectional area (m2)
	R	=	hydraulic radius (m)
	S	=	slope of hydraulic grade line (m/m)
	n	=	roughness coefficient
			0.013 for PVC pipe
			0.013 for asbestos cement, clay and concrete pipe
			0.024 for corrugated metal pipe (CMP)

NOTE: Asbestos cement pipes, clay pipes, and corrugated pipes are not acceptable for new storm sewers.

(b) Downsizing of storm sewers will not be accepted for sizes 600 mm diameter or less. A maximum downsizing of two pipe sizes for storm sewers larger than 600 mm diameter will be considered.

(c) The minimum size of storm sewers shall be 250 mm diameter except at a terminal section of a short *cul-de-sac* with no catch basin connections where the size may be reduced to 200 mm diameter.

(d) For the purpose of reference in this section, large diameter sewer refers to sizes 675 mm or larger and small diameter sewer refers to sizes 600 mm and smaller.

(4) Minimum/Maximum Velocity

(a) The minimum velocity for pipes flowing full or half full shall be 0.75 m/s.

(b) If the design velocity exceeds 3.00 m/s and/or supercritical flow occurs, provisions for structural stability and durability of the pipe shall be included. Anchor blocks are required where the pipe grade is steeper than 15%.

(c) Where drainage enters a natural *watercourse*, sediment control and energy dissipation will be provided and the maximum velocity shall be limited to 1 m/s.

(5) Minimum Depth of Cover

(a) The minimum depth of cover shall be 1.0 m for storm sewers up to 600 mm diameter. For pipe sizes larger than 600 mm and for cover less than that specified above, an engineering design for cover will be required.

(b) The depth of storm sewers shall be adequate to service all adjacent *developments* as well as all existing properties within practical limits. The invert of storm sewers at the upstream end shall be of sufficient depth to service all of the tributary lands. In common trench installations, the sanitary service connections shall be permitted to cross over the top of the storm sewer.

(6) Pipe Joints

All storm sewer joints shall be open except where the pipe is temporarily or permanently designed to act under head, adjacent to embankments or located within Statutory Rights-of-Way.

(7) Curvilinear Sewers

(a) Curvilinear sewers are not acceptable unless approved by the *Director of Engineering and Public Works* under special circumstances. Where curvilinear sewers are approved, the minimum radius should not be less than 60 m and only where the maximum joint deflection is one half of the pipe manufacturers' recommendations.

(8) Sewer Location

(a) Storm sewers shall be designed inside the highway right-of-way using the offsets in the typical highway cross-sections in the *Standard Drawings*. Sewers and manholes should be offset from the vehicular wheel paths wherever possible to minimize the roughness of travel.

(b) Where the storm sewer is required to cross private lands, the right-of-way shall have a minimum width of 3 m. Where both storm and sanitary sewers are located within a single right- of-way, the minimum width shall be 5.0 m.

(c) When a storm sewer and other appurtenances (i.e. manholes, valve chambers, etc.) are located within a right-of-way, the *Owner* may be required to construct and dedicate a highway access for Municipal maintenance. The maintenance access shall be constructed to Municipal standards adequate to support the maintenance vehicles for which the access is intended.

(9) Video inspections

(a) Shall be required for all constructed sewers as directed by the *Director of Engineering and Public Works*, in accordance with the MMCD Specifications.

(b) Supplemental to the MMCD Specifications, the Owner/Owner's Engineer shall provide the District with a written report (as per the Scheduled form), signed and sealed by a professional engineer, summarizing the findings of the inspection and their recommendations.

(c) Supplemental to the MMCD Specifications, constructed sewers of ALL sizes shall be video inspected.

(d) Maybe required to determine condition and adequacy of existing downstream systems.

(10) Utility Separations

As per the *Standard Drawings*.

(11) Manholes - Standard Requirements

(a) Manholes are required at:

(i) Every intersecting sewer.

(ii) All changes in pipe size.

(iii) Every 150 m for pipes less than 900 mm diameter.

(iv) Every 200 m for pipes 900 mm diameter and larger.

(v) All changes in direction or as approved by the *Director of Engineering and Public Works*.

(vi) Downstream end of curvilinear sewers.

(vii) All changes in grade or as approved by the *Director of Engineering and Public Works*.

(b) Common design requirements are:

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

(ii) Outside drop connections shall be provided wherever the drop exceeds 0.6 m.

(iii) Sudden and extreme changes in direction for large sewers should be avoided.

(iv) Manufactured bends will only be considered by the Director of Engineering and Public Works under unique circumstances.

(v) To minimize the head loss in large sewers, high incoming flows from opposite direction should not impinge in the same manhole structure. Separate manholes are to be used.

(vi) Manhole anchorage may be required for 90E bends with large flows or high velocity flows.

(vii) Intermediate safety platform is required for all manholes in excess of 6 m deep.

(12) Manholes - Hydraulic Losses

(a) Invert drops across manholes are required to compensate for the hydraulic (energy) losses due to changes in flow directions. The required drop in invert levels is the hydraulic loss across the manhole.

(b) For junctions involving large diameter sewers or high velocity flows, and where a hydraulic jump is expected, detailed engineering analyses required.

(c) For small diameter sewers (600 mm or smaller) and low velocity flows, the following minimum drops are:

(i) straight run - no drop required

(ii) deflections up to 45° - 20 mm drop

(iii) deflections 45° to 90° - 30 mm drop

(13) Catch Basins

(a) Catch basins shall be provided at regular intervals along roadways, at the upstream end of radius at intersections, and at low points (sags). Low points are not to be located within curb returns at intersections. The Designer shall ensure that sufficient inlet capacity is available to collect the entire minor flow into the underground pipe system.

(b) The maximum spacing shall be established to permit each catch basin to drain a maximum area of 500 m^2 on highway grades up to 5% and 350 m^2 on steeper grades. If the major flow is to be conveyed in the pipe system, additional catch basins are required.

(c) The minimum size for catch basin leads is 200 mm for single catch basins and 250 mm for double catch basins. Catch basin leads should be taken directly into manholes if feasible. Double catch basins shall not be directly connected together; instead the lead from each catch basin shall be connected to a wye and into the manhole. The minimum grade for leads is 1% The maximum length is 30 m.

(14) Lawn Basins

Lawn Basin leads shall have a minimum size of 150 mm and a minimum slope of 2%. Where a lawn basin lead connects directly to a storm sewer instead of a manhole, an inspection chamber is required at the property line.

(15) Temporary Clean-Outs

Temporary clean-outs may be provided at terminal sections of a main provided that all the following conditions are met:

(a) Future extension of the main is proposed or anticipated

(b) The length of sewer to the downstream manhole does not exceed 45m

(c) The depth of the pipe does not exceed 2 m at the terminal point

NOTE: Clean-outs cannot be considered permanent structures.

(16) Service Connections

Service connections shall be installed to *provide* a "gravity-flow" connection to all buildings fronting the main, except where the land can drain to an acceptable alternate existing system. The design requirements are:

(a) The minimum diameters are 100 mm for residential and 150 mm for industrial/commercial.

(b) The minimum slope is 2.0%.

(c) The connection shall be located at the lower (downstream) portion of a larger lot or land *parcel*.

(d) The service connection at the property line shall be above the hydraulic grade line of the

minor flow.

(e) Each connection shall only service one single lot.

(f) When the design is proposed to infill an existing ditch, all existing service connections are to be connected to the proposed main.

(g) The maximum length is 30 metres.

(h) Inspection chambers (I.C.) are required for all service connections. An inspection chamber shall be provided in accordance with the MMCD Specification and Standard Drawings. The inspection chamber shall be located 300 mm on the sewer main side of the property.

(17) French Drains

The use of French drains shall only be permitted where the topography and soil conditions are proven adequate to the *acceptance* of the *Director of Engineering and Public Works*. A soils report will be required to support the design.

90. MAJOR FLOW ROUTING AND FLOOD CONTROL

(1) Major Flow Routing

(a) Unless the storm sewer system is oversized to accommodate the major flow (i.e. 1:100 year return frequency storm), provision for surface flow is required wherever the overland flow in excess of 0.05 m^3/s is anticipated. Major flow routing is generally accommodated along roadways, swales, and *watercourse*s. These designated flow paths shall be protected by a rights-of-way or service easement and clearly identified in the stormwater management plan.

(b) The quantity of flow to be conveyed by the surface flow path is the total major flow less the capacity of the minor system. The design of the major flow routing shall ensure, to the satisfaction of the *Director of Engineering and Public Works*, that no endangering of public safety nor substantial property damages will occur under the major flow conditions.

(2) Highway Surface Drainage

(a) Urban highways with curbs and gutters can be designed as wide shallow channels to convey major surface flow. The water elevation at maximum ponding/flow shall be at least 0.35 m below the lowest minimum building elevation of the adjacent buildings. The maximum depths of flow shall not exceed 150 mm above the gutter line. Refer to Table 2.3.6 for calculating the flow capacities for various highway grades.

(b) The design of intersections shall ensure that the surface flow can continue along the designated path crossing over lateral *street*s. Similar considerations are required if a change of surface flow direction is required at an intersection.

(3) Ditches

(a) Ditches adjacent to roadways shall conform to the following criteria:

(i) Maximum depth	1.0 m
(ii) Minimum bottom width	0.5 m
(iii) Maximum side slope	1.5 (H):1 (V)
(iv) Minimum grade	0.5%
(v) Maximum velocity (Unlined ditch)	1.0 m/s

(b) Where soil conditions are suitable, or where erosion protection is provided, higher velocities may be permitted. If grades are excessive, erosion control structures or ditch enclosure may be required.

(c) The minimum right-of-way width for a ditch shall be 5 m where the ditch crosses private

property. The ditch shall be offset in the right-of-way to permit a 3 m wide access for maintenance vehicles. Additional right-of-way may be required to facilitate the ditch construction and access. The top of the ditch adjacent to the property line shall be a minimum
0.5 m away from that property line.

(4) Watercourses

(a) Natural *watercourse*s are integral components of the major drainage system and the ecological system. If the process of *development* or drainage design involves a watercourse located within 50 meters of the subject property the Designer shall refer to the "Land Development Guidelines for the Protection of Aquatic Habitat" by the Department of Fisheries and Oceans & the BC Ministry of Water Land and Air Protection.

At the discretion of the Director of Engineering and Public Works, and for all instream works, the development application may be directed (by the *Owner's Engineer*) to the following agencies for approval:

Department of Fisheries and Oceans (DFO)
Conservation and Protection
12841 Madeira Park Road Madeira
Park, BC, V0N 2H0
Telephone: (604) 883-2313

Ministry of Environment
Planning and Assessment
10470-152nd Street
Surrey, BC, V3R 0Y3
Telephone: (604) 582-5200

(b) No toxic materials shall be employed and materials such as concrete and fine soils are not permitted to enter any *watercourse*. In no case will sand/cement bags be permitted as rip rap or wall structures on *watercourse*s.

(c) To ensure that large scale flooding will not occur to dwellings adjacent to natural *watercourse*s, the Designer shall determine what affects downstream obstructions would have on the level of the *watercourse*, i.e., should a highway crossing culvert be plugged, to what height will the water rise before the water discharges over the roadway, and what effect will this have on adjacent properties? It shall be shown that the basement elevation in the adjacent development will not be affected by such flooding.

(d) The Designer and *Owner* shall be aware of the flood control requirements contained in the District's Zoning Bylaw #25, 1987, and Official Community Plan as amended from time to time.

(e) Prior to construction, verification of environmental agency approvals shall be received by the District of Sechelt.

(f) Rights-of-way, as required by the *Director of Engineering and Public Works* for maintenance access are required.

(5) Culverts

(a) Culverts located in natural *watercourse*s or in culverts crossing any highway shall be designed to convey the major flow or greater. The Designer shall determine whether the culvert will operate under inlet or outlet control at design conditions.

(b) Concrete culverts are preferred for general uses. Corrugated steel culverts may be considered under special circumstances when their use can be justified.

(c) The minimum diameter of culverts is 600 mm (450 mm for driveway culverts).

(d) The average water velocity in culverts should not exceed:

(i) 1.2 m/s for lengths up to 24.4 m

(ii) 0.9 m/s for lengths over 24.4 m

(e) The minimum depth of cover for culvert is 0.3 m, subject to the correct pipe loading criteria.

(f) No culvert shall exceed 30 metres in length unless approved by the *Director of Engineering and Public Works*.

(g) Maximum length of driveway culvert shall be 6 metres, unless otherwise approved by the Director of Engineering and Public Works.

(h) Inlet and outlet structures are required for all culverts. Refer to Item 6 below.

(i) Driveway culverts that form part of the minor system shall have capacity for the runoff from the 10-year storm with the design headwater not to exceed the top of the culvert.

(6) Inlet and Outlet Structures

(a) Refer to *Standard Drawings* for the design of inlet and outlet structures for pipes up to 1200 mm diameter. Pipes larger than 1200 mm diameter and non-circular culverts require specially designed inlet and outlet structures. Concrete block headwalls (see *MMCD Drawings*) may be used for culverts up to 750 mm diameter.

(b) Structures for driveway culverts may be constructed of concrete block, in accordance with the MMCD Standard Drawings.

(c) Outlets having discharge velocities in excess of 1 m/s require rip rap protection and/or energy dissipating structures for erosion control.

(d) Grills are required at the inlets and outlets of all pipes that are over 450 mm in diameter and which exceed 30 m in length (except large culverts in major *watercourse*s). Trash racks are required at the inlet of the pipes utilizing the grills. Grills may also be required on smaller diameter storm sewers at the discretion of the *Director of Engineering and Public Works*. See *Standard Drawings* for grill details.

(7) Site and Lot Grading

(a) Developments shall incorporate site and lot grading techniques unless otherwise noted.

(b) The following criteria shall be used:

(i) Each lot shall be graded to drain into a Municipal Drainage System or a natural drainage path independent of adjacent lots where possible. Minimum lot grades to be 1%. Lot grading is to be uniform and consistent.

(ii) Areas around buildings (or proposed building sites) shall be graded away from the (proposed) foundations to prevent flooding.

(iii) Lots lower than adjacent roadways should be avoided where possible or acceptable storm water management techniques shall be incorporated to direct the runoff to an existing or proposed drainage system. Proper flood proofing is required at the low points of roadways.

(iv) Existing or proposed buildings shall be sited above the hydraulic grade line of the Major System. The Designer shall note any existing *Minimum Building Elevations (MBE)*.

(v) Individual lots will not be permitted to direct storm runoff into any natural *watercourse*, park or green belt areas. Only sheet flow may be permitted.

NOTE: The submission and *acceptance* of lot grading record drawings is required prior to issuance of a building permit.

(8) Minimum Building Elevations (MBE)

(a) 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 a crawlspace.

(b) Crawlspace is a 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.

(c) The MBE shall be established at least 0.6 m above the service connection invert and 0.1 m above the 100 year hydraulic grade line elevation. Approved MBE's may not be revised without referral to the *Director of Engineering and Public Works*.

(d) Unless otherwise required, rural and agricultural subdivisions do not require MBE's.

(e) A gravity connection to the municipal storm drainage system may be made only where the habitable portion of a dwelling is above the Major System hydraulic grade line.

(9) Roof Drainage

(a) Provided that a site is graded away from the building, where soil conditions permit, and where surface water does not flow to adjacent lots, roof drainage shall be discharged to the ground and dispersed via splash pads at the downspouts.

(b) If site grading in accordance with (a) above is not possible, roof drainage may be discharged into the municipal drainage system, at the discretion of the *Director of Engineering and Public Works*, where the size of the proposed or existing storm sewer has been designed for, or can be shown to accommodate the anticipated flows.

(10) Swales

All swales proposed to affect the submitted *Storm Water Management Plan*. It is policy in Sechelt to avoid surface drainage from one lot to cross another adjacent lot. Where grading is not feasible to direct surface drainage away from adjacent lot(s), swales shall be incorporated generally on the upstream side of the downstream log. An easement is required over any lot accepting drainage from more than one up-stream lot. In addition, when a swale is proposed over several lots, a lawn basin, connected to a storm sewer system, is to be provided at every third lot.

Swales shall be a maximum 150 mm deep and shall conform to *Standard Drawings*. All swales are to be lined with turf on a minimum 100 mm of topsoil. Swales required for lot grading conformity shall be located on a 3 m easement for accepting drainage from adjacent lots. Swales designed for Major Flow Routing may exceed the 150 mm depth to accommodate the anticipated flows with the easement width established accordingly. Swales shall have a minimum 1% grade.

(11) Siltation Controls

(a) Designers are required to demonstrate how work will be undertaken and *complete*d so as to prevent the release of silt, raw concrete, leachate, and other deleterious substances into any ditch, storm sewer, *watercourse*, or ravine. Construction materials, excavation wastes, overburden soils, or other deleterious substances shall be disposed of, or placed, in such a manner as to prevent their entry into any *watercourse*, ravine, storm sewer system, or restrictive covenant area.

(b) The Designer shall refer to the "Land Development Guidelines for the Protection of Aquatic Habitat" and consult the Ministry of Environment with regards to the required siltation controls. Details of the proposed controls are to be included in the design drawings and shall be installed as part of the works.

(c) All siltation control devices shall be situated to provide easy access for cleaning and maintenance. Proposed siltation control structures shall be maintained throughout the course of construction and to the end of the maintenance period (final *acceptance*). Changes in the design of the structure will be required if the proposed structure is found to be inadequate.

91. EROSION PROTECTION

(1) The implementation of stormwater management controls are intended to reduce post-development peak flows to pre-development levels, however the provisions for erosion protection and bank stabilization may still be required at outlets and other criticalareas.

(2) Bank protection shall be considered along existing and new watercourses to provide adequate erosion protection in the form of bank armouring, soil stabilization, flow deflection or other methods applicable for the specific site conditions. Some of the optional methods are summarized below, however it is the Applicant's Engineers responsibility to assess the requirements for and suitable method of bank protection.

(a) Grass lined and natural channels – most suitable for longitudinal gradients of 2 % or less.

(b) Rip-Rap protection – The selection of rip-rap protection shall consider the flow velocities and scour of the underlying materials. The use of granular material or geotextiles shall provide a suitable barrier to prevent the migration of finer materials caused by either the flow in the main channel or by flows from the channel banks due toseepage.

(c) Bio-Engineering – Bio-engineering methods of bank protection shall be promoted wherever possible for the protection and stabilization of watercourses. Bio-engineering solutions involve the use of live plants and vegetation to provide bank lining and cohesion of bank materials to resist scour. The plant materials used will require anchoring to ensure long term stability. Bio- engineered solutions shall be compiled by a Applicant's Engineer with demonstrated expertise in this area.

(3) It is noted that any proposed works within the streamside protection area of an existing watercourse falls under the jurisdiction of the MWLAP and DFO, and as such, will be subject to ministry approval as discussed in Section 90.4(a) – Watercourses.

92. GROUNDWATER RECHARGE

(1) The drainage characteristics of the surface soils in the District of Sechelt are variable from one location to another. These conditions may provide the opportunity to implement infiltration measures to reduce stormwater runoff. All development proposals are encouraged to implement on-site mitigative measures for the purposes of groundwater recharge. For all commercial, institutional, multi-family residential, and industrial developments, as a condition to receiving design approval from the Director of Engineering and Public Works, the Applicant's Engineer is required to submit a report prepared by a qualified hydrogeologist which clearly identifies the specific opportunities and constraints for implementing shallow groundwater recharge systems on-site. This report shall present the following items:

- Description of site condition, size and location;
- Description of proposed development and resulting design flows;
- Description of native soils and water table conditions on site to a depth of 5 meters;
- Estimated infiltration rates for each strata of material within the 5 meter depth (complete with a description of seasonal variability); and
- Recommendations for recharge methods suitable for the proposed development.

(a) Based on the opportunities identified in the above noted investigation, groundwater recharge systems may be approved, at the discretion of the Director of Engineering and Public Works, in lieu of stormwater detention facilities, or reduce stormwater detention requirements.

(b) Requirements to incorporate recharge systems in the design will be reviewed by Director of Engineering and Public Works on a site specific basis; however the Applicant's Engineer is required to demonstrate that infiltration potentials are being maximized, within reason.

(2) Pre-Treatment

Particularly in multi-family, commercial, institutional and industrial developments, all groundwater recharge systems shall include pre-treatment measures to remove sediments, suspended solids and greases prior to entering the infiltration zone. Biofiltration is the preferredapproach.

(3) Overflow system

Recharge systems should be designed with sufficient volume to maximize the opportunity for infiltration, however systems contained within a municipal right-of-way, or where the infiltration rate of the native sub soils are inadequate to dispose of the 1:10 year design flows, an overflow connected to the municipal drainage system which is sufficiently sized for the 1:10 year peak discharge from the site is required.

(4) Recharge systems

Methods of groundwater recharge (infiltration) systems will be approved by the *Director of Engineering and Public Works* on a site specific basis. The proposed system shall satisfy long term performance and maintenance issues to be approved. Typical systems supported by the District include the following, in accordance with the *Standard Drawings*:

(i) Drywells
(ii) Rock pits
(iii) Perforated drains
(iv) Pre-manufactured plastic infiltrator chambers (design as per manufacturer's recommendation).

C. SANITARY SYSTEMS DESIGN CRITERIA

93. INTRODUCTION

Sanitary sewer systems shall be designed in accordance with the requirements of the Ministry of Environment, Waste Management Branch, "Guidelines for Assessing Sewage Collection Facilities" 1980 Edition, and the requirements noted in this bylaw, as amended from time totime.

94. DESIGN FLOWS

(1) The sanitary sewer system shall be designed using the following average daily flows for the *zone* noted:

(a) Residential/institutional	=	410 litres/capita/day
(b) Industrial/commercial	=	22,500 litres/day/hectare

(2) An infiltration rate of 0.1 litres/second/hectare shall be added to the aboveflows.

(3) The design flows shall be calculated using the peak daily flows plus the infiltrationrate.

(4) Peak flows shall be 5 times the average daily flow for contributing areas with populations less than 1,000; and 4 times the average daily flow for contributing areas with populations between 1,000 and 3,000.

(5) Design populations used in calculating average daily flows shall be computed in accordance with the District of Sechelt's population predictions or with the planned *development* in the area to be served, whichever is larger.

95. PIPE FLOW FORMULAS

(1) Gravity Sewers: Manning's formula shall be used:

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

Where:	Q	=	design flow in cubic metres per second (CMS)		
	A	=	cross sectional area in square metres		
	L	=	hydraulic radius (area/wetted perimeter) in metres		
	S	=	Slope of hydraulic grade line in metres/metre		
	N	=	Roughness coefficient	=	0.011 for PVC pipe
				=	0.013 for all other pipe

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

(2) Force Main Sewers: Hazen-Williams formula shall be used:

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

Where: Q = rate of flow in litres per second D
= internal pipe diameter in metres
S = slope of hydraulic grade line in metres per metre C
= friction coefficient = 120

96. MANHOLES

(1) Manholes shall be required at:

(a) All changes in grade.

(b) All changes in direction.

(c) All changes in pipe sizes.

(d) All intersecting sewers.

(e) All terminal sections.

(f) Downstream end of curvilinear sewers.

(2) Manholes shall be placed where future extensions are anticipated and shall be spaced no greater than 200 metres apart.

(3) Sanitary manhole rim elevations shall be designed to be:

(a) Above the adjacent storm manhole rim elevation where possible.

(b) Above the surrounding ground so that infiltration from ponding will not occur.

97. HYDRAULIC LOSSES ACROSS MANHOLES

The following criteria shall be used:

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

(2) Minimum drop in invert levels across manholes:

(a) Straight run - no drop required

(b) Deflections up to 45° - 15 mm drop

(c) Deflections 45° to 90° - 30 mm drop

(3) An outside drop pipe shall be installed when the drop between inverts exceeds 0.6 metres.

(4) Inside ramps will be permitted up to 450 mm from invert to channel bed.

98. TEMPORARY CLEAN-OUTS

Temporary clean-outs may be provided at terminal sections of a main provided that:

(1) Future extension of the main is proposed or anticipated.

(2) The length of sewer to the downstream manhole does not exceed 45.0 metres.

(3) The depth of the pipe does not exceed 2.0 metres at the terminal point.

Note: Clean-outs shall not be considered a permanent structure.

99. M**INIMUM PIPE DIAMETER**

The minimum size of pipe shall be 200 mm except for the last upstream section which may be 150 mm, provided the sewer cannot be extended in the future.

100. VELOCITIES

The minimum velocity shall be 0.6 metres/second. There is no maximum velocity; however, consideration shall be given to scour problems where flow exceeds 2.5 metres/second. Anchoring should be incorporated where the grade(s) of the sewer is 15% or greater.

101. MINIMUM GRADE

The grade(s) of any sewer is determined by the minimum velocity required. However, the last section of a main that will not be extended in the future, shall have a minimum grade of 1.0% where 150 mm diameter pipe is proposed.

102. MINIMUM DEPTH OF COVER

(1) The minimum cover over any main shall be 1.0 metre.

(2) The depth of the sewer shall be sufficient to *provide* "gravity flow" service connections to both sides of the roadway and shall allow for future extension(s) to properly service all of the upstream tributary lands for ultimate *development*.

(3) Where it is not feasible to service by gravity connection, a rear yard sewer (double maining) may be required.

103. CURVILINEAR SEWERS

(1) Curvilinear sewers are not acceptable unless approved by the *Director of Engineering and Public Works* under special circumstances.

(2) Where approved, horizontal curves will require a constant offset and/or shall be uniform throughout the curve. The radius of the curve shall not be less than 60 metres. The design velocity shall exceed 0.90 metres/second, the minimum grade shall be 1.0%, and each joint is to be located by survey.

104. SEWER LOCATION/CORRIDORS

(1) Sanitary sewers shall be located within the highway right-of-way as noted in the applicable Standard Drawing Typical Cross-section for that highway.

(2) When the utility is required to cross private land(s), the right-of-way shall be a minimum of 3.0 metres wide. Where both storm and sanitary sewers are in one right-of-way, the width shall be a minimum of 5.0 metres wide.

(3) When a utility is located within a right-of-way, and manholes, valve chambers, or other appurtenances which require maintenance are located within the right-of-way, the *Owner* may be required to *provide* for a constructed highway access from a Municipal highway for maintenance vehicles. The maintenance access shall be constructed to a paved standard adequate to support the maintenance vehicles for which the access is intended.

105. PRIVATE PUMPING SYSTEMS

Any proposed use of private pumping systems shall be approved by the District of Sechelt. The District will only consider private pumping systems where a gravity system is physically impossible to construct. Please refer to Residential Wastewater Pumping Station Bylaw No. 307 for private pumping systems.

106. SERVICE CONNECTIONS

(1) Service connections shall be provided to each lot fronting the main. All services shall enter the main above the springline.

(2) Single connections only will be permitted.

(3) Connections to new mains shall be made using wye fittings; connections to existing mains shall be made using saddles.

(4) The minimum size for service connections shall be 100 mm.

(5) The minimum grade of service connections from the main to the property line shall be 2.0%.

(6) The minimum depth of a service at the property line shall be 1.0 metre and the maximum depth of a service at the property line shall be 2.0 metres unless otherwise accepted by the *Director of Engineering and Public Works*.

(7) Service connections may be permitted into manholes provided that:

(a) The connection is not in an adverse direction to the flow in the sewer main and the angle is less than 90 degrees.

(b) The provisions noted in Section 40 are met.

(c) The invert of the connection extended to the centre of the manhole is above the sewer main springline.

(8) Inspection chambers (I.C.) are required for all service connections. An inspection chamber shall be provided in accordance with the MMCD Specifications and Standard Drawings. The inspection chamber shall be located 300 mm on the sewer main side of the property line.

107. SANITARY PUMP STATIONS

The use of sanitary pump stations is discouraged. Any use of pump stations shall be approved by the *Director of Engineering and Public Works*.

(1) General

(a) Sanitary pump stations shall be located within a right-of-way outside the highway dedication.

(b) The entire site shall be paved and graded to *provide* adequate surface drainage to the storm sewer system.

(c) Electrical kiosk, standby generator enclosure, and other equipment are to be protected from traffic. Concrete barriers or steel posts shall be installed if required.

(d) The kiosk shall be located not less than 1.2 m and not more than 3 m from the wet well lid.

(e) The size of the site shall be determined by the requirements for maintenance with the minimum clearance around structures to be 1.2 m.

(f) The following services are required for each pump station:

(i) a BC Hydro power supply in accordance with the utility requirements;

(ii) a Telus connection for the District's future telemetry system; and,

(iii) a minimum 50 mm diameter water service connection with standpipe and backflow preventer for cleaning purposes.

(g) The following items are to be *provide*d to make the site reasonably secure from vandalism and accidental occurrences:

(i) all station equipment shall be contained within a locked kiosk, wet well, or enclosure;

(ii) vents shall be covered with bird screens; and,

(iii) the site shall be enclosed by a 2 m high chain link gated security fence, as directed by the *Director of Engineering and Public Works*.

(h) Pump station sites shall be located above maximum stream levels and extreme high tide. The minimum elevation of the kiosk concrete pad shall be based on the 200 year flood plus 300 mm, unless otherwise approved.

(i) All equipment shall have at least a one year guarantee for parts and labour.

(j) The supplier shall provide three sets of Operating and Maintenance Manuals.

(2) Pumping Facility

(a) Only one gravity inlet sewer shall be connected to the wet well.

(b) The pump station design flow shall be the Peak Design Flow as defined in this bylaw.

(c) All stations shall be equipped with two pumps, each capable of handling the design flow.

(d) The depth of the wet well shall be determined by the following criteria:

(i) with one pump out of service, the remaining pump shall not be required to start more frequently than the minimum interval recommended by the manufacturer, or a maximum of 10 starts per hour; and,

(ii) the wet well drawdown between normal pump start and stop shall be from 150 mm below the invert of the incoming sewer to approximately 150 mm above the centre of the pump volute.

(e) A geotechnical investigation of the site shall be conducted to determine the foundation design for the wet well, kiosk, and any auxiliary equipment. This investigation shall be performed by a professional engineer registered in the Province of BC.

(f) The wet well shall be designed and certified by a professional engineer registered in the Province of BC, and shall have the following construction:

(i) filament wound FRP with reinforcement ribs to support and stiffen the wall for given soil and loading conditions;

(ii) FRP nozzles for all connections except electrical conduit connections.

(iii) sanitary white gelcoat interior; and,

(iv) dark green gelcoat exterior.

(g) The wet well shall be adequately protected against hydrostatic uplift based on the wet well empty and the maximum expected groundwater elevation.

(h) The top of the wet well shall extend between 200 mm and 300 mm above the surrounding grade.

(i) The wet well shall be equipped with the following:

(i) lockable, hinged fibreglass access hatch;

(ii) an intermediate deck located above the high wet well level and below the shut off and check valves. The deck shall be constructed from FRP or marine grade aluminum grating and is to include hatches, which will open to allow removal of the pumping units. (The requirement for an intermediate deck may be waived by the District for very shallow stations);

(iii) a marine grade aluminium ladder, which shall extend from the upper hatch to the intermediate deck. The ladder shall conform to current WCB requirements;

(iv) a removable lifting arm to facilitate the removal and installation of the pumps;

(v) slide rails to guide the pumps during removal and installation;

(vi) one explosion proof lighting fixture; and,

(vii) level sensing device as specified in Section 5.

(j) All pumping units shall meet the following requirements:

(i) submersible, centrifugal, and non-clog type designed to pump municipal sewage;

(ii) supplied with a quick disconnect discharge connection, guide rails, rail support brackets, lifting chain, power cable, and related accessories;

(iii) equipped with motor temperature sensors and leakage detectors;

(iv) equipped with cable support bracket, *complete* with non-corroding mesh-type cable grips; and

(v) factory tested prior to installation.

(vi) Piping and valves shall be provided in accordance to the following:

(vii) piping shall be arranged so that valves and pumping units can be easily removed for service;

(viii) discharge piping shall include a connection for a pressure gauge;

(ix) discharge piping shall be sized for a minimum velocity of 1.0 m/s;

(x) valves shall be located above the normal maximum wet well level;

(xi) an isolating valve shall be provided for each pumping unit; and,

(xii) a swing type or ball type check valve shall be provided for each pumping unit.

(3) Ventilation

(a) The wet well shall be provided with positive ventilation by means of an explosion proof supply fan, which is to be sized to exchange the total volume of air inside the wet well with fresh air within 3 minutes. The fan shall be controlled by a manual switch in theelectrical kiosk.

(b) The fan shall be located in a separate, Class 1, Division 2 compartment in the electrical kiosk. The compartment is to be isolated from the electrical equipment and divided into the following sections:

(i) an upper section, vented to atmosphere, containing the fan; and,

(ii) a lower section containing the power and control junction boxes.

(c) A buried supply vent duct is to extend from the bottom of the fan compartment to the wet well. An exhaust duct shall be installed outside the wet well, starting at a point just above the incoming sewer, and terminating above grade in a 180 degree goose neck with a bird screen.

(d) Odour control equipment may be required in certain areas as determined by the District of Sechelt.

(4) Electrical, Controls, and Standby Power

(a) General

(i) The wet well shall be classified as a Class 1, Division 1, Hazardous Area.

(ii) All electrical equipment is to meet the requirements of the Canadian Electrical Code and the local electrical inspection department.

(iii) The electrical service, distribution, and control panels shall be contained in a fabricated weather-proof steel kiosk.

(iv) All electrical equipment shall be CSA approved.

(b) Power Supply and Distribution

(i) The electrical service connection and revenue metering arrangements shall be approved by, and in accordance with, the standards of BC Hydro, the BC Electrical Code, and the local Electrical Inspector.

(ii) Preferably, the service voltage shall be 347/600 volt, 3 phase, 4-wire. Other service voltages are subject to the District's approval.

(iii) Pump motors shall be 3-phase, squirrel-cage type. For locations where only single- phase service is available, suitable phase-conversion devices, designed by the pump supplier, shall be provided.

(iv) Power factor correction capacitors, sized as required to maintain a power factor of not less than 95% shall be provided. Capacitors shall be dry-type, with blown fuse indicators.

(v) All stations shall be provided with a diesel gen-set for standby power in case of power failure. In the case where adequate storage can be demonstrated, the District may waive this requirement.

(vi) Where adequate storage can be provided, each station shall be equipped with a manual transfer switch and a reverse-pin power receptacle. The receptacle shall be mounted such that the plug can be inserted without the need to open the kiosk doors. A "generator circuit breaker" shall be provided between the power receptacle and the manual transfer switch.

(vii) A 600 V lightning surge arrester shall be provided. In addition, a control power conditioner/surge protector shall be provided for the programmable logic controller.

(viii) An ammeter, with a selector switch to read the current in each phase, shall be provided for each pumping unit.

(c) Controls

(i) The pump station controls shall include the following control and alarm features:

(A) intrinsically safe circuits for the level switches or the level transducer;
(B) separate fusing for each pump circuit and common control/alarm circuit;
(C) separate start/stop levels for each pump;
(D) "Hand-Off-Auto" switch for each pump (the Hand position will bypass the automatic signal but not the safety shutdown features);
(E) Lead-Alternate-#2 Lead" switch;
(F) automatic pump alternation;
(G) green "pump running" indicator light for each pump;
(H) elapsed time meter for each pump;
(I) red "motor overload" alarm light for each pump;
(J) red "motor high temperature" alarm light for each pump;
(K) red "wet well high level" alarm light;
(L) separate high level switch, not connected to the other control logic, for future remote alarm;
(M) red "wet well low level" alarm light (optional);
(N) amber "moisture sensing" indicating light for each pump;
(O) data recorder connection (optional);
(P) an ammeter for each pumping unit (optional);
(Q) staggered pump starting after power failure;
(R) manual reset for all alarm conditions; and,
(S) "push to test" alarm lights.

(ii) The motor starting, control, and alarm devices shall be assembled in a control panel, which shall be contained in a separate compartment within the kiosk. The starters shall be EEMAC rated.

(iii) Level controls shall be either float level switches or an ultrasonic level controller. Guides shall be used for all float level devices.

(iv) A 120 VAC GFCI type receptacle shall be provided in the kiosk.

(v) The pump station shall be controlled by an approved programmable logic controller (PLC). The PLC shall perform the following functions:

(A) control pump operation from the discrete floats with level signals or from a 4-20 ma input from the level sensor;
(B) provide an alarm if the PLC ceases tooperate; and,
(C) assess combined malfunction alarms to determine whether they are equivalent to total station failure.

(vi) The PLC is to be programmable from a DOS-based PC and the program is to be submitted to the District in printed and diskette form.

(vii) Provisions shall be made for connection to a future remote alarm telemetry system. A SPDT, 120 VAC-rated dry contact shall be provided for each of the alarm conditions and for "Pump Running" conditions listed above. Further requirements for this system will be provided by the District. A 500 mm wide x 600 mm high x 300 mm deep space shall be kept clear on the kiosk back pan for the installation of future telemetry equipment.

(viii) A weatherproof, flashing warning light, *complete* with red globe and cast guard, shall be mounted on the top of the kiosk. This light shall be actuated under any of the alarm conditions listed above.

(d) Electrical Kiosk

(i) The electrical kiosk shall contain separate compartments for: the control section; the incoming power supply and distribution section; and, the ventilation equipment and junction boxes.

(ii) The control section of the kiosk shall contain adequate lighting and a thermostatically controlled anticondensation convection heater.

(iii) All equipment and electrical fittings in the ventilation compartment are to be rated for Class 1, Division 2, service.

(iv) The kiosk shall be fabricated from 12 gauge steel, and have the following features:

(A) painted plywood backpan for mounting of equipment;
(B) lockable, hinged steel doors that provide easy access to allequipment;
(C) a sloped roof;
(D) a minimum 100 mm overhang and gutters over all openings and doors; and,
(E) screened ventilation openings.

(v) The kiosk shall have a light grey internal coating and a dark green external coating. The coating system shall be as follows or an approved equal:

(A) commercial sand blast all surfaces (SSPC-SP-6).
(B) one coat epoxy zinc rich primer.
(C) one coat of polyamide high build epoxy, intermediate coat,and,
(D) one coat of aliphatic polyurethane finish coat.

(vi) The kiosk is to be mounted on a concrete slab with a minimum 75 mm concrete pad. The slab shall slope away from the kiosk.

(e) Wiring

(i) Conduits shall be provided from the wet well to the kiosk. Separate conduits shall be provided for each pump, the float switch or level transducer cables, and the wet well light. The conduits shall be oversized to allow easy installation and removal of the cables.

(ii) Power and control wiring shall be connected to junction boxes within the ventilation compartment. Conduit seal fittings are to be used where the conduits leave the ventilation compartment to the control and power sections of the kiosk.

(iii) Cables shall be continuous from within the wet well to the junction boxes in the kiosk. In no instance shall a cable be spliced.

(iv) Within the wet well, all electrical couplings, connections and lighting fixtures shall be wrapped with Denso tape.

(v) All wiring within the wet well shall meet the requirements of Class 1, Division 1, Hazardous Area.

(vi) Flexible cables within the wet well shall be suspended from ceiling hooks or brackets using non-corroding mesh-type cable grips.

(f) Standby Gen-Set

(i) The standby power facility shall include the following:

(ii) a diesel driven generator sized to operate both pumps (staggered starting of the pumps shall be provided);

(iii) an automatic transfer switch, mounted in the electrical kiosk, with neutral delay timer to automatically start the gen-set upon failure of the normal Hydro power and to stop the pump upon restoration of Hydro power; and,

(iv) a *complete* fuel system including accessible filler and a fuel tank. The fuel tank shall be sized for at least 24 hours of continuous operation.

(v) The gen-set shall include an engine control panel with the following:

(A) generator circuit breaker;
(B) output voltmeter and a meter with selector switches;
(C) elapsed time meter;
(D) alarm indicating lights and shut-down circuits for low oil pressure, high water temperature, overspeed, overcrank, and other conditions recommended by the manufacturer;
(E) alarm indicating lights for low battery voltage and low fuel level;
(F) dedicated alarm contacts for connection to a future telemetry system. The requirements for this system will be provided by the District; and,
(G) "Run-Off-Auto" selector switch.

(vi) The gen-set enclosure shall meet the following requirements:

(A) fabricated from 12 gauge steel;
(B) equipped with lockable, hinged, steel doors that provide easy access to all equipment;
(C) equipped with dampers on intake an exhaust louvres to prevent dust and debris from entering the compartment when the gen-set is not running;
(D) lined with insulation to reduce condensation and to provide sound attenuation to maximum 85 dBA at 1.5 m from the unit;
(E) provided with thermostatically controlled anticondensation heater; and,
(F) coated to the same specification as the electrical kiosk.

(vii) The gen-set is to be mounted on a concrete slab that slopes away from the enclosure.

(g) Shop Drawings

(i) Shop drawings, prepared by a *Professional Engineer* registered to practice in British Columbia, shall be submitted to the District for review prior to fabrication of any pump station, electrical kiosk, controls, or appurtenances. Any review *complete*d by the District or their designated agent or consultant shall not relieve the pump station designer or supplier of their obligation to comply with District of Sechelt standards, the Canadian Electrical Code, BC Hydro and Power Authority Standards, BC Telephone Co. Standards, and good engineering practice.

(ii) Four copies of all shop drawings shall be submitted for review. One copy, marked up with any comments or required revisions will be returned.

(iii) Shop drawings are required for:

(A) Site Plan
(B) Station wet well including plan view of wet well, elevation of wet well, schedule of all equipment, piping, and appurtenances.
(C) Power supply, distribution, and controls.

(iv) Shop drawings shall be drawn to scale. All lettering and text shall be formed using Leroy stencils or templates and all drawings shall be A1 size prepared in accordance with District of Sechelt standards.

(v) Shop drawings showing the power distribution and control system shall be prepared and shall include the following:

(A) Single Line Diagram, showing:
- load values in hp, kW, kVA and kVAr, asapplicable;
- circuit breaker and/or fuse sizes;
- wire sizes;
- motor overload relay settings or sizes;and
- transformer sizes.

(B) Control schematic showing all internal and external devices and, a fully cross-referenced and annotated print-out of the PLC program.
(C) Control schematics shall utilize line numbers for the identification of wires, relays, timers, and similar control devices.
(D) Sealed layout and construction detail drawings for the kiosk and its contents.
(E) Drawing showing the wiring and equipment mounting arrangement in the wet well.

108. FORCE MAIN

In conjunction with sanitary pumping facilities, the following criteria shall be noted in the design of force main systems.

(1) Velocity

At the lowest pump delivery rate anticipated to occur at least once per day, a cleansing velocity of at least zero decimal nine (0.9) metres/second shall be maintained. Maximum velocity shall not exceed three decimal five (3.5) metres/sec.

(2) Air Relief Valve

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

(3) 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 shall be incorporated.

(4) Size

The minimum size for force mains shall be 100 mm diameter.

(5) Materials

(a) The material selected for force mains shall meet the municipal standards and shall adapt to local conditions, such as character of industrial wastes, soil characteristics, exceptionally heavy external loadings, abrasion. and similar problems.

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

D. HIGHWAYS DESIGN CRITERIA

109. GENERAL REQUIREMENTS

The design of *highway*s shall conform to these engineering standards and "Geometric Design Standards for Canadian Roads and *Streets*" published by:

Transportation Association of Canada (TAC) 2323 St.
Laurent *Boulevard*
Ottawa, Ontario K1G 4K6

110. HIGHWAY ALLOWANCES

(1) When the owner proposes a highway allowance in a plan of subdivision, the Approving Officer will consider the sufficiency of the highway allowance by determining the highway classification. Highway classifications shall be based on a hierarchy of highways integrated into the existing or proposed adjoining highway pattern, and are determined in relation to land use, configuration of the land, and the classification of the existing or approach highway. Arterial and collector highways are shown in the District of Sechelt *Official Community Plan*.

(2) The owner shall provide, without compensation, highways:

(a) For the purpose of a highway within the subdivision, land up to 20 metres in width; or

(b) For the purpose of widening a highway that borders or is within the subdivision, land up to 10 metres in width, or the difference between its current width of the existing highways and 20 metres.

(3) If the Approving Officer believes that, due to terrain and soil conditions, a roadway of a width of 8 metres cannot, within the 20 metre limit be adequately supported, protected or drained, the Approving Officer may determine that the owner provide, without compensation, land of a greater width that, in the Approving Officer opinion, would permit the local highway to be supported, protected, or drained.

(4) Where subdivision borders on a natural body of water, public access shall be given by highways in accordance with the requirements of the Land Title Act.

(5) Where access to subdivision is by way of a roadway from a road allowance or highway then such access shall be constructed to the standard required Part 6.

111. PUBLIC HIGHWAY STANDARDS

(1) Except as otherwise provided in this Bylaw, all highways within or immediately adjacent to the lands being subdivided or developed shall be designed and constructed to the standards of pavement width and number of sidewalks set out in Table 1 of this Bylaw and in accordance with Council policy respecting highway design.

(2) The owner shall clear, grade, surface or otherwise construct or upgrade the required highways including roadways, emergency access, and transit bays in accordance with the standards contained in Part 6.

(3) Arterial and collector highways are shown in the District of Sechelt *Official Community Plan.*

(4) Bike lanes in some cases, shall be an integral part of the roadway surface. It is the responsibility of the owner to mark the bike lane with painted solid white lines.

112. HIGHWAYS PASSING THROUGH MORE THAN ONE ZONE

Where a highway passes through more than one zone or land use, the OCP land use designation which will have the most significant impact on the roadway will dictate the applicable *highway* standards.

113. HIGHWAYS CLASSIFICATION AND DESIGN

(1) Highways shall be designed with regard to:

(a) The present and future traffic requirements at full development of the District of Sechelt as indicated from the Official Community Plan;

(b) Adjoining land uses;

(c) Development Permit areas;

(d) The function of the highway;

(e) On-street parking needs;

(f) Topography, natural features, and vegetation;

(g) Safety and social impacts;

(h) The standards provided in Table 1 of this Bylaw;

(i) Council policy with respect to highway classification and design.

114. HIGHWAY CLASSIFICATION

(1) The appropriate classification shall be consistent with the *Official Community Plan* (OCP).

(i) The Director of Engineering and Public Works, in consultation with the Approving Officer, is authorized to establish the classification of each highway for each development in accordance with the requirements of this Bylaw. The Consulting Engineer shall confirm the classification with the Director of Engineering and Public Works at a pre-design meeting.

115. HIGHWAY DESIGN REQUIREMENTS

(1) Design Speeds

(a) Unless otherwise specified by the *Director of Engineering and Public Works*, the following design requirements shall be:

- Proposed posted speed + 10 km/h
- The *Director of Engineering and Public Works* shall confirm the proposed posted speed of any *highway* in the District.

(2) Design Gradients

Gradients for *highway*s shall be:

Classification	Maximum	Minimum
Arterial	10%	0.50%
Collector	12%	0.50%
Through Local	15%	0.50%
Limited Local	15%	0.50%
Cul-de-sac (downhill)*	8%	0.50%
Cul-de-sac (uphill)	15%	0.50%

*Downhill cul-de-sacs are discouraged.

(3) Cross Slopes and Superelevation

(a) Cross slopes for all *highway*s shall not be less than 2% or more than 4% in the direction indicated on the appropriate Standard Drawing.

(b) Superelevation for any *highway* shall not exceed 4%.

(c) The *Director of Engineering and Public Works* may approve Superelevation up to 6% on Major *Arterial*s, *Arterial*s, and *Collector*s.

(4) Horizontal Curves

(a) Horizontal curves shall be governed by the design speed of the highway. Radii shall be derived from the expression:

$$R = \frac{V^2}{127(e + f)}$$

Where: R = radius of circular curve in metres
V = vehicle speed in kilometres per hour
E = roadway superelevation in metres per metre F
= side friction factor
Values for F: 70 km/h = 0.17; 60 km/h =0.18
50 km/h = 0.21; 40 km/h = 0.25
30 km/h = 0.31

The following examples are derived from this equation:

Classification	Design Speed (km/h)	Min. Radius (m)
Local	50 with 2% Crossfall	100
	50 with 2% Superelevation	85
Collector	60 with 2% Crossfall	150
	60 with 2% Superelevation	142
	60 with 4% Superelevation	129

(5) Vertical Curves

(a) Vertical curves shall be governed by the design speed of the highway. Generally, the numerical value of the length of a vertical curve in metres should not be less than the numerical value of the design speed in km/h.

(b) Vertical curves are required for all changes in grade greater than 1.5%.

(c) Crest Curves: Minimum vertical curvature:

Design Speed	Length (k factor)
20 km/h	1 m/1% change in slope
30km/h	2 m/1% change in slope
40 km/h	4 m/1% change in slope
50 km/h	6 - 7 m/1% change in slope
60 km/h	10 - 13 m/1% change in slope

NOTE: When a local highway meets another local highway at a stop condition, and no through condition is contemplated, then a 30 km/h design speed is permitted.
The 20 km/h design speed is only permitted for the last 10 metres in approaching a stop sign.

(d) Sag Curves: minimum length:

Design Speed	Length
20 km/h	2 m/1% change in slope
30km/h	4 m/1% change in slope
40 km/h	6 m/1% change in slope
50 km/h	5 - 6 m/1% change in slope
60 km/h	8 - 9 m/1% change in slope

NOTE: When a local highway meets another local highway at a stop condition and no through highway is contemplated then a 20 km/h design speed is permitted.
The 20 km/h design speed is only permitted for the last 10 metres in approaching a stop sign.

(6) Mountainous Terrain

(a) "Mountainous Terrain" shall be where the predominant slope of the land in the region exceeds 15%.

(b) The Consulting Engineer is required to consult with the *Director of Engineering and Public Works* to confirm the use of this Section prior to commencement of design.

(c) Local highways in Mountainous Terrain may be designed using 30 km/h design speed. These highways shall be posted as 30 km/h.

(d) The *Director of Engineering and Public Works* may approve a maximum gradient of 12% over short distances on an *arterial* highway where conditions warrant.

116. INTERSECTIONS

(1) Dedications

(a) A 6 metre property corner truncation is required at all intersections.

(b) At intersections not at 90°, dedications shall be confirmed with the *Director of Engineering and Public Works*.

(2) Curb Returns

(i) Radii of curb returns shall be governed by the wider of the intersecting *street*s or as specified by the *Director of Engineering and Public Works*.

Pavement Width	**Radius**
6 m	5 m
7.5 m	6 m
8 m	7.5 m
12 m	10 m
14.6 m	11 m

(ii) Pavement radii at rural highway intersections shall be minimum 12 m radius or as determined by MOT.

(iii) Curbs and curb returns for channelized 90° intersections shall conform to TAC. For intersections at angles other than 90°, use WB 17 design vehicle templates for curb return designs.

(3) Centreline Crossing/Meeting Grades

(a) Major Highway - Vertical alignment at Intersections will be established through consideration with the Ministry of Transportation.

TABLE A – reflects general design guidelines

Major Through Highway	**Maximum Grade/Minimum Distance for Major Highway Through Highway at Intersection With**		
	Arterial	*Collector*	Local
Arterial	4%/120 m	5%/60 m	6%/30 m
Collector		5%/60 m	6%/30 m
Local			6%/30 m

* Distances are measured from the end of the approach vertical curve (EVC) to the beginning of the departure vertical curve (BCV).

(b) Minor Highway - Vertical Alignment at Intersections

TABLE B

Minor Highway	**Maximum Grade/Minimum Flattened Distance * for Minor Highway at Intersection With**		
	Arterial	*Collector*	Local
Arterial	2% / 60 m		
Collector	2% / 30 m	2% / 25 m	
Local	2% / 25 m	2% / 20 m	2% / 10 m

*Distances are measured along the minor highway from the ultimate near curb line of the major highway to the beginning of the vertical curve (BVC).

(c) Where the predominant slope of the land at the intersection exceeds 12%, the crossfall of the major highway, through the intersection, may be reduced to zero to assist in achieving the minimum flattened distance along the minor highway.

(4) Spacing and Location

(a) Intersecting highways shall meet as close to 90° as possible. A *Collector* highway shall not intersect an *Arterial* highway at an angle of less than 70°.

(b) Crossing sight distance shall be as outlined by TAC.

(c) Intersections on curves should be avoided, especially on the inside of curves. Intersections near the crests of hills should be avoided.

(d) Where T-intersections occur on *collector*s, the minimum spacing between them shall be 80 m as measured between the centrelines of the intersecting *street*s.

117. HIGHWAY LENGTHS

(1) Cul-de-sacs

(a) The maximum length of permanent cul-de-sacs and non through highways shall be:

Type of Development / Highway	**Maximum Centreline Length**
Residential	150 m
Industrial, Commercial	110 m
Institutional	110 m
Rural	400 m
*P-loop**	400m

* the entrance leg of a *P-loop* shall not exceed 120 m.

(b) Measurement shall be from the centre line of the intersection *highway* with more than one outlet to the beginning of the turn-around or bulb.

(c) The maximum length of a residential *cul-de-sac* may be extended to 230 m provided emergency access is dedicated and constructed.

(d) Topographic or traffic generation considerations may warrant variations to the maximum length at the discretion of the *Director of Engineering and Public Works*.

(2) Future Through Highway/Temporary Dead-End

(a) The maximum length of the constructed portion of a highway that will be extended in the future is 400 m, otherwise alternate access is required.

(b) Temporary dead-end highways shall use hammerhead type turnarounds.

(3) Emergency Accesses

(a) Any emergency access shall be able to support a wheel axle bearing load of 9.1 tonnes.

(b) Urban, permanent emergency accesses shall conform to the Standard Drawing Part 17, Section 146 – SC-4. The travel surface shall be concrete and shall have chain link fencing, or other suitable substitute, on both sides and have bicycle baffles at each end. Variations to this standard may be considered by the *Director of Engineering and Public Works*.

(c) Rural emergency accesses or temporary emergency accesses in urban *developments* will require a special design. The travel surface may be of asphalt and fencing may not be a requirement. However, vehicular restriction devices shall be designed for each end, as required.

(d) Where there is a reasonable expectation that a rural *development* will be urbanized in the near future, an urban standard emergency access will be required.

118. STRUCTURAL CONSIDERATIONS

(1) Cuts and Fills

(a) Cut and fill slopes shall be 2% within 2 m of the proposed curbs.

(b) Cut and fill slopes greater than 2%, to a maximum slope of 2H:1V, may begin at 2 m from back of proposed curbs and project to meet existing slopes.

(c) The use of retaining walls to contain highway cuts and fills is permitted subject to:

(i) the approval of the *Director of Engineering and Public Works*;

(ii) the wall being constructed *complete*ly on private property; and

(iii) geotechnical reports being submitted detailing type of construction, base, backfill, and drainage.

(d) Encroachment of cuts and fills or retaining walls over existing lots shall be within registered rights-of-way.

(2) Road Base and Pavement Design

(a) Unless otherwise specified in this bylaw, the basic *highway* structural design shall be adequate for an expected road life of 20 years under the expected traffic conditions for the class of highway. This shall be determined by the results of soils tests and analysis of Benkelman Beam results.

(b) The *Director of Engineering and Public Works* may require the submission of a geotechnical report to confirm the structural adequacy of any *highway*.

(c) Existing Highway Upgrading - highway construction and asphalt overlay design shall be based on the analysis of the results of the Benkelman Beam tests. Test holes shall be dug carried out on the existing highway which is to be upgraded. An alternate method may be used subject to approval by the *Director of Engineering and Public Works*.

(d) New Highway Construction - the design of new highways shall be based on an analysis of test holes dug on the proposed highway site at representative intervals. An alternate method may be used subject to approval by the *Director of Engineering and Public Works*.

(e) Test holes and samples shall be undertaken by a qualified soils testing company. All reports shall be signed and sealed by a qualified geotechnical engineer.

(f) The Benkelman Beam design method shall use the maximum seasonally adjusted design defections (mean plus two standard deviations) per the following:

	Road Base	**Asphalt**
***Arterial* Highways**	1.5 mm	1.0 mm
***Collector* Highways**	2.0 mm	1.2 mm
Local Highways	2.6 mm	1.5 mm

(g) Regardless of the method used for design, the pavement structures shall be at least equal to, or greater than, the minimum pavement structures noted in the applicable standard drawing. Pavement structure design is to be carried out by a qualified geotechnicalengineer.

(h) Regardless of the method used for design, a minimum base course thickness of 75 mm and a minimum asphaltic concrete thickness of 75 mm shall be used. Pavement structure design is to be carried out by a qualified geotechnical engineer.

(3) Paving Materials

(a) The standard paving material in the District is hot-mixed, machine laid, asphaltic concrete, and shall conform to appropriate standards and specifications of the District.

(b) Gravel, surface-treated, or flush-coated highways are not acceptable for new *highway* construction.

(4) Paving Procedure

(a) The paving of all *highway*s shall be done in two lifts in thicknesses as designated by the applicable Standard and Specifications, and in conformance with the Construction Specifications.

(b) The first lift shall be laid on an approved road base. The second and final lift may be laid prior to the end of the one-year maintenance period or when 90% of house construction in the *development* is *complete*, at the direction of the *Director of Engineering and Public Works*.

119. CROSS-SECTIONS

(1) Refer to *standard drawings* for appropriate cross-section.

(2) The *Director of Engineering and Public Works* and the *Approving Officer*, in accordance with Council policy, shall determine which cross-section is appropriate for each *development*.

(3) Standard off-sets for utilities and other services are shown on the *StandardDrawings*.

(4) When existing utilities do not conform to the standard off-sets, or will not permit the use of a standard cross-section, an alternative design is required. The Consulting Engineer shall confirm the alternative design with the *Director of Engineering and Public Works* and the *Approving Officer*. The *Owner* shall provide further dedication if required.

120. DRIVEWAYS

(1) Each lot created by *development* shall have sufficient highway frontage to accommodate the construction of a standard driveway access.

(2) Rural driveway culverts shall conform to this Bylaw. The minimum length of culvert shall be 6 metres.

(3) Urban driveway let downs, where required, are maximum 6.0 metres for *residential crossing*s and 9.0 metres for commercial and industrial *crossing*s unless otherwise approved by the *Director of Engineering and Public Works.*

(4) Where a corner lot adjoins highways of different classifications, the driveway shall be constructed to access the highway of the lower classification.

(5) Normally only one access is permitted to each lot, however a secondary access may be approved at the discretion of the *Superintendent* of PublicWorks.

(6) No driveway shall be constructed within 1.5 m of a *street* light or fire hydrant.

(7) Driveway accesses shall be restricted to a minimum 10.0 metres from the nearest edge of the driveway letdown to the property line adjacent to the intersection with an *arterial* highway, and no closer than 6.0 metres from any intersection as measured from the property line. A note is to be added to the design drawings indicating the access location restriction.

(8) The first 5 metres from the road edge shall be constructed at or near a right angle to the roadway (70 to 110 degree range).

(9) Urban driveway design grades shall consider the following:

- Maximum 3% minimum 1% for the first 2 metres from the back of the curb
- Maximum 8% minimum 2% for the remainder of the boulevard
- Maximum 20% inside properties.

(10) Rural driveways (to open shoulders) are to be constructed with a "swale" over the ditch line to ensure surface water enters the ditch and not the road surface. The maximum grades beyond the swale shall be as per Section 120(9).

(11) All driveways will be designed with vertical curves of adequate lengths at grade changes to permit appropriate vehicular access without "bottoming out" or "hanging up".

(12) All driveways in excess of 15% shall be constructed with a hard surfacing.

121. BOULEVARDS

(1) All *boulevard*s shall be finished with a minimum of 150 mm topsoil and a combination of grass and indigenous shrubs as approved by the Municipal Engineer. Seed mix shall be as specified by the *Director of Engineering and Public Works*.

(2) All *boulevard*s shall be irrigated, mowed, and otherwise maintained by the *owner* for the maintenance period.

122. SIGNS

(1) All *street* signs and traffic advisory signs required for each project will be purchased and installed by the owner.

(2) *Street* signs shall comply to the latest edition of Uniform Traffic Control Devices for Canada.

(3) *Street* signs are to be shown on the highway design drawings.

123. POSTAL SERVICE

(1) The placement and construction of post boxes shall conform to the standards set out in the latest edition of Canada Post Corporation's publication entitled, "Planning for Postal Service".

(2) The location shall be approved by the *Director of Engineering and Public Works*. The Consulting Engineer shall consult with Canada Post's local delivery planner.

E. CURBS, SIDEWALKS, WALKWAYS AND BIKEWAYS

124. CURBS AND GUTTERS

(1) All commercial and residential highways 11 metres and wider shall have barrier curbs.

(2) Residential highways of less than 11 metres in width shall have rollover curbs unless flood path venting is a criteria.

(3) Where major flood path routing dictates, the designer may propose barrier style curbs on residential highways less than 11 metres in width, provided that predetermined driveway accesses are incorporated in the design.

(4) The transition between barrier and rollover curbs shall be done through a minimum distance of 2 metres.

125. WHEELCHAIR RAMPS

Wheelchair ramps are required at all intersections.

126. SIDEWALKS

(1) A *sidewalk* is required on any urban highway that provides a pedestrian link to a school, community centre, walkway, park, etc. These *sidewalk*s will be identified in the *Preliminary Layout Approval*.

(2) The grade of a *sidewalk* shall match the grade of the highway where possible and in any event be consistent with the grade of the highway.

127. WALKWAY STANDARDS

(1) Walkways with an overall grade of 8% or less shall have a uniform gradient. Where the gradient exceeds 12%, a stairway, in accordance with the appropriate requirement of the National Building Code, shall be provided.

(2) Walkways with an overall grade exceeding 8%, but less than 12%, shall use a ramp and step combination.

(3) The maximum continuous length of any ramp shall be 15 m. Ramp/step walkways longer than 15 m shall alternate the ramp from one side of the steps to the other equally over the length. Each transition landing area shall be flat.

(4) Walkways shall have ornamental street lighting at:

(a) the entrance and exit;

(b) all changes in direction greater than 30° along its length; and

(c) every 50 m.

(5) Walkways shall be appropriately signed for the disabled.

128. HANDRAILS

(1) All handrails shall be constructed and installed in accordance with *Standard Drawings*. Handrails shall be required for walkways and/or *sidewalk*s where grades are determined to warrant such

installations or where steps are provided due to grades in excess of 12%.

(2) Handrails may also be required along the top of major storm sewer inlets and outfalls, along walkways and/or *sidewalk*s where steep or excessive side-slopes may be encountered, or in any location as deemed necessary by the *Director of Engineering and Public Works* where, in his opinion, the safety of pedestrian traffic or the protection of the public so requires. Where steep or excessive slopes are proposed or encountered, the slope shall be no greater than 4:1 and no closer than 1 m from the walkway or *sidewalk*.

129. BIKEWAYS

The design of bikeways shall conform to these engineering standards and "Geometric Design Standards for Canadian Roads and Streets".

F. STREET LIGHTING

130. GENERAL

(1) *Street* lighting design shall comply with ANSI/IESNA RP-8-00 ROADWAY LIGHTING as amended from time to time.

(2) *Street* lighting systems shall be constructed in accordance with the latest version of Master Municipal Construction Documents (MMCD), except where otherwise noted in this Bylaw.

(3 Service Bases: Street light service bases shall be 60A, 1120/240VAC, 1-phase and shall be in accordance with MMCD standards.

(4) Conduit and Wiring: Underground *street* lighting wiring shall be #6 RW90 with #8 RW90 bond (unless otherwise on the drawings). Underground *street* lighting conduits shall be 35mm RPVC (unless noted otherwise on the drawings).

131. ILLUMINANCE AND CONFIGURATION

(1) *Street* lighting shall be designed as follows:

Highway Class	Land Use	Height of Optical Centres Luminaries (meters)	Location Configuration
Arterial	Commercial	7.5 unless otherwise directed by the District	Staggered
	Residential	7.5 unless otherwise directed by the District	Staggered
	Industrial	7.5 unless otherwise directed by the District	Staggered
	Rural [1]	7.5 unless otherwise directed by the District	Staggered
	Institutional [2]	7.5 unless otherwise directed by the District	Staggered
Collector	Commercial	7.5 unless otherwise directed by the District	Staggered
	Residential	7.5 unless otherwise directed by the District	One Side
	Industrial	7.5 unless otherwise directed by the District	One Side Staggered
	Rural [1]	7.5 unless otherwise directed by the District	Hydro Pole
	Institutional [2]	7.5 unless otherwise directed by the District	Staggered
Local	Residential	7.5 unless otherwise directed by the District	One Side
	Industrial	7.5 unless otherwise directed by the District	One Side
	Rural [1]	7.5 unless otherwise directed by the District	Hydro Pole
	Institutional [2]	7.5 unless otherwise directed by the District	One Side

(2) The illumination criteria shall be as listed in Table 2 "Illuminance Method - Recommended Values" of ANSI/IESNA RP-8-00 document "American National Standard Practice for Road Lighting" and the intersection illumination criteria listed in Table 9 of the ANSI/IESNA RP-8-00 document. All subdivision lighting design shall be in accordance with ANSI/IESNA RP-8-00 as amended from time to time.

132. STREET LIGHT POLE LOCATIONS

Poles shall be located within 1.0m of property corners, wherever practical, and shall not conflict with proposed driveways and/or underground services. Refer to *Standard Drawings* for the appropriate cross-section.

133. UNDERGROUND DUCTS

(1) Underground wiring for *street* lighting shall be designed in accordance with BC Hydro Specifications and shall conform to the rules and regulations of the Canadian Electrical Code (Part 1), the Provincial Electrical Inspection amendments, and any municipal codes or bylaws and other authorities having jurisdiction.

(2) The standard off-set for the location of the underground *street* lighting ducts in highway rights-of- way shall conform to the applicable Standard Drawing for the highway.

(3) The minimum depth for the underground ducts shall be 0.6 m in *boulevard*s and 0.9 m below the finished grade of the roadway.

(4) It is the consulting electrical engineer's responsibility to ensure that the supply service to the *street* lighting system receives approval from BC Hydro.

134. CLEARANCES TO HYDRO LINES

The requirements of BC Hydro, Canadian Electrical Code, BC Electrical Inspectors Branch, and the Worker's Compensation Board shall be followed with respect to clearances between *street* light poles, luminaries, high voltage, and other conductors.

135. CIRCUIT DESIGN

(1) Voltage drop in the streetlighting system shall not exceed 5.0% under normal operating conditions. Where a new system can be expanded in the future, the design shall account for this by sizing wire and circuits accordingly. The maximum number of luminaires on any circuit shall be limited to 25.

(2) Where an existing system is to be extended, the consulting electrical engineer shall ensure that existing service entrance, circuits, and power draw on the existing system meets minimum standards and regulations of the Canadian Electrical Code.

(3) Each circuit to be controlled by a single photo cell. A manual switch to override the photo cell is to be provided in each circuit for the purpose of daytime maintenance checks.

136. TRANSITION LIGHTING

(1) On roadways connecting residential areas to commercial areas, the spacing of luminaires shall change gradually to suit the change in levels of illumination. In the case where luminaire output or type changes, the spacing in the transition *zone* may not have to change significantly. In any case, the spacing changes in the transition area shall not be abrupt or irregular.

(2) There shall not be an abrupt change in luminaire mounting height between adjacent developments. Where a height transition occurs between an existing development and a new development, a minimum three (3) luminaires must be installed that provide uniform transition between the differing mounting heights.

137. LUMINAIRE SPACING

(1) The design drawings shall show:

(a) distribution type;

(b) maximum spacing of luminaires;

(c) minimum average lux achieved for the luminaire selected;

(d) luminaire manufacturer, type and model number; and

(e) the uniformity ratio.

138. LUMINAIRE TYPES

(1) Luminaire type shall be full-cutoff as defined in ANSI/IESNA RP-8-00 with a Type II of Type III refractor and 100w - 175w medium base metal-halide lamp and pulse start ballast as per the revised standard Street Light shown in Drawing SL-1. Type of luminaire is to be confirmed with the *Director of Engineering and Public Works* prior to start of design.

G. STREETSCAPING

139. GENERAL

Streetscaping requirements, materials and specifications may be varied at the discretion of the Approving Officer in order to conform to District Neighbourhood Plans as amended from time to time.

General design guidelines shall conform to the "Geometric Design Standards for Canadian Roads" published by the Transportation Association of Canada (TAC).

Design of *street* tree and *boulevard* planting shall be prepared by a Landscape Architect, registered with the British Columbia Society of Landscape Architects or a Landscape Designer. District of Sechelt approval is required and an inspection by a qualified staff member. The District of Sechelt retains the ability to alter the street tree and/or boulevard plan.

140. PLANTING REQUIREMENTS

Street trees shall consist of more than one variety and shall be planted with 6 - 12 metre spacing. *Boulevard* plantings will be required in all *boulevard*s where the *boulevard* is physically separated from the adjacent *development* by a solid landscape screen or fence.

141. PLANT SPACINGS

(1) *Street* trees shall be spaced from 6 m to 12 m apart depending on the species used in the design.

(2) *Boulevard* plantings shall be designed to fill in as a mass planting within 3 years of installation. A maximum spacing at installation shall be 900 mm O.C. for #2 pot evergreen shrubs and 450 mm O.C. for 10 cm pot evergreen ground covers.

142. MINIMUM TREE PLANTING CLEARANCES

Street trees in different highway categories shall be planted at offsets shown in the *Standard Drawings*. In addition, *street* trees shall have a minimum distance from the following:

Lamp standards	6 m
Steel/wooden poles	3 m
Driveways	2 m
Catch Basins	2m
Manholes, Valve Boxes, Services	2 m
Sewer Services	1.5m
Hydrants	2 m
Corners	in line with 8 m sight triangle

143. SPECIES SELECTION

(1) *Street* tree and *boulevard* planting design shall blend with existing plantings. Changes if necessary should occur at intersections.

(2) *Street* trees species selection can be made from the list of recommended *street* trees included in Table 2.8.1. Any others not on this list can be used with permission from the District ofSechelt.

(3) The following trees are not acceptable for *street* use:

- Alnus rubra (Red Alder)

- Catalpa
- Juglans sp. (Walnuts)
- Malus (fruiting apple)
- Populus sp. (Poplars)
- Prunus (fruiting cherry)
- Pyrus (fruiting pears)
- Quercus palustris (Pin Oak) except "Crownright"
- Salix sp. (Willows)
- Tilia americana (American Linden, Basswood)
- Ulmus americana, U. parvifolia, U. pumila (Elm: american, chinese, siberian)

(4) Most conifer trees are not acceptable due to sight clearance problems and root system requirements. Exceptions may be made for extremely wide *boulevard*s, parkways, or ample root- system spaces.

144. RECOMMENDED STREET TREES

The following tree species are suggestions only, the District of Sechelt retains the ability to alter or approve the provided street tree and/or planting plan.

Tree Type	Common Name	Variety
Acer campestre	Hedge Maple	
Acer cappadocicum	Cappadocian Maple	
Acer circinatum	Vine Maple	
Acer davidii	Davids Maple	
Acer ginnala	Amur Maple	
Acer griseum	Paperbark Maple	
Acer palmatum	Japanese Maple	
Acer platanoides	Norway Maple	Columnare, Crimson King, Globosum, Summershade, etc.
Acer pseudoplat-anus	Sycamore Maple	
Acer rubrum	Red Maple	
Acer saccharum	Sugar Maple	
Acer tataricum	Tatarian Maple	
Aesculus hippocast-anum	Horse Chestnut	esp. Baumanni
Aesculus x carnea	Red Horse Chestnut	Briotii
Amelanchier laevis	Allegany Serviceberry	
Amelanchier canadensis	Shadblow Serviceberry	
Betula alba-sinensis	Chinese White Birch	
Betula papyrifera	Paper Birch	
Carpinus betulus	European Hornbeam	
Carpinus caroliniana	American Hornbeam	
Davidia involucrata	Dove tree	
Liquidamber styraciflua	American Sweet Gum	
Liriodendron tulipifera	Tulip Tree	Arnold, Fastigiata
Magnolia kobus	Kobus Magnolia	
Magnolia x soulangiana	Saucer Magnolia	
Malus	Flowering Crabapple	Winter Gold & other med size
Malus floribunda	Japanese Flowering Crabapple	Plena, Hopa, Makamik
Prunus blireiana	Blireiana Plum	
Prunus serrulata	Japanese Flowering Cherry	esp. Kwanzan, Shirofugen, Ukon
Prunus subhirtella	Flowering Cherry	Autumnalis
Prunus subhirtella	Flowering Cherry	Whitcombi
Prunus ydeoensis	Yoshino Flowering Cherry	Akebono
Pyrus calleryana Bradford	Bradford Pear	
Quercus coccinea	Scarlet Oak	
Quercus garryana	Oregon White Oak	
Cercidiphy-llum Japonica	Katsura Tree	
Cercis canadensis	Eastern Redbud	
Cornus Eddies	White Wonder, Eddies White, Wonder Dogwood	
Cornus florida	Flowering Dogwood	
Cornus kousa	Chinese Dogwood	
Crataegus lavallei	Carriere Hawthorn	
Davidia involucrata	Dove Tree	

Fagus sylvatica	European Beech	esp. Atropunicea, Purpurea, Cuprea
Fraxinus Americana	White Ash	esp. Autumn Purple
Fraxinus excelsior	European Ash	Kimberly
Fraxinus holotricha		Moraine
Fraxinus latifolia	Orgegon Ash	
Fraxinus ornus	Flowering Ash	
Fraxinus pennsylvanica lanceolata		Marshal, Summit, etc.
Ginkgo biloba	Maidenhair Tree	(male only)
Ginkgo biloba	Maidenhair Tree	Sentry (male only)
Gleditsia tricanthos inermis	Honey Locust	Skyline, Shademaster, etc.
Halesia tetraptera	Silver Bell Tree	
Liriodendron chinensis	Chinese Tulip Tree	
Magnolia grandiflora	Evergreen Magnolia	
Magnolia wilsoni Parrotia	Wilsons Magnolia	
persica Oxydendrum	Persian Ironwood	
arboreum Parrotia	Sourwood	
persica	Persian Ironwood	
Quercus palustris	Pin Oak	Crownright
Quercus phellos	Willow Oak	
Quercus robur	English Oak	Fastigiata
Quercus rubra	Red Oak	
Quercus shumardii	Shumard Oak	
Robinis pseudo-acacia	Black locust, Variety Frisia & Tortuosa	
Sorbus hupehensis	Hypeh Mountain-Ash Variety, Pink Pagoda	
Stewartia pseudocamellia	Japanese Stewartia	
Styrax obassia	Fragrant Snowbell	
Styrax japonica	Snowdrop Tree	
Tilia cordata	Littleleaf Linden	esp. Greenspire, Rancho
Tilia buchlora	Crimean Linden	
Zelkova serrata	Japanese Zelkova	

PART 11 – CONSTRUCTION SPECIFICATIONS AND STANDARD DRAWINGS

145. CONSTRUCTION SPECIFICATIONS AND STANDARD DETAIL DRAWINGS

(1) The District of Sechelt has adopted the Master Municipal Construction Document and Standard Detail Drawings, printed for use on all Engineering Works Contracts. To bring these specifications into conformance with practices within the District, the following amended and additional clauses and *standard drawings* are to be considered part of the specifications. These amendments take precedence over the Master Municipal Contract Documents.

Division 1 - General Requirements	
Section 01535	Temporary Facilities
1.13	Delete
Section 01561	Environmental Protection
1.2	Disposal of Wastes
1.2.4	Maintain the site in a neat and orderly condition. Rubbish accumulations to be removed promptly.

Division 2 - Site Work	
Section 02111	Clearing and Grubbing
1.4	Measurement for Payment
1.4.1	Payment for all work under this Section is incidental to payment for work described in other sections.
1.4.2	Delete
3.0	Execution
3.0.2	Prior to clearing, take photographs as required to document preconstruction conditions. Provide full set of prints to the Engineer.
3.4	Grubbing
3.4.2	Grub out all stumps located within 3 metres of trench centreline.
Section 02223	Excavation, Trenching and Backfilling
1.9	Permits and Approvals
1.9.2	Examine site with Engineer and obtain approval of previous work prior to commencing excavation.
1.10	Measurement for Payment

1.10.2	Replace “rock excavation” with “rock and ditch excavation.”
1.10.7	Ditch excavation to be measured in lineal metres.
3.1	Site Preparation
3.1.2	Add “Cuts may be made with diamond saws”.
3.5	Backfill and Compaction
3.5.4.1	Replace “90%” with “95%.”
3.5.5	Place and compact backfill under or adjacent to existing structures in a manner which will prevent damage to the structure from settlement. Under existing pipes, place a minimum of 0.6 m horizontal on each side of pipe at the top of the pipe and slope down at 1.5 horizontal to 1 vertical.
3.7	Maintenance
3.7.1	Maintain all trench surfaces and working surfaces conforming to this section until the project is accepted by Engineer or *owner*’s Engineer. Fill and re-grade depressions, pot holes and washboard conditions with suitable material as soon as they occur.
Section 02224	Roadway Excavation, Embankment, and Compaction
1.8	Measurement for Payment
1.8.1	Payment for rock excavation, common excavation, and imported embankment fill performed under this Section is incidental to payment for work described in other Sections.
3.1	General
3.1.4	Subsurface drainage: place weeping drains in 0.3 m of drain rock in the subgrade to intercept subsurface water that creates unstable conditions Direct the water to a storm drain or ditch.
3.11	Landscape Restoration
3.11.1	Grade, smooth, and seed all cuts and fills behind proposed curbs or *sidewalk*s to slopes acceptable to the Engineer.
3.11.2	Restore lawns with topsoil and seed or sod to match existing lawn.
3.11.3	Restore planted areas with topsoil, ground cover, and plants or shrubs to match existing planted areas.
Section 02233	Granular Base
1.4	Measurement for Payment
1.4.1	Granular base will be measured in square metres of *complete*d base surface area. Payment for granular base will include:
	site preparation, including removing fences and poles, disconnecting overhead wiring, transporting and/or replanting shrubbery, landscaping plants, and materials, removing

	asphalt, curbing, concrete, and retaining walls;
	rock excavation, common excavation, imported embankment fill, granular sub-base, and granular base as specified elsewhere in this document;
	lowering or relocating overhead or underground utilities;
	adjusting existing water vales, water services, gas valves, gas services, metre boxes, and manhole covers.
3.4	Finish Tolerances
3.4.1	Replace “plus or minus 10 mm” with “plus 2 mm or minus 10 mm.”
3.5	Inspection and Testing
3.5.7	Benkelman Beam tests will be required at 10 m spacing per *lane* with staggered tests on adjacent *lane*s. Seasonally adjusted results shall not exceed 2.6 for local residential roads, 2.0 for *collector*s and industrial roads, and 1.5 for *arterial* highways. If initial testing reveals areas of defective pavement structure, *Contractor* shall take all steps necessary to correct deficiencies. Subsequent testing at *Contractor*’s cost.
Section 02234	Granular Sub-base
1.4	Measurement for Payment
1.4.1	Payment for all work performed as specified in this Section is deemed to be incidental to payment for work specified in other Sections.
Section 02512	Hot-Mix Asphalt Concrete Paving
3.4	Transportation of Mix
3.4.5	Replace “Generally, this shall not be less than 135E C.” with “Temperature shall be not less than 125E C and not more than 160E C.”
3.5	Placing
3.5.4.1	Delete
3.5.4.2	Add “and not to be less than 38 mm.”
3.5.4.3	Add “and minimum 38 mm.”
3.10	Finish Tolerances
3.10.1	Add “Against concrete gutter, finished asphalt surface to be higher than the gutter but not by more than 6 mm.”
3.10.4	Add “All manhole rims, water valves, etc., are to be left flush to the initial lift of asphalt. A riser ring shall be used at a later date when the final asphalt lift is applied.”
Section 02523	Concrete Walks, Curbs and Gutters
1.4	Measurement for Payment

1.4.1	Delete.
1.4.5	Concrete curbs and gutters will be measured in lineal metres. Payment will include excavation, subgrade fill, subgrade preparation, granular sub-base, granular base, and concrete curbs and gutters.
1.4.7	Concrete walks will be measured in lineal metres for the width indicated on the Contract Drawings. Payment will include excavation, subgrade fill, subgrade preparation, granular sub-base, granular base, and concrete walks.
3.6	Extruded Sections
3.6.1	"Add "Rollover curbs may be narrow base type as shown on Standard Detail Drawing C4. Barrier curbs to be wide base type as shown on Standard Detail Drawing C5."
3.9	Expansion Joints
3.9.1	Add "Form transverse expansion joints in curb and gutter at the centre of curb returns, at each end of all curb let downs, at all catch basins poured integrally with the curb, and every 15 m in cul-de-sac turnarounds. For wheelchair letdowns refer to drawings C8 and C9.
3.10	Control Joints
3.10.1	Replace "3 m" with "1.5 m."
Section 02546	Asphalt Prime
2.1	Material
2.1.1	Use CAN/CGSB-16.1 grade MC-70 unless otherwise approved by the Engineer.
Section 02666	Waterworks
	Delete. Refer to SCRD Requirements.
Section 02721	Storm Sewer
1.6	Measurement for Payment
1.6.4	Replace "Payment to include excavation" with "Payment to include clearing, grubbing, and excavation."
1.6.5	Over-excavation and replacement with specified materials will be measured in cubic metres for the nominal trench width shown on the *Standard Drawings*.
2.3	Plastic pipe, mainline ribbed profile.
	Delete
3.10	Service Connections
3.10.4	Mark curb with letter "D" (75 mm high, 15 mm deep) on adjacent curb on alignment of service connection."

3.12	Testing
3.12.3	Replace “Curvilinear” with “All.” Add “Provide one copy of the videotape(s) and one copy of the typewritten inspection report to the Engineer.”
Section 02723	Pipe Culverts
1.5	Measurement for Payment
1.5.4	Replace “Payment to include excavation” with “Payment to include clearing, grubbing, and excavation.”
1.5.9	Over-excavation and replacement with specified materials will be measured in cubic metres for the nominal trench shown on the *Standard Drawings*.
2.4	Plastic pipe, mainline ribbed profile.
	Delete
Section 02725	
	Manholes and Catch Basins
1.5	Measurement for Payment
1.5.8	Supply and installation of stubs will be measured in units installed for the pertinent size, as shown on the Contract drawings.
2.1	Materials
2.1.9	Delete
2.1.14	Replace with “Bitulithic mastic will be used on joints to make watertight.”
2.1.23	Catch basin trapping hoods to be Dobney A-10 or equivalent. Support pins to be 16 mm diameter hot-dipped galvanized rebar.
2.1.24	Drain wells to be corrugated steel pipe to CAN3-G401, perforated with drain holes, with asphalt coating and galvanized steel steps.
Section 02731	Sanitary Sewers
1.6	Measurement for Payment
1.6.4	Replace “Payment to include excavation” with “Payment to include clearing, grubbing, and excavation.”
1.6.10	Over-excavation and replacement with specified materials will be measured in cubic metres for the nominal trench width shown on the *Standard Drawings*.
3.10	Service Connection Installation
3.10.4	Mark curb with letter “S” (75 mm high, 15 mm deep) on adjacent curb on alignment of service connection.”
3.12	Testing - General

3.12.1	Delete “or both as determined by the Engineer.” Add “, infiltration if the surface level of existing ground water is 1 m or more above the top of the pipe over the test section, and exfiltration if less than 1 m above.”
3.18	Video Inspection
3.18.4	Add “Provide one copy of the videotape(s) and one copy of the typewritten inspection report to the Engineer.”
Section 02732	Sewage Force Mains
1.8	Measurement for Payment
1.8.4	Replace “Payment to include excavation” with “Payment to include clearing, grubbing, and excavation.”
1.8.13	Over-excavation and replacement with specified materials will be measured in cubic metres for the nominal trench width shown on the *Standard Drawings*.
3.15	Pressure Testing Procedure
3.15.2	Replace “1.5 x working pressure applied at highest elevation” with “690 Kpa additional pressure applied at the lowest elevation.” Add “The maximum allowable leakage rate over the one-hour test period is 3.4 litres per day per millimetre diameter per kilometre length.”
Section 02831	Chain Link Fences, Gates, and Handrails
1.0	General
1.0.1	Replace “chain link fences and gates” with “chain link fences, gates, and handrails.”

Division 3 - Concrete

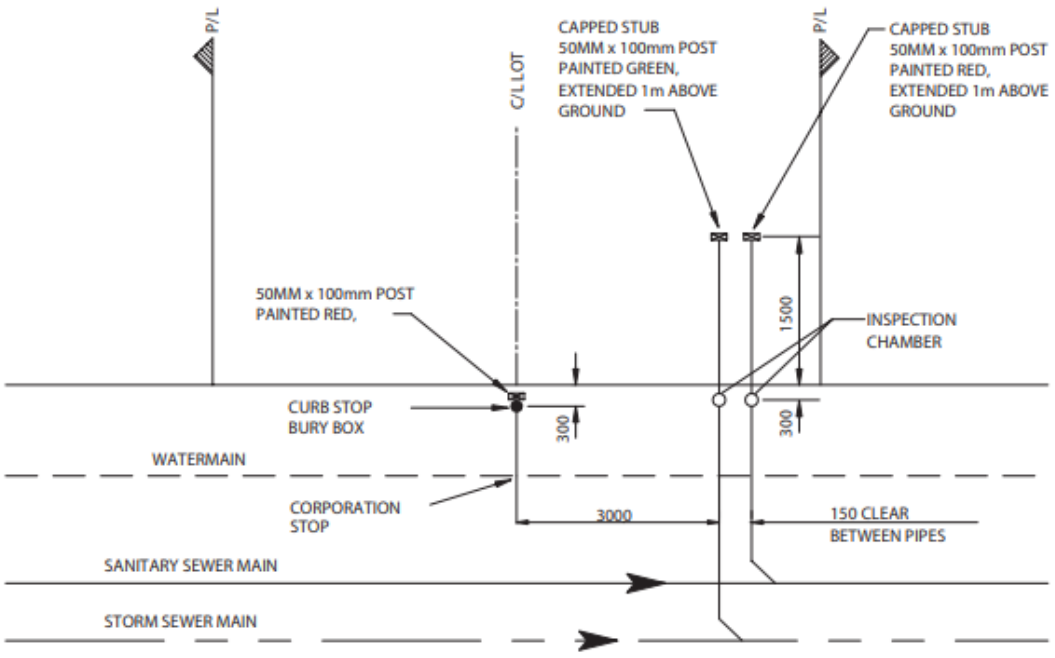
Section 03300	Cast-in-Place Concrete
3.5	Field Quality Control
3.5.1	“One strength test will be required for each 500 lineal metres of *sidewalk* or curb and gutter placed, with not less than one test per day of placement.”
Section 16550	*Street* Lighting
2.6	Conduit
2.6.1.3	Conduit to be 30 mm nominal size, with 42 mm outside and 35 mm inside diameters.
3.2	Tolerances
3.2.4	Voltages at *street* light poles to be within 5% of the supply voltage at the service panel.

3.2.5	Branch feeded current to be within 10% of added luminaire name plate values.
3.2.6	Illumination to meet or exceed design requirements.
3.7	Conductors
3.7.6	Leave 1.0 m length of each conductor in junction boxes.
3.8	Poles
3.8.5	Add “Plumb to be checked using a plumb bob.”
3.8.6	Replace “If more than 6 shims required” with “If total height of shims exceeds 10 mm.”
3.8.8	Add “The exposed thread of anchor bolts to be between 3 mm and 9 mm above the anchor nuts.”
3.12	Conductor Connections
3.12.5	Add “Conductor connections from the luminaire at pole handholes to have a drip loop.”
3.13	Service Base Connection to Utility Company Service Supply
3.13.5	Install padlocks supplied by the District of Sechelt on service panels.
3.13.7	For power supply point at:
3.13.7.1	underground secondary service box, pull in service conductors.
3.13.7.2	open secondary wiring on a power pole, supply and install service conduit, fittings, conduit straps, and weather head. Pull in service conductors.
3.13.8	Meet requirements of utility company for service installation. Install service switch override for maintenance testing purposes.
3.15	Inspection and Testing
3.15.3	Add “Voltage to be tested at service panels(s) and *street* light poles. Results to be reported to Engineer. Illumination to be tested at sufficient locations to verify requirements for minimum lighting levels and maximum uniformity ratio are met. Results in lux to be reported to Engineer.”
Standard Detail Drawings	
S13	Storm Sewer Inlet with Safety Grillage is also Storm Sewer Outlet.

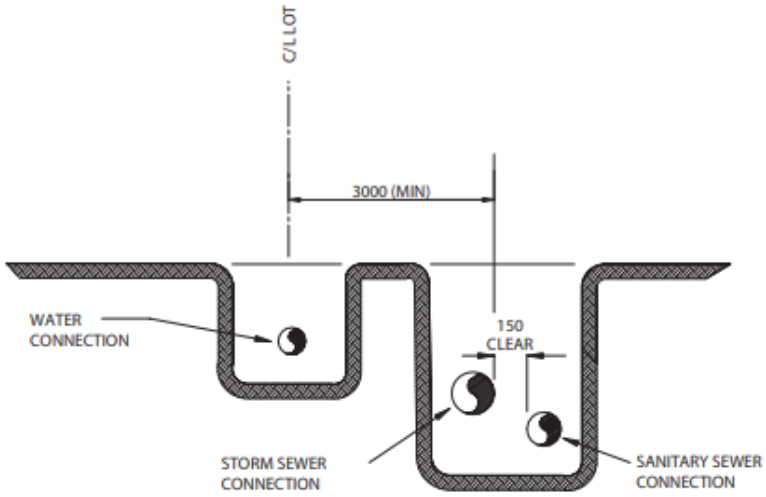
146. STANDARD DRAWINGS

The following drawings take precedence over the Standard Detail Drawings of the Master Municipal Contract Documents.

	Drawing No.
Supplementary General	
Survey Monument Box	SG-1
Typical Lot Service Connection	SG-2



PLAN



No.	REVISION	APPROVED

SCALE: N.T.S.

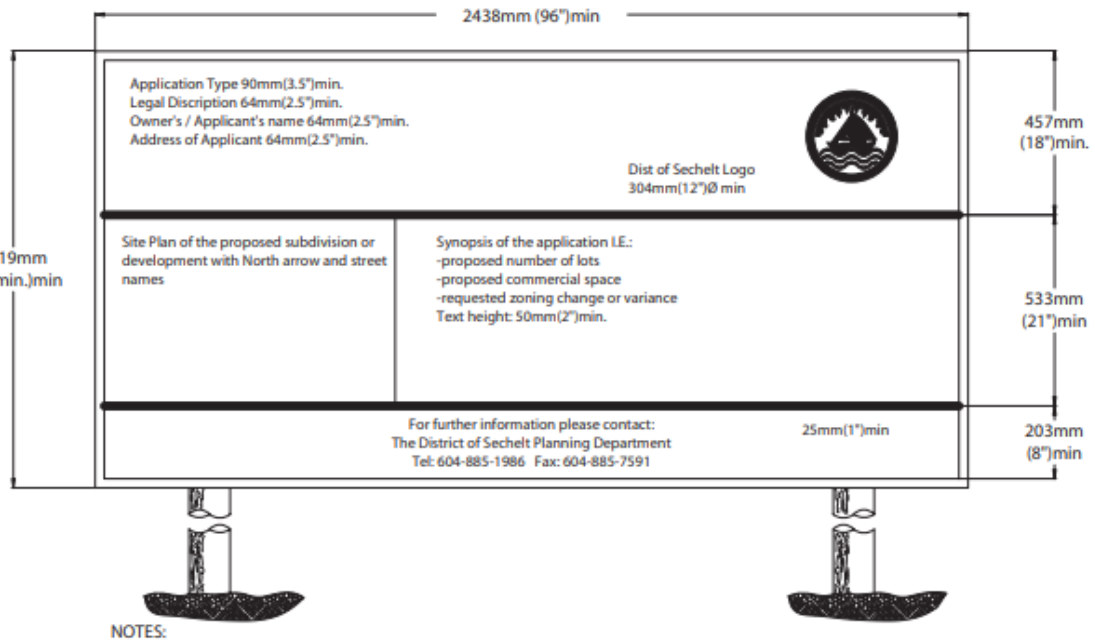
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE

TYPICAL
LOT SERVICE CONNECTION

SG-2



NOTES:

The required public notice sign is to be erected on subject property at least 10 days prior to the public information meeting date. The sign is to be removed within 10 days of the final decision on the application.

Sign must be erected on the front property line adjacent to the road. Sign must be legible from the street without having to enter private property.

Minimum sign size 1219mm(48") high by 2438mm(96") long

White background with black lettering and a 25mm(1") wide border

Site Plan: White background with black highlights, sized as large as possible c/w North arrow

Lettering: Block capitals with headings not less than 90mm(3.5") in height, notice copy not less than 50mm(2") in height, map lettering not less than 25mm(1") in height.

District of Sechelt Logo: Minimum 304mm(12") diameter

Applicant responsible for weekly inspection of sign for possible weather damage or vandalism and to make immediate repairs in such event.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

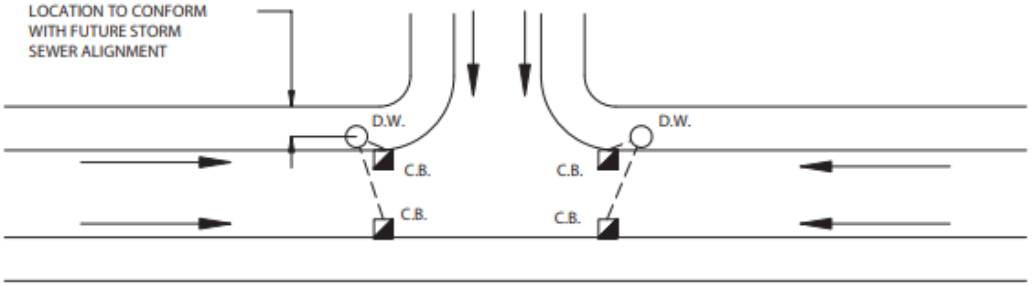
DISTRICT OF SECHELT

TITLE:

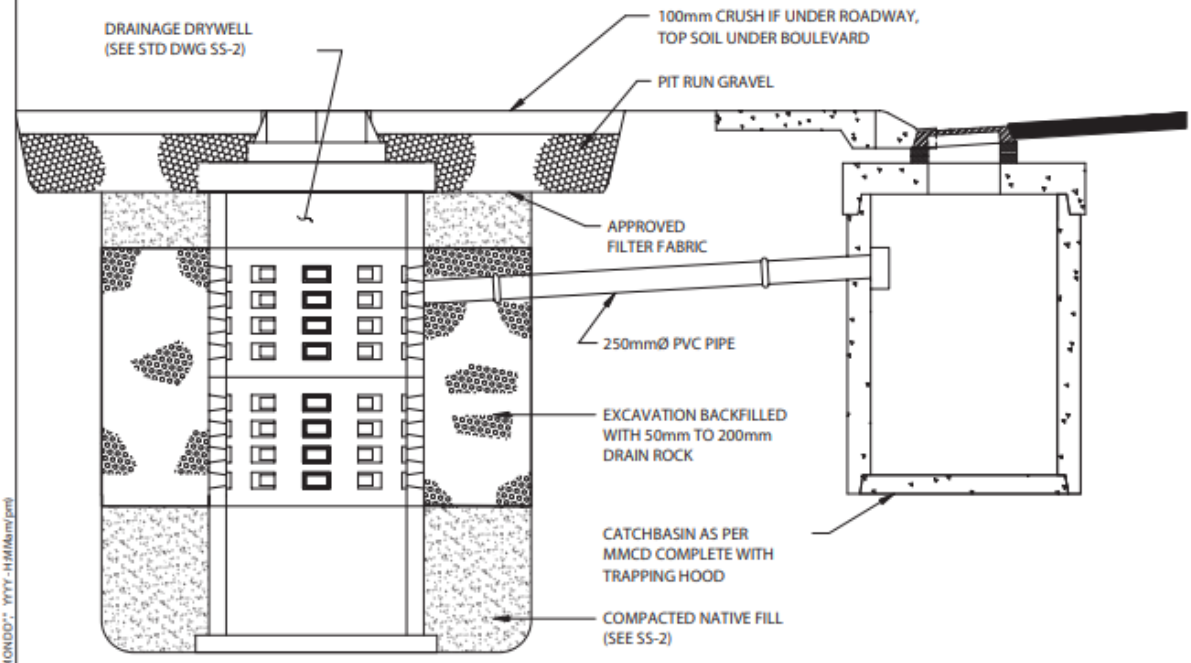
DEVELOPMENT APPLICATION SIGN

SG-3

Plot Date: $(edtime, 0,MON DD,YYYY - H:MMAM/PM) $(getvar, "loginname") $(getvar, "dwgprefix") $(getvar, "dwgname")



TYPICAL INSTALLATION



FOR USE ONLY WITH ENGINEER'S APPROVAL

NOTES:

1. THE NUMBER AND SPACING OF DRAINAGE DRYWELLS WILL BE CALCULATED IN ACCORDANCE WITH DRAINAGE DESIGN CRITERIA AND WILL DEPEND UPON THE AREA DRAINED AND EXISTING GROUND CONDITIONS.
2. FILTER FABRIC TO BE PLACED OVER TOP OF BARREL PRIOR TO PLACING COVERSLAB. ACCESS TO DRYWELL NOT TO BE CUT THROUGH FILTER FABRIC UNTIL FINAL INSPECTION.
3. THE DRYWELL SHALL BE INSTALLED ON THE UPHILL SIDE OF THE RIGHT-OF-WAY.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

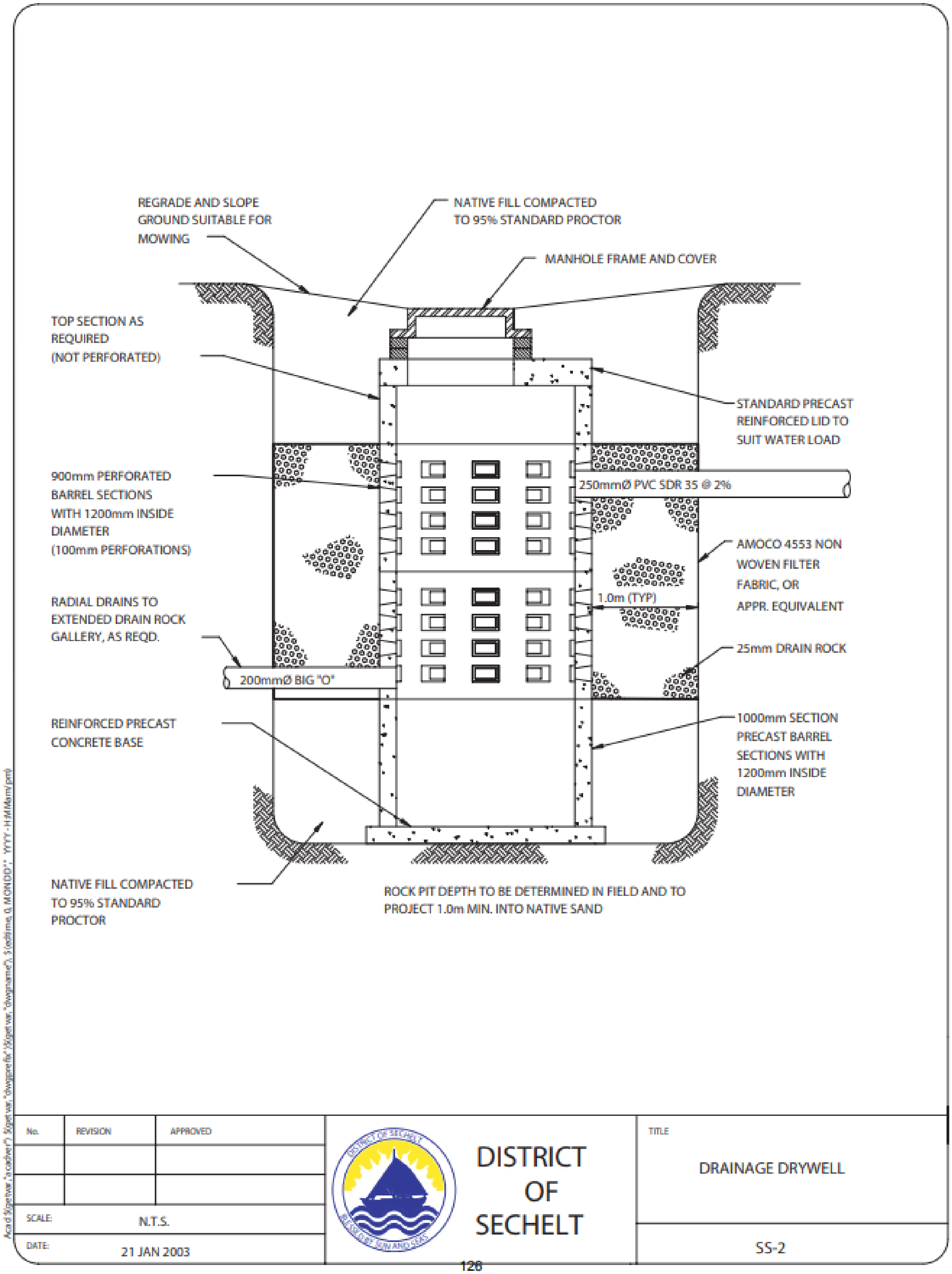
DISTRICT OF SECHELT

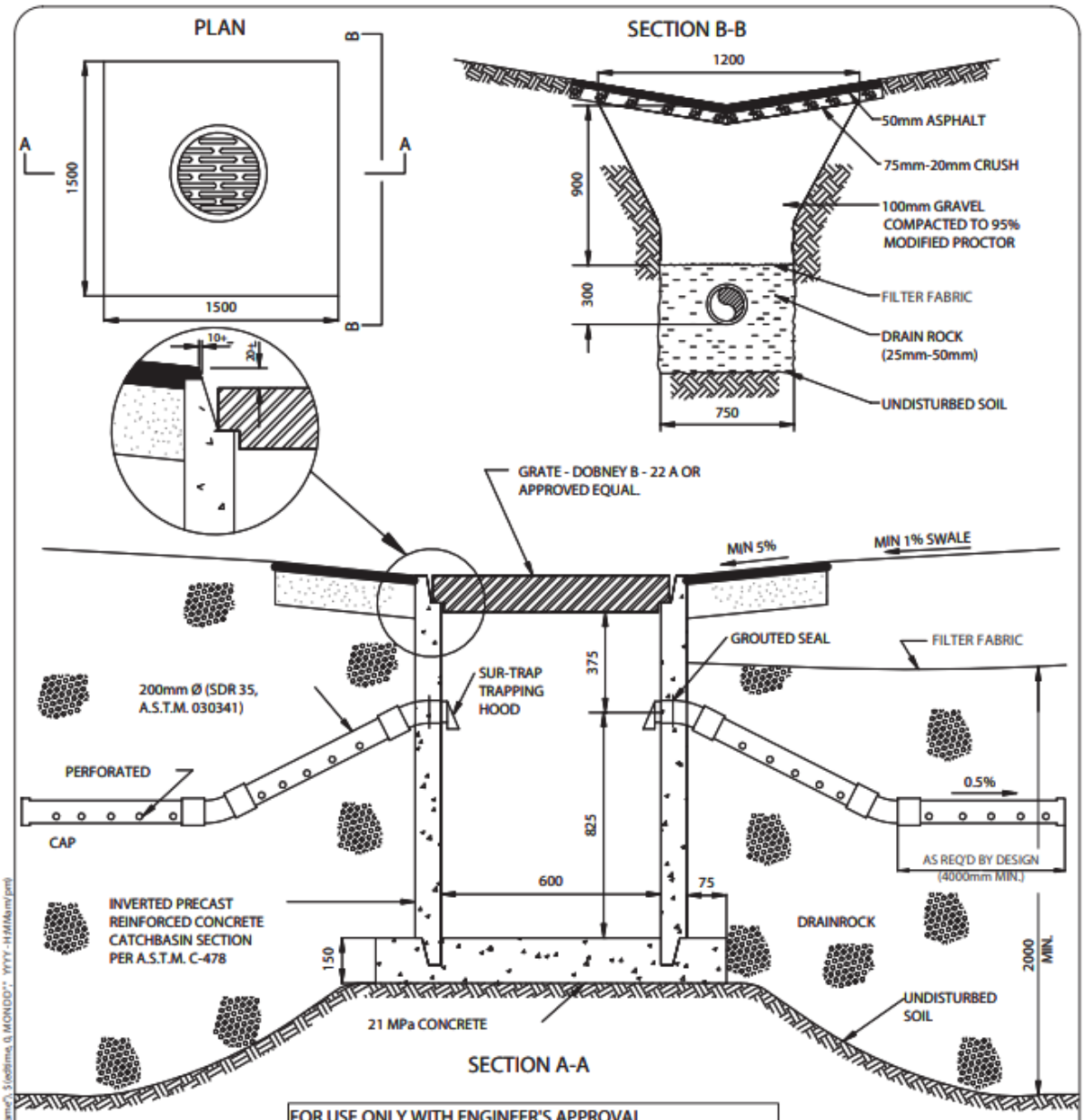
TITLE

INSTALLATION OF DRAINAGE DRYWELL

SS-1

125


REGRADE AND SLOPE GROUND SUITABLE FOR MOWING
NATIVE FILL COMPACTED TO 95% STANDARD PROCTOR
MANHOLE FRAME AND COVER
TOP SECTION AS REQUIRED (NOT PERFORATED)
STANDARD PRECAST REINFORCED LID TO SUIT WATER LOAD
900mm PERFORATED BARREL SECTIONS WITH 1200mm INSIDE DIAMETER (100mm PERFORATIONS)
250mmØ PVC SDR 35 @ 2%
AMOCO 4553 NON WOVEN FILTER FABRIC, OR APPR. EQUIVALENT
1.0m (TYP)
RADIAL DRAINS TO EXTENDED DRAIN ROCK GALLERY, AS REQD.
25mm DRAIN ROCK
200mmØ BIG "O"
REINFORCED PRECAST CONCRETE BASE
1000mm SECTION PRECAST BARREL SECTIONS WITH 1200mm INSIDE DIAMETER
NATIVE FILL COMPACTED TO 95% STANDARD PROCTOR
ROCK PIT DEPTH TO BE DETERMINED IN FIELD AND TO PROJECT 1.0m MIN. INTO NATIVE SAND
No.
REVISION
APPROVED
SCALE: N.T.S.
DATE: 21 JAN 2003
DISTRICT OF SECHELT
TITLE
DRAINAGE DRYWELL
SS-2
126



FOR USE ONLY WITH ENGINEER'S APPROVAL

NOTES:
1. DISCHARGE PIPES TO BE ALIGNED PARALLEL TO THE ROAD CENTRELINE.
2. TRENCH DEPTH SHALL BE AS REQUIRED TO REACH A PERVIOUS UNDISTURBED SOIL.
3. MINIMUM TOTAL DEPTH OF DRAINROCK 2.0m.
4. USE ROCK PIT ONLY WITH POSITIVE DRAINAGE OUTLET.

No.	REVISION	APPROVED

SCALE: N.T.S.

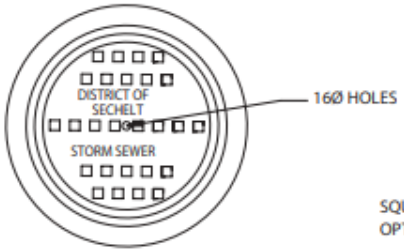
DATE: 21 JAN 2003

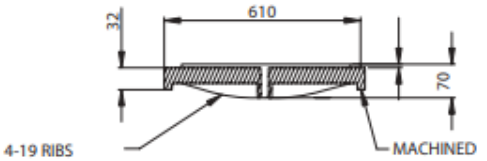
DISTRICT OF SECHELT

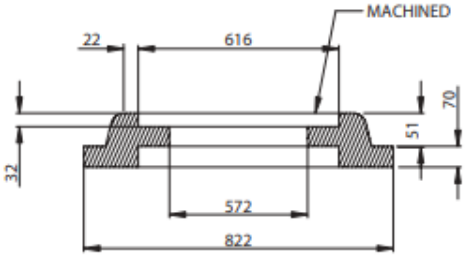
TITLE

ROCK PIT

SS-3

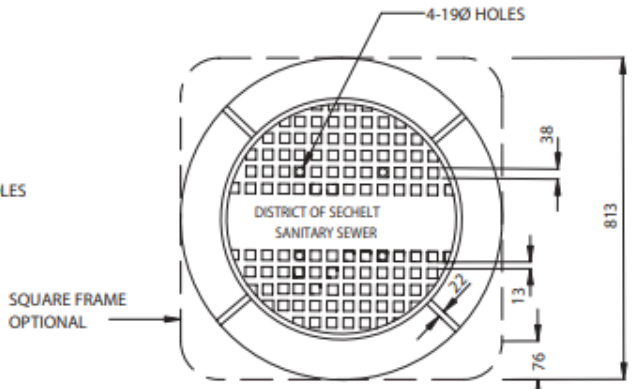




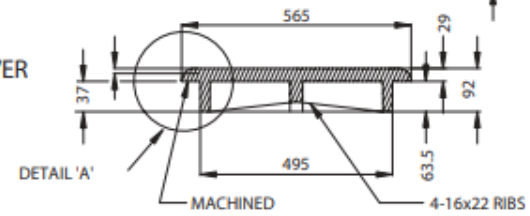


FRAME & COVER #1

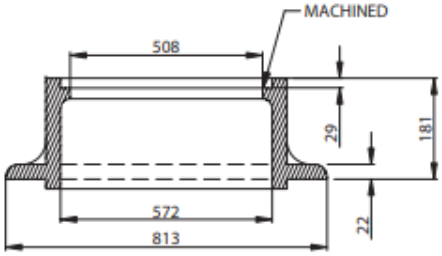
(LIGHTWEIGHT)



COVER



FRAME



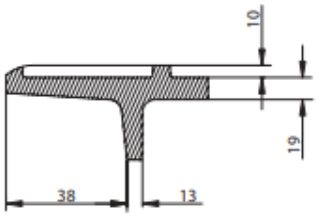
FRAME & COVER #2

(H20 LOADING)

NOTES

1. APPROXIMATE WEIGHTS:
   - COVER No.1 61 kg
   - FRAME No.1 47-52 kg
   - COVER No.2 63 kg
   - FRAME No.2 102-138 kg
   - GRATE FOR ABOVE (NOT SHOWN) 50-59 kg

   FOR DETAILS OF COVER AND FRAME No.1 SEE DOBNEY B-26D AND B-26F OR APPROVED EQUAL.
   FOR DETAILS OF COVER, FRAME AND GRATE No.2 SEE DOBNEY C-18 OR APPROVED EQUAL.
2. LIMITS OF TOLERANCE + 2mm.
3. COVER SHALL BE MARKED SANITARY OR STORM AS REQUIRED AND MACHINED FOR A NON ROCKING FIT IN ALL POSITIONS.
4. CASTINGS SHALL BE FINISHED BT COATING WITH HOT ASPHALT AND BLACK PAINT EMULSION.
5. LETTERING TO BE 25mm FLATTENED FACE GOTHIC LETTERING WITH FACE OF LETTERS RAISED TO THE SAME LEVEL AS THE TOP OF THE RIBS.



DETAIL 'A'

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

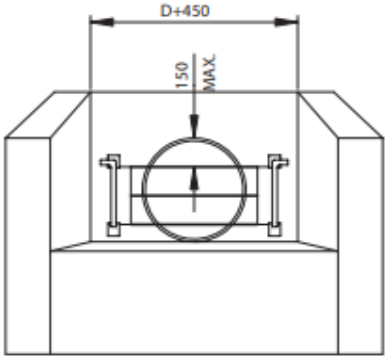
DISTRICT OF SECHELT

TITLE

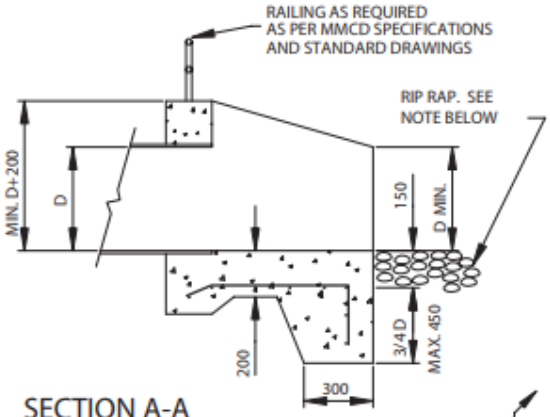
MANHOLE
FRAME AND COVER

SS-4

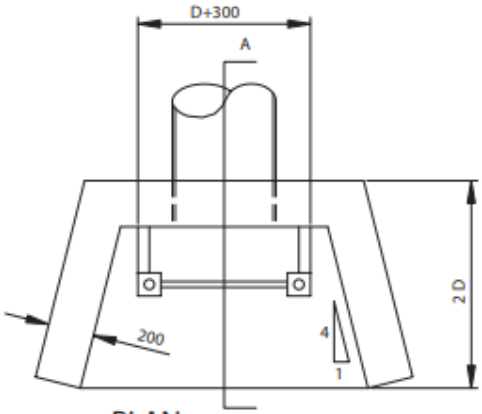
128



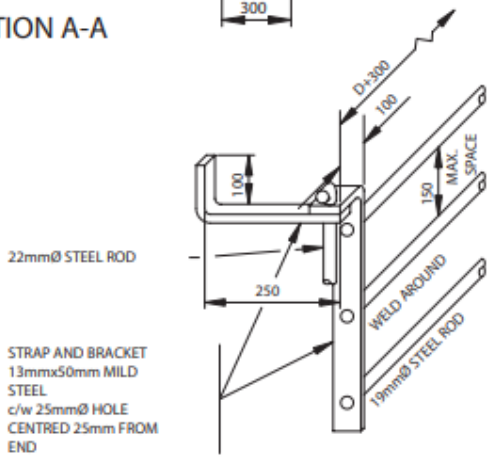
ELEVATION



SECTION A-A



PLAN



GRILL DETAIL

NOTES:

1) RIP RAP SUITABLY SIZED, OR GABIONS c/w FILTER BED SHALL BE PLACED ON BOTTOM AND SIDES TO DESIGN WATER LEVEL AND DOWNSTREAM DISTANCE OF 2.5 TIMES THE DESIGN WATER VELOCITY (MINIMUM 1m).
2) PIPE SIZES LARGER THAN 1200mmØ, WATER VELOCITIES GREATER THAN 2.13m/sec. OR WALLS HIGHER THAN 2m SHALL REQUIRE A SPECIAL DESIGN FOR THE STRUCTURE.
3) 10M REBAR AT 20mm BOTH WAYS AND CENTRED PLUS ONE 10M AROUND PIPE.
4) REBARS TO HAVE MINIMUM 50mm COVER.
5) CONCRETE TO BE 21 MPa AT 28 DAYS.
6) CHAMFER ALL EXPOSED CORNERS 25mm.
7) PLACE SUFFICIENT GRANULAR BACKFILL FOR DRAINAGE.
8) GRILLAGE NOT REQUIRED ON PIPES LESS THAN 450mmØ.
9) ALL GRILLAGE MATERIALS TO BE GALVANIZED.

No.	REVISION	APPROVED

SCALE: N.T.S.

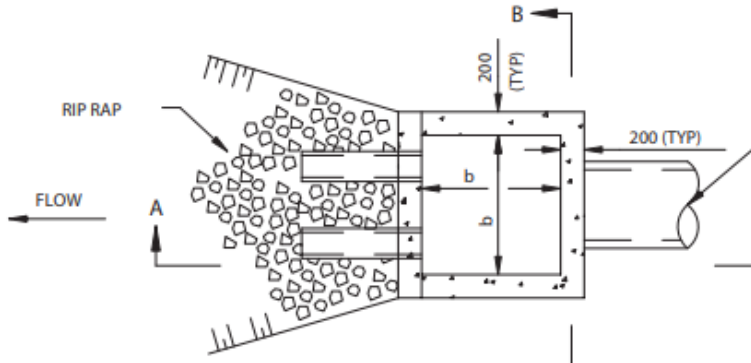
DATE: 21 JAN 2003

DISTRICT OF SECHELT

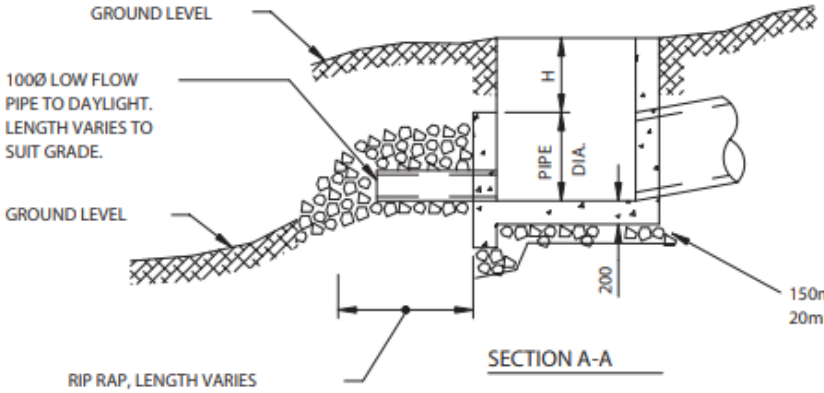
TITLE: OUTLET STRUCTURE

SS-5

129



PLAN



SECTION A-A

NOTES:

1. CONCRETE 28 MPa MONOLITHIC POUR
2. VARIABLE DIMENSIONS b & H TO BE SPECIFIED ON PLAN
3. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. EQUIVALENT PRECAST UNIT MAY BE APPROVED AT DISCRETION OF THE DIRECTOR OF ENGINEERING AND PUBLIC WORKS.

SECTION B-B

REINFORCING DETAIL

REINFORCING

10mm DEFORMED MILD STEEL REINFORCING AT MIN. OF 460 mm c-c BOTH WAYS IN WALLS AND FLOOR PAD BENT TO OVERLAP 300mm AT CORNERS 150mm OVERLAP AT SPLICES

DISCHARGE - FRONT OR SIDE TO SUIT FIELD CONDITIONS.

No.	REVISION	APPROVED

SCALE: N.T.S.

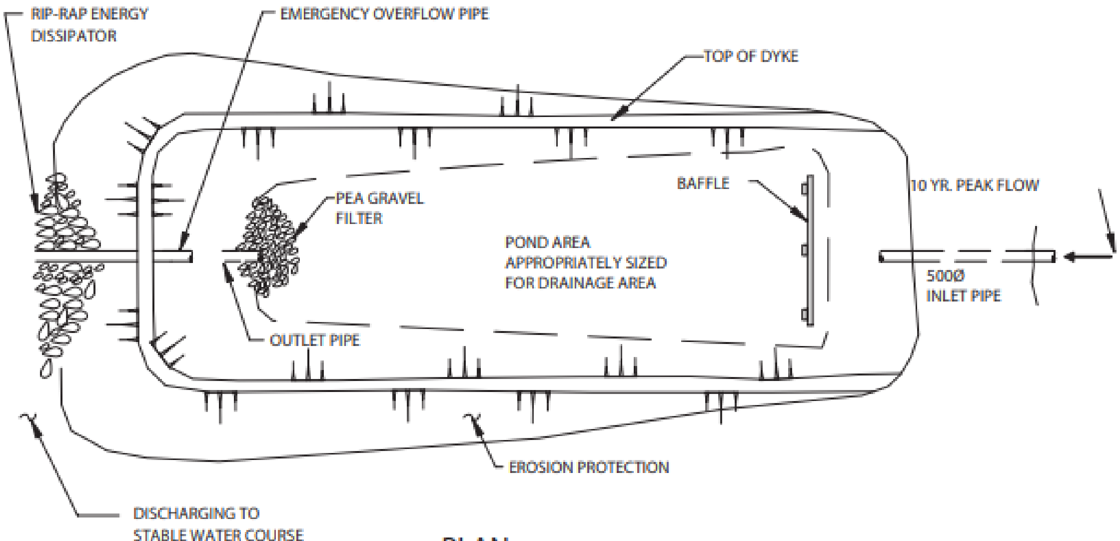
DATE: 21 JAN 2003

DISTRICT OF SECHELT

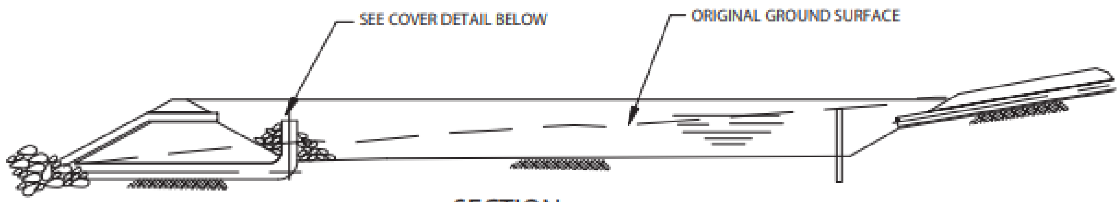
TITLE: ENERGY DISSIPATOR

SS-6

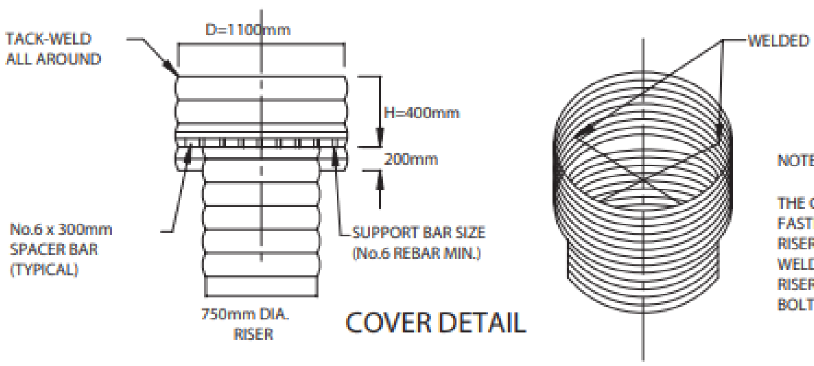
130



PLAN



SECTION



COVER DETAIL

NOTE:

THE CYLINDER MUST BE FIRMLY FASTENED TO THE TOP OF THE RISER. SUPPORT BARS ARE WELDED TO THE TOP OF THE RISER OR ATTACHED BY STRAPS BOLTED TO TOP OF RISER.

No.	REVISION	APPROVED

SCALE: N.T.S.

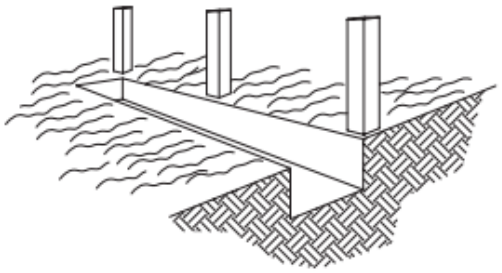
DATE: 21 JAN 2003

DISTRICT OF SECHELT

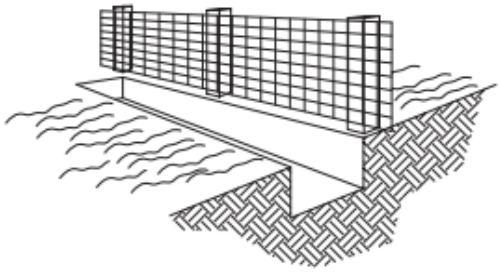
TITLE: CONCEPTUAL SEDIMENT BASIN LAYOUT

SS-7

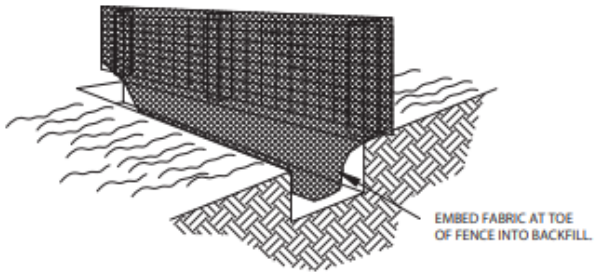
131



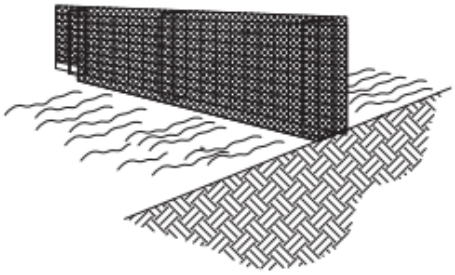
1. SET POSTS AND EXCAVATE A 100 x 100mm TRENCH UPSLOPE FROM AND ALONG THE LINE OF POSTS.



2. STAPLE WIRE FENCING TO THE POSTS.



3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

INSTALLATION PROCEDURE

1. LAY OUT A SUITABLE FENCE LINE AND SET POSTS ALONG IT. ON SLOPES, ALIGN THE FENCE ALONG THE CONTOUR AS CLOSELY AS POSSIBLE. IN SMALL SWALES, CURVE THE FENCE LINE UPSTREAM AT THE SIDES TO DIRECT THE FLOW TOWARD THE MIDDLE OF THE FENCE. THE ENDS SHOULD BE HIGHER THAN THE CENTRE.

   EXCAVATE A TRENCH APPROXIMATELY 100mm DEEP ALONG THE LINE OF THE POSTS ON THE UPHILL SIDE OF THE BARRIER.

2. FASTEN WIRE MESH TO THE UPHILL SIDE OF THE FENCE POSTS, USING HEAVY-DUTY WIRE STAPLES (MIN. 25mm LONG). EXTEND WIRE AT LEAST 150mm INTO THE TRENCH, AND LEAVE APPROXIMATELY 900mm HEIGHT ABOVE THE GROUND. IF EXTRA-STRENGTH FABRIC IS USED AND FENCE POST SPACING DOES NOT EXCEED 1.8m, THE WIRE MESH MAY BE OMITTED.

3. FASTEN THE FILTER FABRIC TO THE UPHILL SIDE OF THE FENCE POSTS USING STAPLES OR TIE WIRES. EXTEND FABRIC AT LEAST 150mm INTO THE TRENCH, AND LEAVE A MAXIMUM OF 900mm HEIGHT ABOVE THE GROUND. CUT THE FABRIC FROM A CONTINUOUS ROLL TO AVOID THE USE OF JOINTS. WHERE JOINTS ARE NECESSARY, SPLICE THE FABRIC AT A POST WITH A MINIMUM 150mm OVERLAP, AND SECURELY FASTEN BOTH SECTIONS TO THE POST.

4. BACKFILL THE TRENCH OVER THE TOE OF THE FABRIC, AND COMPACT THE SOIL TO MEET THE ORIGINAL GRADE.

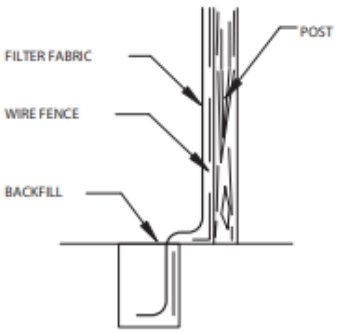
MATERIALS

FILTER FABRIC
-NICOLAN CONTROL AND CONTROL PLUS
-AMOCO 1380
-NILEX P100 OR AS APPROVED
-EXXON GTF 150
-EXXON GTF 200

WIRE MESH
-MIN. 14 GAUGE STEEL WIRE
-MIN. 150mm MESH SPACING

FENCE POSTS
-WOOD POSTS - MIN. 100 x 100 x 1500 LONG
-STEEL POSTS - MIN. 1.97kg/m x 1500 LONG

NOTE
-INSPECT AFTER EVERY RAINFALL
-REMOVE SEDIMENT BEFORE DEPTH REACHES 1/2 HEIGHT OF FENCE
-REPAIR AS REQUIRED



No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

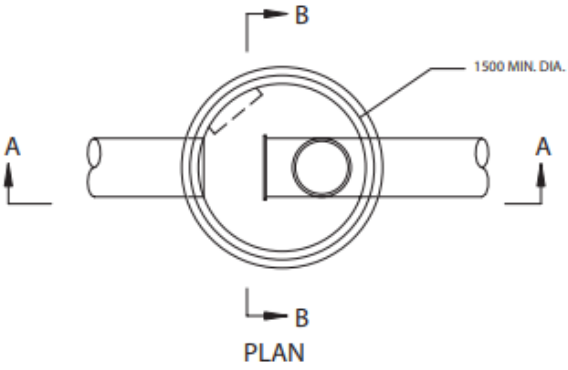
DISTRICT OF SECHELT

TITLE

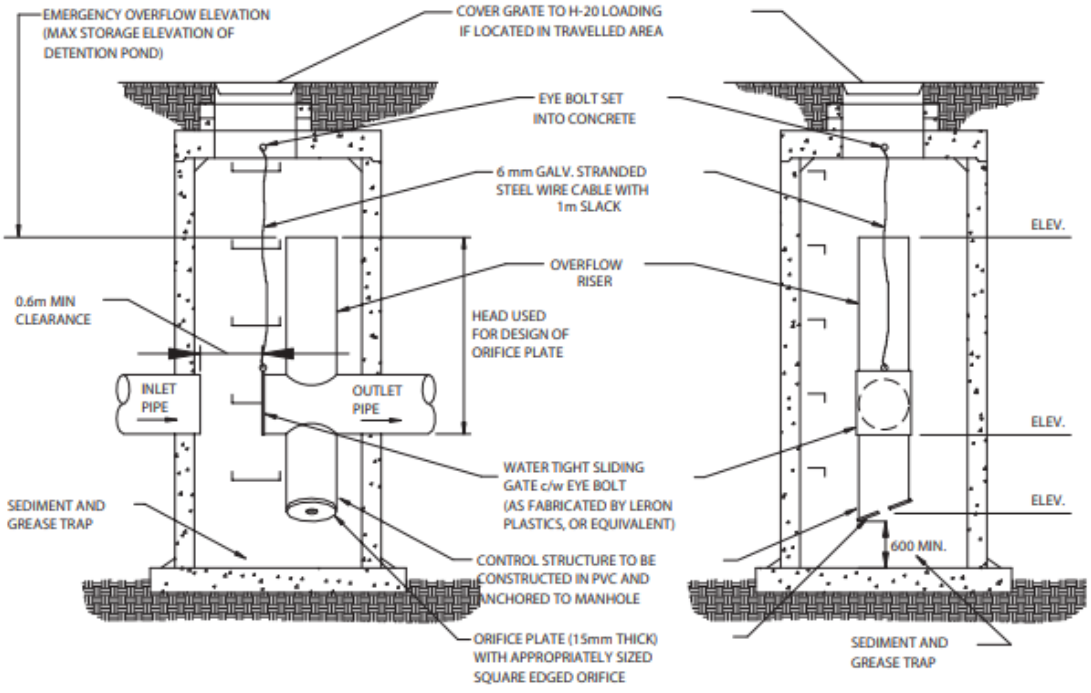
SILT FENCE

SS-8

132



PLAN



STANDARD MANHOLE

SECTION A-A

STANDARD MANHOLE

SECTION B-B

NOTES:

1. CONSTRUCT MANHOLE AS PER DWG MMCD S-1.
2. MINIMUM MANHOLE SIZE TO BE 1200mm DIAMETER.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

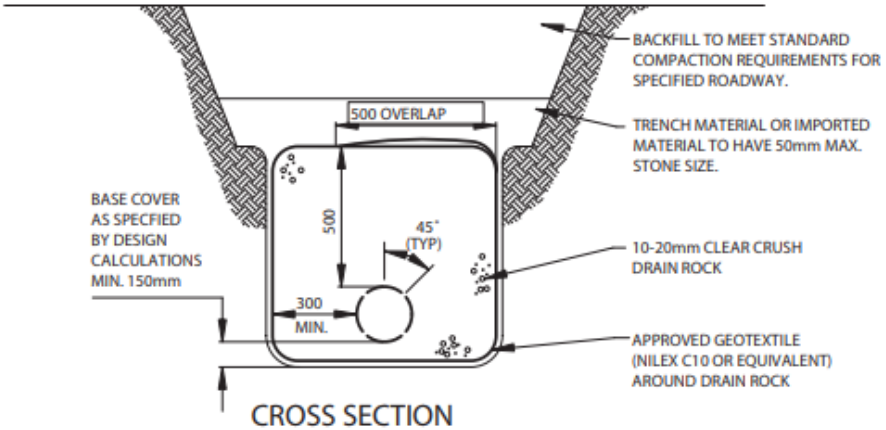
DISTRICT OF SECHELT

TITLE

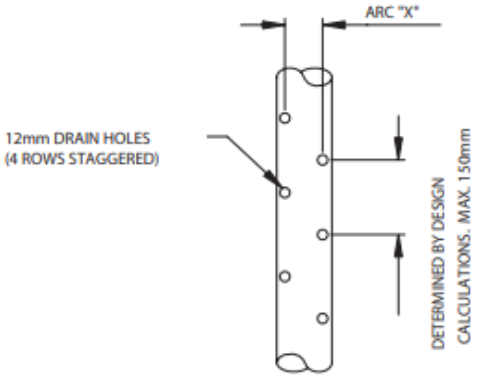
FLOW CONTROL MANHOLE

SS-9

133



CROSS SECTION



PLAN VIEW

NOTES:

1) USE PERFORATED PVC PIPES.
2) FIELD PERFORATION OF PIPE SHALL BE TO THIS STANDARD. FACTORY PERFORATED PIPE MUST BE APPROVED BY THE MUNICIPAL ENGINEER.
3) PROVIDE 0.5m MINIMUM OVERLAP FOR LONGITUDINAL OR TRANSVERSE JOINTS IN FABRIC.
4) FILTER FABRIC TO BE APPROVED BY THE MUNICIPAL ENGINEER.
5) CLEAR DRAIN ROCK TO BE SIZED 20mm.
6) ENSURE NO SILT OR CLAY LENS ADJACENT TO TRENCH WALL.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

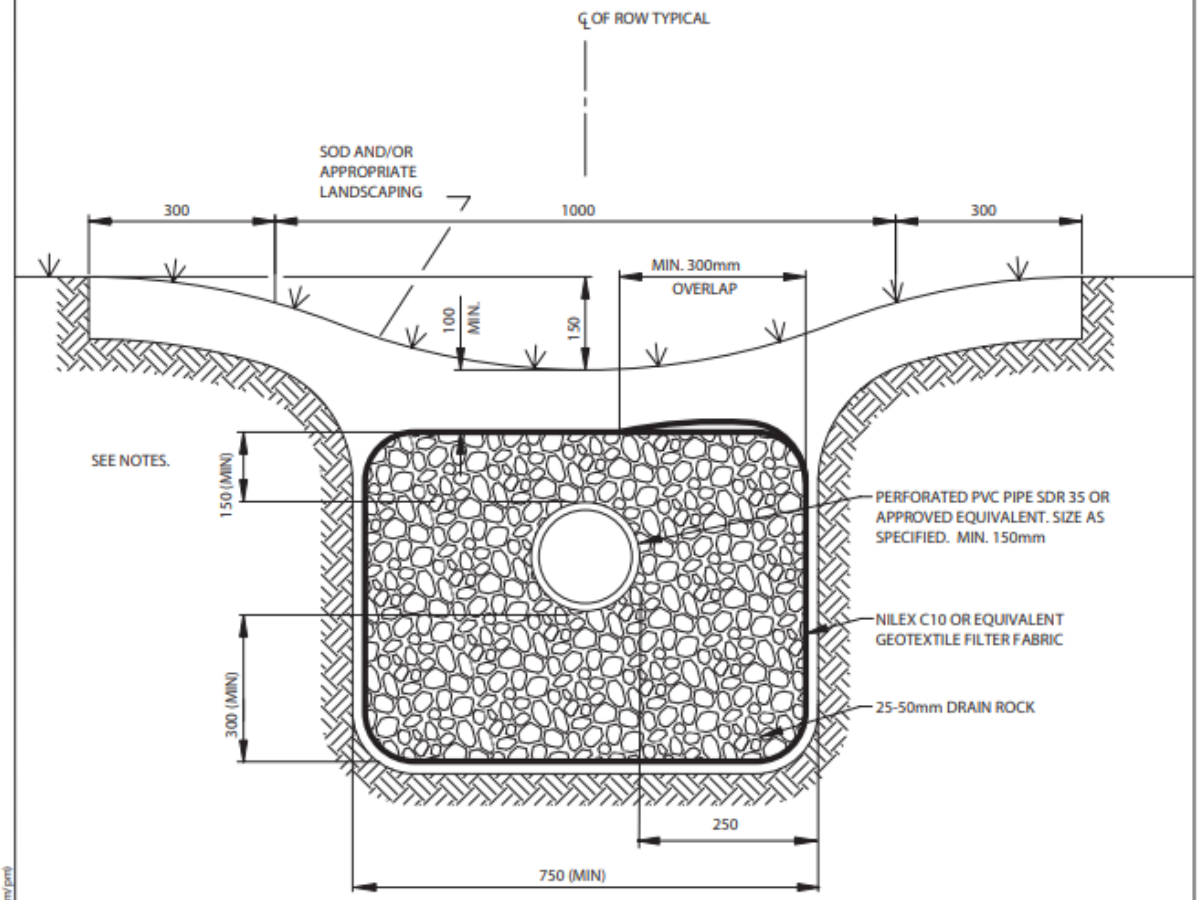
DISTRICT OF SECHELT

TITLE

EXFILTRATION TRENCH

SS-10

134



NOTES:

1. SWALE TO BE CENTRED ON 3m RIGHT OF WAY.

2. SOD TO BE PLACED ON MINIMUM 100mm TOPSOIL.

3. FOR ALL DRAINS CONTAINED WITHIN MUNICIPAL RIGHT-OF-WAYS AND/OR WHERE THE WINTER INFILTRATION RATE OF THE NATIVE SOILS ARE QUESTIONABLE, A RAISED CATCH BASIN, AND PIPE SYSTEM SIZED TO CONVEY THE 1:10 YEAR DESIGN FLOW, IS REQUIRED (SEE STD DWG SS-12).

4. COVER OVER PIPE SHALL BE INCREASED TO 500 mm WHERE LAWN DRAINS ARE INCORPORATED INTO DESIGN (SEE STD DWG SS-12).

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

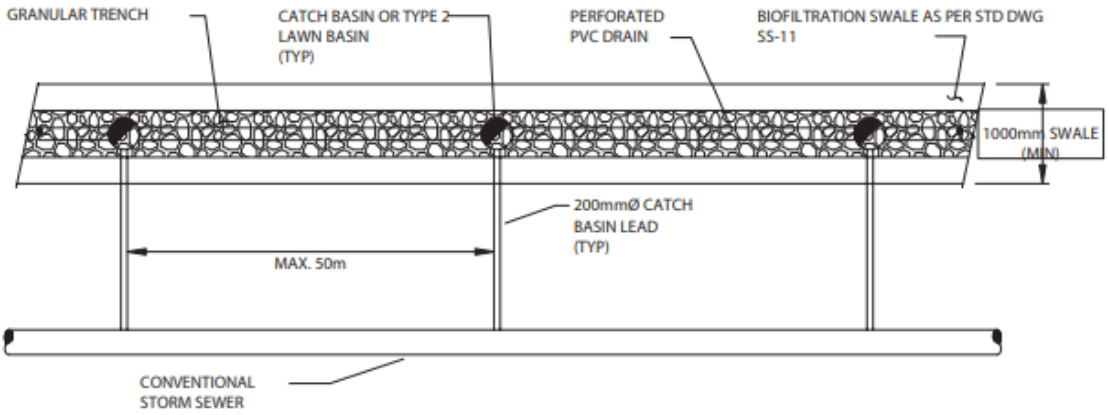
DISTRICT OF SECHELT

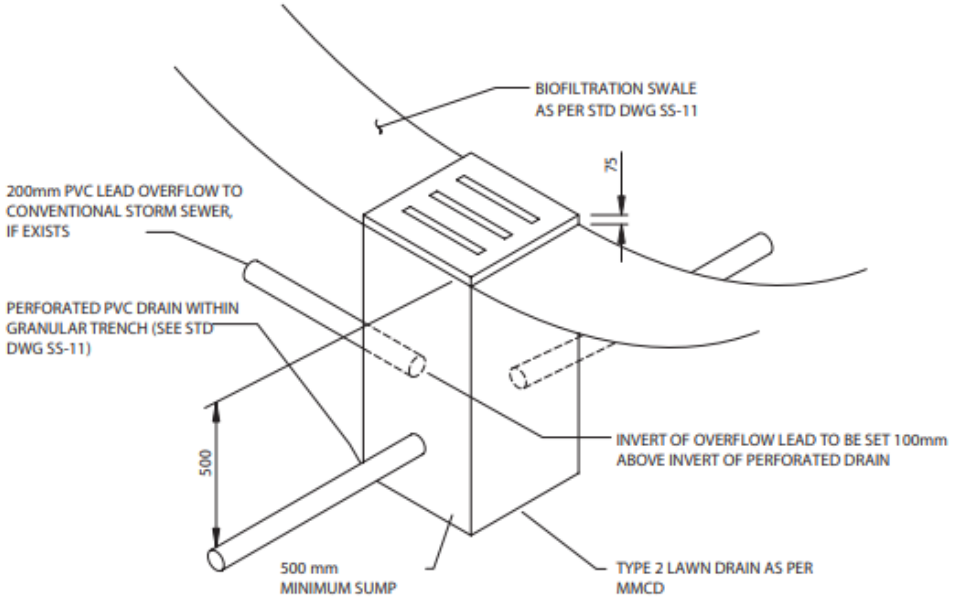
TITLE

BIOFILTRATION
SWALE
WITH PERFORATED DRAIN

SS-11

135





NOTES:

1. SWALE TO BE CENTRED ON 3m RIGHT OF WAY.

2. SOD TO BE PLACED ON MINIMUM 100mm TOPSOIL.

3. WHERE AN EXISTING CONVENTIONAL STORM SEWER DOES NOT EXIST FOR AN OVERFLOW CONNECTION, THE PERFORATED DRAIN MAY BE SIZED TO CONVEY THE 10 YEAR FLOW (MAX. 300mm). ALL PIPE SHALL BE DESIGNED IN ACCORDANCE WITH SECTION 2.3.11 STORM SEWERS AND APPURTENANCES.

No.	REVISION	APPROVED

SCALE: N.T.S.

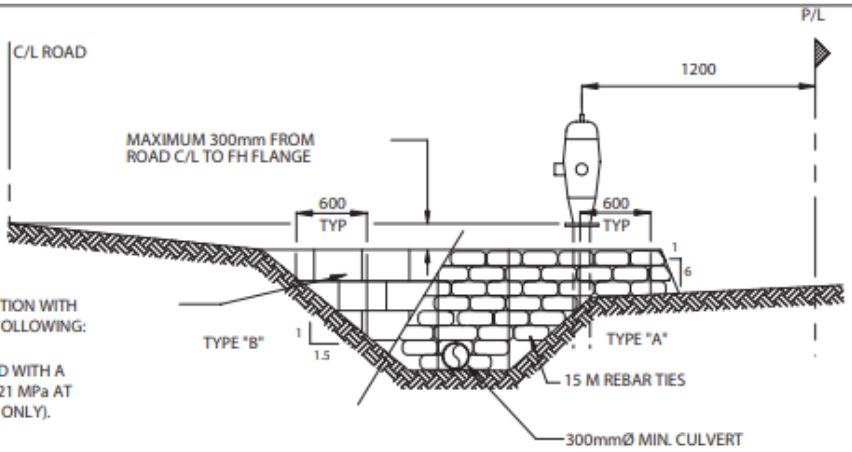
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE: BIOFILTRATION SWALE WITH STORM SEWER OVERFLOW

SS-12

136



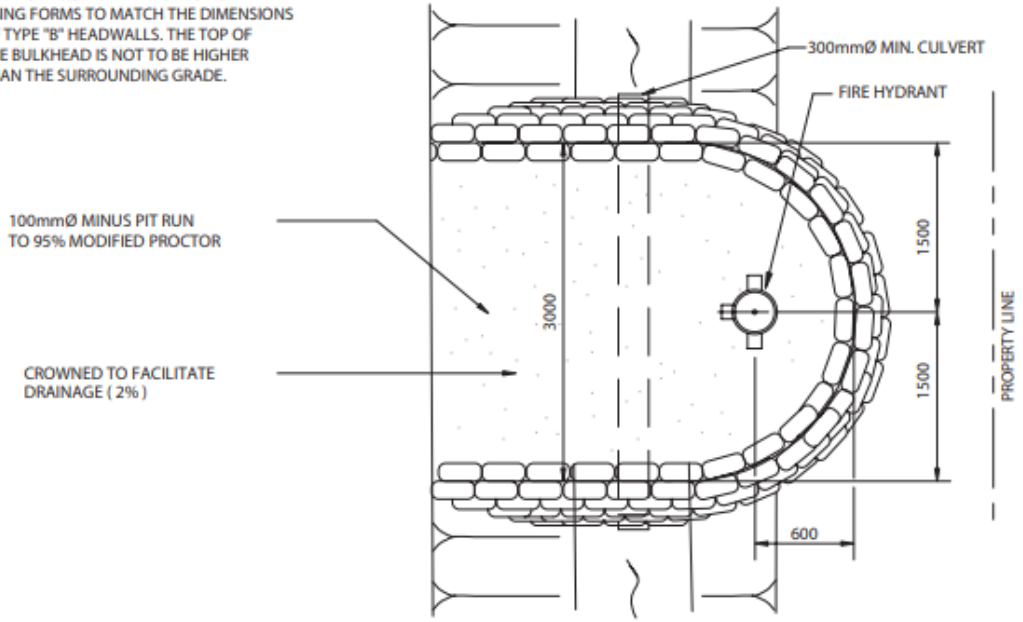
ELEVATION

CONSTRUCT BANK PROTECTION WITH CONCRETE BAGS PER THE FOLLOWING:

TYPE "A" JUTE SACKS FILLED WITH A WET CONCRETE MIX TO BE 21 MPa AT 28 DAYS. (TEMPORARY USE ONLY).

TYPE "B" 200mm x 200mm x 400mm "H" TYPE CONCRETE BLOCKS. REINFORCE AS SHOWN IN SKETCH. FILL BLOCKS WITH CONCRETE. THE TOP OF THE BULKHEAD IS NOT TO BE HIGHER THAN THE SURROUNDING GRADE.

TYPE "C" POURED IN PLACE CONCRETE USING FORMS TO MATCH THE DIMENSIONS OF TYPE "B" HEADWALLS. THE TOP OF THE BULKHEAD IS NOT TO BE HIGHER THAN THE SURROUNDING GRADE.



PLAN

NOTES:

1. IN RURAL AREAS WHERE A DITCH IS REQUIRED IN A CUT, THE AREA AS SHOWN ABOVE SHALL BE RETAINED BY SUITABLE SIDESLOPES OR WALLS.
2. CULVERT SHALL BE CLASS 3 CONCRETE.
3. MINIMUM CULVERT LENGTH IS 4.0m.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

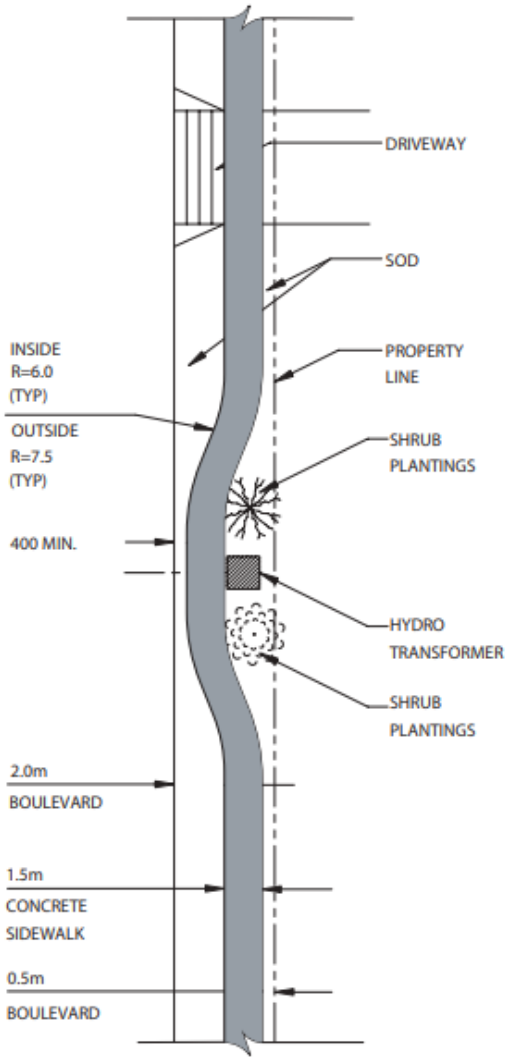
DISTRICT OF SECHELT

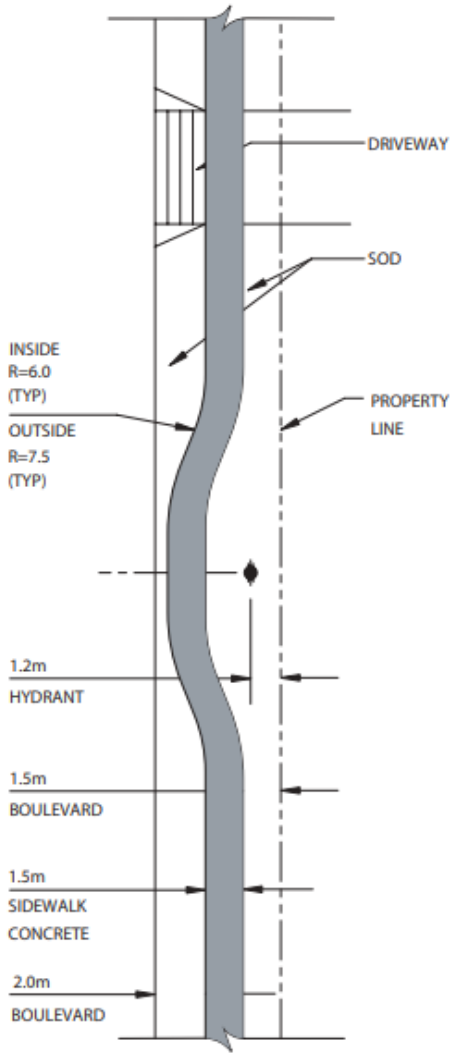
TITLE

RURAL
FIRE HYDRANT ASSEMBLY

SW-1

137





No.	REVISION	APPROVED

SCALE: 1:250

DATE: 21 JAN 2003

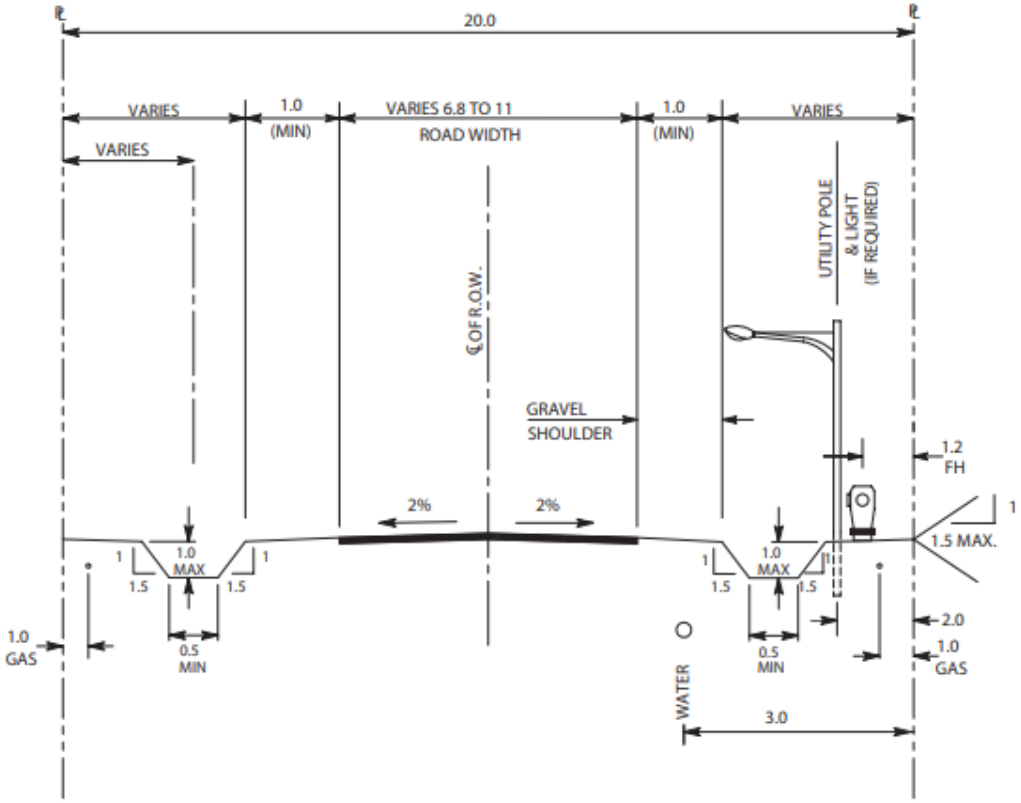
DISTRICT OF SECHELT

TITLE

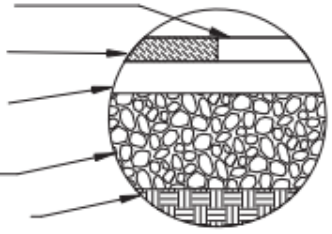
BOULEVARD STANDARD DEFLECTIONS

SR-1

138



MIN. 65mm OF 20mm CRUSH
SHOULDER TO 95% MODIFIED
PROCTOR
MIN. 85mm COMPACTED ASPHALT
MIN. 100mm OF 20mm MINUS CRUSH
BASE TO 95% MODIFIED PROCTOR
MIN. 300mm OF 100mm GRAVEL SUBBASE
TO 95% MODIFIED PROCTOR
SUBGRADE TO 90% MODIFIED PROCTOR



NOTES:
1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.
4. PAVEMENT WIDTH SHALL BE AS SPECIFIED BY THE ENGINEER.
5. DITCHES SHALL BE PIPED PAST UTILITY POLES AND FIRE HYDRANTS WHERE REQUIRED.

No.	REVISION	APPROVED

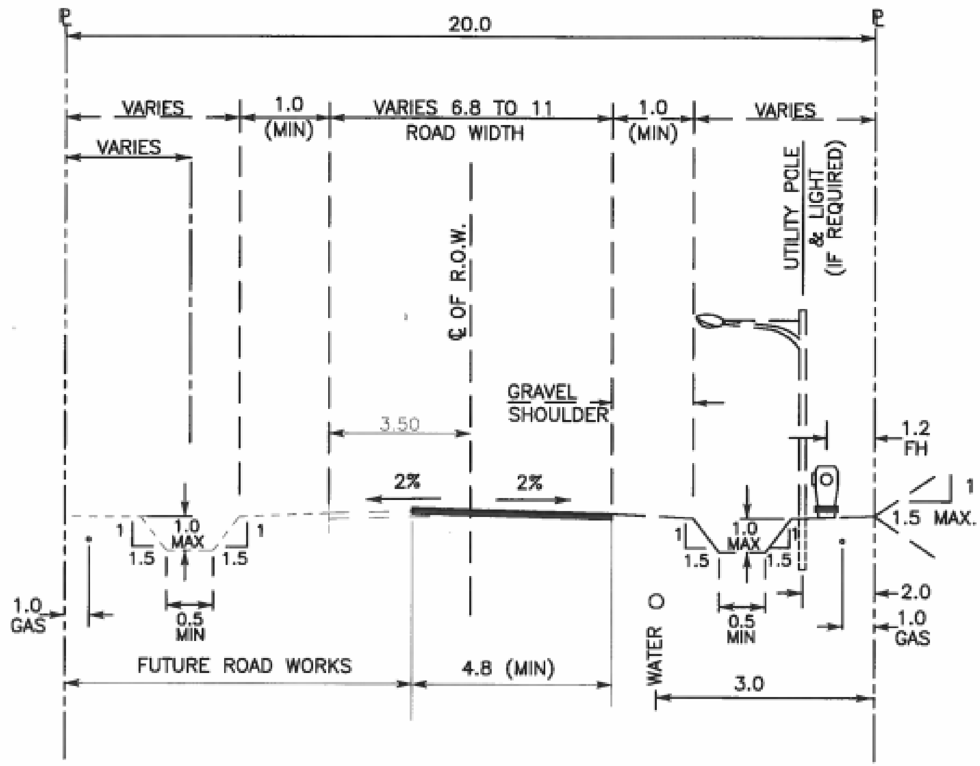
SCALE: N.T.S.
DATE: 21 JAN 2003

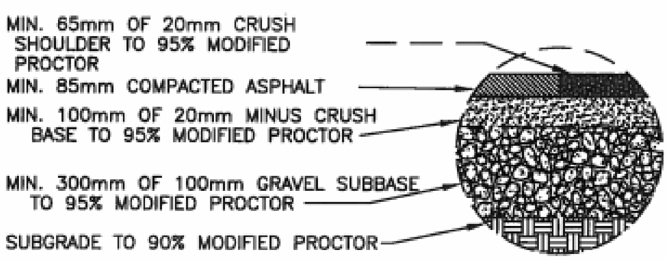
DISTRICT OF SECHELT

TITLE
RURAL ROAD

SR-2

139

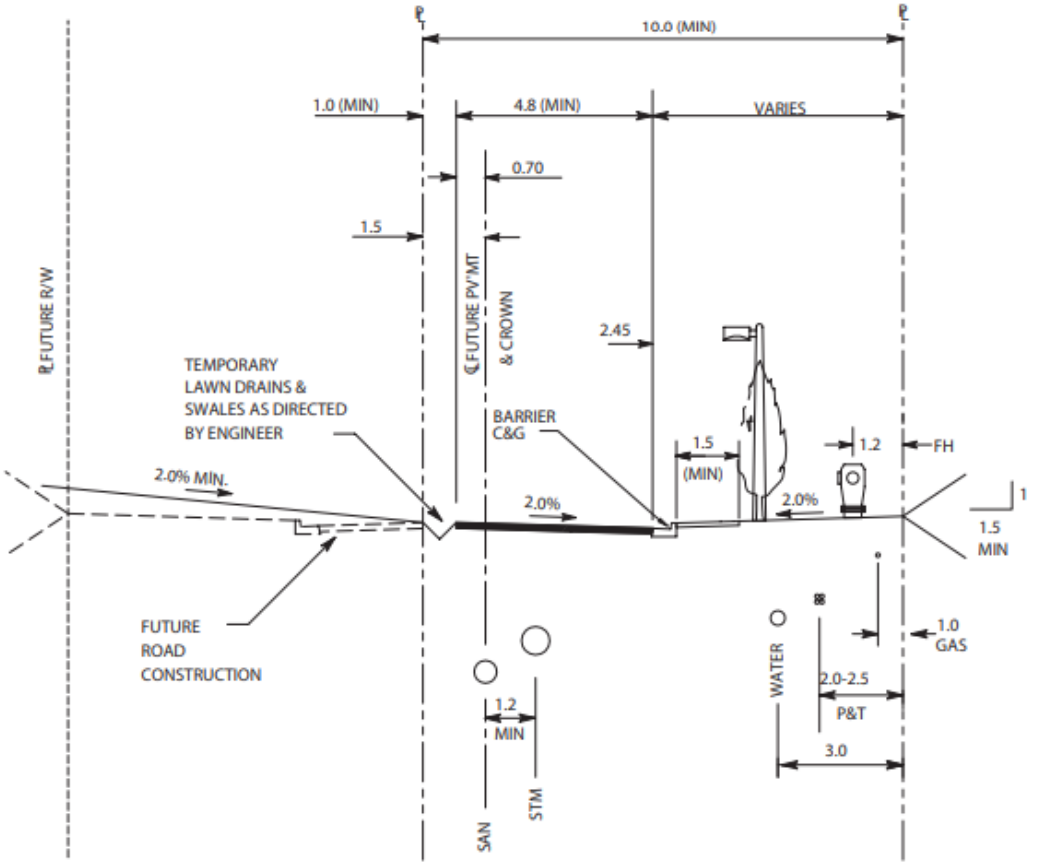




NOTES:
1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.
4. PAVEMENT WIDTH SHALL BE AS SPECIFIED BY THE ENGINEER.
5. DITCHES SHALL BE PIPED PAST UTILITY POLES AND FIRE HYDRANTS WHERE REQUIRED.

No.	REVISION	APPROVED		TITLE
			DISTRICT OF SECHELT	MODIFIED RURAL HALF ROAD
SCALE:	N.T.S.			
DATE:	21 JAN 2003			SR-2A

140



NOTES:
1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.
4. PROVISION MUST BE MADE FOR OFFSITE DRAINAGE AT THE FUTURE ROAD CENTRELINE.

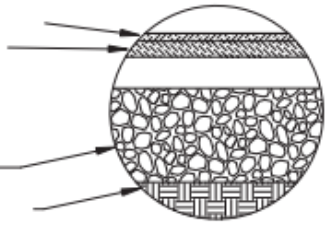
MIN. 35mm ASPHALT SURFACE COURSE

MIN. 50mm ASPHALT BASE COURSE

MIN. 100mm OF 20mm MINUS CRUSH BASE TO 95% MODIFIED PROCTOR

MIN. 300mm OF 100mm GRAVEL SUBBASE TO 95% MODIFIED PROCTOR

SUBGRADE TO 90% MODIFIED PROCTOR



No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

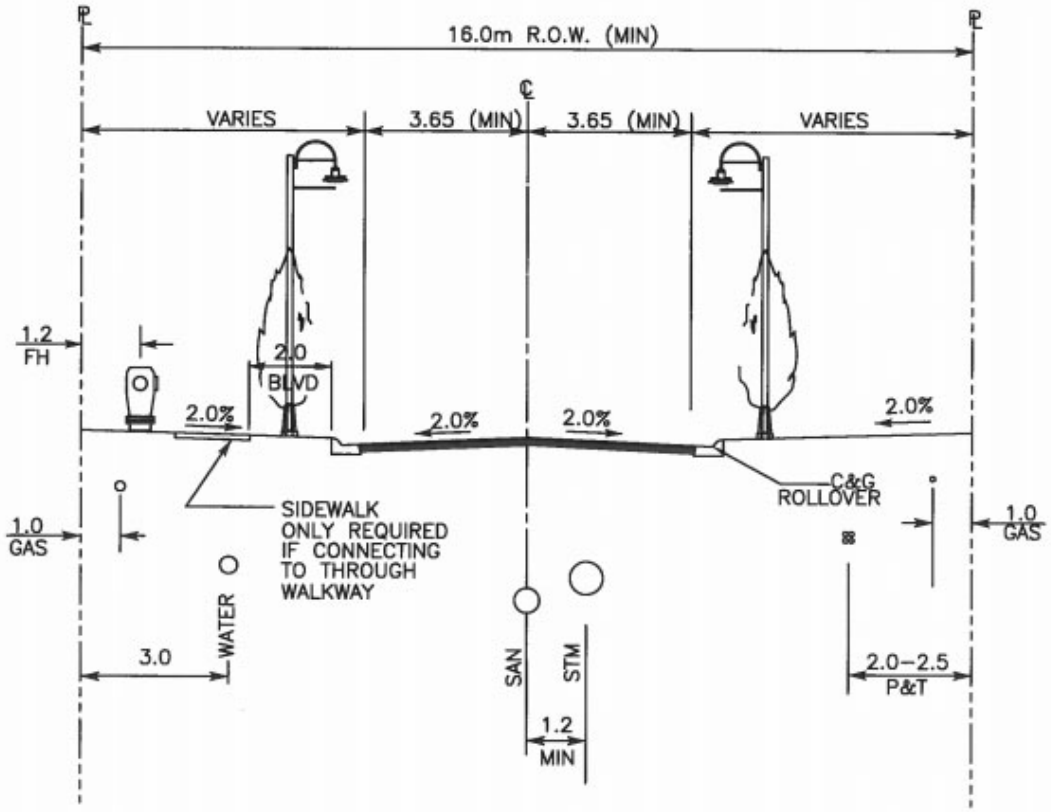
DISTRICT OF SECHELT

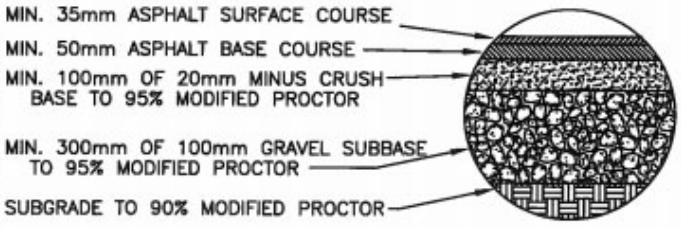
TITLE

URBAN HALF ROAD

SR-3

141





NOTES:
1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.
4. APPLICABLE FOR CUL-DE-SAC AND P-LOOP ROADS.

No.	REVISION	APPROVED

SCALE: N.T.S.

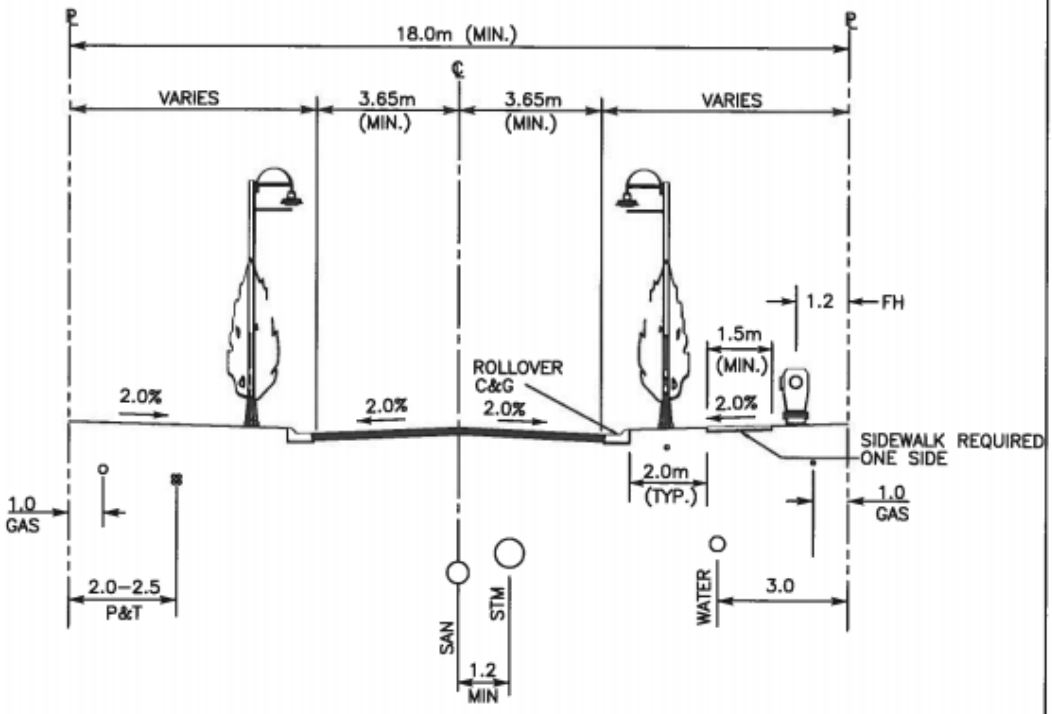
DATE: 21 JAN 2003

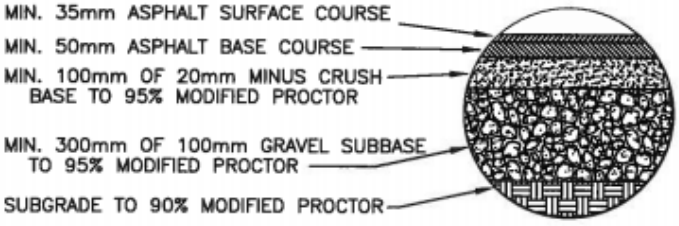
DISTRICT OF SECHELT

TITLE

URBAN LIMITED LOCAL ROAD

SR-4





NOTES:

1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.
4. APPLICABLE FOR CUL-DE-SAC AND P-LOOP ROADS.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE: URBAN LOCAL ROAD

SR-5

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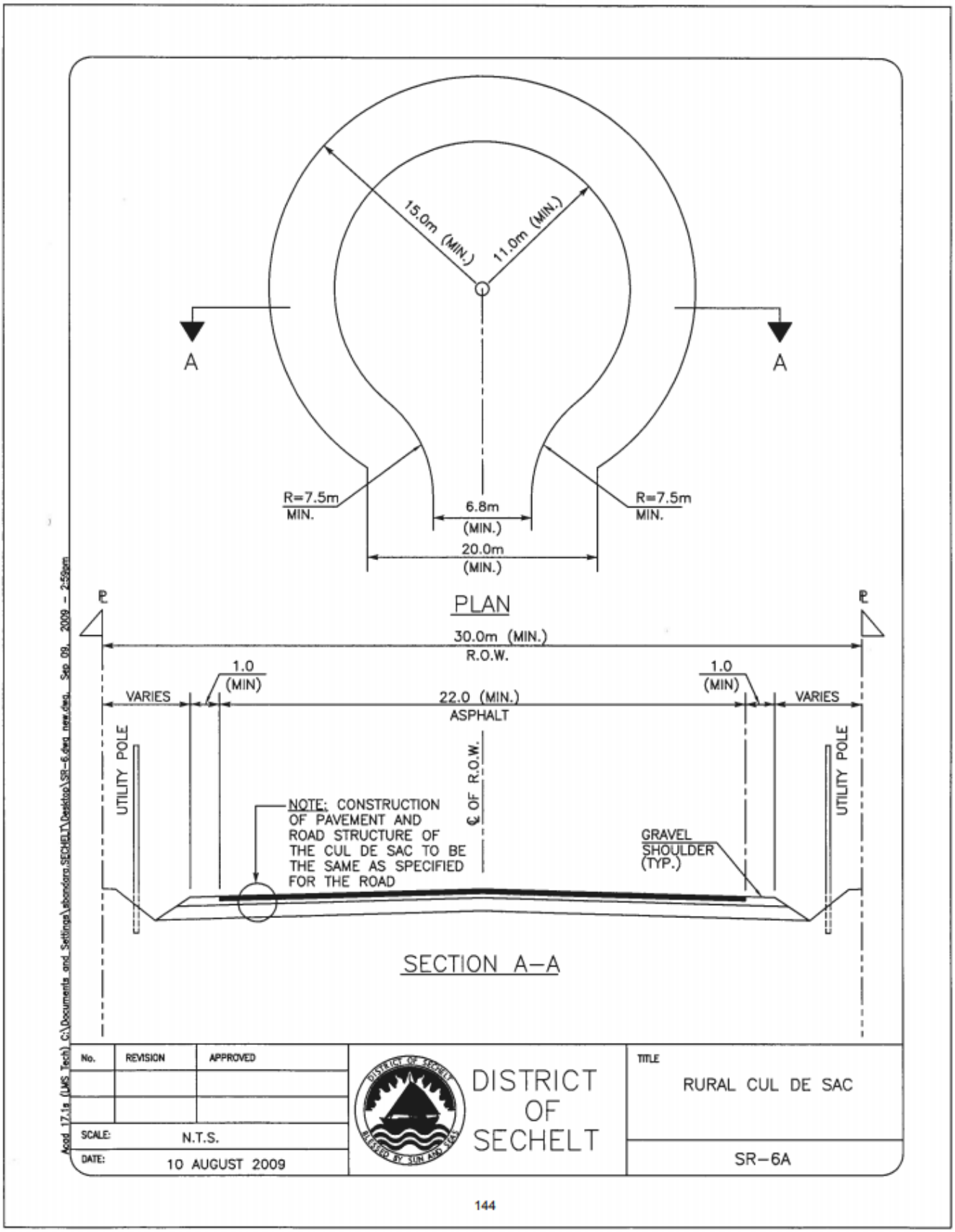
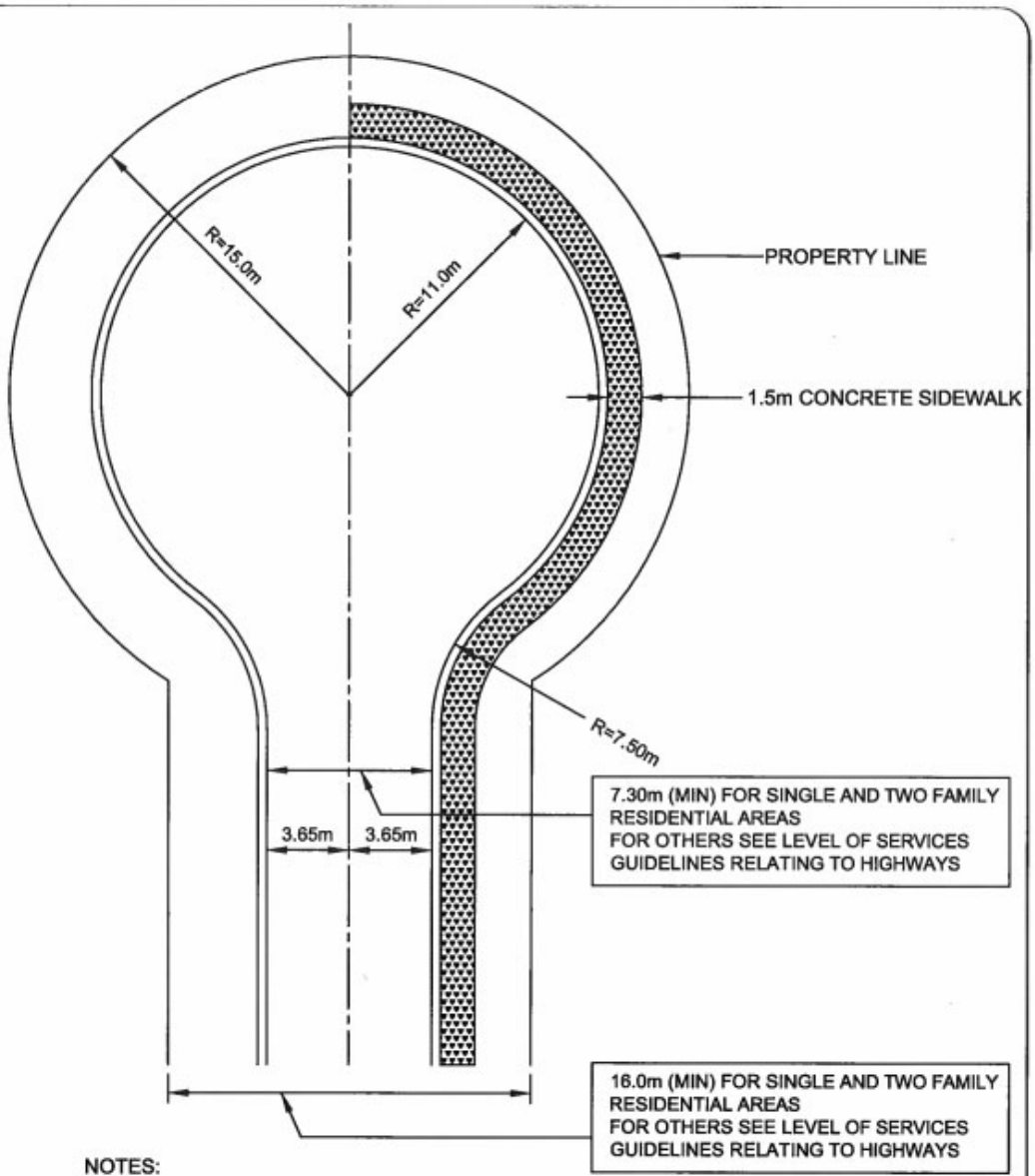
143


15.0m (MIN.)
11.0m (MIN.)
A
A
R=7.5m MIN.
R=7.5m MIN.
6.8m (MIN.)
20.0m (MIN.)
PLAN
℄
℄
30.0m (MIN.) R.O.W.
1.0 (MIN)
1.0 (MIN)
VARIES
VARIES
22.0 (MIN.) ASPHALT
UTILITY POLE
UTILITY POLE
℄ OF R.O.W.
NOTE: CONSTRUCTION OF PAVEMENT AND ROAD STRUCTURE OF THE CUL DE SAC TO BE THE SAME AS SPECIFIED FOR THE ROAD
GRAVEL SHOULDER (TYP.)
SECTION A–A
No.
REVISION
APPROVED
SCALE: N.T.S.
DATE: 10 AUGUST 2009
DISTRICT OF SECHELT
TITLE
RURAL CUL DE SAC
SR–6A

144



NOTES:

1. PAVEMENT STRUCTURE OF CUL-DE-SAC SHALL BE SAME AS SPECIFIED FOR ROAD
2. USE A MINIMUM CROSSFALL OF 2% FOR CUL-DE-SAC

No.	REVISION	APPROVED

SCALE: N.T.S.

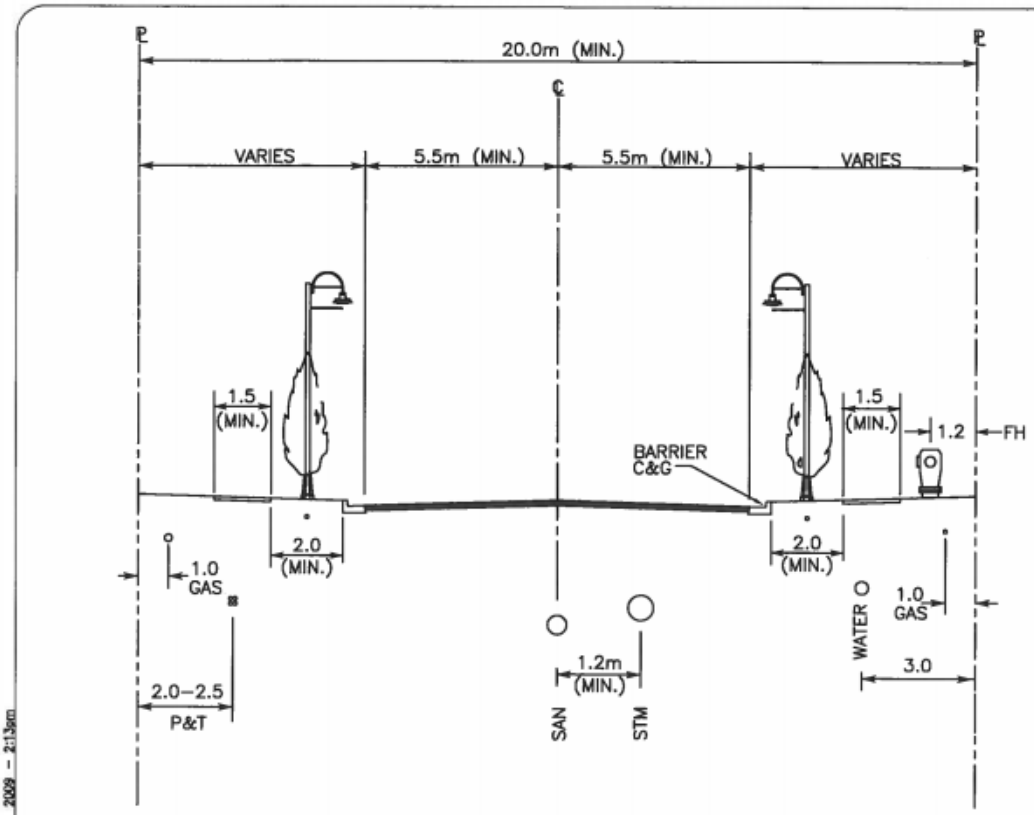
DATE: 10 AUGUST 2009

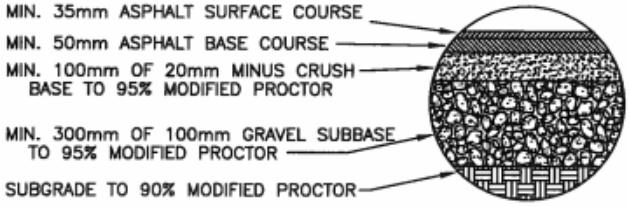
DISTRICT OF SECHELT

TITLE: URBAN CUL DE SAC

SR–6B

145





NOTES:

1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE: URBAN COLLECTOR ROAD

SR-7

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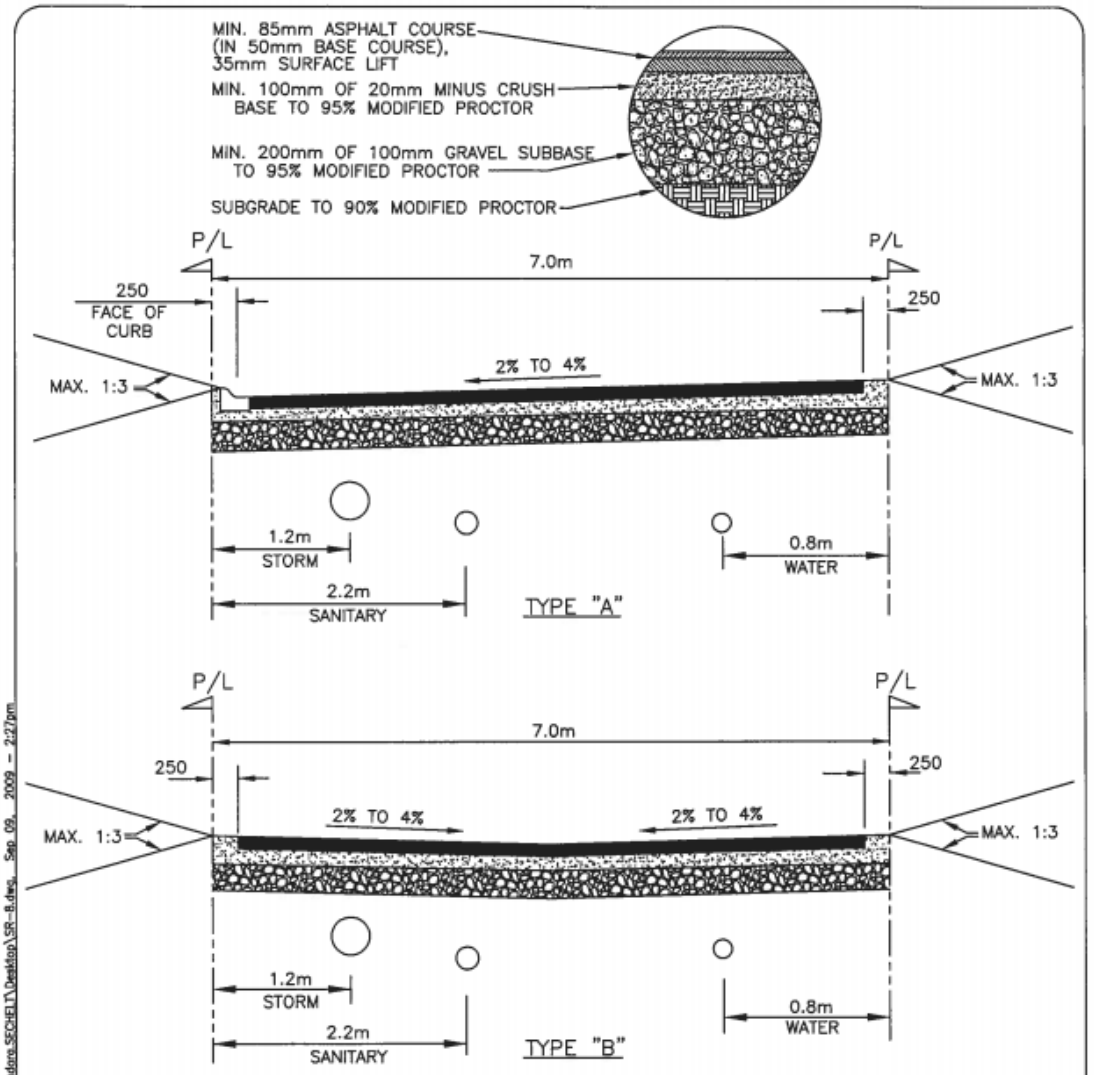
146



NOTES:
1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM TEST RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE. SEE SECTION 2.5.12.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.
4. CATCH BASINS TO BE LOCATED AT LOW POINTS AND CONNECTED TO THE STORM SEWER. MINIMUM ONE CATCHBASIN PER 200 METRES.
5. ALGEBRAIC DIFFERENCE IN CROSSFALL GRADE SHALL NOT EXCEED 6%.

No.	REVISION	APPROVED

SCALE: N.T.S.
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE: 7.0m LANE

SR-8

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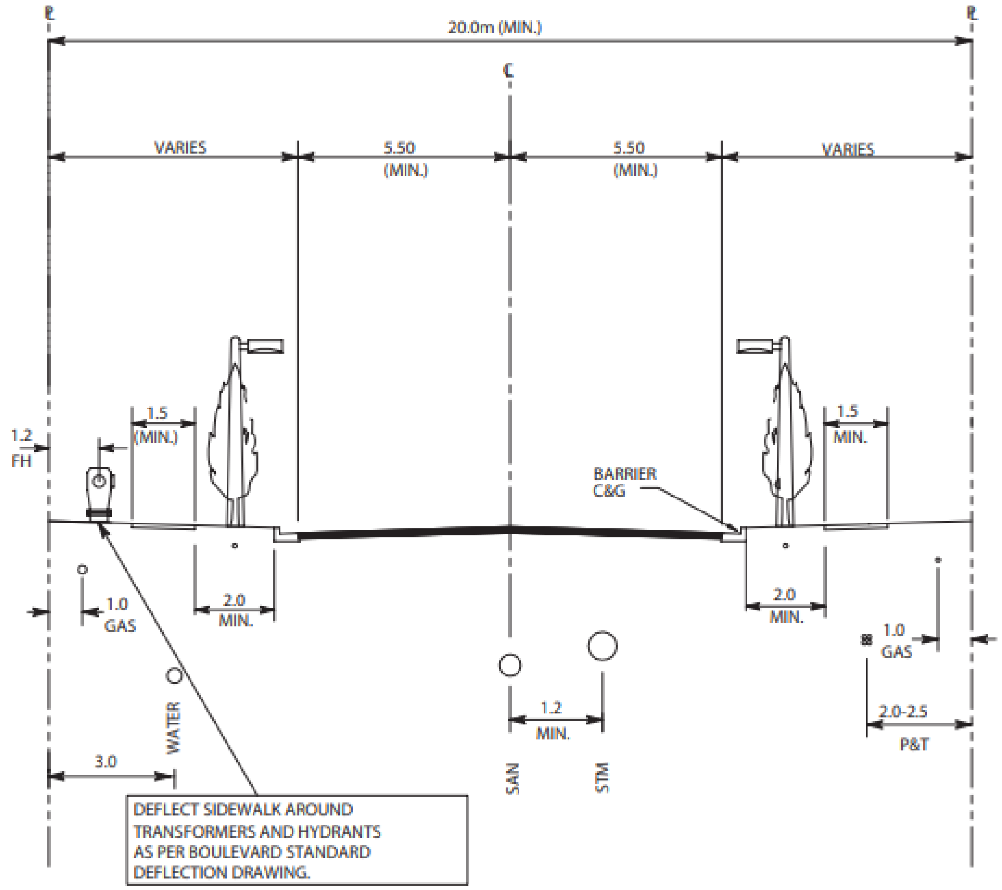

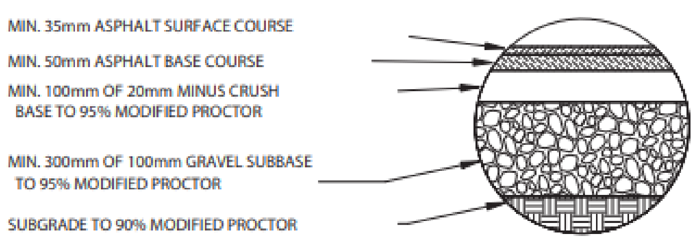

NOTES:

1. THE STRUCTURAL ROAD ELEMENTS SHOWN ARE THE MINIMUM REQUIREMENTS. SOILS TEST, BENKELMAN BEAM RESULTS OR EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
2. ALL UTILITY SERVICES AND SERVICE CONNECTIONS SHALL BE INSTALLED PRIOR TO FINAL PAVING.
3. ANY PERMANENT WORKS ON PRIVATE PROPERTY MUST BE PROTECTED BY A REGISTERED EASEMENT OR RIGHT-OF-WAY.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE: URBAN ARTERIAL ROAD

SR-9

148

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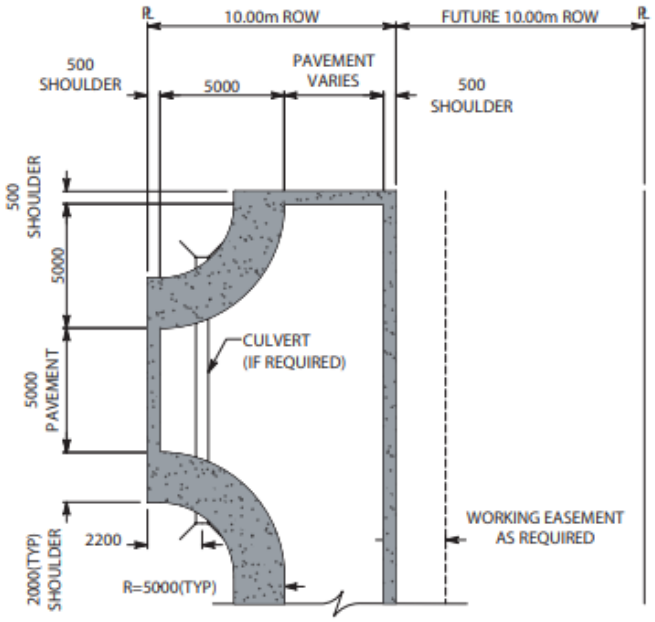
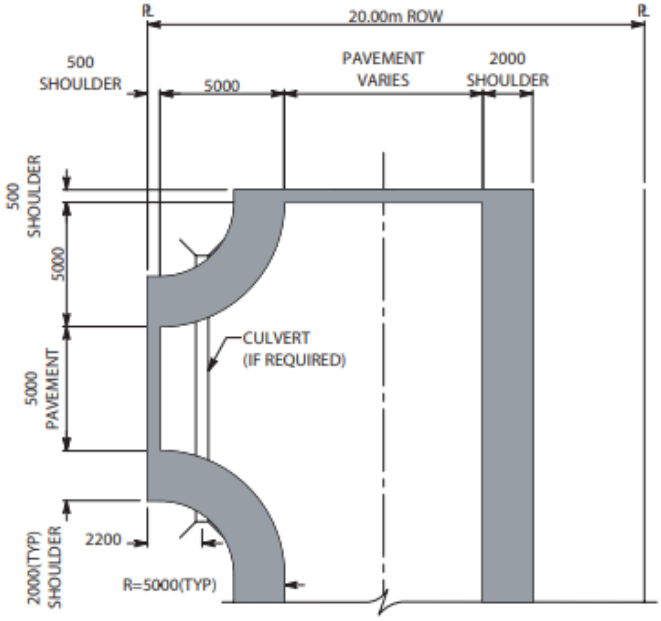


HALF ROAD



FULL ROAD

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

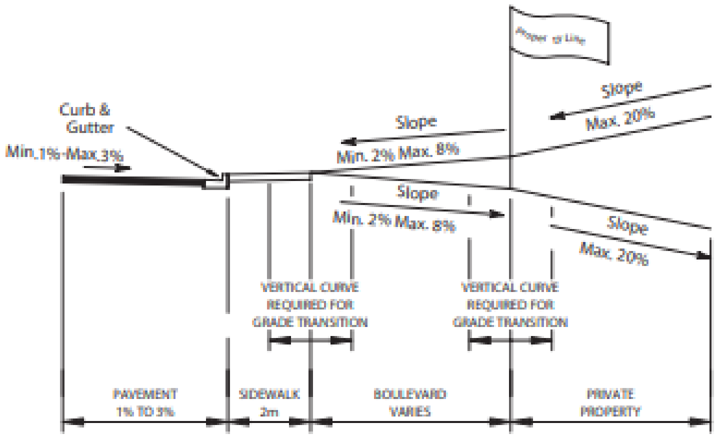
DISTRICT OF SECHELT

TITLE

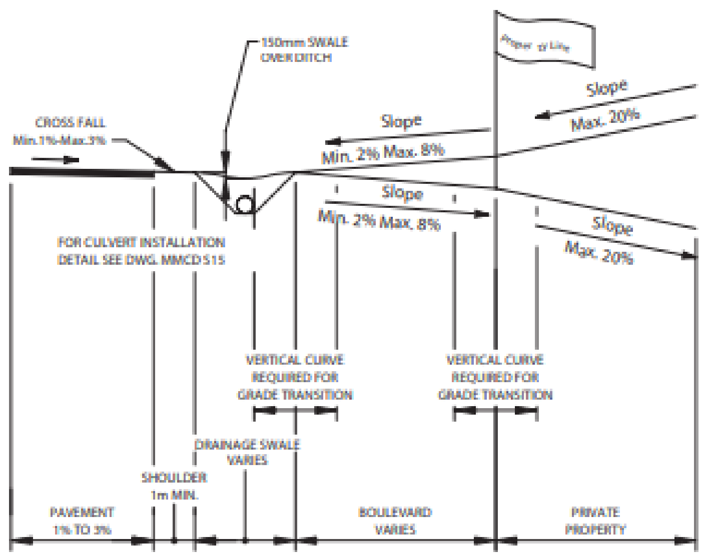
HAMMERHEAD TURNAROUND

SR-10

149



URBAN DRIVEWAY CROSS SECTION



RURAL DRIVEWAY CROSS SECTION

Notes:

-ALL DRIVEWAYS OVER 15% SLOPE SHALL BE CONSTRUCTED WITH A HARD SURFACE
-WERE DRIVEWAY IS PAVED, USE A MINIMUM DEPTH OF 50mm ASPHALT OR EQUIVALENT HARD SURFACING, MINIMUM OF 100mm OF 19mm CRUSHED GRAVEL BASE DEPTH OF 50mm

No.	REVISION	APPROVED

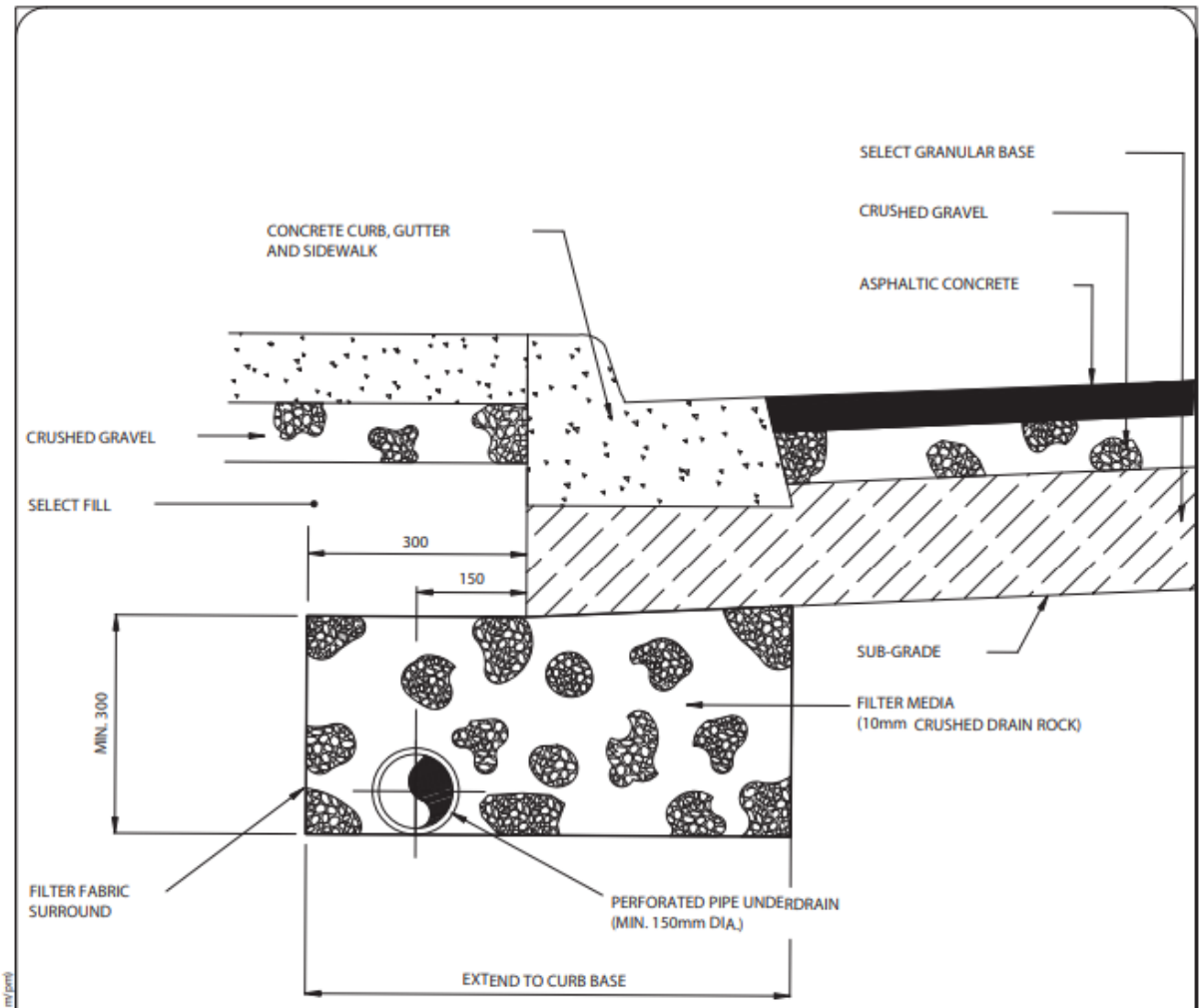
SCALE: N.T.S.

DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE: Typical Driveway Cross Sections

SR-11



NOTES:

1. REFER TO CONSTRUCTION DRAWINGS FOR PROPOSED LOCATION AND DEPTH OF UNDERDRAINS.
2. WHEN THE CENTRELINE ROAD GRADE IS 2% OR GREATER, UNDERDRAINS SHALL ONLY BE REQUIRED FOR A LENGTH OF 6.0 METRES ON THE UPSTREAM SIDE OF THE CATCH BASIN.
3. ALL UNDERDRAINS ARE TO BE CONNECTED TO CATCH BASINS OR THE STORM SEWER IF CATCH BASINS ARE NOT ACCESSIBLE.
4. IF THE SUB-GRADE IS SELF DRAINING IN THE OPINION OF THE ENGINEER, THE UNDERDRAIN INSTALLATION MAY BE WAIVED.

No.	REVISION	APPROVED

SCALE: N.T.S.

DATE: 21 JAN 2003

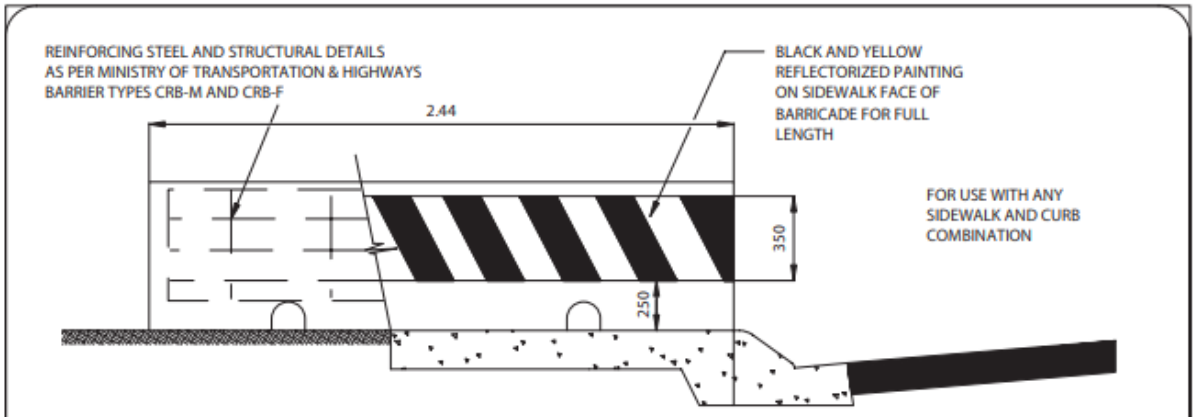
DISTRICT OF SECHELT

TITLE

PERFORATED PIPE UNDERDRAIN

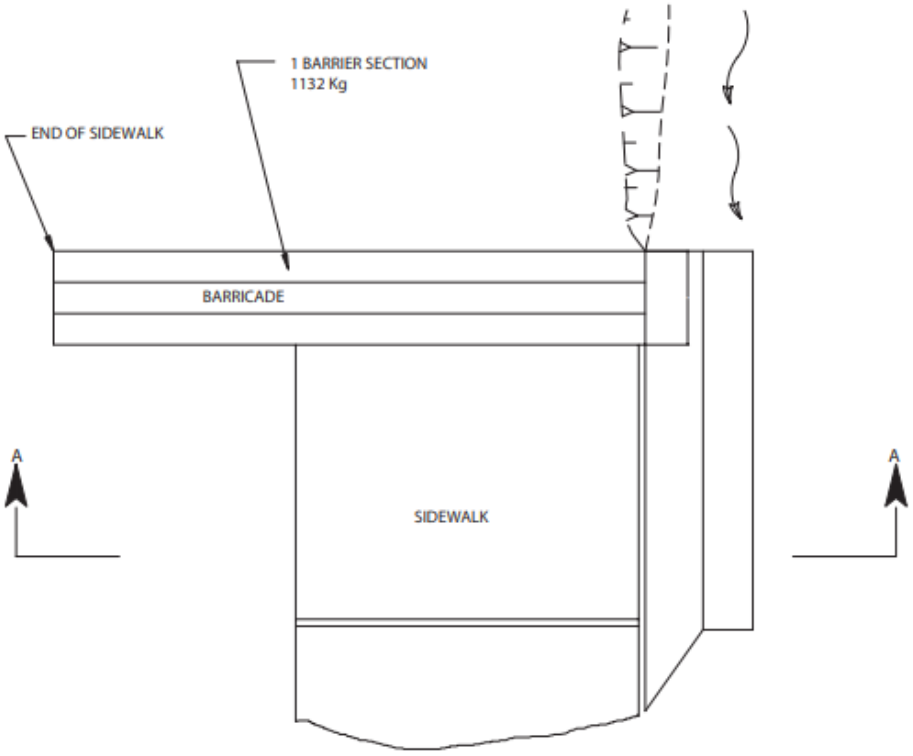
SC-1

151



FRONT ELEVATION

A-A



PLAN

No.	REVISION	APPROVED

SCALE: N.T.S.

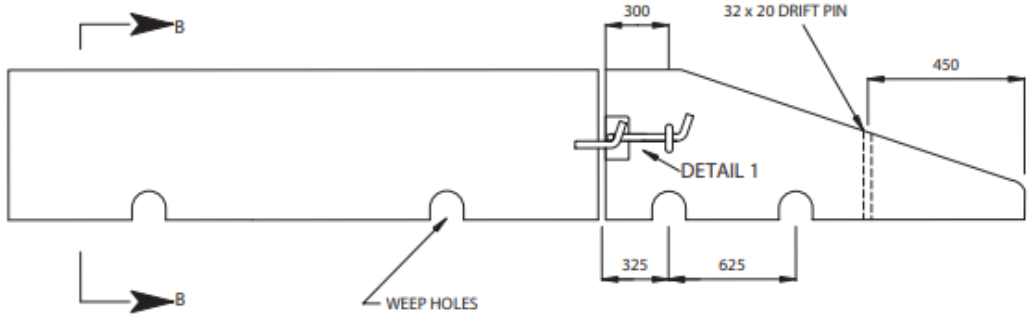
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE

PRECAST REINFORCED CONCRETE BARRIER FOR SIDEWALK END

SC-2

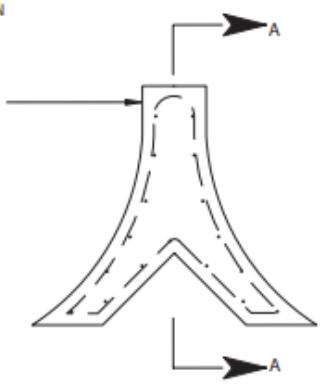


SECTION A-A

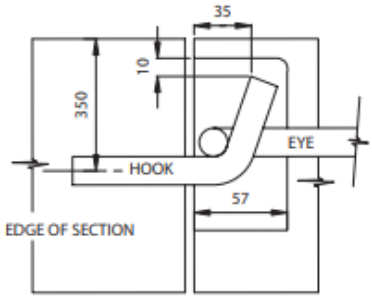
INSTALLATION

COMMENCE INSTALLATION WITH HOOK ON LEADING END - BULLNOSE SECTION TO BE PLACED FIRST. END OF BARRIER IS A BULLNOSE SECTION WITH EYE CONNECTOR.

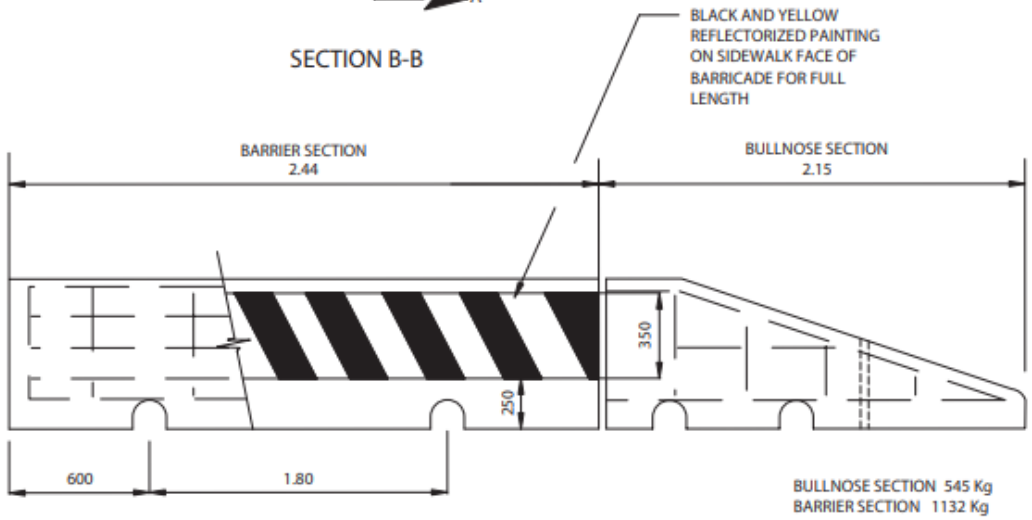
690 x 2500 CONCRETE BARRIER
REINFORCING STEEL AND STRUCTURAL DETAILS AS PER MINISTRY OF TRANSPORTATION AND HIGHWAYS BARRIERS TYPE CRB-M AND CRB-F OR APPROVED EQUAL.



SECTION B-B



DETAIL 1



BULLNOSE SECTION 545 Kg
BARRIER SECTION 1132 Kg

FRONT SECTION

No.	REVISION	APPROVED

SCALE: N.T.S.

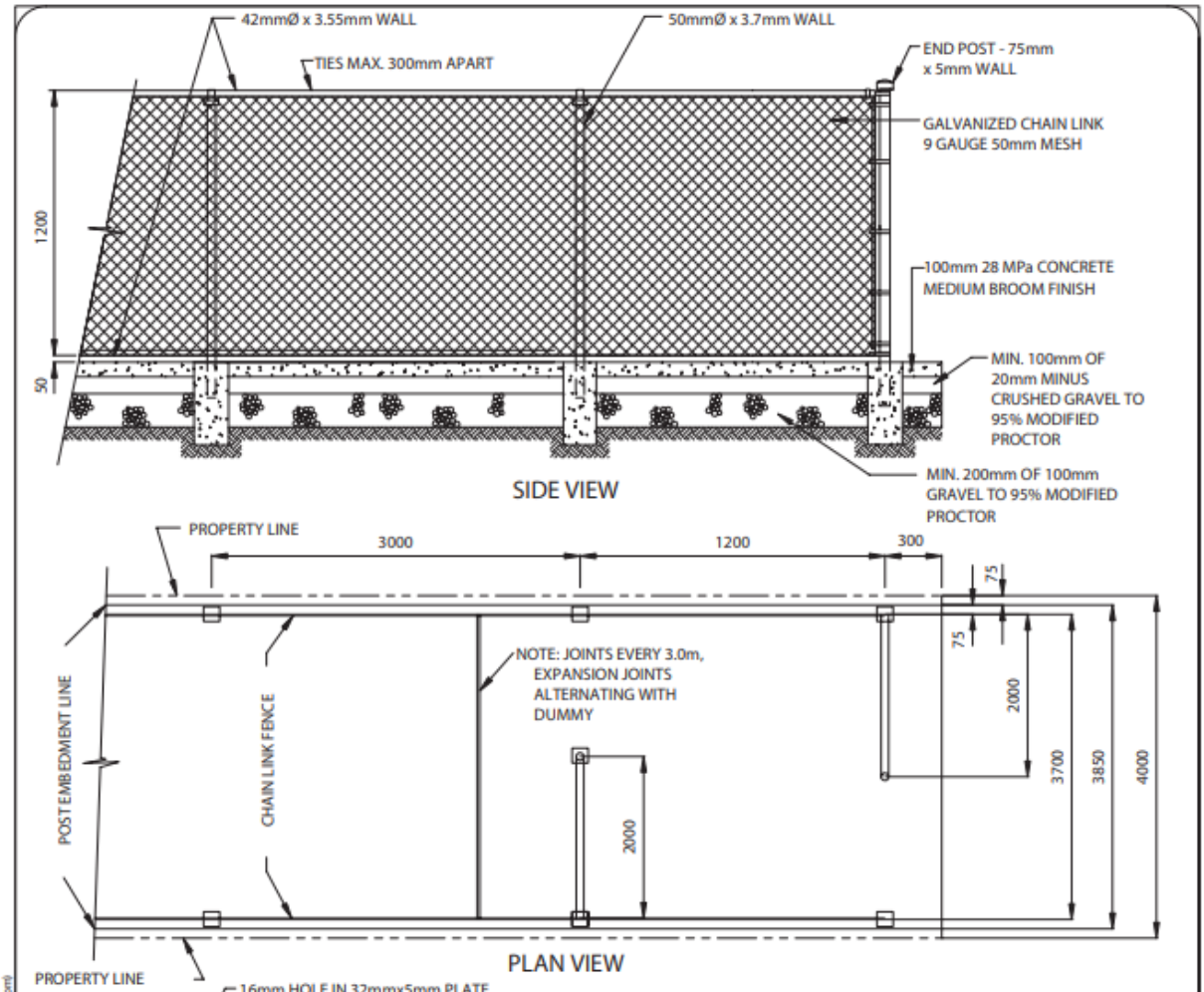
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE

PRECAST REINFORCED CONCRETE BARRIER

SC-3



No.	REVISION	APPROVED

SCALE: N.T.S.

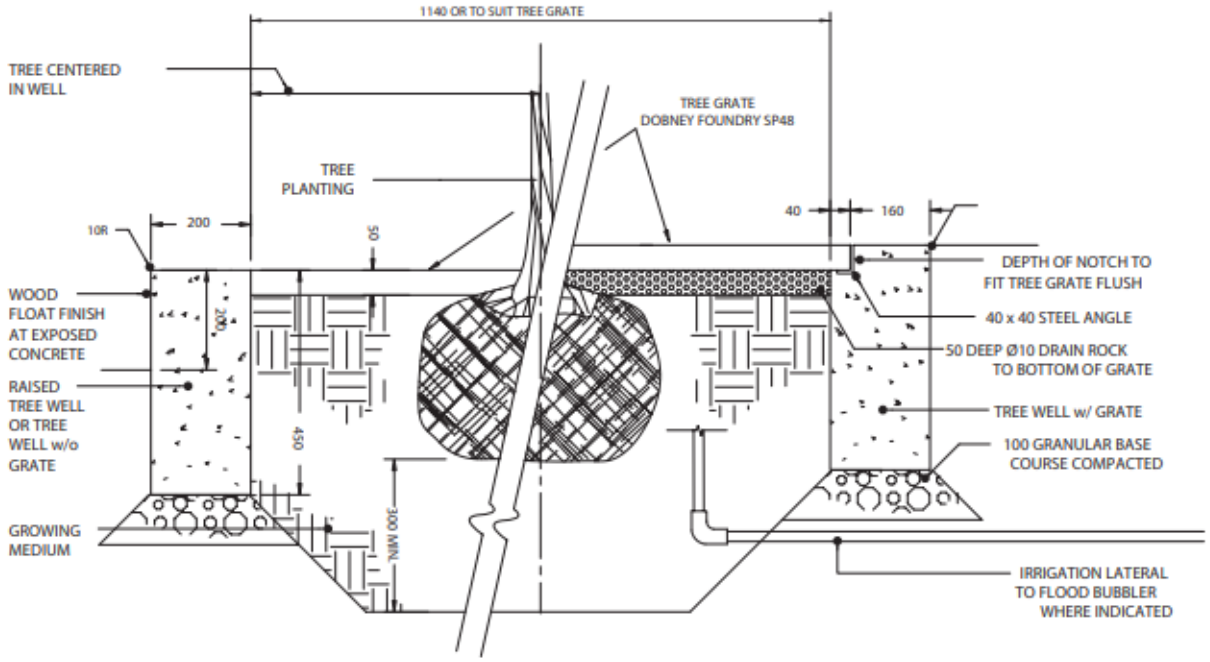
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE

EMERGENCY ACCESS
4.0m R.O.W.

SC-4



SECTION - TYPICAL

N.T.S.

TREE WELL

No.	REVISION	APPROVED

SCALE: N.T.S.

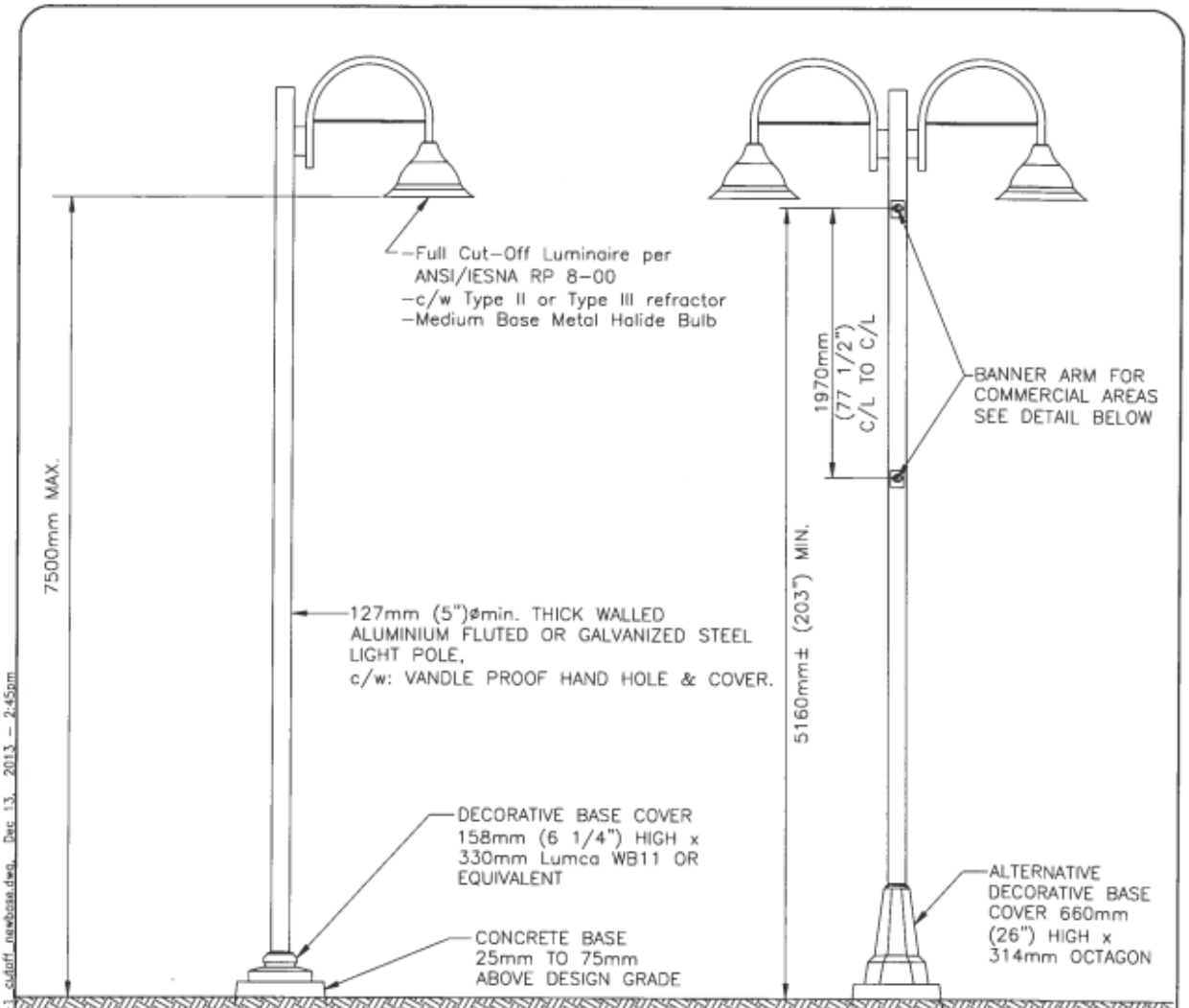
DATE: 21 JAN 2003

DISTRICT OF SECHELT

TITLE

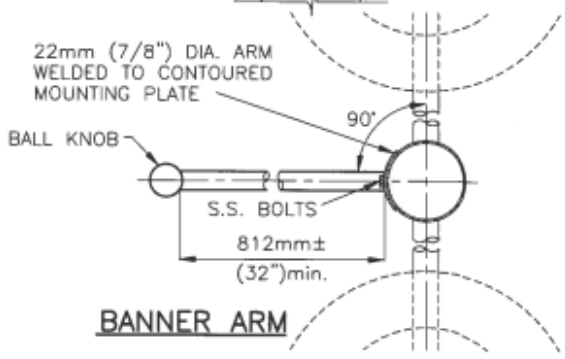
TYPICAL TREE WELL

SC-5



NOTES:

-CONCRETE STREET LIGHT BASE C, C1, C2 OR C3 PER MMCD STANDARDS OR EQUIV.
-INTERSECTION LIGHTING - CONTACT DIST. ENG. FOR SITE SPECIFIC REQ.
-LIGHT POLE ENGINEERED TO MEET LOCAL WIND EFFECTS
-LIGHT STANDARD COLOUR - TO BE DETERMINED AT THE DISCRETION OF THE DIRECTOR OF DEVELOPMENT SERVICES
-ALL PAINTED SURFACES TO BE POWDER COATED TO MANUFACTURER'S SPECIFICATIONS FOR APPLICATION
-STEEL POLES AND COMPONENTS SHALL BE GALVANIZED PRIOR TO POWDER COATING
-ALL LUMINARIES TO BE FULL-CUTOFF OPTICS - PER IESNA DEFINITION.
-REFRACTOR TO BE TYPE II OR TYPE III -PER IESNA DEFINITION
-ALL LIGHTING DESIGNS TO MEET ANSI/IESNA RP-8-00 "AMERICAN NATIONAL STANDARD FOR ROADWAY LIGHTING" AS AMMENDED FROM TIME TO TIME



BANNER ARM

No.	REVISION	APPROVED
3	13 DEC 2013	
1	16 NOV 2007	

SCALE: N.T.S.

DATE: 13 DEC 2013

DISTRICT OF SECHELT

TITLE: ORNAMENTAL STREET LIGHTS

SL-1

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PART 12 – FORMS

Standard Form G-1
PERMISSION TO CONSTRUCT

File No:_____

Authorization to proceed with construction is hereby granted to:

NAME OF DEVELOPER:_____
ADDRESS:_____

For the works described generally as:

_____
_____
_____

Authorized Start Date:_____ Completion Date:_____

Authorized Hours of Work: From_____hrs to_____hrs
Monday to Saturday inclusive.

Check the following:

☐ Construction plans approved
☐ Certificates of insurance received
☐ Administration fee paid
☐ Security deposit paid
☐ Servicing Agreement completed, No._____
☐ Latecomer Waiver/Agreement adopted

Developer's Engineer:_____
Contact:_____
Bus. Tel:_____

Special Conditions:_____
_____
_____

_____
DIRECTOR OF ENGINEERING
Date:_____

CC: Contractor

Standard Form G-2

CERTIFICATE OF INSPECTION

I hereby certify that all engineering and construction services required under the Subdivision and Development Control Bylaw of the District of Sechelt for the subdivision of:

LEGAL DESCRIPTION: _____
PROJECT NO: _____

Which services were approved for construction under drawing numbers:

Drawing No.	***Date***	***Drawing No.***	***Date***

Have been inspected by or under the direction of:

_____
_____

I further certify that the "record Drawings" hereby submitted represent the works and services as installed for the aforementioned subdivision. These works and services were installed with sufficient inspection to assure construction in substantial compliance with approved design drawings , in full compliance with the District of Sechelt Subdivision and Development Control Bylaw and as required by the Engineer and Geoscientist Code of Ethics.

Professional Engineer responsible for design:

Signature: _____
Name: _____
Company: _____
Address: _____
_____
Date: _____

Engineer's Seal

District of
SECHELT

Standard Form G-3

CERTIFICATE OF SUBSTANTIAL COMPLETION

File No:_____

DEVELOPER:_____
CONTRACTOR:_____
PROJECT NO:_____
SERVICING AGREEMENT NO:_____

The certificate is issued pursuant to Section_____to the Subdivision and Development Control Bylaw.

The **MAINTENANCE PERIOD** for the Works will begin on_____
The **MAINTENACNE PERIOD** for the Works will end on_____

The Certificate of Acceptance will be issued when all deficiencies have been cleared, the maintenance period expired, and the Director of Engineering has been satisfied of all conditions of the Servicing Agreement have been fulfilled.

The Certificate has been made to the best of the Municipal Engineer's knowledge, information and belief. It does not constitute acceptance of any work not in accordance with the requirements of the Subdivision and Development Control Bylaw, and not listed as a deficiency herein, whether or not such a defect(s) could have been observed or discovered during construction.

The following is a **LIST OF DEFICIENCIES** related to the Work:

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

_____
DIRECTOR OF ENGINEERING

Cc: Contractor

Date:_____

Standard Form G-4

CERTIFICATE OF ACCEPTANCE

File No:_____

DEVELOPER:_____
CONTRACTOR:_____
PROJECT NO:_____
SERVICING AGREEMENT NO:_____

All deficiencies, defects or fault in the Work observed or discovered within the period preceding the date of this Certificate having been rectified, this Certificate is issued pursuant to the referenced Servicing Agreement.

This Certificate has been made to the best of the Director of Engineering's knowledge, information and belief. It does not constitute acceptance of any work not in accordance with the requirements of the Servicing Agreement, whether or not such defect(s) could have been observed or discovered during construction.

_____
DIRECTOR OF ENGINEERING

Cc: Contractor

Date:_____

Standard Form G-5 PRIVATE

WELL CERTIFICATION

Pursuant to Part 2 of the Subdivision and Development Control Bylaw, which requires that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION:_____
PROJECT NO:_____

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that each well within the subdivision has been tested and is capable of continuously providing water at a rate of 9 litres per minute for a four-hour period.

I certify that water quality tests have been conducted and that the "Canadian Drinking Water Standards, latest edition" can be met for each existing or proposed lot in the development.

Professional Engineer responsible for design:

Signature:_____
Name:_____
Company:_____
Address: _____
_____
Date: _____

Engineer's Seal

Standard Form G-6 WELL

PUMP – FIELD TEST

OWNER'S NAME:_____ **DATE**:_____
APPLICATION NO:_____ **WELL NO:**_____
LOCATION:_____ **TEST NO:**_____
_____ **SHEET:**_____of_____

☐ ***Drawdown*** ☐ ***Recovery***

Reading No.	Time from Start (min)	Depth to Water (m)	Draw down (m)	Flow Measurement Data			Comments
				Min	*l*	*lpm*	

Standard Form G-7

WELL PUMP – DRAWDOWN GRAPH

OWNER'S NAME:_____ **DATE:**_____
APPLICATION NO:_____ **WELL NO:**_____
LOCATION:_____ **TEST NO:**_____
_____ **SHEET:**_____ of _____

Dp	=	Depth of proposed pump suction	=_____ m
Dtw	=	Depth of static water level	=_____ m
S30	=	Drawdown at 30 days	=_____ m
D	=	Adjustment for seasonal decline	=_____ m
SF	=	Safety Factor	= 1.0
Qh	=	Pumping Rate	=_____ lpm
Sh1	=	Drawdown at 10 minutes	=_____ m
Sh2	=	Drawdown at 4 hours	=_____ m

For calculating drawdown values:

SL1 = (Qi/Qh) x Sh1
SL2 = (Qi/Qh) x Sh2

Use this estimate minimum adjustments For seasonal decline (D) if other local data Or hydrogeologist's opinion is not available:

Test run in	***D***
Aug Sept Oct	2.0 m
Nov Dec Jan May Jun Jul	4.0 m
Feb Mar Apr	6.0 m

Minimum available drawdown =Dp – (Dtw + S30 + D + SF) =_____ m

If the calculated minimum available drawdown is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

Standard Form G-8

WELL PUMP – TEST SUMMARY

OWNER'S NAME:_____ **DATE:**_____
APPLICATION NO:_____ **WELL NO:**_____
LOCATION:_____ **TEST NO:**_____
SHEET:_____of_____

Well Completion Date	***Screen Design (mark one)***	***Description of Aquifer***
Depth_____m	□ Open Hole □ Slotted Casing	_____
Diameter_____m	□ Screen □ Gravel Pack	_____
Static water level_____m	□ Other_____	_____

Screen Interval_____m to_____m

Pump Test
Start: Date (d/m/y)_____ Time (h:m)_____

Pump Type: □ Elect submersible □ Jet □ Airlift
□ Other (describe):_____

Test pump set at_____metres below ground

Water level sounded by: □ Electric Tape □ Air bubbler □ Steel Tape
□ Other (describe):_____

Flow measured by: □ Container & Watch □ Flow Meter □ Orifice & tube
□ Other (describe):_____

Test

Initial non-pumping level_____m
Constant rate of yield _____lpm
Test duration _____h
Drawdown _____m
Recommended pumping Rate _____lpm

Water Samples Taken During Test

Chemical Analysis □ Yes □ No
Bacterial Analysis □ Yes □ No
Water Temperature_____C°
Any particular gas smells noted
_____
Comments on clarity of water
_____

Other comments:
_____
_____
_____

DISTRICT OF SECHELT

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Fax: 604-885-7591
Vanc. Line: 689-1680
Website: www.sechelt.ca