PENTICTON INDIAN BAND

SUBDIVISION, DEVELOPMENT AND SERVICING BYLAW

NO. 2020-01

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PREAMBLE

WHEREAS:

A. The Penticton Indian Band has inherent aboriginal and Treaty rights and authority to govern relations among its members and between Penticton Indian Band and other governments;

B. In accordance with the September 13, 2007 UN Declaration on the Rights of Indigenous Peoples, the Penticton Indian Band and its Membership have the right to own, use, develop and control lands, territories and resources they possess by reason of traditional ownership or use as well as those they have otherwise acquired subject to any collective rights held by all Penticton Indian Band Members;

C. The Penticton Indian Band has historically managed its lands and resources according to traditional laws and its inherent right of self-government, which includes the right to designate, allocate and assign lands for different purposes and to regulate use of the Reserves;

D. Council has the power under section 81(1)(g) of the Indian Act to make Bylaws not inconsistent with the Indian Act or with any regulation made by the Governor in Council or the Minister, for the dividing of the Reserves or a portion thereof into zones and the prohibition of the construction or maintenance of any class of buildings or the carrying on of any class of business, trade or calling in any zone;

E. Council also has the power under Section 81(1)(h) of the Indian Act to make Bylaws not inconsistent with the Indian Act or with any regulation for the construction, repair and use of buildings whether owned by the Penticton Indian Band or by individual Members of the Penticton Indian Band;

F. It is considered necessary for the interests and integrity of the Penticton Indian Band to adopt a Subdivision, Development and Servicing Bylaw as a planning document for the Penticton Indian Band to be used by the Council, the Penticton Indian Band administration and Membership as a framework for growth and development management on the Reserves and as a decision-making guide;

G. Council believes it is in the best interests of the Penticton Indian Band to exercise its inherent right of self-government and its powers under Sections 81(1)(g)(h) of the Indian Act to enact this Subdivision, Development and Servicing Bylaw No. 2020-01.

1. TITLE

1.1 This Bylaw may be cited for all purposes as the "Penticton Indian Band Subdivision, Development and Servicing Bylaw No. 2020-01".

2. APPLICATION

2.1 This Bylaw applies to all of the Reserves;

2.2 This Bylaw binds the Council and the Membership.

3. INTERPRETATION

3.1 The equivalent Imperial units of measure shown in the parenthesis after metric units are for information purposes only and do not form part of this Bylaw;

4. DEFINITIONS

4.1 In this Bylaw, unless the context otherwise requires:

"APPLICANT" means a person who has applied for approval of a Subdivision or Development of land, whether as the Parcel Holder or as the agent for a Parcel Holder, or as the lessee, of the land on the Reserves in respect of which the application was made and "APPLICATION" means an application made by an Applicant pursuant to this Bylaw;

"APPROVING OFFICER" means the person appointed by the Council by way of a Resolution to administer this Bylaw;

"ARCHITECT" means an architect who is a person registered to practice as an architect by the Architectural Institute of British Columbia;

"CERTIFICATE OF POSSESSION" means a certificate of possession issued to a Member pursuant to ss. 18(2) of the *Indian Act*;

"COMPLETE" or any variation thereof when used with respect to the Works and Services referred to herein will mean completion of the Works and Services to the satisfaction of the Approving Officer;

"CONSTRUCTION" means build, erect, install, repair, alter, add, enlarge, move, locate, re-locate, re-construct, upgrade, demolish, remove, excavate or shore;

"CONTRACTOR" means any person or firm having a contract with an applicant or with the Penticton Indian Band to construct the Works or Services or any other items required by this Bylaw;

"COORDINATING REGISTERED PROFESSIONAL" means a Professional Engineer or Architect engaged by the Applicant responsible for the preliminary design, detailed design, tendering and administration of the construction contract(s) of the Works and Services required by this Bylaw;

"COUNCIL" means the elected Chief and Council of the Penticton Indian Band;

"DETAILED DESIGN SUBMISSION" means the requirements to be undertaken and submitted by the Applicant to the Approving Officer as set out in Section 9.4;

"DEVELOP" or "DEVELOPMENT" means construction, alteration, excavation or improvement of land, building or other structure that requires the installation of any Works and Services under this Bylaw which will require a Development Permit or Subdivision Permit, or both;

"DEVELOPER" means any person or firm authorized by the Parcel Holder to represent the Parcel Holder of the land on the Reserves to be developed or a lessee of that land, who will be undertaking the development of that land;

"DEVELOPMENT PERMIT" means the permit issued by the Penticton Indian Band for a Parcel or Parcels to be Developed;

"FINAL ACCEPTANCE" means the acceptance of the Works and Services for a Development upon completion of an inspection of the Works and Services by the Penticton Indian Band satisfactory to the Approving Officer prior to the expiration of the Maintenance Period;

"FINAL ACCEPTANCE CERTIFICATE" shall mean the certificate issued by the Approving Officer for the final acceptance of the Works and Services upon the expiration of the Maintenance Period;

"FINAL APPROVAL" means the approval of a Subdivision Permit or a Development Permit by the Approving Officer when all conditions of Preliminary Layout Approval, subsequent instructions issued by the Approving Officer and all applicable requirements of this Bylaw have been met to the satisfaction of the Approving Officer and the application complies with all other relevant Bylaws of the Penticton Indian Band and all applicable legislation and the Approving Officer accepts the Total Performance Certificate;

"HIGHWAY" means a road, street, lane, walkway, trail, path, thoroughfare, bridge, viaduct and any other way open to public use, other than a private road on a Parcel held under a Certificate of Possession that is not open for use by the public;

"LAND USE PLAN" means a land use plan prepared for the Reserves, or any portion thereof, and approved by Council;

"LETTERS OF ASSURANCE" means the confirmation of commitment and letters of assurances to be prepared and submitted to the Approving Officer by the Parcel Holder, Coordinating Registered Professional and Registered Professionals in accordance with Schedule E and described in Sections 9.1.1 and 9.7.1;

"MAINTENANCE PERIOD" means the maintenance period set forth in section 14;

"MASTER MUNICIPAL CONSTRUCTION DOCUMENTS" or "MMCD" means reference to the most recent versions of the documents published by the Master Municipal Construction Documents Association for Design Guidelines and for Unit Price Contracts, MMCD Volume II and any amendments thereto;

"MEMBERSHIP" means the members of the Penticton Indian Band who are on its membership list

and “Member” or “Members” means each or some of them;

“OFF-SITE WORKS AND SERVICES” means Works and Services required for a Development which are located outside of the legal boundary of the Parcel on which the proposed Development is to occur;

“PARCEL” means any lot, block, or other area on the Reserves but does not include a Road or portion thereof unless the Road is included within the surveyed Parcel;

“PARCEL HOLDER” means the registered lessee of a Parcel or a person holding a Certificate of Possession for a Parcel;

“PRECONSTRUCTION SUBMISSION”: means the requirements to be undertaken and submitted by the Applicant to the Approving Officer as set out in Section 9.5;

“PRELIMINARY LAYOUT APPROVAL” or “PLA” means a document issued by the Approving Officer which sets out the terms and conditions for Final Approval;

“PROFESSIONAL ENGINEER” means an engineer who is registered to practice as an engineer by the Engineers and Geoscientists British Columbia and in accordance with the Engineers and Geoscientists Act of British Columbia;

“PUBLIC UTILITY” means any system having facilities installed in a Right-Of-Way for the purpose of providing a service to property including systems for water, gas, electricity, steam, or any other agent for the production or distribution of light, energy, sewage and drainage collection and disposal, emission, transmission or reception of information, messages or communications by cable, microwave, telephone, optical fibre or radio communications systems;

“RESERVES” means the Penticton Indian Band’s reserve lands, those being Penticton Indian Reserve Nos. 1, 2 and 3A;

“RESOLUTION” means a resolution passed by Council at a duly convened meeting which said meeting may be conducted by audio or video conferencing or both, and may be executed in counterparts and sent electronically;

“REVIEWING AGENCIES” means those provincial and federal agencies, ministries, and departments, as the case may be, identified by the Penticton Indian Band from time to time, as a resource to provide technical advice, assessments, recommendations and reports, as required;

“RIGHT-OF-WAY” means an interest in land acquired for the purpose of:

a. public rights of passage with or without vehicles;

b. erecting and maintaining any pole-line;

c. laying, placing, and maintaining drains, ditches, rainwater detention, pipes, transmission and distribution lines, or wires for the conveyance, transmission, or transportation of water, electric power, communications infrastructure, forest products, oil, or gas, or both oil and gas, or solids as defined in the Pipeline Act of British Columbia; or

d. the disposal of sanitary sewage, storm water or drainage.

"ROAD" means a Highway that affords the principal means of vehicular access to abutting Parcels, and includes a Road allowance;

"SECURITY" means an irrevocable letter of credit, cash deposit, certified cheque, or other form of security satisfactory to the Council or the Approving Officer;

"SIDEWALK" means a walkway that is intended for pedestrian traffic only;

"SUBDIVIDE" or "SUBDIVISION" means:

a. the division of a Parcel into two or more Parcels, whether by plan or by metes and bounds description or by replotting scheme or otherwise;

b. the consolidation of two or more Parcels into a single Parcel, or several Parcels into a smaller number or Parcels; or

c. the creation of a Highway or a portion of a Highway by plan;

"SUBDIVISION PERMIT" means the permit issued by the Penticton Indian Band allowing for subdivision of a Parcel;

"SUBSTANTIAL PERFORMANCE" means substantial completion as defined in the MMCD;

"SURVEYOR" means a land surveyor licensed and registered as a Canada Land Surveyor;

"SURVEY PLAN" means a fully dimensioned legal plan prepared by a Surveyor;

"TOTAL PERFORMANCE" means total performance as defined in the MMCD;

"TOTAL PERFORMANCE CERTIFICATE" means the certificate issued by the Approving Officer once Total Performance has been achieved;

"TRAIL or PATH" means a Highway primarily designed for the use of the walking public and bicycle traffic, that may be designed to afford emergency or maintenance vehicle use;

"WATERCOURSE" means any drainage course or source of water, whether usually containing water or not, and includes any lake, river, stream, creek, spring, ravine, swamp, gulch, or source of ground water whether open or enclosed;

"WORKS AND SERVICES" means any or all works, services, facilities and utilities that are required by this Bylaw to be designed, constructed and installed as a condition of a Subdivision Permit or Development Permit and without limitation, includes Highways, Sidewalks, Trails, Paths, landscaping, curbs, gutters, ductworks, boulevards, boulevard crossings, transit bays, street lighting, water distribution systems, fire hydrant systems, sewage and drainage collection, treatment and disposal systems, hydro, electrical, gas, cablevision, fibre optics and telephone supply, and other things required to be done under this Bylaw or otherwise in relation to the Subdivision or other Development whether on a parcel being subdivided or elsewhere;

"WORKS INSPECTOR" means an employee of the Penticton Indian Band who has been appointed in writing by the Approving Officer to coordinate, inspect and test any or all Works and Services

provided, constructed or installed pursuant to this Bylaw; and

"ZONING BYLAW" means a zoning bylaw of the Penticton Indian Band which is in force at any given time and which may be enacted after the coming into force of this Bylaw.

5. SEVERABILITY

5.1 If any section, subsection, clause, sentence or phrase of this Bylaw is for any reason held to be invalid by the decision of any court of competent jurisdiction, the invalid portion shall be severed and the portion that is invalid shall not affect the validity of the remaining portions of this Bylaw.

6. ADMINISTRATION

6.1 The Approving Officer shall be appointed by Resolution to administer this Bylaw;

6.2 If a proposed Development is in an area of the Reserves in which Works and Services of the types prescribed by this Bylaw have already been installed, and the existing Works and Services do not conform to the standards in this Bylaw, the Approving Officer may authorize the issuance of a Development Permit or may approve a Subdivision without the Works and Services being improved to the standards prescribed by this Bylaw if the level of service already provided to the Subdivision or Development and to adjacent areas is, in the opinion of the Approving Officer, adequate and in accordance with standards generally accepted as good engineering practice in existing developed areas.

7. SUBDIVISION AND DEVELOPMENT OF LAND

7.1 A person shall not Subdivide or otherwise Develop land within the Reserves except in compliance with this Bylaw. For a proposed Subdivision, the Applicant shall first have a preliminary survey plan prepared by a surveyor with valid registration under the Canada Lands Surveyors Act which shall be submitted to the Lands Department of the Penticton Indian Band for review. If the Lands Department approves of the survey plan, it will be submitted to the Council for approval by way of Resolution.

7.2 As a condition of Final Approval of a Subdivision Permit or Development Permit, every Applicant shall:

a. Comply with all applicable requirements of this Bylaw and all other legislation, Bylaws, rules and policies that apply to the Reserves; and

b. Obtain any and all necessary approvals and permissions from the Penticton Indian Band and the ministries, agencies, and authorities of any other government body having jurisdiction; and compliance with this Bylaw shall not relieve the Applicant from compliance with all other applicable enactments.

7.3 The Applicant whose Parcel is the subject of a Subdivision Permit or a Development Permit Application shall provide, locate and construct at the Applicant's expense, such Works and Services within the Subdivision and Development Permit areas, and Off-Site Works and Services, with the

written approval of the Penticton Indian Band, provided those Off-Site Works and Services do not encroach beyond the center line of the existing Highway or Highways immediately adjacent to the land being Subdivided, as required by Schedules A, B, C, D, E, and F of this Bylaw.

7.4 The Applicant shall retain, at the Applicant's own expense, a Coordinating Registered Professional to design the Works and Services in accordance with Schedules A, B, C, D, E, and F of this Bylaw.

7.5 Every Developer of lands on the Reserves to be Developed shall, at the Developer's sole cost and expense:

a. Provide Works and Services for that Development in accordance with the applicable provisions of this Bylaw; and

b. Ensure that the Works and Services are constructed and installed to the applicable minimum standards and specifications prescribed in this Bylaw, and if not prescribed in this Bylaw with the MMCD.

7.6 Without restricting section 7.5, all Works and Services required to be provided, designed, constructed and installed shall be provided, designed, constructed and installed to the satisfaction of the Approving Officer who may consult with a Professional Engineer(s) and Architects employed or retained by the Penticton Indian Band.

7.7 The Penticton Indian Band recognizes that site conditions may prompt the Applicant to request the Approving Officer to consider minor deviations from the standards and specifications for Works and Services established in this Bylaw. The Coordinating Registered Professional shall provide a sealed report which details the rationale for the request. The Approving Officer, having consulted with a Professional Engineer or Architect, or both, employed or retained by the Penticton Indian Band, all other authorities deemed appropriate by the Approving Officer, and having received endorsement by Council and the approval of the Penticton Indian Band authorities or other authorities who will have operational jurisdiction over the Works and Services, may consider approval of such minor deviations. Approval shall be in writing by the Approving Officer to the Applicant.

7.8 All drawings, sketches and plans submitted in respect of an application for a Subdivision Permit or a Development Permit, or both, shall comply with the standards established in the Schedules which form part of this Bylaw. The Approving Officer may adopt or revise from time to time, criteria, standards and specifications for Works and Services where adoption, revision and implementation of those criteria, standards and specifications support the policies endorsed by Council and are acceptable to the Penticton Indian Band authorities or other authorities having operational jurisdiction over the proposed Works and Services.

8. APPLICATION AND PROCESSING FEES

8.1 For Works and Services that are required by this Bylaw, the Applicant shall pay the Penticton Indian Band a processing fee of 5%, or such other amount as directed by Council, based upon the estimated costs of the Works and Services, to cover the Penticton Indian Band's administrative,

consulting, and legal costs incurred in reviewing the Application and submissions, carrying out site inspections of the Works and Services during Construction, processing reductions in Security, and any legal costs in preparing or reviewing any related agreements or Right-of-Way, or other encumbrances associated with the Works and Services.

8.2 At the discretion of the Approving Officer, the 5% fee may be provided in three separate payments as follows:

a. 1% at the time of submission of the Application for Development

b. 3% at the time of Detailed Design Submission

c. 1% at the time of Pre-Construction Submission

8.3 Notwithstanding any other provision herein, no fees shall be payable under this Bylaw by a Member applying to construct a single-family home or duplex on their land for their personal residence.

9. SUBDIVISION AND DEVELOPMENT PERMIT PROCESS

9.1 Application for Development

9.1.1 An Applicant or Developer wishing to Develop on the Reserves must first submit an Application for a Subdivision Permit or a Development Permit, or both, to the Approving Officer in the form of a Conceptual Development Plan and shall include the following:

a. Payment of the non-refundable application fees;

b. Applicable Confirmation of Commitment and Letters of Assurance – refer to Schedule E;

c. A completed Application form as prescribed from time to time by Council for that purpose;

d. A Conceptual Development Plan in the form of a map showing the existing and proposed land uses including the approximate location, configurations and dimensions of all proposed Parcels within the Development and as a minimum but not limited to the following:

- A map showing the natural topographic features including contours, Watercourses, water bodies and treed areas;
- A map showing existing property lines, easements, Rights-of-Way, services including water, sanitary, water, drainage, Roads, electrical, telephone and gas and indicate which, if any, will be removed or modified as a result of the Development;
- A map showing the approximate location, dimensions and area of all existing buildings and structures within the proposed Development and indicate which, if any, will be removed, altered or added to. If an existing building is to be altered or added to, include a description of the proposed alteration or addition;

- A map showing the existing land uses and zoning and the proposed land uses and zoning;
- If the Development is to be constructed in phases, a map identifying the phases;
- All maps to be metric with a bar scale and a north arrow. Maps may be consolidated providing the resulting map(s) is clear, concise and easy to interpret.
- A description of the building scheme which will be applied to the Development and buildings;
- An Environmental Impact Assessment and Report prepared by a person or firm acceptable to the Approving Officer;
- A Traffic Impact Study for a Development generating more than 100 trips per day;
- An Archaeological Overview Assessment prepared by a firm or person agreed to by the Approving Officer. The Approving Officer may require additional archaeological assessments;
- A Geotechnical Investigation and Report prepared by a firm or person agreed to by the Approving Officer;
- A Preliminary Design Report prepared and sealed by a Professional Engineer which includes a map indicating the Road and lot layout, general servicing requirements for water, sewer and drainage and shallow utilities and which details the design rationale, design criteria and calculations relating to the design of the Works and Services. The Preliminary Design Report must be prepared in accordance with the Works and Services requirements of this Bylaw and sealed by a Professional Engineer.

9.1.2 For leases on Penticton Indian Band community Lands not held under a Certificate(s) of Possession, the process shall be as follows:

a. The substantive terms of the lease shall be negotiated by the Proponent and the Penticton Indian Band through its authorized representative(s).

b. Once an agreement in principle has been reached, it will be presented to the Council of the Penticton Indian Band for approval, rejection or directions for modification.

c. Once the substantive terms have been agreed to by the Chief and Council, the Proponent will prepare the first draft of the proposed lease, utilizing Canada's standard form of lease as a precedent, and provide it to the Lands Department of the Penticton Indian Band which will negotiate the non-business terms of the lease.

d. Once the Proponent and the Penticton Indian Band's Lands Department have reached agreement on the terms of the lease, the Lands Department will present it to the Council and seek their approval.

e. Should the Council approve of the lease terms, they shall provide their consent by way of a Resolution. The Lands Department will then submit the lease to Indigenous Services Canada for review, execution and registration in the Indian Lands Registry in Ottawa or any other subsuming registry at the cost of the Proponent.

9.1.3 For leases on Penticton Indian Band reserve lands held under a Certificate(s) of Possession, the process shall be as follows:

a. The terms of the lease shall be negotiated by the Proponent and the Penticton Indian Band in consultation with Indigenous Services Canada.

b. The draft lease will be provided to the Lands Department of the Penticton Indian Band for review in order to ensure compliance with the laws of Canada and the Penticton Indian Band. The Lands Department and any other authorized representative of the Penticton Indian Band reviewing the lease will not provide financial advice on the lease. The Penticton Indian Band will not be responsible for any financial inequities in the lease.

c. The Proponent or the Certificate(s) of Possession holder, or both, are responsible for registering the lease. The registered lease will be provided to the Lands Department within ten (10) days of registration.

9.1.4 Except as otherwise provided in this Bylaw, the Developer shall provide paved vehicular and pedestrian Highway systems, water system, sanitary sewer system, stormwater management and drainage systems including treatment, underground power, telephone, TV, gas, fibre optics or other communications equipment, street lighting and all other Works and Services deemed to be required by the Approving Officer such that each system:

a. Serves and is connected to all Parcels created by the Development;

b. Extends along all Highways within the Development;

c. Extends along all existing Highways adjacent to the Development, subject to section 7.3;

d. Connects to the appropriate Public Utility;

e. Does not adversely impact the capacity of any of the existing Penticton Indian Band Roads and Public Utilities; and

f. Shall be constructed to provide connection to lands and systems beyond the Development.

9.2 Review of Initial Application for Development

9.2.1 Once the Applicant has submitted all documentation as set out in Section 9.1, the Approving Officer shall review and process the Application for Development. The review process may also include consultation with outside agencies including Professional Engineers, Architects and others engaged by the Approving Officer.

9.2.2 The Approving Officer, during this process, may request clarification or additional information from the Applicant.

9.2.3 Once the Approving Officer has Completed the review process, the Approving Officer shall prepare a report and present the report to Council for its consideration. The report shall include but not be limited to the following:

a. A copy of the Application for Development;

b. A copy of the proposed Conceptual Development Plan;

c. A summary of the various reports, assessments and studies including an assessment of the potential impacts to existing Penticton Indian Band infrastructure;

d. Confirmation of receipt of payment in full of the Application fees; and

e. Confirmation that the proposed Development does not contravene any Penticton Indian Band Land Use Plan or Zoning Bylaw. Should the Development contravene the Penticton Indian Band Land Use Plan or Zoning Bylaw, Council may decide to instruct the Developer to undertake a Land Use Plan and/or Zoning Bylaw amendment or seek an exception or waiver before granting approval of the Conceptual Development Plan.

9.3 Approval of the Conceptual Development Plan and issuance of Preliminary Layout Approval (PLA)

9.3.1 Approval of the Concept Development Plan shall be provided in writing by the Approving Officer to the Applicant upon:

a. All requirements with respect to the Application for Development Permit or Subdivision Permit have been addressed to the satisfaction of the Approving Officer; and

b. Council, by Resolution, has approved the Conceptual Development Plan.

9.3.2 The Approving Officer shall prepare a letter of Preliminary Layout Approval which shall list all requirements the Developer must address before the Approving Officer will submit the Development to Council for Final Approval.

9.3.3 Preliminary Layout Approval is effective for a period of one hundred eighty (180) days, following which time the Applicant must resubmit the application for Preliminary Layout Approval with payment of any applicable fees except that the Approving Officer may grant an extension where the Approving Officer is satisfied there has been an unavoidable delay or other special

circumstances exist that would justify an extension of time.

9.3.4 Preliminary Layout Approval shall not be construed as Final Approval and the Approving Officer, acting reasonably, may revoke the Preliminary Layout Approval at any time.

9.4 Detailed Design Submission and Approval

9.4.1 Once Preliminary Layout Approval has been issued, the Applicant shall address all items in the letter of Preliminary Layout Approval that must be considered before the Approving Officer authorizes the Applicant to proceed to Construction of the Works and Services. As a minimum, the Applicant shall include, but not be limited, in its submission to the following:

a. Detailed design drawings of all Works and Services sealed by the Professional Engineers and Architects;

b. Detailed design drawings from all Public Utility companies;

c. A Final Design Report including all supporting design calculations for all Works and Services, sealed by the Professional Engineer; and

d. Payment of non-refundable process fees.

9.4.2 Once the Applicant has submitted all information to the satisfaction of the Approving Officer, the Approving Officer shall review the submission. The review may include consultation with outside agencies including but not limited to a Professional Engineers and Architects retained by the Penticton Indian Band, an environmental consultant retained by the Penticton Indian Band if required, or the Penticton Indian Band's Environmental Consultant, Penticton Indian Band Natural Resources, Penticton Indian Band Public Works, the Penticton Indian Band Utilities Department, the Penticton Indian Band Lands Department, and other Penticton Indian Band staff, the local Fire Department, the Ministry of Transportation and Infrastructure (when applicable), the Ministry of Environment and Climate Change Canada, Fisheries and Oceans Canada and the First Nations Health Authority (when required).

9.4.3 All additional requests for information during the review process shall be submitted to the Applicant in writing. It may be necessary for the Applicant to amend and re-submit the Design Drawings, Final Design Report and other documents as required by the Approving Officer. This process shall continue until the Approving Officer confirms all deficiencies and recommendations have been satisfied.

9.4.4 The Approving Officer shall prepare and present a report to Council which shall include:

a. Confirmation that all deficiencies and recommendations have been satisfied; and

b. Confirmation that the non-refundable process fees have been paid.

9.5 Pre-Construction Submission and Approval

9.5.1 Once Council, by Resolution, has approved the Detailed Design Submission, the Applicant shall undertake the following:

a. Where applicable, provide all permits required from all government agencies including, where applicable, the Ministry of Transportation and Infrastructure, the Ministry of Environment, and the First Nations Health Authority;

b. Provide proof of payment to all Public Utility companies;

c. Where applicable, enter into Development Permit and/or servicing agreements with Penticton Indian Band as directed by the Approving Officer;

d. Pay all Development Cost Charges (DCC), non-refundable process fees and other fees. DCCs for Parcels intended for single family residential use are paid at the time of Subdivision. DCCs for multi-family residential, commercial, industrial and institutional Developments are paid at the time of Development Permit issuance; and

e. Provide certificate of comprehensive general liability insurance in accordance with Section 13.

9.5.2 Once the above has been Completed to the satisfaction of the Approving Officer, the Approving Officer shall authorize the Applicant in writing to proceed with Construction of the Works and Services.

9.6 Construction Phase

9.6.1 The Developer's Coordinating Registered Professional shall administer the construction contract(s) between the Applicant and the Contractor for the Works and Services required by this Bylaw in accordance with the Master Municipal Construction Documents and the provisions of this Bylaw. In addition, the Developer's Coordinating Registered Professional shall provide the following to the Approving Officer or a person appointed by the Approving Officer.

a. Any proposed deviation from the Approved Design Drawings which shall require the written approval of the Penticton Indian Band prior to making the change;

b. A copy of a weekly report throughout the Construction phase;

c. A copy of all tests results including but not limited to sieve analysis of materials incorporated into the Works and Services, compaction test results, concrete field tests and 28-day compressive strength tests, asphalt Marshall tests including core samples and density, air tests for sanitary sewer mains and for storm sewer mains when requested by the Approving Officer, sanitary sewer and storm sewer main videos, pressure tests for water mains and bacteriological tests prior to applying for connection to existing Penticton Indian Band water system;

d. For all lot grading and retaining walls, provide certification by a Professional Engineer that the lots and retaining walls have been graded and constructed in accordance with the Professional Engineer's requirements and the lot grading and retaining walls are acceptable for the building and land uses specified; and

e. A copy of the Substantial Performance Certificate and Deficiency List as required by,

and defined in, the Master Municipal Construction Documents.

9.6.2 The Applicant's Coordinating Registered Professional shall coordinate with the Penticton Indian Band staff to attend the Substantial Performance Inspection and provide input to the Deficiency List. The Approving Officer shall not accept the Substantial Performance Certificate without the inspection by the Penticton Indian Band staff.

9.7 Final Approval

9.7.1 For the Approving Officer to consider Final Approval, the Developer shall undertake the following:

a. The Developer shall have the preliminary survey plan that has been approved by Council finalized. Once finalized, the Lands Department will review the survey plan for any inconsistencies between the preliminary survey plan, Record Drawings and the finalized survey plan. If there are no inconsistencies or the inconsistencies are considered to be minor or inconsequential by the Lands Department, the finalized survey plan will be submitted to Council for approval by way of a Resolution;

b. Upon payment of the requisite fee by the Developer, the Lands Department will arrange to have the survey plan registered in the Indian Lands Registry in Ottawa or any subsuming registry;

c. The Applicant's Coordinating Registered Professional shall submit the Substantial Performance Certificate with the Deficiency List and Cost Estimate to the Approving Officer for review and approval. The Substantial Performance Certificate shall not be considered valid by the Penticton Indian Band until it is signed by the Approving Officer or his or her authorized representative;

d. The Applicant's Coordinating Registered Professional shall prepare and submit the Record Drawings to the Penticton Indian Band for review and approval. AutoCAD and PDF formats are required;

e. The Applicant's Coordinating Registered Professional shall prepare and submit the legal plan for the Development to PIB Lands for review and approval. PIB Lands shall submit the legal plan to Council for approval by Resolution. Once Council approval is achieved, PIB Lands shall submit the Band Council Resolution to the Developer's Canadian Land Surveyor (CLS) for registration. Final Approval of the Development shall not be granted without proof of legal plan registration is provided to PIB Lands by the Developer's CLS.

f. The Developer and its Professionals shall provide the appropriate Letters of Assurance – refer to Schedule E;

g. Once all Deficiencies noted on the Substantial Performance Certificate have been corrected, the Applicant's Coordinating Registered Professional shall coordinate with the Penticton Indian Band staff to attend the Total Performance Inspection. After the inspection, the Applicant's Coordinating Registered Professional shall submit the

Total Performance Certificate to the Approving Officer for approval. The Total Performance Certificate shall not be considered valid by the Penticton Indian Band until it is signed by the Approving Officer or his or her authorized representative;

h. The Applicant shall provide all other information as required by the Letter of Preliminary Layout Approval and as requested by the Approving Officer.

i. Once the Total Performance Certificate, Record Drawings, Letters of Assurance and all other information requested by the Approving Officer are approved by the Approving Officer, the Approving Officer will arrange to have the Security reduced to the amount required for the Maintenance Period;

9.7.2 When the Approving Officer is satisfied that all requirements have been met, the Approving Officer shall notify the Applicant in writing and advise Council that the Development has achieved Final Approval. The Approving Officer shall provide approval to the Applicant in writing.

9.8 Final Acceptance at Expiration of the Maintenance Period

9.8.1 For the Approving Officer to consider Final Acceptance, the Approving Officer shall undertake the following:

a. One month prior to the expiration of the Maintenance Period for the Works and Services, the Penticton Indian Band and the Applicant or the Applicant's Coordinating Registered Professional shall inspect all Works and Services for the Development.

b. If there are any deficiencies, the Approving Officer shall notify the Applicant in writing to correct the deficiencies.

c. Once the deficiencies are corrected or if there are no deficiencies, the Approving Officer shall prepare and issue a Final Acceptance Certificate to the Applicant.

9.8.2 When the Approving Officer is satisfied all requirements have been met, the Approving Officer shall notify the Applicant in writing and advise Council the Development has achieved Final Acceptance.

9.8.3 The Approving Officer shall arrange to release all remaining Security amounts to the Applicant.

10. WORKS AND SERVICES AGREEMENTS

10.1 Where a Development requires the installation of Works and Services located outside of the legal boundary of the proposed Development, those Works and Services are deemed to be Off-Site Works and Services. In order to ensure these Off-Site Works and Services are constructed as required to support the proposed Development, the Applicant shall enter into a Works and Services Agreement with the Penticton Indian Band including but not limited to the following:

a. Execution of an Off-Site Works and Services Agreement with the Penticton Indian Band in a form satisfactory to the Penticton Indian Band as provided in Schedule F of this Bylaw;

b. The Off-Site Works and Services Agreement shall include the Approved Off-Site Works and Services Design Drawings and Class A Construction Cost Estimate approved by the Approving Officer, sealed by the Applicant's Coordinating Registered Professional, and a Construction Schedule; and

c. The Applicant shall provide Security, in a form compliant with this Bylaw, in the amounts stated in the Off-Site Works and Services Agreement, or such other amount as directed by Council; and

d. Provide all other information required by the Letter of PLA as directed by the Approving Officer.

10.2 During the Pre-Construction Approval period and prior to commencing Construction of the Works and Services, an Applicant may request the Approving Officer grant Final Approval of a Development providing the Developer undertakes the following:

a. Execute a Works and Services Agreement with the Penticton Indian Band in a form satisfactory to the Penticton Indian Band as provided in Schedule F of this Bylaw;

b. Include with the Works and Services Agreement the Approved Works and Services Design Drawings and Class A Construction Cost Estimate approved by the Approving Officer and sealed by the Applicant's Coordinating Registered Professional; and

c. Provide Security, in a form compliant with this Bylaw, in the amounts stated in the Works and Services Agreement, or such other amount as directed by Council;

d. Provide all other information required by the Letter of PLA as directed by the Approving Officer; and

e. Pay all Development Cost Charges (DCCs), non-refundable process fees and other fees. DCCs for Parcels intended for single family residential use are paid at the time of Subdivision. DCCs for multi-family residential, commercial, industrial and institutional Developments are paid at the time of issuance of the Development Permit.

10.3 Notwithstanding Section 10.2, any time during the Construction of the Works and Services, the Applicant may request the Approving Officer grant Final Approval of a Development providing the Applicant undertakes the following:

a. Execute a Works and Services Agreement with the Penticton Indian Band in a form satisfactory to the Penticton Indian Band as provided in Schedule F of this Bylaw;

b. Include with the Works and Services Agreement the Approved Works and Services Design Drawings and clearly identify all Works and Services that have been constructed and which Works and Services remain unconstructed;

c. Include with the Works and Services Agreement a Class A Construction Cost Estimate sealed by the Applicant's Coordinating Registered Professional and approved by the

Approving Officer for the Works and Services to be constructed;

d. Provide certification by the Applicant's Coordinating Registered Professional in a form acceptable to the Approving Officer that all Works and Services constructed to date are in accordance with the Approved Design Drawings and the requirements of this Bylaw;

e. Provide Security, in a form compliant with this Bylaw, in the amounts stated in the Works and Services Agreement, or such other amount as directed by Council; and

f. Provide all other information required by the Letter of PLA and as requested by the Approving Officer.

11. RIGHTS-OF-WAY

11.1 Where Works and Services are not located within a Highway, the Developer shall grant to the Penticton Indian Band or obtain from third parties, at the Developer's cost, all required Rights-of-Way for the approval of the Approving Officer in accordance with the requirements of this Bylaw.

11.2 The Developer shall prepare all Right-of-Way agreements and plans, submit the agreements and plans to the Approving Officer, and once approved by the Approving Officer, register Right-of-Way agreements and plans with Natural Resources Canada.

11.3 Once registered, the Developer shall provide the Approving Officer proof that the Right-of-Way agreements and plans are registered.

12. NUISANCE AND DAMAGE

12.1 During Construction or installation of the Works and Services, the Developer shall be responsible to:

a. Ensure the safety of employees and Contractors carrying out the work, and in particular, in accordance with applicable Provincial or Federal legislation addressing the safety of workers;

b. Maintain control over dust, dirt, and harmful or annoying emissions;

c. Prevent the escape of water or harmful substances, and other sources of nuisance; and

d. Ensure the site is free of inappropriate accumulations of construction materials and any accumulations of toxic substances, waste material, garbage and debris, and that such substances, materials, garbage and debris are collected, stored, transported and disposed of in accordance with the Environmental Management Act of British Columbia and as required by the Approving Officer.

12.2 If in the opinion of the Approving Officer, the Applicant fails to effectively control the risks or occurrences of matters listed in Section 12.1, the Penticton Indian Band may notify and direct the Applicant to do so, including by taking steps and measures, within a time period it considers to be

reasonable in the circumstances. If the Applicant fails to comply with such notice within the time period specified, the Penticton Indian Band may enter on the property, and carry out control and remedial measures at the cost of the Applicant plus an administration fee of fifteen percent (15%).

12.3 If in the course of Construction or installation of Works and Services, any land, Watercourse, building, structure, or personal property on the Reserves is damaged or destroyed as a result of such Works or Services, the Developer shall restore such property, or ensure that such property is restored, to the current standards established in this Bylaw or other applicable Bylaw or enactment and to the satisfaction of a Professional Engineer employed or retained by the Penticton Indian Band and designated to act for that purpose.

13. INSURANCE

13.1 The Developer shall obtain and maintain, at the Developer's expense, until Final Acceptance, comprehensive general liability insurance covering premises and operations, contingencies with respect to the operations of Contractors and sub-contractors, completed operations liability, contractual liability and automobile liability for owned, non-owned, and hired units. Each insurance policy shall:

a. Provide for liability not less than $5,000,000 for each occurrence for bodily injury, death and damage to property with an aggregate amount of not less than $10,000,000;

b. Name the Penticton Indian Band as an additional or named insured;

c. Provide that the policy cannot be cancelled, lapsed, or materially altered without providing at least thirty (30) days' notice in writing to the Penticton Indian Band by registered mail; and

d. Provide a cross-liability clause.

13.2 The Developer shall deliver a copy of each insurance policy to the offices of the Penticton Indian Band, to the attention of the Approving Officer at the Pre-Construction Approval Phase.

13.3 If the Developer fails to provide the insurance in accordance with Section 13.1, the Approving Officer shall not authorize the Developer to commence with Construction of the Works and Services.

13.4 For Construction, the Developer shall ensure all insurance required by MMCD is provided. All insurance certificates are to be provided to the Penticton Indian Band prior to start of Construction.

14. MAINTENANCE PERIOD REQUIREMENTS

14.1 The Developer shall be responsible for the costs of repairs and if necessary, replacement of Works and Services Constructed and installed pursuant to this Bylaw for a period of twelve (12) months from the date the Approving Officer approves the Substantial Performance Certificate.

14.2 In addition to what is set forth in Section 14.1, the Developer shall be solely responsible for the

costs of operation and maintenance of the storm water detention facility including providing reports and tests that conclusively confirm the infrastructure performs as intended by the Approved Design Drawings and Final Design Report and specifications for a period of twelve (12) months from the date the Approving Officer approves the Substantial Performance Certificate.

14.3 The Developer shall provide the Penticton Indian Band with Security for the Maintenance Period in an amount of ten percent (10%), or as directed by Council, of the cost Construction of all Works and Services associated with the Development based on the approved Class A Construction Cost Estimate or the actual costs of Construction, if available. The Security may be in the form of cash, a bond in a form agreed to by the PIB, funds held in solicitor's trust account or a Letter of Credit in a form acceptable to the Approving Officer.

14.4 If the Developer fails to operate, maintain, repair or replace the Works and Services during the Maintenance Period, the Penticton Indian Band may draw on the Security as necessary to cover the associated costs, and without limiting the foregoing, may, at the expense of the Applicant or, failing that, the Parcel Holder, undertake such maintenance, repairs or replacement that may be necessary, plus a fifteen percent (15%) administration fee. Any expenses not recovered or recoverable from drawing on the Security, together with interest at the current rate, may be recovered in like manner as for property taxes.

15. OFFENCES

15.1 No person must obstruct, interfere with or hinder Council, the Approving Officer or any authorized employee, officer or agent of the Penticton Indian Band in the carrying out of their duties and responsibilities under this Bylaw.

15.2 Any person who violates any of the provisions of this Bylaw or who suffers or permits any act or thing to be done in contravention or in violation of any of the provisions of this Bylaw, or who neglects to do or refrains from doing any act or thing required by any of the provisions of this Bylaw, is guilty of an offence under this Bylaw, and is liable to the penalties imposed by this Bylaw.

15.3 Each day a violation of this Bylaw continues will be deemed to be a separate offence for which a fine or imprisonment may be imposed.

15.4 Any person who is guilty of an offence under this Bylaw is liable, on summary conviction to a fine of not more than One Thousand ($1,000.00) Dollars or to a term of imprisonment not exceeding thirty (30) days, or both.

15.5 Any person who violates any of the provisions of the Bylaw or who suffers or permits any act or thing to be done in contravention or in violation of any of the provisions of this Bylaw, or who neglects to do or refrains from doing any act or thing required by any of the provisions of this Bylaw, is subject to injunctive or mandamus relief in the courts set forth in section 15.6 in addition to any penalties imposed by this Bylaw.

15.6 The Provincial Court of British Columbia, the Supreme Court of British Columbia and the Federal Court of Canada Trial Division are hereby granted jurisdiction to enforce the provisions of this Bylaw.

16. APPLICATION OF BYLAW

16.1 The headings given to the sections and paragraphs in this Bylaw are for convenience of reference only. They do not form part of this Bylaw and will not be used in the interpretation of this Bylaw.

16.2 Historical amendments to this Bylaw:

Date of Amendment	Section Amended	Amendment

17. SCHEDULES

The following Schedules are attached to and form part of this Bylaw:

Schedule A: Supplementary Design Guidelines

Works and Services provided pursuant to this Bylaw shall be designed in accordance with the most recent Master Municipal Construction Documents Association (MMCD) Design Guidelines and with the Supplementary Design Guidelines of the Penticton Indian Band as issued and amended from time to time. Supplementary Design Guidelines shall govern over the MMCD Design Criteria.

Schedule B: Supplementary Construction Specifications

Works and Services provided pursuant to this Bylaw shall be constructed in accordance with the most recent Master Municipal Construction Documents Association (MMCD) and with the Supplementary Construction Specifications of the Penticton Indian Band as issued and amended from time to time. Supplementary Construction Specifications shall govern over the MMCD.

Schedule C: Supplementary Standard Detail Drawings

Works and Services provided pursuant to this Bylaw shall be constructed in accordance with the most recent Master Municipal Construction Documents Association (MMCD) and with the Supplementary Standard Detail Drawings of the Penticton Indian Band as issued and amended from time to time. Supplementary Standard Detail Drawings shall govern over the MMCD.

Schedule D: Design and Record Drawing Submission Standards

Works and Services provided pursuant to this Bylaw shall be designed in accordance with the most recent Master Municipal Construction Document Association (MMCD) Design Guidelines and with the Design and Record Drawing Submission Standards of the Penticton Indian Band as issued and amended from time to time. Design and Record Drawing Submission Standards shall govern over the MMCD Design Criteria.

Schedule E: Letters of Assurance

The Parcel Holder, or his or her agent, a lessee, and the Coordinating Registered Professional, Architect and Professional Engineer, as the case may be and as required for each project shall provide the following Letters of Assurance:

E-1 Confirmation of Commitment by Owner and Coordinating Registered Professional Re: Design and Field Review of Construction

E-2 Assurance by Registered Professional of Professional Design and Commitment for Field Review

E-3 Assurance by Registered Professional of Professional Design and Commitment for Field Review (Environmental)

E-4 Assurance by Registered Professional of Professional Design and Commitment for Field Review (Heritage)

E-5 Assurance by Registered Professional Field Review and Compliance (Coordinating Registered Professional)

E-6 Assurance by Registered Professional Field Review and Compliance (Registered Professional)

E-7 Assurance by Registered Professional Field Review and Compliance (Environmental)

E-8 Assurance by Registered Professional Field Review and Compliance (Heritage)

Schedule F: Works and Services and Warranty Security Agreements

Pursuant to the provisions of this Bylaw, the following Works and Services and Warranty Security Agreements shall be entered into by the Owner and Penticton Indian Band:

F-1 Works and Services Agreement Prior to Completion of Construction of all Works and Services, including Off-Site Works and Services

F-2 Works and Services Warranty Security Agreement

THIS BYLAW IS HEREBY enacted at a duly convened meeting of the Council of the Penticton Indian Band this 16th day of June, 2020.

Signed by the following members of Council:

Chief Chad Eneas

Councillor Clinton George

Councillor Vivian Lezard

Councillor Carlene George

Councillor Charlene Roberds

Councillor Suzanne Johnson

Councillor Elliott Tonasket

Councillor Inez Pierre

Councillor Fred Kruger

being the majority of those members of the Council of the Penticton Indian Band present at the meeting of the Council.

SCHEDULE A

SUPPLEMENTARY DESIGN GUIDELINES

SUPPLEMENTARY DESIGN GUIDELINES
GENERAL DESIGN CONSIDERATIONS

1.0 GENERAL DESIGN CONSIDERATIONS

1.2	**Independent Utilities**	Add to Section 1.2	The Developer shall supply, locate and install the mail delivery equipment to Canada Post Specifications and to the satisfaction of the *Approving Officer*. All mail delivery equipment is to be accessible by persons with physical disabilities.
1.3	**Utility Rights-Of-Way**	Remove Section 1.3 Replace with:	A Right of Way alignment shall be selected to avoid environmentally sensitive areas such as but not limited to watercourses, wetlands and wildlife migration corridors and forested areas and shall accommodate access for operation, maintenance, flushing and cleaning of the sewer. The Right of Way minimum width for a single pipe shall be 6.0m. Where necessary due to depth of pipe cover, the width shall be increased to accommodate a future excavation based on WorkSafe BC Regulation side slopes or as recommended by the *Consulting Engineer* plus an allowance of 0.6m for the trench bottom width plus an additional 2m width at the top of the trench. Where a water main and/or storm sewer main is constructed with the sanitary sewer main, the Right of Way width shall be increased to provide utility separation. The distance from the top of the trench excavation to each property line shall be 1.0m. Provide a design cross section for each right of way and pipe configuration. Where a pipe is installed adjacent to a building, the design cross section shall indicate the minimum safe elevation of the adjacent building footing and the minimum distance between the right of way boundary and the building footing based on a safe angle of repose from the limits of the WorkSafe BC Regulation excavation slopes or as recommended by the *Consulting Engineer*. For a trunk main or force main, the minimum Right of Way width shall be 6.0m and additional width to accommodate future twinning when required by the *Approving Officer*. Water pump stations, sewage lift stations, kiosks and appurtenances shall be located outside of road curb and gutter, sidewalk, and asphalt. A paved access suitable for maintenance equipment and vehicles to park outside the

			road curb and gutter, sidewalk, and asphalt shall be provided. Where water mains, water main chambers, manholes, meter buildings, pressure reducing stations, pump stations, sanitary pump stations, treatment plants, reservoirs, water sources and all related appurtenances are to be located outside of the road right of way, additional dedicated road right of way of suitable size shall be provided to the satisfaction of the *Approving Officer*. A paved access shall be located outside the road curb and gutter, sidewalk, and asphalt. The paved access shall be sized and aligned to accommodate the required maintenance equipment and vehicles at a maximum grade of 12% and a minimum paved width of 3m.
1.4.1	**Horizontal Separation**	Remove Section 1.4.1 Replace with	A minimum of 3.0m horizontal separation shall be maintained between a water main and a sanitary sewer/storm sewer main. In special circumstances, specifically in rock, separation of less than 3.0m may be considered by the *Approving Officer* subject to the approval of the First Nations Health Authority provided that: ▪ The sanitary/storm sewer main and water main are installed in separate trenches with the water main invert a minimum of 0.5m above the crown of the sewer main and all water, sanitary/storm sewer pipe joints are wrapped with heat shrink plastic or packed with compound and wrapped with petrolatum tape in accordance with the latest version of AWWA Standards; or ▪ The sanitary/storm sewer main and the water main are installed in the same trench with the water main located on a bench of undisturbed soil or rock and a minimum of 0.5m above the crown of the sewer, the sewer pipe(s) shall be constructed of pressure pipe such as high-density polyethylene (HDPE) or PVC C900 in accordance with the MMCD and pressure tested to assure it is watertight.
1.4.2	**Vertical Separation**	Remove Section 1.4.2 Replace with	Where a sanitary/storm sewer main crosses a water main, the sewer main shall be located below the water main with a minimum clearance of 0.5m and the joints of the water main over a length extending 3m either side of the sewer main are to be wrapped with heat shrink plastic or packed

with compound and wrapped with petrolatum tape in accordance with the latest version of the AWWA Standards.

Where it is not possible to obtain the vertical separation indicated above, and subject to the approval of the First Nations Health Authority and where permitted by the *Approving Officer*, the following shall apply:

- The water pipe joints shall be wrapped as indicated above, and
- The sewer shall be constructed of pressure pipe such as high-density polyethylene (HDPE) or PVC C900 pressure pipe in accordance with the MMCD and pressure tested to assure it is watertight.

2.0 WATER DISTRIBUTION

2.2 Metering

Remove Section 2.2
Replace with

When directed by the *Approving Officer*, water meters to PIB specifications shall be provided at the following locations:

- each single detached dwelling.
- each unit of a duplex dwelling.
- each multiple-unit residential building consisting of three or more dwelling units.
- each commercial, industrial, or institutional building.
- at the boundary of each manufactured home park.
- at the boundary of a bare land strata development consisting of more than three strata lots.

Refer to the PIB Approved Products List for water meter types approved for use.

In no circumstances shall there be any diversion of water permitted upstream of the water meter except for building fire sprinklers, fire hose stations and fire hydrants.

The following are specific requirements for each meter use:

a) Single and Two-Family (Duplex) Residential Dwellings

- Every service shall be equipped with an easily accessible full port ball valve (building shut-off) installed at a distance not greater than 1m from the service entry inside the building. The service entrance into the building shall be in a crawl space, basement or ground floor location and be readily and easily accessible to shut off the water supply to the building and for meter installation and meter servicing.
- The water meter shall be installed in accordance with the manufacturer's specifications and in the horizontal position downstream of the building shut-off. In no circumstances shall there be any water supply connections permitted between the building shut off and the water meter.
- Refer to the manufacturer's specifications for installation of remote reading equipment.

b) Multi-Family Residential Developments:

- Every multi-family residential development of three or more units shall provide a single water meter located on private property. The water meter shall be installed in an above grade, secure, lighted, heated and ventilated secure separate building or in the mechanical room of the main building. The meter shall be accessible to the PIB by an exterior door.
- Below grade meter pits or chambers are not permitted.
- All meters shall be installed double check valve back flow prevention. Consideration is to be given for water supply during meter and back flow prevention testing.
- Refer to the manufacturer's specifications for installation of remote reading equipment.

c) Commercial, Industrial, and Institutional Developments:

- Every commercial, industrial and institutional development shall provide a single water meter located on private property. The water meter shall be installed in an above grade, secure, lighted, heated and ventilated secure separate building or in the mechanical room of the main building. The meter shall be accessible to the PIB by an exterior door.
- Below grade meter pits or chambers are not permitted.
- All meters shall be installed with double check valve back flow prevention. Consideration is to be given for water supply during meter and back flow prevention testing.
- Refer to the manufacturer's specifications for installation of remote reading equipment.

For developments with multi-family, commercial, industrial and institutional buildings, the water intended for fire sprinkler systems, fire hose stations or on-site fire hydrants is not required to be metered. However, for strata developments comprised of detached or semi-detached units, the water meter and double check valve back flow assembly may be required to serve the domestic water supply and the on-site fire hydrants.

2.3	**Per Capita Demand**	Remove Section 2.3 Replace with	Water demands shall be estimated based on appropriate flow rates for each land use type. Existing demands should be validated against existing flow meter records. Careful consideration shall be given to seasonal population variations in particular for communities with a high

percentage of population that is only present seasonally. Furthermore, unaccounted for or non-revenue water demands should also be carefully considered and determined if these numbers will remain constant, decrease or increase as population increases.

In the absence of reliable water consumption records and/or specific municipal requirements, use the following per capita demands for future residential requirements.:

Average Annual Daily Demand (ADD):	900 Litres per capita per day
Maximum Daily Demand (MDD):	2,400 Litres per capita per day
Peak Hour Demand (PHD):	4,000 Litres per capita per day

The density for each specific land use shall be as provided in the following Table 2.3 – Densities for Specific Uses:

Table 2.3 - Densities for Specific Uses

Land Use	People/Ha	People/ Unit
Low Density Residential		
Single Detached	30	3
Semi-Detached	45	
Townhouse	90	2
Medium Density (3-4 story)	120	
High Density (> 4 story)	240	
Mobile Home Park	40	
Industrial	50	n/a
Institutional	50	
Commercial- Highway	75	
Commercial- Retail	75	

2.4 Non-Residential Demand

Remove Section 2.4
Replace with

For uses other than residential, the demand criteria shall be selected to suit the land use and density as approved by the *Approving Officer*.

2.5 Fire Flows

Remove Section 2.5
Replace with

Fire flows are subject to the following minimum requirements (Table 2.5):

Table 2.5 - Fire Flow Demand under Maximum Day Condition

Land Use	Fire Flow (Lps)	Duration (Hours)
Low Density Single Detached and Semi-Detached Residential	60	2.0
Townhouse, Medium and High Density Residential	90	2.0
Institutional	150	2.0
Commercial	150	2.0
Industrial	225	3.0

In addition, the minimum fire flow for specific building structures shall be determined in accordance with the requirements of the current edition of "Water Supply for Public Fire Protection – A Guide to Recommended Practice" published by Fire Underwriters Survey. The calculation of the fire flow required for each building structure shall be prepared and sealed by a qualified *Consulting Engineer* and submitted to the *Approving Officer*. The fire flow as calculated for each specific building structure shall not exceed the fire flow in Table 2.5.

2.7 Water Pressure

Remove

Minimum pressure at Peak Hour Demand (H) 300 kPa

Replace with

Minimum pressure at Peak Hour Demand (H) 345 kPa

Remove

Where the maximum pressure exceeds 515 kPa, service connections must be individually protected by pressure reducing valves located in the building being served.

Replace with

A pressure reducing valve is required for each structure regardless of the system pressure.

2.8 Hydraulic Design

Add to section

For a water main designated by the *Approving Officer* as a dedicated pump main located between the pump and reservoir and/or distribution network, the maximum design velocity shall not exceed 2.0 m/s.

For a water main designated by the *Approving Officer* as a trunk main, the maximum design velocity shall not exceed

			2.0 m/s at Maximum Day Demand plus Fire Flow or Peak Hour Demand.
2.11	**Minimum Depth of Cover**	Remove bullets	▪ Clear other underground utilities. ▪ Minimum cover: 1.0 m except where otherwise indicated by *Approving Officer*.
		Replace with	▪ Provide adequate clearance from other underground utilities. ▪ Minimum 1.5 m depth of cover except 1.0 m with appropriate insulation for frost protection of pipes crossing under ditches.
2.14	**Valves**	Remove Section 2.14 Replace with	Gate valves shall be located as follows and as additionally directed by the *Approving Officer*: ▪ At pipe intersections either in a cluster at the pipe intersection or at projected property lines to avoid conflicts with curbs and sidewalks unless otherwise directed by the *Approving Officer*. ▪ 3 valves at "X" intersection ▪ 2 valves at "T" intersection ▪ Maximum spacing: 150m. ▪ Not more than 2 hydrants isolated. ▪ Not more than 20 service connections isolated. ▪ For each fire hydrant. ▪ To provide for a unidirectional flushing program using fire hydrants for flushing. Additional valves may be required for higher density or for commercial, institutional and industrial developments. In order to permit the use of pigging cleaning methods, the valve sizing and type selection shall be as follows: ▪ Gate valve size shall match the water main size for water mains 300mm diameter and smaller. Gate valve size may be one size smaller than the water main size for water mains 350mm diameter and larger. ▪ Gate valves for 350mm and larger water mains shall include a bypass. ▪ Gear operated butterfly valves shall only be

			permitted for valves larger than 350mm diameter where pigging will not be part of a water main maintenance program. ▪ Unless the use of butterfly valves is approved in advance, all valves shall be gate valves.
2.15	**Hydrants**	Add to section	All hydrants shall be installed with the pumper port facing the street. Once final boulevard grading is complete, each fire hydrant shall have a 2-meter diameter landscaped area around the hydrant. The landscape area shall consist of a 100mm depth of course drain rock on top of non-woven medium geosynthetic and edged with 100mm depth HDPE landscape edging. Where permitted by the *Approving Officer*, a fire hydrant may serve a secondary role as a blow-off but not as an air relief valve.
2.20	**Chambers**	Remove Section 2.20 Replace with	Chambers or manholes containing air valves, blow offs or other approved appurtenances shall provide adequate room for maintenance, including head room and side room. Access openings shall be suitable for removals and replacements. Provide a drain to a storm sewer or ditch, complete with backflow prevention. Rock pits may be considered subject to suitable soil and groundwater conditions. A pumping system may be required for drainage. The *Local Authority* may require provisions for forced ventilation, lighting, heating and dehumidification. Access and ventilation details shall comply with WorkSafeBC Requirements. Insulation to prevent freezing shall be provided
2.21	**Service Connections**	Remove Section 2.21 Replace with	The service connection size shall be calculated on the basis of the designated land use including sprinkler systems and/or on-site hydrants, where applicable. The minimum size is shown in 2.9 - Minimum Pipe Diameter. Each service connection at the water main shall have a minimum spacing of 1.0m. Each 19mm to 50mm service shall have a mainstop and saddle at the watermain and a curb stop and box located 300mm from the property line on the public side of the road

			right of way and mid-span of the lot frontage. The service shall be installed perpendicular to the water main except at end of cul-de-sac bulbs. For service connections 100mm dia. or larger, a gate valve connected to the tee at the water main shall be provided. Each service connection larger than 25mm diameter shall be provided with a double check valve back flow prevention device located in the above ground meter station located within the development property and be accessible to the PIB for inspection. All new service connections shall include provisions for metering.
2.22	**Alignments and Corridors**	Remove Section 2.22 Replace with	On straight roads, watermains shall have straight alignments with uniform offsets between intersections. For roads on curved alignments, watermains shall be considered for installation on a horizontal curve providing the following criteria are achieved: ▪ The watermain shall have a single continuous radius consistent with the road property line radius and at a constant offset from the road property line in accordance with the Standard Drawings, and ▪ The radius of curvature shall be made by pipe joint deflection. The minimum radius of pipe curvature shall not be less than 300 times the outside diameter of the pipe barrel or 1.5 times the pipe manufacturer's guideline for minimum radius, whichever achieves the largest radius.
2.23	**Reservoirs**	Remove Section 2.23 Replace with	When directed by the *Approving Officer*, reservoir storage in accordance with the requirements of this Section shall be provided. All detailed design drawings including but not limited to geotechnical, structural, HVAC and mechanical, electrical and controls and civil shall be sealed by each *Consulting Engineer* prior to submission to the *Approving Officer*.

2.23.1	**Preliminary Design**	Remove Section 2.23.1 Replace with	A Preliminary Design Report shall be prepared by the qualified *Consulting Engineer* and submitted to the *Approving Officer* for review and approval prior to the preparation of detailed design drawings. The Preliminary Design Report shall consider but not be limited to the following: ▪ Site Location. ▪ Selection of materials. ▪ Design standards. ▪ Volume and shape. ▪ Number of cells and piping for operation and maintenance. ▪ Geotechnical Report which addresses but is not limited to foundation requirements for reservoir and control building, groundwater, temporary and final excavation and embankment slopes and, long-term slope and site stability and seismic design considerations. ▪ Aesthetics. ▪ Water quality and reservoir mixing. ▪ Access. ▪ Valve building. ▪ Alarms, controls and monitoring, including process and instrumentation drawing and control narrative and connection to PIB SCADA system. ▪ Security
2.23.2	**Capacity**	Remove Section 2.23.2 Replace with	Reservoir storage capacity shall be calculated by the following formula: Total Storage Volume = A + B + C Where: A = Fire Storage (Table 2.5 and the Fire Underwriters Survey guide) B = Equalization Storage (25% of Maximum Day Demand) C = Emergency Storage (25% of A + B) Subject to the results of a detailed engineering analysis, and at the discretion and the approval of the *Approving Officer*,

			the requirement for emergency storage (C) may be reduced or eliminated based on consideration of the following: ▪ Dependability of water source. ▪ Reliability of supply system. ▪ Presence of more than one supply source. ▪ Whether the reservoir is part of a larger system. ▪ Presence of other reservoir(s) in system. ▪ Availability of standby power and the supply source capacity to deliver MDD during a power outage. ▪ Need for increased water turnover within the reservoir to maintain water quality.
2.23.3	**Structural Design Codes**	Remove Section 2.23.3 Replace with	Design in accordance with the latest edition of the BC Building Code and, as applicable, the following specialty codes: ▪ American Concrete Institute (ACI) 350/350R: Code Requirements for Environmental Engineering Concrete Structures, and Commentary. ▪ Portland Cement Association (PCA): Circular Concrete Tanks Without Prestressing. ▪ ACI 350.3/350.3R: Seismic Design of Liquid Containing Concrete Structures, and Commentary. ▪ American Waterworks Association (AWWA) D110: AWWA Standard for Wire and Standard-Wound Circular Prestressed-Concrete Water Tanks. ▪ AWWA D115: AWWA Standard for Circular Prestressed Concrete Water Tanks with Circumferential Tendons.
2.23.4	**Design Features**	Remove Section 2.23.4 Replace with	Provide Seismic Loading for the following: ▪ Watertight structure and fully operational mechanical equipment, following a 475-year return period earthquake. ▪ Repairable damage and no uncontrolled release of water following a 2475-year return period earthquake. Concrete reservoir shall be fully buried unless otherwise approved by the *Approving Officer*.

A minimum of two cells, each containing one-half of total required volume and capable of being operated, drained and filled independently. A single cell reservoir may be considered if alternative storage is available (another reservoir in same pressure zone) and the volume is deemed to be adequate by the *Approving Officer* and which can be easily used while the proposed reservoir is temporarily out of service.

Place a brass tag which clearly indicates the geodetic elevation on the inside vertical concrete wall of each reservoir access hatch. The brass tag shall be visible and accessible from outside of the reservoir hatch with the hatch open.

Provide an overflow drain in each cell with capacity to accommodate the entire design inlet flow. The overflow drain shall be located adjacent to the reservoir hatch and be visible from the hatch opening. The reservoir overflow drain pipe may be connected to the reservoir floor sump drain pipe below the sump drain pipe gate valve. Each cell shall have an overflow drain and sump drain pipe with consideration given to discharge route and capacity and any environmental concerns.

Provide a reservoir foundation perimeter drain with consideration given to discharge route and capacity and any environmental concerns. The reservoir foundation perimeter drain shall not be connected to the overflow or sump drain pipes.

Provide zoned under slab drain (one zone per cell) to collect, drain and allow for monitoring for potential reservoir under-slab leakage with a manhole located at the outlet side of each zone for leakage monitoring. Alternatively, a separate pipe for each zone can be independently directed through a single manhole.

Provide an inlet and outlet pipe for each cell with consideration given to access for operation and maintenance.

Provide reservoir mixing design with inlet diffuser piping and outlet collection piping.

Make provision for re-chlorination if required by *Approving Officer*.

Each cell shall have an access hatch suitable for access for operation and maintenance.

Access Hatch shall include:

- watertight and aluminum.
- reinforced for 1,465 kg/m^2.
- gas spring assisted cylinder.
- hinges and related hardware.
- perimeter drain.
- sealing gasket.
- flush lift handle.
- slam lock with aluminum removable sealing plug and opening tool.
- intrusion alarms.
- Minimum opening size 900mm x 900mm.

Slope the reservoir floor from the walls to reservoir floor drain and sump.

Provide a floor drain and sump in each cell. Floor drain sump shall be minimum 1,000mm x 1,000mm x 400mm deep. Sump drain pipe to be flush with sump floor. Stainless steel or aluminum sump grating shall be installed over sump at the reservoir floor elevation.

Provide stainless steel or aluminum interior wall ladder from roof access hatch to floor. All ladders to meet WorkSafe BC Regulations including attachment points for fall arrest equipment.

Provide fall prevention railings at hatch opening as required.

All pipework within the reservoir cell shall be either PVC or stainless steel.

All metal parts within the reservoir including bolts, nuts, screws, anchors, ladders, etc. shall be 316 stainless steel.

Primary reservoir level control for each cell shall be provided by ultrasonic transmitter and connected to PLC and PIB SCADA system. Backup high and low-level control for each cell shall be provided by float balls (not to contain any lead or mercury) connected to PLC and PIB SCADA system.

			Provide roof vents sized to provide or release air during normal filling and draining and for an emergency draw down based on a water main full separation break below the reservoir. A minimum of two vents shall be provided for each cell. Provide vehicular and equipment access to each hatch and to the control building for operation and maintenance. Provide alignment suitable for maintenance equipment and vehicle access. Minimum paved width shall be 3m and maximum access grade shall be 12%. Provide security fencing and gates, lighting, locks, alarms and other security facilities to minimize vandalism and prevent water contamination. Provide site finishing and landscaping to suit location and surrounding land uses and as specified by the *Approving Officer*. Provide road right of way for the entire facility to the satisfaction of the *Approving Officer*.
2.23.5	**Valve Chambers**	Remove Section 2.23.5 Replace with	Valve chambers shall be as per Section 2.20 - Chambers
2.23.6	**Reservoir Control Building**	Add Section 2.23.6	Where a control building is required by PIB, the building shall be aesthetically pleasing and subject to the approval of the *Approving Officer*. The exterior shall be faced with split faced concrete blocks, aluminum soffit, facia and gutters and aluminum roofing and snow guards. Exterior door(s) shall be insulated metal. The interior of all exterior walls shall be wood framed, insulated and faced with good-one-side plywood and painted. Ceiling shall be faced with good-one side plywood and painted. Include all valves associated with the reservoir inlet and outlet operation but excluding reservoir overflow, floor drains and zoned under slab drains. Design in accordance with seismic codes used for the reservoir. The elevation of the floor of the building shall be located a minimum of 2.4m below the reservoir floor elevation, or as required for the operation of all equipment in the building. One face of the building shall be located at ground level with

an access door of suitable width to accommodate replacement of all equipment but shall be no less than 900mm wide. Generally, equipment, pipes and valves shall be located approximately 0.9m above the floor elevation.

Provide lifting beams and hoists where necessary to enable removal of equipment.

Provide space for safe and convenient operating and maintenance access to all valves, piping, equipment and additional space as instructed by the *Approving Officer* for future installations.

Provide coating of all interior and exterior steel piping to AWWA standards, or alternatively, use stainless steel. Steel pipe in contact with potable water to use products that are NSF 61 certified.

Provide floor drains and drainage system.

If located adjacent to waterways, locate the floor 0.6m above the 200-Year flood elevation or 1.0 m above highest recorded flood elevation

Provide security alarm for door and low building temp alarm.

Provide heat, light and ventilation to WorkSafe BC Regulations.

All alarms and operations to be by PLC and connected to PIB SCADA.

Provide uninterruptible power supply (UPS) for control system.

Provide a sampling port on the reservoir inlet and outlet pipe with full port brass ball isolation valve.

Additional features, which may be required subject to system operations details as approved by the *Approving Officer*, include the following:

- Flow measurement and recording.
- Chlorine residual analyzer for reservoir inlet and outlet.
- Provision for re-chlorination facilities.

2.23.7	**Operations and Maintenance Manuals**	Add Section 2.23.7	Provide four (4) copies and a digital (PDF format) file of a comprehensive Operations and Maintenance Manual. Manual shall be hardbacked bound documents with the name of the facility embossed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized, labeled divider. As the minimum, the manuals shall include the following: ▪ As constructed shop drawings. ▪ Equipment layout drawings. ▪ Electrical, control and alarm wiring diagrams. ▪ Operating instructions for all equipment. ▪ Maintenance instructions for all equipment including frequency of maintenance tasks. ▪ Equipment data sheets. ▪ Equipment parts lists with supplier and manufacturer contact information. ▪ Emergency operating procedures. ▪ A copy of the commissioning report.
2.24	**Pump Stations**	Remove Section 2.24 Replace with	When directed by the *Approving Officer*, a pump station, in accordance with the requirements of this Section, shall be provided.
2.24.1	**Preliminary Design**	Remove Section 2.24.1 Replace with	A Preliminary Design Report shall be prepared by the qualified *Consulting Engineer* and submitted to the *Approving Officer* for review and approval prior to preparing the detailed design drawings. The Preliminary Design Report shall follow a 'systems based' approach which addresses the performance of the pump station and the supply and distribution network together. The Preliminary Design Report shall consider but not be limited to the following: ▪ Building structure and aesthetics shall be as specified for the Reservoir Control Building Section 2.23.6 ▪ Location. ▪ Geotechnical Report which addresses but is not limited to foundation requirements for the building, groundwater, temporary and final excavation and embankment slopes and long-term slope, and site stability and seismic design considerations. ▪ Capacity.

			▪ Hydraulics (Pressure, NPSH, pump RPM, efficiencies). ▪ Water hammer analysis and mitigative measures. ▪ Number and type of pumps. ▪ Need for treatment/re-chlorination. ▪ Preliminary piping layout and building floor plan. ▪ Power supply. ▪ Maintenance requirements and access. ▪ Energy requirements (sustainability, energy efficiency). ▪ Standby power. ▪ HVAC including building high and low temperature sensors. ▪ Security. ▪ Noise. ▪ Alarms, controls and monitoring, including process and instrumentation drawing and control narrative and connection to PIB SCADA. ▪ Life cycle costs and operation and maintenance cost estimate.
2.24.2	**Capacity**	Remove Section 2.24.2 Replace with	The pumping capacity shall meet maximum day demand with the largest pump out of service and with the reservoir equalization storage volume available and on line. If the reservoir equalization storage volume is not available and on line, the pumping capacity shall meet the peak hour demand with the largest pump out of service.
2.24.3	**Design Features**	Remove Section 2.24.3 Replace with	All necessary detailed design drawings including geotechnical, structural, HVAC and mechanical, electrical and controls and civil shall be sealed by each Professional Engineer prior to submission to the *Approving Officer*. Design features shall include: ▪ Structure, piping and mechanical systems shall be designed in accordance with seismic codes for post-disaster structures. ▪ Lowest floor elevation shall be 0.6m above 200-Year flood elevation or 1.0m above highest recorded flood elevation.

- Access doorway(s) shall be sized for safe and convenient removal and replacement of the largest piece of equipment. The minimum exterior door width shall be 900mm. Provide lifting hooks or rails with hoisting equipment as required.
- Adequate HVAC and lighting.
- Electric motors shall be 600-volt, 3-phase, premium efficiency, with thermal protection. Lower voltage such as 208-volt, 3-phase may be considered depending upon service voltage available from the power company.
- Electrical motors shall be suitable for use with a Variable Frequency Drive (VFD).
- Motors 100 HP and above shall have analog vibration recording and protection.
- Air relief discharge and pilot lines shall be piped to floor drains.
- Housekeeping pads shall be provided for motor control centres.
- Hydraulically operated or motorized pump control valves with isolation valves shall be provided unless pumps have variable speed drives which control transient pressures.
- Flow metres with totalizers shall be provided.
- Spring return “Silent” check valves shall be provided.
- High pressure and surge relief valves or VFDs with isolation valves shall be provided if warranted by system characteristics and transient analysis.
- Suction and discharge pressure gauges, with isolation valves, for each pump shall be provided.
- Discharge pressure transducer shall be provided.
- Mechanical pump seals shall be provided.
- Water quality sampling ports with full port brass ball isolation valves shall be provided.
- Interior and exterior of pipework coated to AWWA standards, or, alternatively, use stainless steel shall be provided. Steel pipe in contact with potable water shall use products that are NSF 61 certified.

- Pump system shall be PLC-controlled and connected to SCADA system. PLC shall conform to current PIB standard.
- Hour meter and ammeter for each pump shall be provided.
- Power factor correction, if required by power company shall be provided.
- A minimum of four (4) 120-volt power duplex outlets for small tools shall be provided.
- Noise attenuation shall be provided such that the measured sound levels not to exceed 65 dB @ 10.7 metres.
- Equipment shall be CSA approved and have minimum one-year guarantee on parts and labour. All equipment shall be tested prior to acceptance.
- Motor control centre and all other electrical and monitoring equipment shall be provided in a separate room.
- Off-road vehicle paved parking with 3m minimum width paved access driveway at a maximum grade of 12% shall be provided.
- Dedicated road right of way for the entire facility to the satisfaction of the *Approving Officer* shall be provided.
- Site grading and landscaping shall be provided.
- Security fencing and gates, lighting, locks, alarms and other security facilities to minimize vandalism shall be provided.

Other potential features that may be required by the include re-chlorination facilities including a separate room with separate exterior door, HVAC, alarms, SCADA, duplex chlorine injection pumps, storage tank and emergency spill containment, chlorine transfer pump and tank, emergency eye wash and hot water supply.

The pump station shall be located outside of the road right of way in a dedicated right of way.

2.24.4 Operations and Maintenance Manuals Add Section 2.24.4

Provide four (4) copies of a comprehensive Operating and Maintenance Manual and one digital (PDF) file. Manual shall be hardbacked bound documents with the name of the facility embossed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized,

labeled divider. As the minimum, the manuals shall include the following:

- As constructed shop drawings.
- Equipment layout drawings.
- Electrical, control and alarm wiring diagrams.
- Operating instructions for all equipment.
- Maintenance instructions for all equipment including frequency of maintenance tasks.
- Equipment data sheets.
- Certified head/capacity curves for pumps.
- Equipment parts lists with supplier and manufacturer contact information.
- Emergency operating procedures.
- A copy of the commissioning report.

2.25 **Pressure Reducing Valve (PRV) Station**

Remove Section 2.25
Replace with

When directed by the *Approving Officer*, a pressure reducing station in accordance with the requirements of this Section shall be provided.

Pressure reducing valves (PRV) and associated equipment shall be located above ground and in a building as described in Section. The *Approving Officer* may consider a kiosk providing all requirements specified for a building are met to the satisfaction of the *Approving Officer*.

Above ground installation to be located outside of the road right of way in a dedicated right of way.

2.25.1 **Preliminary Design Parameters**

Remove Section 2.25.1
Replace with

A Preliminary Design Report shall be prepared by the *Consulting Engineer* and submitted to the *Approving Officer* for review and approval prior to preparing the detailed design drawings. The Preliminary Design Report shall consider but not be limited to the following Design Criteria:

- Design Flows:
- Peak hour.
- Maximum day plus fire flow.
- Two PRV trains in parallel. One train sized for peak hour demand and one train sized for maximum day demand plus fire flow.
- Location.

- Building structure or kiosk details and floor plan.
- Connections to the water system.
- Access, parking, maximum grade of access – 12%; minimum width of access road – 3m.
- Alarms, controls and monitoring, including process and instrumentation drawing and control narrative and connection to PIB SCADA.
- Security.

2.25.2 Design Features

Remove Section 2.25.2
Replace with

All necessary detailed design drawings including but not limited to geotechnical, structural, HVAC and mechanical, electrical and controls and civil shall be sealed by each *Consulting Engineer* prior to submission to the *Approving Officer*.

Building or kiosk structure of suitable size to house all equipment and provide suitable space for ease of movement around the equipment for operation and maintenance.

Kiosk Requirements:

Kiosk requirements and aesthetics shall be as specified in Building Requirements and Supplementary Standard Detail Drawing W11b.

All kiosks to be wrapped with anti graffiti vinyl wrapping. Wrap material shall be a cast vinyl then laminated with a high gloss laminate. The wrap is to be visually pleasing and compliment the area it would be situated in considering the landscape, geography, or general theme of the specific area. Artwork to have a high degree of contrast so as to be more impervious to graffiti vandalism and not to be for commercial advertising. All artwork to be approved before installation.

Building Requirements:

Building structure and aesthetics shall be as specified for Section 2.23.6

The following design features shall be included:

- Minimum 30 amp, 120 VAC service; HVAC; comply with WorkSafe BC Regulations.
- Isolation gate valve located outside of the structure or kiosk on the upstream and downstream pipe.

- Air release valves on upstream side and combination valves on the downstream side of PRV assemblies.
- Flow meter(s).
- Water quality sample port on the downstream side of the pressure reducing valves with full port brass ball isolation valve.
- Hose bib on downstream side of pressure reducing valves with full port brass ball valve.
- Floor drain(s) connected to the storm sewer system.
- Off-road parking for all anticipated operation and maintenance vehicles and equipment.
- Landscaping to match surrounding landscape form and character.
- Basket strainer upstream of each control valve.
- Upstream and downstream pressure gauges.
- Interior and exterior of pipework coated to AWWA
- standards, or alternatively use stainless steel.
- PLC Control with connection to PIB SCADA system, including:
- Upstream and downstream pressure.
- Building temperature sensor.
- Building security and fencing.
- Flow meter and transmitter.
- Uninterruptible power supply (UPS).
- Operator interface panel.

2.25.3 Operations and Maintenance Manuals

Add Section 2.25.3

Provide four (4) paper copies and a digital (PDF format) file of a comprehensive Operating and Maintenance Manual. Manual shall be hardbacked bound documents with the name of the facility embossed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized, labeled divider. As a minimum, the manuals shall include the following:

- As constructed shop drawings.
- Equipment layout drawings.
- HVAC, Electrical, control and alarm wiring diagrams.
- Operating instructions for all equipment.

- Maintenance instructions for all equipment including frequency of maintenance tasks.
- Equipment data sheets.
- Equipment parts lists with supplier and manufacturer contact information.
- Emergency operating procedures.
- A copy of the commissioning report.

SUPPLEMENTARY DESIGN GUIDELINES
SANITARY SEWERS

3.0 SANITARY SEWERS

3.2 Per Capita Flow

Remove Section 3.2
Replace with

The per person average daily dry weather flow shall be 350 Litres per day.

For all residential and non-residential areas, the land use densities shown in the following Table 3.2 shall be used to estimate the design population.

Table 3.2 – Land Use and Density

Land Use	People/Ha	People/Unit
Low Density Residential		
Single Detached	30	3
Semi-Detached	45	
Townhouse	90	2
Medium Density (3 story)	120	
High Density (> 4 story)	240	
Mobile Home Park	40	
Industrial	50	n/a
Institutional	50	
Commercial - Highway	75	
Commercial - Retail	75	

3.8 Flow Velocities

Remove bullet

Replace with

- Force mains: 0.75 m/s
- Force mains:
  - Min: 0.9 m/s
  - Max: 3.5 m/s

3.9 Alignment

Add to section

Gravity sewer mains shall be located within the road right of way and in accordance with the alignments shown on the Standard Drawings.

Sewer mains shall be extended to the center of a cul-de-sac; terminate upstream of the service connection of the last lot to be serviced; or terminate at the property boundary of the development where the pipe is to be extended to service future lands beyond the development.

3.11 Minimum Pipe Grade

Add to section

Where the slope of the gravity or force main exceeds 15%, pipe anchor blocks shall be provided. The location of the anchor blocks shall be shown on the design drawings. For force mains

			where heat-fused HDPE pipe is provided, a flange is required at each pipe anchor.
3.12	**Curved Sewers**	Remove Section 3.12 Replace with	A gravity sewer main shall be permitted on a horizontal curve alignment provided all following criteria are achieved: ▪ The sewer main shall have a single continuous radius which follows a constant offset from the property line in accordance with the Standard Drawings; and ▪ Curvature will be achieved through joint deflection only, bending of the pipe barrel will not be permitted. The minimum radius of curvature shall not be less than 1.5 times the manufacturers guideline for minimum radius. Radius of curvature shall be uniform throughout the curves; and ▪ The minimum velocity shall be 0.9m/s at Peak Design Flow; and ▪ A manhole shall be located at the beginning and end of curve.
3.13	**Depth**	Remove bullets	▪ Prevent freezing. Minimum depths are shown on Figure 2.1. Provide insulation where minimum depth cannot be attained.
		Replace with	▪ Provide a minimum depth of cover of 1.5m for mains and services located with a road right of way and provide a minimum depth of cover of 1.2m for mains and services located outside of road rights of way or located inside yard or back of lot rights of way.
3.14	**Manholes**		
3.14.2	**Hydraulic Details**	Remove bullets	▪ Straight run: 5mm drop ▪ Deflection up to 45 degrees: 20mm drop ▪ Deflection 45 to 90 degrees: 30mm drop
		Replace with	The minimum grade of the manhole channel shall be the average of the grade of the upstream and downstream pipes. For example, if the upstream pipe grade is 8% and the downstream pipe grade is 4%, the grade of the channel shall be 6% ((8% + 4%) / 2). In no circumstances, shall the elevation difference across a manhole be less than the following: ▪ Straight run: 15mm drop ▪ Deflection up to 45 degrees: 30mm drop ▪ Deflection 45 to 90 degrees: 60mm drop

Remove table 3.14
Replace with

Further, the deflection at the pipe joint at the entrance and exit to the manhole shall not exceed the pipe joint deflection specified in Section 3.12.

Table 3.14 – Drop Structures

Invert Difference	Structure
Up to 0.45m	Inside Ramp*
0.45 to 0.90m	Outside Ramp
Greater than 0.90m	Outside Drop
* An inside ramp shall only be permitted where the proposed connection is to an existing manhole and the connection conflicts with existing utilities and no other option is available.	

3.14.3 Temporary Clean-Out

Add Section 3.14.3
Temporary Clean-Out

A Temporary Clean-Out is not considered a permanent structure but may be substituted for a manhole at a terminal end of a main providing the following criteria are achieved:

- Future extension of the main is proposed or anticipated; and
- The length of sewer to the downstream manhole does not exceed 45m; and
- The depth of the pipe does not exceed 2m at the terminal location; and
- Design of the anticipated extension shall be provided to the next manhole to ensure the works will not require realignment when extended; and
- The sanitary main between the manhole and temporary cleanout shall have no more than two service connections.

3.14.4 Manhole Located Outside of Paved Roads

Add Section 3.14.4
Manhole Located Outside of Paved Roads

Sanitary manhole rims located outside of paved roadways shall meet the following criteria:

- Located above the adjacent storm manhole rim elevation; and
- Located above the surrounding ground elevation so that inflow from the surface shall not occur; and
- Located above the 100-Year return event hydraulic grade line; and

- The *Approving Officer* may require sewer mains located in back of lots to be extended to a road right of way and terminated with a manhole to provide access from the road for flushing and cleaning.

3.16	**Service Connections**	Add to section	For pumped connections, the pump and appurtenances shall be located on private property and operation and maintenance shall be the responsibility of the lot owner.
3.16.2	**Location and Depth**	Remove Section 3.16.2 Replace with	For each single-family lot, the service connection shall be installed at the lowest lot corner and at an offset of 3.0m from the property corner pin. For multi-family, commercial, industrial and institutional developments, the service connection location shall be designed to accommodate service to each development. The length of any service connection between the sewer main and the property lot line shall not exceed 30m. In special circumstances, where a single service for all buildings on existing industrial or commercial property is not feasible, two service connections may be provided if permitted by the *Approving Officer*. The service connection shall be terminated at the lot boundary fronting the sewer main. The service connection shall be installed perpendicular to the lot line and sewer main and in no circumstances be less than 45° from perpendicular to the main and lot line. The service connection shall not be installed in front of an adjacent lot.
3.16.4	**Details**	Remove Section 3.16.4 Replace with	A 100mm diameter and 150mm diameter service shall be connected to a new sewer main with a wye fitting. A 100mm diameter and 150mm diameter service shall be connected to an existing sewer main with a wye saddle. The service shall connect to the spring line of the sewer main. An inspection chamber shall be provided at the property line for each 100mm diameter and 150mm diameter service and a manhole shall be provided at the main and at the property line for each 200mm diameter and larger service. 100mm diameter and 150mm diameter services may connect to a manhole provided all following criteria are met: ▪ The connection is not in an adverse direction to the flow in the manhole channel; and ▪ The crown of the service pipe at the manhole is not lower than the crown of the manhole outlet pipe and

			the manhole bench and channel are constructed accordingly.
			A manhole shall be provided at the property line for an industrial service regardless of the service pipe diameter. A manhole shall be provided at the property line for a 150mm diameter and larger commercial service.
3.18	**Pump Stations**	Remove Section 3.18 Replace with	The use of sanitary lift stations shall be avoided and shall only be considered by the *Approving Officer* if there are no other viable options by gravity mains. The criteria in this Section address submersible sewage lift stations, kiosks and appurtenances only. Larger capacity lift stations or lift stations with special design criteria or siting requirements may require additional assessment and review of criteria. The *Consulting Engineer* shall provide the *Approving Officer* a digital copy (PDF) of the Final Design Report sealed by the *Consulting Engineer*. The Final Design Report shall include all design calculations and detailed design drawings including mechanical, electrical, structural, geotechnical, civil and Controls/SCADA. The report and all calculations and detailed design drawings shall be sealed by each *Consulting Engineer*.
3.18.1	**Preliminary Design Requirements**	Remove Section 3.18.1 Replace with	Prior to commencing the preparation of detailed design, the *Consulting Engineer* shall prepare a Preliminary Design Report and submit the report to the *Approving Officer* for review and approval. The Preliminary Design Report shall clearly articulate the necessity for a pump station and shall include all pertinent design criteria as described by this Section. Approval of the Preliminary Design Report shall be obtained from the Approval Officer prior to *Consulting Engineer* commencing detailed design. Preliminary Design Requirements shall include but not limited to the following: ▪ System Layout: Thoroughly consider other options to avoid lift stations wherever practical. Select lift station location(s) to minimize the long-term total number of lift stations and provide a layout plan for each proposed location. ▪ Location: Either within the dedicated road right of way and not to interfere with the road asphalt, curb and gutters, sidewalk and other utilities or outside of the dedicated road right of way but within an area suitably

sized and designated as right of way for the lift station and appurtenances.

- Capacity: Dependent upon the total amount of development and the size of the catchment area. The capacity shall accommodate the ultimate design flow of the entire catchment area.
- Configuration: Gorman-Rupp pump or pre-approved equivalent.
- Safety for PIB maintenance staff and operators and the public.
- Excavation, backfill and dewatering requirements.
- Access and parking for construction and maintenance.
- Aesthetics, noise, odor control and landscaping.
- Type of station and impact on neighborhood.
- Water hammer and/or column separation prevention measures.
- Security against vandalism and theft.
- Station uplift design shall be based on minimum load level and maximum flood elevation.
- Proximity of receiving sewers, water mains, and power supply.
- Minimize energy requirements.
- Controls shall include PLC; ultrasonic level control and backup floats; SCADA and other controls shall be compatible with the PIB Control System. Contact the PIB for an approved PLC list of suppliers and equipment.
- All new lift stations shall have standby power and an uninterruptible power supply (UPS).
- Sub-surface soils investigations shall be undertaken prior to site approval and a report prepared by the *Consulting Engineer*.
- Capital costs and operation and maintenance costs.
- Corrosion control.
- Vehicle loads adjacent to and/or on station structure.
- Davit and lifting arms for pumps and fall arrests.

3.18.2 Design Features Remove Section 3.18.2 Replace with

Detailed Design Requirements shall include the following:

- Lift stations shall be designed with commonly available pumps each capable of pumping the peak wet weather maximum flow condition with one pump on standby. The minimum number of pumps is two (2).
- Where the *Consulting Engineer* can demonstrate the design flow exceeds the capacity of a commonly available pump, three or more pumps shall be provided with capacity such that there is always one pump available for standby.
- Pump criteria shall include:
  - Gorman-Rupp or pre-approved to be equivalent
  - Capable of passing solids up to 75mm in size.
  - Operate at motor speed: 1750 RPM.
  - Explosion proof.
  - Fitted with hour meters.
  - Operate on a 347/600-volt electrical source with 5 H.P. and larger to operate on 600-volt 3 Phase electrical source.
  - Fitted with Variable Frequency Drive.
  - Easily removed and re-installed. Provide an anchor frame, self-seating discharge connection, stainless steel lifting cable or chain fastened to the top of the pump and the chamber with stainless steel guide rails for the easy removal of pumps without entering the chamber.
  - Capacity to operate alternately and independently of each other pump.
  - Capacity to meet maximum flow condition with one pump in failure mode.
  - Each motor shall be sized to not cycle more than four times in one hour under the worst-case operating condition or as recommended by pump manufacturer.
  - Motor high temperature and leak detection system.
- Each lift station shall be sized to provide the following minimum storage volume between the high-level alarm and the start of overflow under the more critical of:
  - Minimum one (1) hour in wet well at average wet weather flow, or

  - Minimum one (1) hour in wet well and influent pipes at peak wet weather flow. Surcharge into service pipes under this condition shall not be permitted.

- A plug valve shall be located outside of the lift station on the influent line. Each valve shall include a square operating nut, rising stem to 1.2m from finished ground surface, rock guard and nelson box. A manhole shall be located immediately upstream of the influent line plug valve to provide access for bypass pumping.
- Provision for double block and bleed shall be provided on the influent line and the force main.
- Provide an above-ground kiosk located adjacent to the lift station, a pump discharge ball lift check valve and isolation plug valves for each pump discharge pipe, and a magnetic flow meter with isolation plug valves with connection to the control kiosk and telemetry system. Odor control equipment shall also be provided.
- Provision shall be made for standby pumping from an external source. An adaptor flange ("Camlock") complete with a quick coupling and lockable cap and easily accessible shall be provided.
- Minimum wet well size shall be 2440mm diameter and designed in accordance with the latest edition of the Hydraulic Institute Standards. The wet well shall be manufactured from concrete or fiberglass and all fasteners shall be 316 stainless steel. Under special circumstances, a smaller diameter may be permitted subject to the approval of the *Approving Officer*.
- The wet well bottom shall be benched to direct solids to the pump suction intake. The influent line shall be located tangent to the wet well to encourage scouring of the wet well bottom.
- The lift station lid shall be either concrete or fiberglass and sealed and waterproofed and fitted with suitable locks and alarms. All fasteners shall be 316 stainless steel.
- The top of the lift station lid shall be located 300mm above the finished ground elevation. The elevation of the lift station lid shall be a minimum of 600mmm above the 200-Year flood elevation or a minimum of 1.5m above the high-water mark if the 200-Year flood elevation is not available.

- The lift station lid shall include an access hatch and the access hatch shall meet the following criteria:
  - Minimum 900mm x 900mm clear opening and sized for removal of largest piece of equipment without removing or damaging other equipment.
  - Permit removal of pumps using a hoist truck with a 1.8m boom.
  - An aluminum 6.4mm tread plate.
  - A perimeter drain.
  - A perimeter sealing gasket.
  - A slam lock with an aluminum removable sealing plug and opening tool.
  - A flush lift handle.
  - A gas spring assist cylinder.
  - A 90 degree hold open arm.
  - A flush fitting padlock tang.
  - Hatch safety grate.
  - Reinforced to 1465 kgs/m^2.
- Access to the interior of the lift station shall meet WorkSafe BC Regulations by use of an aluminum ladder. Locate the ladder to avoid interference with the removal and installation of pumps and other equipment. Provide a lockable extension to the ladder to a minimum distance of 600mm above the top of the lift station access hatch opening. A fiberglass grating platform shall be provided above the high-level float. Access, ladder and platform shall meet WorkSafe BC Regulations.
- Provide lift station ventilation which meets WorkSafe BC Regulations for ventilation in a confined space. The exhaust fan shall be explosion-proof and activated by a manual switch located in the control kiosk.
- An explosion-proof light with a protective cover shall be in a suitable location in the lift station and the light shall be activated by the opening and closing of the access hatch.
- A davit socket compatible with the PIB lifting arm shall be provided to facilitate the removal and installation of the pumps and other equipment.
- Steel and fiberglass surfaces shall receive a minimum of two coats of two-component white epoxy enamel. All

concrete shall be designed to prevent sulphide attack and include epoxy rebar, and the concrete surface shall be coated with a minimum of two coats of blue epoxy and an additional two coats of white epoxy enamel.

- Provide an automatic permanent standby power generator with automatic transfer switch. The concrete base shall be located a minimum of 300mm above the finished ground elevation and a minimum of 600mmm above the 200-Year flood elevation or a minimum of 1.5m above the high-water mark if the 200-Year flood elevation is not available. The generator enclosure shall be weatherproof and include noise control.
- All auxiliary equipment and control panels shall be mounted in a suitable control kiosk and shall meet the following criteria:
  - Weatherproof and located not less than 1.2m and not more than 3m from the edge of the lift station lid.
  - The kiosk shall be founded on a concrete foundation and should be made from powder coated aluminum, with a standard green finish. All kiosks shall be supplied with a rubber gasket between the aluminum kiosk and the concrete to prevent water leakage into the kiosk.
  - The electrical Kiosk shall be CSA Type 3R rated and fabricated from marine grade aluminum in accordance with the following Ministry of Transportation and Infrastructure Kiosk Specifications:
    - General Material Requirements: 402.3.1
    - Connecting Hardware 402.3.2
    - Fabrication Mechanical Requirements, General Requirements 402.4.1
    - Welding 402.4.2
    - Door Gaskets 402.4.4
    - Kiosk Environmental Requirements, General 402.4.8.1
    - Kiosk Fan and Heater Thermostat 402.4.8.5
    - Kiosk Finish 402.6
    - Electrical Kiosk shall be powder coated “Fence Post Green”.

- Plan Pouch 402.9

- The kiosk shall be fabricated with sufficient bracing to form a structure capable of withstanding transportation, wind, snow and ice loading. The kiosk manufacturer is responsible for obtaining structural and seismic certification from a professional engineer registered with Engineers and Geoscientists BC. Structural certification shall include recommendations for fastening methods.
- All kiosks to be wrapped with anti graffiti vinyl wrapping. Wrap material shall be a cast vinyl then laminated with a high gloss laminate. The wrap is to be visually pleasing and compliment the area it would be situated in considering the landscape, geography, or general theme of the specific area. Artwork to have a high degree of contrast so as to be more impervious to graffiti vandalism and not to be for commercial advertising. All artwork to be approved before installation.
- Ventilation to meet confined space entry requirements and regulations.
- All wiring in lift station and the fan compartment of the kiosk shall be explosion-proof to Class 1, Division 2.
- All electrical design and installation shall be subject to approval by Provincial Safety Inspector.
- Power and control cables shall be continuous from within the lift station to within the kiosk with no splices permitted.
- Configure the control kiosk for the control and telemetry equipment to be located on the front panel facing the lift station and the power equipment located on the rear panel. The concrete base shall be a minimum of 300mm above the finished ground elevation and 600mmm above the 200-Year flood elevation or a minimum of 1.5m above the high-water mark if the 200-Year flood elevation is not available.
- Provide a separate enclosure for each variable frequency drive.
- Uninterruptable Power Supply (UPS) to serve the telemetry system, alarms and controls.

- The control kiosk shall incorporate a Crouse Hinds receptacle and a transfer switch for an alternate standby power source. The receptacle is to be located to permit connection to the portable standby power unit with the control panel doors closed and locked.
- Provide underground electrical and control wiring between the standby power generator, control kiosk and lift station.
- Hour meter and amp meter for each pump.
- Operator interface (Panelmate or equivalent) and include a lamp test button.
- PLC control to meet PIB requirements.
- A minimum of two duplex 110-volt receptacles suitable for hand tools and temporary lighting.

- Unless otherwise permitted by the *Approving Officer*, all lift stations shall be equipped with telemetry compatible with the PIB SCADA system.
- Sewage levels in the lift station shall be controlled by an ultrasonic level transmitter plus emergency high and low-level floats.
- At the discretion of the *Approving Officer*, a 38mm water connection with standpipe and cross-connection protection shall be provided on-site.
- The area around the facility shall be graded, at a minimum of 2%, away from the lift station, control kiosk and standby power generator and paved. The size of the area shall be determined by the *Approving Officer* as required for all equipment related to access and parking for operations and maintenance.
- Where instructed by the Approving Officer, provide security lighting and perimeter security fencing. The fence shall be 2.1m height, security style, black plastic-coated mesh with an adequate number of suitably sized gates as required for access by all equipment related to operations and maintenance.
- Landscaping and irrigation, acceptable to the *Approving Officer*, shall be provided.
- All design shall be in accordance with appropriate seismic standards.
- All equipment shall be CSA approved and include as a minimum a one-year guarantee on all parts and labour.

All equipment shall be tested prior to acceptance and all pumps shall be factory tested prior to installation.

- Provide four (4) copies of a comprehensive Operation and Maintenance Manual in hardback bound format with name of facility embossed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized labeled divider. The manual shall contain, as a minimum, the following:
  - As constructed shop drawings.
  - Equipment layout drawings.
  - Electrical, control, and alarm wiring diagrams.
  - Operating instructions for all equipment.
  - Maintenance instructions for all equipment and including the frequency of maintenance tasks.
  - Equipment data sheets.
  - Spare circuit cards for all critical components.
  - Certified head/capacity curves for pumps.
  - Equipment parts list.
  - Emergency operating procedures.
- Corrosion and Odor Criteria
- Analysis for odor and sulfide concentrations shall be undertaken for the lift station and the force main and discharge into the gravity system.
- The dissolved sulfide maximum limit at any point in the sanitary sewer system shall be 0.5mg/l.
- Locate odor control equipment in the above-ground kiosk or building as described in Section 3.17.4.
- Odor Criteria:
  - At a horizontal distance of 10m from any gravity main, force main, manhole and lift station or any other sewer facility and under summer conditions with wind between 2 and 10 km/h, a maximum of 1.0 odor units shall be permitted.
  - Where sewer facilities are close to houses and other building structures, parks or walkways, a maximum of 0.0 odor units shall be permitted.
  - The wet well size, pump cycling times, force main diameter and length, as well as other pertinent

factors shall be considered when optimizing system design and operations to avoid odors.

  - The odor additive shall be inserted through an injection point directly to the lift station wet well.

- Noise Control
  - The noise level from the entire facility shall not exceed 65db as measured at the property line of the facility or a 20m distance from the facility structures, whichever is closer.
- All pump stations and force mains shall be designed to prevent damage from superimposed loads, water hammer or column separation phenomena. Transient surge and cyclic surge analysis shall be provided to a 75-Year life cycle.
- All force main valves shall be lubricated plug valves and designed for the long-term use in a corrosive environment.

SUPPLEMENTARY DESIGN GUIDELINES
STORMWATER MANAGEMENT

4.0 STORMWATER MANAGEMENT

4.2 Stormwater Control Plan

Remove Section 4.2
Replace with

Storm Water Control requires the planning and design necessary to mitigate the hydrological impacts of land development or land use changes. Adverse hydrological impacts include issues such as increased peak storm water flows, erosion, sedimentation, flooding, reduced surface infiltration, reduced minimum groundwater levels and stream flows, water quality deterioration, and degradation of aquatic and wildlife habitats. Mitigation measures to be addressed by the *Consulting Engineer* shall include but are not limited to the following:

- Appropriate sizing and routing of pipes and channels
- Major flow path routing and protection
- Detention storage
- Sediment removal
- Biofiltration
- Landscaping
- Source control
- Erosion protection
- Groundwater infiltration
- Subsurface disposal
- Lot grading

A Storm Water Control Plan is required for all commercial and industrial development and for all residential development larger than 0.4 ha. The Storm Water Control Plan shall be comprised of a report with supporting drawings and tables prepared by a qualified *Consulting Engineer* and shall further include but not be limited to the following:

- Catchment plan for the subject Site including identification of all upstream lands that drain into or through the Site.
- Location, extent, and description of the existing and proposed land uses.
- Details indicating how the Stormwater Control Plan integrates with other applicable master drainage plans, watershed plans, or integrated stormwater management plans.

- Contours at 0.5m elevation intervals (existing and proposed).
- Alignment and limits of existing and proposed watercourses and wetlands located in or within 30 meters of the subject Site and including environmental classifications and/or fish presence information, if available.
- Layout of existing and proposed Minor and Major drainage systems.
- Proposed location and method of storm water discharge or discharges from the Site (e.g. Pipe connection to existing storm sewer and open discharge to ditch or natural watercourse).
- Existing and proposed major surface flow paths including the location of low points on all roads, lanes, or walkways and the proposed maximum ponding depths for low points on roads, lanes and walkways.
- Proposed lot grading plan.
- Proposed source control and/or quality treatment facilities, if appropriate.
- Locations, sizes and hydraulic grade line (HGL) elevations of proposed conveyance and other management facilities for both Minor and Major systems.
- Where building footing perimeter drains are connected to the piped storm sewer system, confirmation the water from the piped storm sewer will not backflow into the building footing perimeter drains.
- Proposed minimum building elevations (MBE) and the relationship to the Major flow path HGL.
- Construction erosion and sediment control plan.
- Pre-Development and Post-Development peak flow rates for both the Minor and Major systems with:
    - Velocity under design peak flow rate condition for all open channels (ditches, swales, ravines, streams, etc.) both on and off site.
    - Pre-development peak runoff rate for all areas draining to and through the subject site shall be determined using appropriate method described further in Section 4.4.

4.3	**Minor and Major Systems**		
4.3.1	**The Minor System**	Remove Section 4.3.1 Replace with	The Minor System shall be designed to convey the flow from the 10-year storm event. Conveyance shall be comprised of pipes, gutters, catch basins, culverts, open channels, watercourses and storm water management facilities designed to convey flows for the specified return frequency. Ensure the rate, volume and quality of runoff does not adversely affect downstream infrastructure, natural channels and receiving waters. Attenuate the 10-Year Post-Development flow to the 10-Year Pre-Development flow prior to release off-site.
4.3.2	**The Major System**	Remove Section 4.3.2 Replace with	The Major System shall be designed to convey the flow from the 100-year storm event. Conveyance shall be comprised of flood paths, roadways, culverts, open channels, watercourses and storm water management facilities. Conveyance of the runoff from the 100-Year Major Storm by a piped system shall only be considered by the *Approving Officer* if the overland route is not possible. Attenuate the 100-Year Major Storm flow to the 10-Year Pre-Development flow prior to release from the development where inadequate downstream major flow paths exist or where the downstream major flow paths are not adequately protected from the flow.
4.4	**Runoff Analysis**	Remove Section 4.4 Replace with	Storm drainage systems shall be designed using the Rational Method or an approved hydrologic/hydraulic computer model. All calculations pertinent to the design of the drainage system shall be signed and sealed by the *Consulting Engineer* and submitted to the *Approving Officer* with the detailed design drawing submission. For developments where the total tributary area is 10 hectares or less, the Rational Method may be used to: ▪ Compute the design peak runoff rates; and ▪ Size detention storage if, and only if, storage is to be provided by a single pond or tank. An approved hydrologic/hydraulic computer model shall be used to analyze catchments larger than 10 hectares and to design all

storage facilities when more than a single pond or tank is proposed.

The extent of the tributary drainage areas of the storm drainage system to be designed shall be based on the natural contours of the land and be subject to the overall drainage plan established by the Storm Water Control Plan.

It is the responsibility of the *Consulting Engineer* to confirm the extent of the drainage area with the *Approving Officer* prior to preparation of final design.

10-Year Pre-Development Flow Release Rate Calculation:

- The calculation of the 10-Year Pre-Development Flow Release Rate shall be prepared by the *Consulting Engineer* and submitted to the *Approving Officer* for review and approval prior to undertaking detailed design.
- Regardless of what development exists within the entire drainage basin, the runoff coefficient(s) shall be as described for "Undeveloped Surfaces" in Table 4.7.1.
- The Travel Time shall be estimated using the formula in Section 4.7.4 for natural areas.
- The Rainfall Intensity shall be estimated by the constants provided in Table 4.7.3.1.

4.4.1 **Climate Change Resilient Design**

Add Section 4.4.1 Climate Change Resilient Design

The design values and criteria provided in this Section, as well as hydrologic data obtained by the *Consulting Engineer* for design purposes, are typically based on recorded data – a reflection of past climate conditions. The drainage and storm water management infrastructure being designed, however, must meet the objectives outlined in Section 4.1 under future climate conditions.

Until recently, the assumption has been that the future climate will be essentially the same as that in the past. There is broad consensus, however, that this is no longer a valid assumption. Engineers and Geoscientists British Columbia, EGBC – formerly APEGBC, has developed a position that "registrants (professional engineers, professional geoscientists, provisional members, licensees, limited licensees, engineers-in-training, and geoscientists-in-training) are expected to keep themselves informed about the changing climate and consider potential impacts on their professional activities".

There is significant uncertainty associated with climate projections. The PIB recognizes this and therefore specifies the following procedure for identifying future climate-related risks corresponding to the proposed drainage and storm water management systems design.

- Prepare designs using historical climate data and criteria as outlined in this document.
- Re-calculate all infrastructure sizing (including but not limited to storm sewers, culverts, storage facilities and inlet) using the projected future climate change values provided in this Section.
- Summarize and submit the change in infrastructure sizing due to projected climate in tabular form.

The *Approving Officer* will review the submitted information and consider the risk to PIB of constructing the proposed infrastructure based on historical rather than projected future climate values. In this context, risk is a function of the likelihood that the subject infrastructure will fail due to the projected future climate if it is constructed using historical climate design values and the severity of the consequences should the infrastructure fail.

A likelihood that the infrastructure will fail if sized using historical climate values combined with the consequences should the infrastructure fail may result in an unacceptable risk resulting from climate change for that infrastructure. In these circumstances, the *Approving Officer* may require the Developer to size the infrastructure using projected future climate design values.

4.4.2	**Design Frequencies**	Add Section 4.4.2 Design Frequencies	Storm water management system components shall safely accommodate runoff from a large range of storm events for different purposes. Drainage systems shall include runoff controls to limit post-development peak discharge to the pre-development runoff rate using the 10-Year Pre-Development return period storm calculation prepared by the *Consulting Engineer* in accordance with Section 4.4 – 10-Year Pre-Development Flow Release Rate Calculation and approved by the *Approving Officer*. The upper limits of what must be accommodated through design are defined by specified return frequencies as provided in the following Table 4.4.2 – Design Frequencies.

Table 4.4.2– Design Frequencies

Drainage System Component	Hydraulic Variables	Hydrologic Design Basis
Minor conveyance system as defined in Section 4.3.1.	Base and peak flow rates, flow depths, flow velocities, and durations.	10-Year design storm Attenuate the 10-Year Post-Development Flow rate to the 10-Year Pre-Development Flow rate.
Storage facility.	Runoff volume, depth, freeboard, peak inflow rate, control discharge rate, time to empty, base flow rates, and flow durations.	Storage capacity to attenuate the 10-Year Post-Development flow rate to the 10-Year Pre-Development flow rate shall be required. Storage capacity to attenuate the 100-Year Post-Development runoff to the 10-Year Pre-Development flow rate shall be required if inadequate downstream major flow paths exist. Storage capacity shall be provided for all commercial and industrial sites to attenuate for all events with return periods of up to 100-Year Design Storm to the 10-Year Pre-Development flow rate.
Major system as defined in Section 4.3.2.	Base and peak flow rates, depths, velocities, and durations.	1:100-Year design storm. Sufficient freeboard above the maximum hydraulic grade line shall be provided to protect buildings and other infrastructure. Ponds, where required, to have an emergency overflow point at a minimum 0.6m below the closest opening (i.e. adjacent doors, windows, etc.)
Culverts, bridges, and other crossing structures.	Peak flow rates, depth and freeboard, backwater effect, fish passage.	1:100-Year design storm and/or with safe overflow to protect existing infrastructure and private property. 1:200-Year design storm for natural streams with catchments exceeding 10 sq. km or for structures crossing arterial or collector roads.
Water Quality Treatment Systems	Peak flow, base flow, pollutant load and type	50% of the 2-Year post-development flow rate.

4.5	**Site and Lot Grading**	Remove Section 4.5 Replace with	Developments shall incorporate site and lot grading techniques in accordance with the following criteria: ▪ Each lot shall be graded to drain to an existing drainage system or to a natural drainage path independent of adjacent lots. Minimum lot grade shall be 2%. Lot grading shall be uniform and consistent. ▪ Areas around buildings or proposed building sites shall be graded away from the proposed building foundations to prevent flooding or damage to the foundation from surface drainage. Grading within 2m of the structure shall have minimum 0.15m drop (7.5%). ▪ The elevation of lots below the adjacent roadways shall be avoided. Otherwise, an approved storm water management technique shall be incorporated to direct the runoff from the lower lots to an existing or proposed drainage system. ▪ Flood proofing is required at the low points of roadways to prevent roadway drainage from flowing onto adjacent lots. ▪ Existing or proposed buildings shall be sited above the hydraulic grade line of the Major System. The Minimum Building Elevations (MBE) shall be noted on the drawings. ▪ Lot grading shall not channelize flow for discharge into natural watercourses. Where lot grading directs runoff to natural drainage courses, measures shall be implemented to distribute rather than concentrate flows. ▪ Avoid drainage across adjacent lots. Side and rear yard swales shall be provided as necessary.

4.7.1 Runoff Coefficients

Remove Table 4.7.1
Replace with

Table 4.7.1– Design Frequencies

Land Use or Surface Characteristic	Coefficient	
	10-Year	100-Year
Commercial	.85	.95
Residential:		
▪ Single Family	.35	.40
▪ Multi-Unit (Detached)	.45	.50
▪ Multi-Unit (Attached)	.55	.65
▪ Apartments	.60	.70
Industrial	.85	.95
Parks, Cemeteries, and Playgrounds	.20	.25
Streets:		
▪ Paved	.90	.95
▪ Gravel	.40	.45
Driveways, Sidewalks and Roofs	.90	.95
Undeveloped Surfaces [1]		
▪ Flat (0-1%)	0.04	0.09
▪ Average (2-6%)	0.09	0.14
▪ Steep (>6%)	0.13	0.18
[1] Undeveloped Surface Definition: Forest and agricultural land, open grassland space		

4.7.3 Rainfall Intensity

Remove Section 4.7.3
Replace with

The rainfall intensity for the Rational Method formula shall be determined from the following rainfall Intensity-Duration-Frequency (IDF) equation and Table 4.7.3.1 and Table 4.7.3.2.

$$I = a \times (T+c)^{b}$$

Where: I = rainfall rate in mm/hour
T = time in hours (typically Tc as determined in Section 2.10.2
a, b = modifiers as specified in Table 4.7.3.1 and Table 4.7.3.2

Table 4.7.3.1– IDF Coefficients based on Historical Rainfall

	Return Period (Years)						
	2	**5**	**10**	**25**	**50**	**100**	**200**
Coefficient a	8.9	12.9	15.6	18.9	21.4	23.8	26.6
Exponent b	-0.666	-0.716	-0.735	-0.752	-0.762	-0.769	-0.782
Constant c	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 4.7.3.2– IDF Coefficients based on Projected Future Rainfall

	Return Period (Years)						
	2	**5**	**10**	**25**	**50**	**100**	**200**
Coefficient a	10.2	15.3	19.9	26.8	34.1	43.2	56.7
Exponent b	-0.704	-0.756	-0.791	-0.836	-0.878	-0.911	-0.948
Constant c	0.062	0.072	0.078	0.086	0.091	0.090	0.100

4.7.6 Detention Storage Calculation Using the Rational Method

Add Section 4.7.6

The Rational Method may be used to calculate the volume required to attenuate post-development runoff to a specified discharge rate provided detention is achieved by means of a single storage unit. This method is not applicable to systems with multiple storage units located throughout the development site, including ponds or tanks in series or combinations of drywells and over-sized storm sewers. An approved computer model shall be used for these applications.

The Rational Method for storage consists of calculating the difference between rainfall volume entering the storage unit and discharge volume leaving the storage unit for a series of storm durations ranging from 15 minutes to 24 hours. The storm duration which generates the largest volume difference is considered the critical storm duration, and the corresponding volume difference is the required detention storage.

For a given storm duration:

The rainfall volume entering the storage unit is calculated as:

$VIN = 10 \times T \times R \times A \times IT$

Where: V_{IN} = volume entering the storage unit (m^3)
T = storm duration (hr)
R = catchment runoff coefficient
A = catchment area (ha)
I_T = rainfall intensity for storm duration T (mm/hr)

The discharge volume leaving the storage unit is calculated as:

$V_{OUT} = 3600 \times T \times Q_{OUT}$

Where: V_{OUT} = volume discharged from the storage unit (m^3)
Q_{OUT} = allowable discharge rate (m^3/s)

The storage volume is calculated as:

$V_T = V_{IN} – V_{OUT}$

Where: V_T = detention storage required for storm duration T (m^3)

As a minimum, the storage volume shall be calculated for the 15 and 30-minute storm durations as well as for the 1, 2, 4, 6, 12, and 24-hour storm durations.

4.8 Hydrograph method

4.8.1 Model Selection

Remove Section 4.8.1
Replace with

The *Consulting Engineer* shall submit the modelling software to the *Approving Officer* for approval prior to undertaking modeling and only the approved software shall be used.

4.8.2 Modeling Procedures

Remove Section 4.8.2
Replace with

Design Storms

Storm water management system component sizing is sensitive to the combination of rain storm volume and peak intensity. Conveyance component capacity tends to be more sensitive to intensity while storage component capacity tends to be more sensitive to rainfall volume.

To ensure that each proposed component is adequately sized to meet the objectives specified in this Section, four design storms are provided for use with computer-based models.

Each storm has a duration of 24 hours – two with a return period of 10 years, and two with a return period of 100 years. Referring to Section 4.7.4 – Inlet or Overland Flow Time (Ti) which specifies inlet times for different land uses, the following Table 4.8.2.1 – Design Storm Characteristics summarizes the defining characteristics of each storm. The peak intensity occurs at 16 hours (2/3 of the storm duration) for all four storms. A digital copy of the hyetographs can be obtained from the *Approving Officer*.

Table 4.8.2.1– Design Storm Characteristics

Storm ID	Return Period (Years)	Time Interval (min)	From Historical IDF Curves		From Projected Future IDF Curves	
			Total Depth (mm)	Peak Intensity (mm/hr)	Total Depth (mm)	Peak Intensity (mm/hr)
1	10	15	36.2	43.2	38.6	48.1
2	10	10	36.2	58.2	38.6	60.6
3	100	10	49.6	94.4	57.1	149.1
4	100	5	49.6	160.9	57.1	213.2

All four storms are based on the Chicago Method for the following reasons:

- The hyetograph values can be calculated using the modifiers provided in Table 4.7.3.1 and Table 4.7.3.2;
- The peak intensity equals the IDF intensity for the corresponding time interval (duration) and return period;
- The storm volume equals the IDF volume for the corresponding storm duration and return period;
- Extreme rainfall in the Okanagan is historically generated by convective storms, which often reflect the shape of a Modified Chicago Storm. This storm pattern should be used for modelling.

The design storms are suitable for most hydrological studies. However, the simulation of large watersheds or complex drainage systems may require extended duration storms or continuous rainfall data. It is incumbent on the *Consulting Engineer* to obtain the appropriate rainfall data for the analysis.

Catchment Data

Data preparation for planning areas or proposed development shall be based on the best available information as per the Land Use Law, Master Storm Water Plan, subdivision proposals and other pertinent land use information.

The *Consulting Engineer* shall determine the pre-development runoff rate using the 10-Year Pre-Development Flow Calculation method described in Section 4.4 and post-development runoff rate using the default methods of selected software. Note that the Soils Conservation Service (SCS) curve number (CN)

approach shall not be used. If enough information is known about the infiltration characteristics of the soils, either the Horton's or Green Ampt methods may be applied. Whichever method is selected, the parameters shall be reflective of the type of soils, ground cover and typical antecedent moisture condition (AMC).

Where information is not specifically available through applicable documents, future impervious fractions for common land uses provided in the following Table 4.8.2.2 – Common Impervious Fractions shall be used for analysis. These are intended as a guide only. In areas of existing development or where more detailed information is available, the *Consulting Engineer* shall verify that the values shown are representative of the true conditions.

Table 4.8.2.2– Common Impervious Fractions

Common Land Use	Total Impervious Fraction
Woodlot	0.00
Agricultural	0.10
Sub-Urban Residential	0.35
Single Family Residential (700 m^2/lot)	0.45
Low Density Multi-Family Residential	0.65
Apartment	0.75
Commercial	0.90
Industrial	0.90
Institutional	0.80

Storm Events

To determine the design flow for sizing drainage works, analysis shall be conducted using design storms with the appropriate return period and time interval provided in Table 4.8.2.1. Developing design flows for both existing and proposed development conditions may be required. The following Table 4.8.2.3 – Design Storm Characteristics shall be used as a guide to assess the level of effort. However, the specific requirements shall be confirmed with the *Approving Officer*.

Table 4.8.2.3– Design Storm Characteristics

Infrastructure Component	Storm Return Period	Hyetograph Time Interval
Minor conveyance system	10-Year	Single Family Residential - 15 min All Other Development – 10 min
Major conveyance system	100-Year	Single Family Residential - 10 min All Other Development – 5 min
Detention Storage Facilities	10-Year (100-Year)	Single Family Residential – 15 (10) min All Other Development – 10 (5) min

The storm duration which generates the critical peak runoff rate is not necessarily the event which results in the largest storage volume requirement for peak flow attenuation. The *Consulting Engineer* is required to review all design storm events and select the critical design values for each component of the drainage system.

4.8.3 Submission of Modeling Results

Remove Section 4.8.3
Replace with

To document the design rational used to develop the hydrologic model and to standardize the presentation of model results, the design reports shall include an appropriate section which shall indicate the following:

- Type and version of modelling software used.
- Summary of all parameters and specific simulation assumptions used.
- Design storms used, to be clearly documented (return period, duration, peak intensity, and depth).
- A summary of peak flows for each system component
- Inflow and outflow hydrographs for storage facilities.
- Predicted hydraulic grade lines throughout the drainage system under conditions governing the design.
- Volumetric runoff coefficient (runoff volume divided by rainfall volume) and unit peak flow (peak flow divided by area) summarized for each catchment.

The report documentation shall include:

- A plan showing sub-catchment areas, watershed boundary (including upstream catchments) and the drainage system.
- A plan identifying the specific land uses modelled for each development condition analysed.
- For detention ponds, stage-area and storage-discharge curves and the layout (including sizing) of pond control devices.
- The functional layout and sizing of any flow control/diversion structure and the tabular/graphical plots of inflow and outflow hydrographs.
- Tables summarizing the above described performance related parameters.
- Appropriate identification tables for cross-reference between plans and tables.

4.9	**Minor System Design**		
4.9.1	**Level of Service**	Remove Section 4.9.1 Replace with	The minor drainage system consists of pipes and appurtenances sized to convey peak runoff by gravity (non-surcharged) flow conditions for storms having the return period specified in Section 4.4.2.
4.9.4	**Ditch Inlets**	Remove	Ditch inlets to storm sewers should include safety grillage for large pipes (>600mm Diameter), debris screens and sedimentation bins.
		Replace with	Ditch inlets to storm sewers shall include inlet structure with safety grillage for all pipes 300mm diameter and larger. Refer to Section 4.10.5 for inlet and outlet structure requirements.

4.9.6 Minimum Pipe Diameter

Remove Section 4.9.6
Replace with

The minimum pipe diameter shall be as follows:

▪ Storm Main	250mm
▪ Culvert:	
- Crossing Roads	600mm
- Crossing Driveways	400mm
▪ Catch Basin Lead Pipe	200mm for top inlet catch basin 250mm for side inlet catch basin [1]
▪ Service Connection:	
• Single Family Residential	100mm
• Multi-Family Residential	150mm
• Commercial/Industrial	150mm

[1] Side inlet catch basins shall be provided at road low points and where the catch basins are used to collect the Major system. The side inlet catch basin lead pipe shall be sized to convey the design flow. Irrespective, the minimum pipe diameter shall be 250mm.

At a manhole, the downstream pipe diameter shall not be less than the upstream pipe diameter unless the downstream pipe is 600mm diameter or larger, the manhole channel and downstream pipe grade provides adequate capacity and no surcharge occurs at the manhole or in the downstream pipe. Detailed hydraulic analysis shall be provided to confirm no surcharge will occur at the point of pipe size reduction and to confirm the capacity of the downstream pipe. The maximum reduction is one standard pipe diameter.

4.9.9 Depth

Delete

Minimum cover without concrete encasement or detailed analysis: 1.0 m.

Replace with

Minimum cover without concrete encasement or detailed analysis: 1.5 m.

4.9.12 Manholes

Add bullet

Locations: manholes are required at the following locations:

- At the downstream end of each mitre bend, tee and wye for large diameter sewer mains.

Add to section

A clean-out is not considered a permanent structure. However, a temporary clean-out may be provided at the terminal end of a main provided that:

- Future extension of the main is proposed or anticipated; and
- The length of sewer to the downstream manhole does not exceed 45m; and
- The depth of the main does not exceed 2.0m at the terminal point; and
- Where services are permitted by the *Approving Officer*, the storm min between the manhole and clean-out shall have no more than two service connections.

Delete bullets

- Minimum drop invert elevations across manholes:
  - Straight run: 5mm drop
  - Deflection up to 45 degrees: 20mm drop
  - Deflection 45 to 90 degrees: 30mm drop

Replace with

- The minimum grade of the manhole channel shall be the average of the grade of the upstream and downstream pipes. For example, if the upstream pipe grade is 8% and the downstream pipe grade is 4%, the grade of the channel shall be 6% ((8% + 4%) / 2). In no circumstances, shall the elevation difference across a manhole be less than the following:
  - Straight run: 15mm drop
  - Deflection up to 45 degrees: 30mm drop
  - Deflection 45 to 90 degrees: 60mm drop

Further, the deflection at the pipe joint at the entrance and exit to the manhole shall not exceed the pipe joint deflection specified in Section 3.12.

4.9.13 Catch Basin Spacing

Remove Section 4.9.13
Replace with

Catch basins are required at regular intervals along roadways, at road intersections and at low points.

Catch basin spacing shall provide inlet capacity to collect the entire minor flow.

The capacity of a catch basin (in sump condition i.e.: low point) shall be calculated using the orifice formula:

$$Q = kCA\sqrt{2gh}$$

Where: Q = inlet capacity (m^3/s)
k = clogging factor (0.5)
C = orifice coefficient (0.8)

A = open area (0.68 m²
for Dobney B-23 grate)
g = gravitational
acceleration (9.81 m/s²)
h = depth of ponding (m)

Space catch basins to drain maximum paved areas as follows:

- A maximum of 500 m² on roads with grades up to and including 4%.
- A maximum of 400 m² on roads with grades greater than 4%.
- To prevent overflow to driveways, boulevards, sidewalks and private property.
- To avoid interference with crosswalks.
- At the high side of a curb return which has no low point.
- At low point in curb return at intersections.
- At low points in roads and lanes.

Each catch basin shall have its own pipe and shall connect to a manhole where possible.

Minimum grade of a catch basin leads: 2.0%.

Lawn basins are required on boulevards and private properties where necessary to prevent ponding or flooding of sidewalks, boulevards, driveways, buildings and private property.

Where a low point on a road is permitted by the *Approving Officer*, all catch basins shall be side inlet. The number of catch basins provided on each side of the low point in the road shall be sufficient to collect the 100-Year Major Storm Flow plus one additional catch basin shall be provided as a factor of safety. Irrespective, a minimum of two catch basins per side of road is required. Each catch basin pipe shall be sized to convey its portion of the 100-Year Major Storm Flow.

4.9.14 Service Connections Add to section

Unless otherwise permitted by the *Approving Officer*, the single-family and duplex residential service connection shall serve the perimeter foundation drain of all building structures by gravity. Where specified by the *Consulting Engineer*, the *Approving Officer* may consider connection of the building roof leaders.

Unless otherwise permitted by the *Approving Officer*, the multi-family residential, commercial, industrial and institutional

service connection shall service the entire lot storm sewer infrastructure with the appropriate flow control infrastructure provided on-site.

Service connections shall meet the following requirements:

- The MBE shall be a minimum 0.6m above the 100-Year hydraulic grade line by gravity. Where the Major flow hydraulic grade line in the storm sewer system is higher than the building perimeter drain, a private pump and backflow prevention device shall be provided. All pumping and backflow prevention devices shall be located on private property and shall be owned, operated and maintained by the private property owner.
- The service connection shall not be extended at an angle that exceeds 45° from perpendicular to the main (except at the end of a cul-de-sac) and in no circumstances shall a service connection be placed so that it extends in front of any property other than the property serviced.
- In special circumstances where servicing of all buildings on existing Industrial or Commercial properties is not feasible, two services may be provided if approved by the *Approving Officer*.
- For service pipe 150mm diameter and smaller, connection to a new main shall be made using standard wye fittings and connection to existing mains shall use wye saddles. All services shall connect the main at spring line.
- For service pipe larger than 150mm, connection to a new or existing main shall be made with a manhole.
- The minimum depth of a service at the property line shall be 1.5m and shall also provide gravity service to the MBE.
- Where rear yard mains are approved by the *Approving Officer*, the minimum depth of cover shall be 1.0 m and shall also provide gravity service to the MBE.

4.9.14.1 Roof Drainage and Building Perimeter Foundation Drainage

Add Section 4.9.14.1 Roof Drainage and Building Perimeter Foundation Drainage

Subject to the recommendations of the *Consulting Engineer*, roof drainage shall be:

- Discharged to an approved sub-surface soak-away system located on each lot; or

- To an approved rain storage tank for on-site reuse; or
- To the ground and dispersed via splash pads at the downspouts and provided the site is graded away from the building per Section 4.5.

If site and lot grading in accordance with Section 4.5 is not possible or if the *Consulting Engineer* deems 4.9.14.1 to be not acceptable, roof drainage may be discharged into the drainage system at the discretion of the *Approving Officer*. The *Consulting Engineer* shall satisfy the *Approving Officer* that either the proposed or existing drainage system have the capacity to accommodate the anticipated increase in flow. Further, building perimeter foundation drains shall connect downstream of all roof drainage discharge and shall be protected from backflow into the perimeter foundation drain system from the roof leaders and the storm sewer system.

Roof leaders and foundation drains shall not discharge at the top of bank of a natural watercourse or to an open channel.

Roof leaders and foundation drains shall not discharge near or above a retaining wall where the water may saturate the soil above or below a retaining wall, flow over a retaining wall or otherwise negatively impact the structural integrity of a retaining wall.

Under no circumstance shall roof leaders or foundation drains discharge to the sanitary sewer system.

4.10 Major System Design

4.10.3 Surface Flow Capacity Add to section

Maximum allowable velocities for various soil types are listed in the following Table 4.10.3.

Table 4.10.3– Maximum Recommended Velocity in Earth and Grass Lined Channels

Earth – Soil Type	Permissible Velocity M/Sec
Fine Sand (non-colloidal)	0.5
Sandy Loam (non-colloidal)	0.5
Silt Loam (non-colloidal)	0.6
Ordinary Firm Loam	0.9
Fine Gravel	1.2
Stiff Clay (very Colloidal)	1.4
Graded Loam to Cobbles (non-colloidal)	1.4
Graded, Silt to Cobbles (colloidal)	1.7
Alluvial Silts (non-colloidal)	0.9

Ditches shall only be provided for roadways when approved by the *Approving Officer* for special interim uses.

Ditches adjacent to roads shall conform to the following criteria:

- Maximum depth 1.0m
- Minimum bottom width 0.5m
- Maximum side slope 1.5(H):1(V)
- Minimum grade 0.5%
- Maximum velocity (Unlined ditch) See Table 4.10.3

Where soil conditions are deemed suitable by the Geotechnical *Consulting Engineer* or where erosion protection is provided, higher velocities than shown in Table 4.10.3 may be considered.

The minimum right-of-way width for a ditch through private property shall be 5m or the width at the top of the ditch plus 3m, whichever is greater. The ditch shall be offset in the right-of-way to permit a 3m wide access for maintenance vehicles. Additional right-of-way may be required by the *Approving Officer* to facilitate the ditch maintenance and access. The top of the ditch shall be a minimum of 0.5m from any property line.

4.10.5 Culverts and Bridges Delete 4.10.5 Replace with

Culverts crossing roadways should generally be sized to convey the 1:100 year design flow. Culverts and channels under bridges

for highways and major arterials, particularly in a defined floodplain, are to be designed to pass the 1:200-year flood.

The fishery value (aquatic classification) of the watercourse will establish the design requirements for the crossing. Particular designs will apply if fish passage is needed. Approvals are required under the BC Water Act and Federal Fisheries Act, and may be required under the federal Navigable Waters Protection Act.

Culvert design is to be in accordance with the procedures outlined in an applicable design manual including but not limited to:

- American Concrete Pipe Association – Concrete Pipe Design Manual
- Corrugated Steel Pipe Institute – Handbook of Steel Drainage and Highway Construction Products
- Standards and Best Practices for Instream Works – Culverts, Province of BC and DFO

Culverts and channels under bridges for highways and major arterials, particularly in a defined floodplain, are to be designed to pass the 1:200-year flood with an inlet capacity not to exceed a HW/D ratio of 0.7.

Culverts crossing collector and local roads shall be designed to accommodate the 100-year event with an inlet capacity not to exceed HW/D < 0.7.

Driveway culverts that form part of the minor system shall be designed to accommodate the 10-year event with an inlet capacity not to exceed HW/D < 0.9.

Inlet and Outlet Structures

Inlet and outlet structures shall and design such that the following criteria are met:

- Provide inlet and outlet structures for all pipes larger than 300mm diameter.
- Pipes larger than 1.2m diameter and non-circular culverts require specially designed inlet and outlet structures.
- All inlet structures shall accommodate the design flow with an HW/D as specified in this section.
- An outlet with discharge velocity greater than 1.0m/s shall require rip rap protection and/or an energy dissipating structure for erosion control.

- Hinged trash grates shall be required at the inlets of all pipes that are 450mm and larger.

4.11 Runoff Controls Add to section

The application of infiltration features to retain frequent rainfall volumes on-site within individual lots is encouraged. The application of such features shall be supported by a Geotechnical Evaluation prepared and sealed by a qualified Geotechnical *Consulting Engineer* which supports the long-term viability of storm water disposal on-site (Refer to Section 4.12.5 – Groundwater Recharge). Target design parameters are listed in Section 4.4.2 – Design Frequencies.

In addition, peak flow attenuation shall be provided where post-development storm water runoff rates exceed the existing or pre-development flow rate, and the following conditions exist:

- The proposed development site contributes directly or indirectly to a natural watercourse or open channel that has a risk of increased erosion.
- The need for a storage facility has been identified in historical documents governing drainage for that catchment.
- The existing storm water infrastructure downstream of the site does not have adequate capacity to accept additional flow and still meet the criteria herein. In this case, the *Approving Officer* will consider upgrading of the downstream deficiencies, at the Owner's cost, as an alternative to storage.

Storm water detention shall be provided in accordance with the following criteria.

Capacity Requirements

The storage capacity requirement is determined by evaluating the performance of the storage facility under several storm events listed in Table 2.1. Sufficient live storage capacity shall be provided. For minor system performance and flood control, the storage facility shall be sized to limit the post development flow from runoff events with return periods of up to 100-Year to no greater than the 10-Year Pre-Development Flow Release Rate as determined in Section 2.5.6.

Storage Alternatives

Storage facilities shall be considered private systems and are to be located on private property. Costs and long-term operation and maintenance are the responsibility of the property owner.

Private systems shall not service more than a single development.

At the discretion of the *Approving Officer*, the PIB may agree to assume responsibility for the long-term operation and maintenance of facilities that service multiple properties. In that case, the proposed facility and all connecting services shall be located within a dedicated right-of-way. In addition, the facility shall be accessible by vehicle and other necessary maintenance equipment.

The proposed storm water detention alternatives shall be reviewed on a site-specific basis.

The *Consulting Engineer* shall consider storage methods listed in this Section, and other methods of merit which the *Consulting Engineer* may determine appropriate. The number and location of the facilities shall consider the ultimate land use and servicing plan for the watershed. The proposed concept for all storage facilities shall be approved by the *Approving Officer* prior to detailed design. Typical control facilities include:

- Dry detention ponds, rain gardens, and swales
- Underground storage units
- Parking lot surface detention

The *Consulting Engineer* shall consider the site and downstream conditions to determine the most suitable type of storage facility. All proposals shall address safety, long-term performance and maintenance issues.

Geotechnical Considerations

On steep slopes, where storm water detention or recharge is proposed, where discharge to a natural watercourse or open channel is proposed, or as required by the *Approving Officer*, a geotechnical investigation shall be completed by a qualified geotechnical engineer to address issues such as groundwater table, soil permeability, composition, stability and the potential long-term impacts downstream. Such investigations shall be undertaken prior to the preparation of the preliminary design of the facilities.

Provision for Water Level Measurement

A manhole accessible by maintenance vehicles shall be provided and hydraulically linked to the storage facility. The invert of the manhole shall be equivalent to the invert of the facility to allow

quick and accurate measurement of the storage depth at any given time. The access for measuring depth may nor may not be the same facility as the control structure.

A brass tag with the geodetic elevation shall be fastened to the inside face of the concrete manhole lid and be accessible from the surface at the manhole opening.

Emergency Overflow

Whether the facility is sized to control the 100-Year event or not, an emergency overflow spillway with the capacity for the peak 100-Year flow rate shall be provided for all storage facilities.

The spillway surface shall be finished with erosion resistant material such as concrete, asphalt, paving stone, or an approved equivalent.

The design of the spillway and/or overflow shall consider the possibility of blockages in the outlet structure. The overflow shall provide safe discharge to an accepted major flow path.

Operation and Maintenance Requirements

A minimum of a 4-meter wide all-weather vehicle access shall be constructed from a public road right-of-way to the control structure and other works requiring maintenance. The maximum grade of the access shall be 12%. The access surface shall be finished with an erosion resistance material such as concrete, asphalt, paving stone, or approved equivalent. A maintenance access of the same type shall also be provided to a sediment sump or forebay at the inlet end of an open pond.

For facilities servicing multiple lots and where the PIB agrees to assume responsibility for operation and maintenance of the facility, two hard copies and a digital file (PDF) of the operation and maintenance manual shall be provided when the facility is completed and prior to transfer of ownership to the PIB. The manual shall include:

- Record drawings of the constructed facility.
- Brief description of the facility operation including design flows, design depths, and schematic diagrams of the inlet and outlet structures, connections, controls, valves, bypasses, overflows, etc.
- List of manufacturer's operation, service and repair instructions and parts lists (where applicable).

- Stage-storage-discharge relationship of all controls.
- General maintenance requirements and emergency procedures.

Public Safety and Signage

All above ground storage facilities shall be designed to maximize public safety. Interior side slopes shall be 5:1 within the limits of the live storage volume. Side slopes above the live storage zone shall be no steeper than 3:1. Subject to the recommendations of the *Consulting Engineer* and if approved by the *Approving Officer*, the interior side slope steepness may be increased.

The design of storage facilities shall include adequate provisions for installation of standard signage to warn of anticipated water level fluctuations, with demarcation of the expected maximum water levels for design conditions.

Security style chain link fencing and gates shall be provided at the discretion of the *Approving Officer*.

Performance Monitoring

Prior to final approval of all storm water detention facilities, the *Consulting Engineer* shall prepare and submit to the *Approving Officer* a written monitoring program to be undertaken by the *Consulting Engineer* for a period of 12 months following Substantial Performance.

Monitoring results are to be submitted to the PIB monthly for review.
Adjustments to the control device shall be required as necessary prior to the expiry of the One Year Maintenance Period.

4.11.6 Outlet Controls

Remove Section 4.11.6
Replace with

The release rate from detention facilities shall be provided by means of a control structure. Control structure design shall be subject to approval of the *Approving Officer*.

The outlet control for storage facilities shall be designed using standard orifice or weir equations:

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

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

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

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

The minimum orifice diameter shall be 30 mm. If the calculated orifice diameter required to control flows to the design discharge rate is less than 30 mm, an alternate control method such as a vortex-type controller shall be used.

Storage facilities shall include provisions for discharge rates greater than the design release rate. Rapid draw down of the facility may be necessary for emergency purposes or to restore the available storage to accommodate subsequent storm events.

Provisions to accommodate higher discharges shall involve over-sizing the fixed openings and sewers connected to control structure. Adjustable mechanism such as slide gates or removable orifice plates can be used to regulate the design release rates. The extent of the over-sizing will depend on the capacity of the downstream drainage system.

Locks for access hatches are required to prevent unauthorized entrance to the structure.

4.11.7 Biofiltration Swales and Constructed Wetlands

Remove Section 4.11.7
Replace with

The term biofiltration refers to a depressed flow conveyance / detention area that is surfaced with a relatively deep layer of highly permeable topsoil and vegetation (turf or ornamental landscaping) that absorbs and filters storm water prior to discharge off-site.

Minimum depth of biofiltration swales shall be 150mm and maximum depth shall be 300mm. Deeper swales may be considered provided side slopes do not exceed 3:1.

Turf lined swales shall include a 200mm depth of top soil beneath the turf. Ornamentally landscaped swales to be lined with a minimum of 450mm of top soil, with consideration for ornamental rock placed in the invert to resist soil erosion.

Perforated underdrains may be added for enhanced groundwater recharge in areas where underlying native soils provide reasonable infiltration capacity. Refer to Section

4.11.10 (Water Quality Protection) and Section 4.12.5 (Groundwater Recharge).

4.11.8 Oil Grit Separators — Remove Section 4.11.8

4.11.9 Oil/Water Separators — Remove Section 4.11.9

4.11.10 Water Quality Protection — Add Section 4.11.10

Specific practices for the quality treatment of storm water runoff shall be applied to the paved surfaces of all multi-family residential, industrial, commercial, public and institutional uses, or other areas that provide communal vehicle parking, or where there is a specific risk from other point source pollution.

Best Management Practices (BMP's) shall be implemented to protect water quality where indicated above, or where required by the *Approving Officer*.

The following Table 4.11.10 - Best Management Practices and Applications summarizes potential BMP's and appropriate application. These shall be considered and implemented where practical. This list is not exhaustive and there may be alternatives which the *Consulting Engineer* may wish to propose for review by the *Approving Officer*. The noted Best Management Practices are intended for water quality control and do not necessarily perform a function of runoff control.

Table 4.11.10– Best Management Practices and Applications

Best Management Practice	Typical Applications
Coalescing plate Oil/Water separator or equivalent (mandatory for noted applications)	Gas stations, automotive service facilities, auto recycling facility.
Engineered Treatment Unit	Parking lots, light industrial, commercial and residential
Sump manholes and catch basins with trash hoods	All uses
Biofiltration swales and rain gardens	Residential developments and roadways
Infiltration and groundwater recharge systems	All uses
Constructed wetland / storm water detention	All uses

Unless otherwise specified by the BMP system manufacturer or by the *Approving Officer*, all storm water quality BMPs shall be installed upstream of any detention storage facility.

4.11.11 Groundwater Recharge

Add Section 4.11.11

Groundwater Recharge shall be considered by the *Approving Officer* for individual on-site lot mitigative measures only and shall be incorporated into a Storm Water Management Plan prepared in accordance with Section 4.2. Groundwater Recharge shall be considered on private lots for the on-site minor system only. Groundwater Recharge shall **not** be considered by the *Approving Officer* for storm water management within dedicated road rights of way.

For all commercial, institutional, multi-family residential, institutional and industrial lots, the *Consulting Engineer* shall submit a report prepared by a qualified hydrogeologist which clearly identifies the specific opportunities and constraints for implementing a long-term, shallow groundwater recharge system on-site for storm water management of the minor system. As a minimum, the report shall include 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;
- Estimate of soil permeability and infiltration rates;
- Estimate of ground storage capacity (volume) for infiltrated water;
- Assessment of potential impacts to hydraulically connected groundwater discharge areas;
- Accessibility of high permeability soil units capable of accepting a high flow with minimum effect on the groundwater table.

Should the hydrogeologist determine that a shallow groundwater recharge system for the subject site is feasible, the report shall also include the following information where applicable:

- Recommendations for recharge methods suitable for the proposed development;

- Transmissibility and storage coefficients – a test well or wells may be required;
- Effect of sediment loads on infiltration structures and the consequences of plugging of the water-soil interface;
- Impact on groundwater quality;
- Maintenance of structures and associated costs;
- Recommendations to maintain design simplicity;
- Provision for overflow (Major Storm overland flow route design shall be provided);
- Provision for system failure (1.5 times design of 50 percent standby areas minimum);
- Review of potential cumulative impacts of nearby developments as well as the impact resulting from irrigation components and inflow;
- Confirm groundwater recharge will not negatively impact downstream development and infrastructure;

Requirements to incorporate recharge systems in the design shall be reviewed by the *Approving Officer* on a site-specific basis. However, the *Consulting Engineer* shall demonstrate that infiltration potentials are being maximized, within reason.

Pre-Treatment

For multi-family, commercial, institutional and industrial developments, all groundwater recharge systems shall include pre-treatment measures to remove sediments, suspended solids and oils and greases prior to entering the infiltration zone. Biofiltration is the preferred approach.

Recharge Systems

The proposed system shall satisfy long-term performance and maintenance issues. Typical systems supported by the PIB shall include the following:

- Drywells: suitable for areas with low groundwater tables as part of an on-site storm water management plan for the minor system.
- Rock pits: single family residential for roof leaders
- Perforated drains or drain fields: suitable only for undisturbed ground where water can move horizontally out of trenching and where drainage water is free from silts. This is especially a concern in

areas with new development where filtration or stilling basins will be required.

- Pre-manufactured modular infiltrator chambers: design as per manufacturers recommendations.

4.12.1 Erosion Control

Remove Section 4.12.1
Replace with

An Erosion and Sediment Control Plan shall be prepared by the *Consulting Engineer* and submitted to the *Approving Officer*. The plan is required to prevent the release of silt, raw concrete, concrete leachate and other deleterious substances into any ditch, storm main, 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.

All siltation and sediment control features shall be situated to allow for ready access for cleaning and maintenance. Siltation and sediment control structures shall be maintained throughout the course of construction and to the end of the One-Year Maintenance Period. Changes in the design of the structures shall be required if the proposed structures are found to perform inadequately.

As a minimum, the Plan shall provide the following sections:

Section I: Narrative

- Project description: A brief description of the nature and purpose of the land-disturbing activity and the amount of grading involved.
- Existing site conditions: A description of the existing topography, vegetation, and drainage.
- Adjacent areas: A description of neighbouring areas, such as streams, lakes, residential areas, and roads that may be affected by the land disturbance.
- Soils: A brief description of the soils on the site including erodibility and particle size distribution (texture).
- Critical areas: A description of areas within the developed site that have potential for serious erosion or sediment problems.
- Erosion and sediment control measures: A description of the methods that will be used to control erosion and sediment on the site including, temporary erosion control and temporary sediment control measures, and whom will be responsible for implementation. Financial guarantees may be required to assure proper implementation.

- Permanent stabilization: A brief description of how the site will be stabilized after construction is completed.
- Maintenance: A schedule of regular inspections and repairs of erosion and sediment control structure, and the person responsible for maintenance.

Section II: Details

- Detailed drawings: Enlarged dimensioned drawings of such key facilities as sediment basin risers, energy dissipaters, waterway cross-sections, and sediment barriers.
- Seeding and mulching specifications: Seeding dates, seeding, fertilizing, and mulching rates in kilograms per hectare, and application procedures.
- Maintenance program: Inspection schedules, spare materials needed, stockpile locations, and instructions for sediment removal and disposal and for repair of damaged structures.

Section III: Calculations

- Calculations and assumptions: Data for design storm used to size pipes and channels and sediment basins and traps (e.g., 10-year, 6-hour storm = 78.74 mm; i peak = 66.04 mm/hr.), design particle size for sediment trap efficiencies, basin discharge rates, size and strength characteristics for filter fabric, wire mesh, fence posts, etc. and other calculations necessary to support drainage, erosion, and sediment control systems.

Section IV: Attachments

- The erosion control plan shall be accompanied by a grading plan.

4.12.3 Slope Stabilization

Add Section 4.12.3

The implementation of storm water management measures, combined with controls on development adjacent to watercourses, is intended to minimize the impact on the receiving watercourses.

Setbacks

- Disturbance too close to a slope bank can destabilize the bank material and contribute to bank failures. In addition to the environmental restrictions to working within the streamside protection area of a natural watercourse, no disruption to the native ground and vegetation is permitted within a setback zone

established by a 4:1 slope measured from the bottom of the slope.

- Detailed site investigations by a qualified Geotechnical *Consulting Engineer* are required prior to the approval of any development of disturbance within this setback zone.

Retention of Bank Vegetation

- Existing vegetation along stream channel banks and within the established riparian setback shall be retained, and the disposal of debris within this setback is prohibited.
- The design shall consider the erection of temporary fencing and flagging during construction which clearly identifies the working limits for the protection of the riparian setback.

Storm Outfalls

- The number of storm outfalls into natural watercourses shall be minimized.
- All storm drains from private properties shall connect to a municipal system. Individual drains to natural watercourses are not permitted unless specific approval has been granted by federal agencies as well as the *Approving Officer*.

4.12.4 Channel Erosion Protection Add Section 4.12.4

Where required by the *Approving Officer*, bank protection shall be considered along existing and new open watercourses to provide adequate erosion protection in the form of bank armoring, soil stabilization, flow deflection and other methods applicable for the specific site conditions.

Three optional methods of channel erosion protection are summarized below. However, it is the *Consulting Engineer*'s responsibility to assess the requirements for and suitable method of bank protection.

- Grass lined and natural channels: Most suitable for longitudinal gradients of 2% or less.
- 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 to seepage.

- 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-engineering solutions shall be compiled by the *Consulting Engineer* with demonstrated expertise in this area.

It is noted that any proposed works within the streamside protection area of an existing watercourse falls under the jurisdiction of the Federal government, and as such, shall be subject to their approval.

SUPPLEMENTARY DESIGN GUIDELINES
ROADS

5.0 ROADS

5.1 General Add to section

Roadways shall be designed to the standards and specifications set out in this Schedule, the current edition of the Transportation Association of Canada – Geometric Design Guide for Canadian Roads and the current version of the PIB Comprehensive Master Servicing Plan. In case of conflict between these guidelines, the *Consulting Engineer* shall advise the *Approving Officer* of the conflict and the *Approving Officer* shall be the final authority.

The *Approving Officer* shall consider the sufficiency and suitability of the proposed roadways including the arrangement, widths, grades and locations of all roads in relation to existing and planned roads, topographic features, public convenience and safety and the proposed uses of the land to be served by the roads.

The arrangement of roadways shall either:

- Provide the continuation or the appropriate projection of existing roads to and from the surrounding areas; or
- Where topographic or other conditions make continuation or projection of existing roads impractical, provide an adequate and suitable roadway system having regard of the uses of land to be served.

These standards are not intended to be a substitute for sound engineering knowledge and experience. Roadway designs shall be prepared under the direction of the *Consulting Engineer* with the appropriate experience and knowledge.

Roadway design shall meet the requirements for emergency access including access for fire protection as required by NFPA 1141 Chapter 5 – Means of Access

Subdivisions and Developments may require frontage roads, double frontage lots, deep lots with rear service lanes, or such other treatment as may be necessary in the public interest for the adequate protection of residential properties and to afford separation of through traffic from local traffic.

The *Approving Officer* may require the Developer to provide an independent Traffic Impact Study (TIS) to determine the requirements or warrants for traffic control/upgrades required for off-site roadways impacted by the development and on-site roadways and the need

			for deceleration and acceleration turning lanes to minimize impacts to safety and disruption to traffic. The PIB and MOTI (where applicable) shall approve the Terms of Reference for the TIS prior to the Developer undertaking the preparation of the TIS.
5.2	**Road Classifications**	Add bullet	▪ A Lane is a roadway with the primary function of providing land access, typically at the rear of abutting properties. Lanes are not intended to carry through traffic. For properties fronting Collector or Arterial roads, a rear Lane can eliminate the need for front driveways. A Lane may also provide emergency access from a cul-de-sac or from other points within a development.
5.3	**Cross Section Elements**	Remove Section 5.3 Replace with	A Supplementary Standard Drawing is provided for each Roadway Classification. The objective of the Roadway Cross-Sections is to provide the minimum requirements for roadway design. It is recognized that ambient conditions may suggest a variance from these standards in existing and substantially developed areas where provisions to accommodate the Roadway Design Cross-Sections may not have been previously anticipated. For the *Approving Officer* to consider a variance, the Developer shall submit a technical report prepared by a *Consulting Engineer* which clearly articulates the technical reasons the Roadway Design Cross-Sections cannot be met and the technical reasons for the variance requested. Where roadway excavations or embankments extend beyond the right-of-way widths identified in the Roadway Cross-Sections, the *Approving Officer* may require the right-of way width increased accordingly. All rock cuts, escarpments or retaining structures shall provide fall protection in the form of protective railings or fencing. Where a rock excavation is encountered for all roadway classifications, the toe of the rock cut may require rock fall protection in the form of a rock fall ditch and increased boulevard width and other means to the approval of the *Approving Officer*.
5.4 Alignments		Remove Section 5.4 Replace with	The following Table 5.4 provides the Geometric Design Criteria for all roadways within the PIB. In addition, the current edition of the Transportation Association of

Canada - Geometric Design Guide for Canadian Roads shall be referenced.

Table 5.4: Geometric Design Criteria

Geometric Design Criteria	Road Classification			
	Lane	**Local**	**Collector**	**Arterial**
Design speed (km/h)	30 km/h	40 km/h	50 km/h	60 km/h
Vertical Alignment:				
Minimum Centerline Grade with curb and gutter	0.5%	0.5%	0.5%	0.5%
Minimum Centerline Grade without curb and gutter	1.0%	1.0%	1.0%	1.0%
Minimum Curb Return Grade at Intersections	0.8%	0.8%	0.8%	0.8%
Maximum Centerline Grade	12% [1]	12%	10%	8%
Maximum Centerline Grade of Through Road at an Intersection	8%	8%	8%	8%
Maximum Grade for Stop or Yield Road at an Intersection	3% [2]	3% [2]	3% [2]	3% [2]
Minimum Stopping Site Distance	30m	45m	65m	110m
Minimum K Value for Sag Vertical Curve with Illumination	4	6	9	15
Minimum K Value for Crest Vertical Curve with Illumination	7	7	12	22
Maximum Centerline Grade of a Downhill Cul-de-sac	N/A	8%	N/A	N/A
Maximum Super elevation	.02 m/m			
Horizontal Alignment:				
Minimum Centerline Radius with Normal Crown	45m	90m	165m	260m
Minimum Centerline Radius at Maximum Super elevation	30m	65m	120m	205m
Minimum curb return radius at intersection with arterial road	12m			
Minimum curb return radius at intersection with collector road	9m			
Minimum curb return radius at intersection with local road	9m			
Cul-de-sac Bulb Minimum Curb and Gutter Radius - Residential	N/A	12.5m	N/A	N/A
Cul-de-Sac Bulb Minimum Curb and Gutter Radius – Commercial and Industrial	N/A	20.0m		

1. Maximum grade at road centerline for an Emergency Access Lane is 15%.
2. A point of reference at road centerline 15m from the projected lane edge of the through road.

Vertical Alignment

Provide vertical alignment to the Geometric Design Criteria in Table 5.4 – Geometric Design Criteria.

The vertical alignment shall provide practical access to the adjacent properties as required by 5.14 – Driveways. Where it is impractical to meet these criteria, the *Approving Officer* may approve the use of a Private Access Lane.

Provide a vertical curve at all grade change greater than 1.0%. Calculate vertical curve length by the formula L = K x A, where:

L = Length of vertical curve in meters

K = Constant related to lines and geometry of a parabolic curve as listed in Table 5.4.

A = Algebraic difference in road grade expressed as a percent.

The standard road cross slope shall be a normal crown at 2.0% on all road classifications unless specified otherwise by the *Approving Officer*.

Full road crossfall (reverse crown at 2%) may be considered by the *Approving Officer* in special circumstances as a means of more closely matching property grade adversity on either side of the roadway or to reduce the minimum horizontal radius where topography warrants a reduction. The transition lengths between normal crown and 2% reverse crown shall meet the requirements of the Transportation Association of Canada Geometric Design Guidelines. Any potential for water to pond on roads at transitions and especially when a transition is located near the crest or sag of the vertical curve shall not be permitted.

Road elevations shall give due consideration to the flood proofing requirements of adjacent properties.

Horizontal Alignment

Provide horizontal alignment to the Geometric Design Criteria described in Table 5.4 – Geometric Design Criteria.

The road horizontal centerline alignment shall be located on the centerline of the road right of way.

Fully describe the horizontal curve components on the design drawings including internal angle, centerline radius, tangent length, arc and begin and end curve chainage.

Transitions between road widths, where permitted by the *Approving Officer*, shall be provided by a minimum of a 40:1 taper between the road widths.

5.5 Intersections

5.5.2 Curb Returns	Add to section	The road right of way geometry at a curb return shall be parallel to the curb return geometry.
5.8 Traffic Control Devices	Remove Section 5.8 Replace with	Road name signs, parking signs, traffic control signs and all other regulatory and information signs shall be provided in accordance with the current edition of the Manual of Uniform Traffic Control Devices for Canada and the British Columbia Ministry of Transportation and Infrastructure Manual of Standard Traffic Signs and Pavement Markings.
5.9 Cul-De-Sac	Remove	The maximum road length for a cul-de-sac, as measured from the edge of the intersecting through road to the center of the cul-de-sac build, is 200m.
	Replace with	The maximum length of a cul-de-sac road shall be 150m as measured from the projected lane edge of the road intersection to the end of the bulb. Where an access lane is provided from the cul-de-sac bulb, the maximum length of cul-de-sac may be increased to 250m.
	Add to section	Where a road is planned to continue beyond the development, the road shall be constructed to the furthest property of the furthest lot. Provide a temporary turnaround of suitable size and geometry to accommodate snow storage and to provide maintenance
5.11 Sidewalk and Pedestrian Crossings		
5.11.2 Pedestrian Crossings	Add to section	Concrete walkways shall be provided for access through the development to connect to other walkways or sidewalks, schools, playgrounds, shopping centers, transit, water ways, community mailboxes and other community facilities and as directed by the *Approving Officer*.

- The maximum grade of a concrete walkway not constructed adjacent to a roadway shall be 15%. Where the grade is greater than 15%, provide concrete steps with a handrail on both sides of the concrete steps and an alternate route for universal access.
- The width of the concrete steps shall match the width of the walkway.
- Provide chain link fence on both sides of

			walkways.
5.11.3	**Multi-use Pathways**	Add section 5.11.3	Multi-use pathways shall be provided as required by the PIB Parks and Trails Master Plan and as directed by the *Approving Officer*.
5.14	**Driveways**	Add to section	Every lot shall be provided with a driveway access from the adjacent roadway. Roadway geometry and site grading shall provide practical driveway access from a roadway.
5.14.2	**Number of Driveways**	Remove Section 5.14.2 Replace with	▪ The maximum number of driveways permitted for each single-family residential lot is one (1). ▪ Suburban, rural, commercial, industrial, institutional, comprehensive and multifamily developments ▪ The maximum number of driveways permitted for each multi-family residential lot and commercial, industrial and institutional lot is two (2).
5.14.3	**Driveway location and width**	Remove	▪ Residential zones: Driveways located on corner lots should be at least 5 m from the lot corner to the nearest intersection. Provision of adequate sight distance should be considered in accordance with TAC Geometric design guidelines. ▪ Minimum and maximum widths of urban residential driveways are 4m and 7.5m respectively. ▪ Commercial, industrial, institutional, comprehensive and multifamily Developments: Driveways to corner lots should be located no closer than 12 m from the property line of the adjoining road. Provision of adequate sight distance should be considered in accordance with TAC Geometric design guidelines.
		Replace with	▪ A Single-family residential driveway located on corner lot shall have a minimum clearance of 7m from the back of curb and gutter of the flanking Local road and 10m from the back of the curb and gutter of the flanking Collector road. Provision of adequate sight distance should be considered in accordance with TAC Geometric design guidelines.

- A Multi-family residential, commercial, industrial and institutional driveway located on a corner lot shall have a minimum clearance of 18m from the back of the curb and gutter of a flanking road regardless of the road classification.
- The maximum driveway width shall be as outlined in Table 5.14.3. Alternative driveway widths may be considered by the *Approving Officer* based on site specific conditions when the Developer submits a report prepared by the *Consulting Engineer* which clearly articulates the technical reasons for the request for additional width.

Table 5.14.3: Maximum Driveway Width

Land Use Type	Maximum Width
Single-family Residential	6m
Multi-family Residential	9m
Commercial	9m (two lanes); 12m (three lanes)
Industrial	Design Vehicle Site Specific

Add to section

Minimum clearance between edge of driveway and a lot property line shall be 0.5m.

5.15.3 Signs and Poles

Add to section

Minimum clearance between the edge of driveway and a fire hydrant, streetlight and street sign shall be 1.5m.

5.19 Hillside Standards

Add to section

Steep slope hillside areas are defined as lands in their natural state which have a slope angle of 20% for a distance greater than 10 meters. In addition, generally more than 20% of the development area shall be located on steep slopes greater than 20%. Development on slopes greater than 30% are discouraged.

The *Approving Officer* may require the Developer to provide an independent Traffic Impact Study (TIS) to determine the requirements or warrants for traffic control/upgrades required for off-site roadways impacted by the development and on-site roadways and the need for deceleration and acceleration turning lanes to minimize impacts to safety and disruption to traffic. The PIB and MOTI (where applicable) shall approve the Terms of Reference for the TIS prior to the Developer undertaking the preparation of the TIS.

5.19.2	**Hillside Emergency Access**	Add to section	Roadway design shall meet the requirements for emergency access including access for fire protection as required by NFPA 1141 Chapter 5 - Means of Access
5.19.3	**Cross-section Elements**	Remove Section 5.19.3 Replace with	A Supplementary Standard Drawing is provided for each Roadway Classification in Table 5.19.3. The objective of the Roadway Design Cross-Section Criteria in Table 5.19.3 is to provide the minimum requirements for roadway design within the PIB. It is recognized that ambient conditions may suggest a variance from these standards in existing and substantially developed areas where provisions to accommodate the Roadway Design Cross-Sections may not have been previously anticipated. For the *Approving Officer* to consider a variance, the Developer shall submit a technical report prepared by a *Consulting Engineer* which clearly articulates the technical reasons the Roadway Design Cross-Sections cannot be met and the technical reasons for the variance requested.

Table 5.19.3: Roadway Cross-Section Criteria

Facility Classification	Minimum Right-of-Way (metres)	Asphalt Width (metres)	Asphalt Lane Width (metres)	Parking	Shoulder (metres)	Curb Type	Sidewalk	Bicycle Facilities
HILLSIDE WALKWAY AND PATHWAY								
Major Multi-Use Pathway	6 (min.)	3-4	N/A	N/A	1.0	N/A	N/A	N/A
Narrow Multi-Use Pathway	4.5 (min.)	1.0 – 2.0	N/A	N/A	0.5	N/A	N/A	N/A
Nature Trail	3 (min.)	0.3 – 1.0	N/A	N/A	0.5	N/A	N/A	N/A
HILLSIDE LANE								
Commercial, Multi-Family Access	9.0 [3]	7.2	2 x 3.6	None	N/A	N/A [4]	N/A	N/A
Residential, Emergency, and Private Access	7.5 [3]	6	2 x 3.0	None	N/A	N/A [4]	N/A	N/A
HILLSIDE LOCAL ROADWAY								
Local	14.0	7.2	2 x 3.6	None	N/A	Rollover	1.5m One side	N/A
Cul-de-sac	14.0	6.4	2 x 3.2	None	N/A	Rollover	1.5m One side	N/A
Strata / Private	14.0	6.4	2 x 3.2	None	N/A	Rollover	Optional One side	N/A
HILLSIDE COLLECTOR ROADWAY								
Residential	18.0	8.6	2 x 4.3	Optional [1]	N/A	Barrier	1.8m One side	Shared
Commercial	20.0	8.6 [2]	2 x 4.3	Optional [1]	N/A	Barrier	1.8m Both sides	Shared

1. Refer to Supplementary Standard Drawings for additional requirements for on-street parking.
2. Refer to Supplementary Standard Drawings for additional requirements for left turn lane.
3. Additional right of way required for shallow utilities when provided in the Lane
4. Assumes inverted crown, otherwise, provide curb and gutter

Where roadway excavations or embankments extend beyond the right-of-way widths in Table 5.1, the *Approving Officer* may require the right-of way width increased accordingly.

All rock cuts, escarpments or retaining structures shall provide fall protection in the form of protective railings or fencing.
Where a rock excavation is encountered for all roadway classifications, the toe of the rock cut may require rock fall protection in the form of a rock fall ditch and

increased boulevard width and other means to the approval of the *Approving Officer*.

5.19.4 Alignments

Remove section 5.19.4
Replace with

The following Table 5.19.4 provides the Geometric Design Criteria for hillside road alignments. In addition, the current edition of the *Transportation Association of Canada - Geometric Design Guide for Canadian Roads* shall be referenced.

Table 5.19.4: Hillside Road Alignment Standards

Geometric Design Criteria	Road Classification		
	Lane	**Local**	**Collector**
Design speed (km/h)	30 km/h	30 km/h	40 km/h
Vertical Alignment:			
Minimum Centerline Grade with curb and gutter	0.5%	0.5%	0.5%
Minimum Curb Return Grade at Intersections	0.8%	0.8%	0.8%
Maximum Centerline Grade	12% [1]	12%	12%
Maximum Centerline Grade of Through Road at an Intersection	12%	8%	8%
Maximum Grade for Stop or Yield Road at an Intersection	3% [2]	3% [2]	3% [2]
Minimum Stopping Site Distance	30m	30m	45m
Minimum K Value for Sag Vertical Curve with Illumination	4	6	6
Minimum K Value for Crest Vertical Curve with Illumination	7	7	7
Maximum Centerline Grade of a Downhill Cul-de-sac	N/A	8%	N/A
Maximum Super elevation	N/A	.02m/m	.02m/m
Horizontal Alignment:			
Minimum Centerline Radius with Normal Crown	45m	45m	90m
Minimum Centerline Radius at Maximum Super elevation	30m	30m	65m
Minimum curb return radius at intersection with collector road	6m	9m	9m
Minimum curb return radius at intersection with local road	6m	9m	9m
Cul-de-sac Bulb Minimum Curb and Gutter Radius - Residential	N/A	12.5m	N/A
Cul-de-sac Bulb Minimum Curb and Gutter Radius - Commercial	N/A	20.0m	N/A

1. Maximum grade at road centerline for a Hillside Private Lane and a Hillside Emergency Access Lane is 15%.
2. A point of reference at road centerline 15m from the projected lane edge of the through road.

5.22 Emergency Access Route and Lane

Add Section 5.23

An emergency access route is required for cul-de-sac lengths greater than 150m and where more than one access route is required by NFPA 1141, Tables 5.1.4.1 (a and b). For NFPA 1141 where three access routes are specified in Tables 5.1.4.1 (a and b), two accesses shall be a primary access road and one access may be an emergency access lane.

Restrict non-emergency vehicles access by means of removable restriction posts.

Shared use with pedestrian trails and walkways is permitted

SCHEDULE B

SUPPLEMENTARY CONSTRUCTION SPECIFICATIONS

SUPPLEMENTARY CONSTRUCTION SPECIFICATIONS

This schedule contains supplementary specifications to be applied in conjunction with the Specifications of the Master Municipal Construction Documents, dated 2009, both of which shall apply to all Works and Services constructed within the Penticton Indian Band Reserve Lands

Supplementary Specifications contained within this Schedule supplement or supersede the Master Municipal Construction Document (MMCD). Where the Penticton Indian Band Supplementary Specifications are in conflict with the MMCD, the Penticton Indian Band Supplementary Specifications shall take precedence.

Section number and clause numbers in the Penticton Indian Band Supplementary Specifications coincide with the MMCD numbering protocol.

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SECTION

1.0 GENERAL

1.8	**Limitations of Open Trench**	Delete 1.8.1 and replace with the following:	.1	Excavate trenches only as far in advance of pipe laying operation as safety, traffic, and weather conditions permit and, in no case, to exceed 30m. Before stopping work each day completely backfill every trench on or adjacent to roadways. All other trenches to be completely backfilled before stopping work on last day of work before each weekend or holiday. If circumstances do not permit complete backfilling of all trenches, adequately protect all open trenches or excavations with approved fencing barricades and, where required, with flashing lights.

3.0 EXECUTION

3.6	**Surface Restoration**	Add to 3.6.2	.7	Restoration work per shall be completed only by a qualified landscape subcontractor with a minimum of at least 2 years of experience with restoration in a developed urban setting.

2.0 PRODUCTS

2.1	**Materials**	Add 2.1.7.3 as follows:	.3	Cover to be marked “SANITARY” or “STORM” to suit.

1.0 GENERAL

1.4 Qualifications

Delete 1.4 and replace with the following:

.1 Qualifications and Experience of Contractor

Prior to construction, the contractor shall provide the Contract Administrator and PIB, a statement of the qualifications, experience and work function of all personnel assigned to drilling and blasting duties. A statement of previous work experience on similar projects shall also be provided. This statement shall include the project name, location, volume of rock, year constructed and the owner/client contact name. The company, the driller and the blaster shall each have a minimum of 5 consecutive years demonstrated experience in drilling and controlled blasting work on at least 3 projects involving rock cuts over 8 m height along transportation corridors.

.2 Qualifications and Experience of Proposed Blasting Contractor

Prior to construction, the Contractor shall provide the Contract Administrator and PIB the name of the consulting firm, and the name and qualifications of the blasting consultant's on-site representative who will be providing the quality control for rock excavation. The blasting consultant shall have a minimum of 5 consecutive years demonstrated experience in preparing successful blast designs along transportation corridors for at least 3 projects. The following information shall be included in the qualifications submitted:

.1 Project name, location and experience
.2 Name and phone number of owner/client contact who can verify the experience of the blasting consultant's site representative

.3 Qualifications and Experience of Proposed Vibration Specialist

The Contractor shall provide and follow a blast design, approved and signed by the blasting consultant, not less than one week prior to commencing drilling and blasting operations and a minimum of one day before the Contractor proposes to implement any changes to the previously utilized drilling or blasting methods. The design may be prepared by the blaster, but shall be reviewed by the Contractor and forwarded to the blasting consultant for signing. The design shall contain full details of the drilling and blasting patterns and controls that the Contractor proposes to use for controlled blasting. The blast design shall contain the following minimum information:

.1 Project name, location and experience.
.2 Name and phone number of owner/client contact who can verify the experience of the vibration specialist.

1.5 **Blasting Operation Proposal**

Delete 1.5 and replace with the following

.1 Proposed Construction Plan

Prior to construction, the contractor shall submit to the Contract Administrator and PIB a general construction plan showing proposed blasting sequence numbers defining the order of blasts for the Contract. The plan shall also show the following information for each blast:

.1 Blast sequence number.
.2 The location of the blast in relation to the remaining rock on the site.
.3 Approximate dimension of the rock to be removed.
.4 Location of the disposal site.

.2 Sequence of Operations

The Contractor shall adopt a logical, systematic sequence of operations to ensure blasting is conducted safely and effectively. The following general sequence of blasting operations outlines minimum requirements of the Contractor to maximize the stability of the excavation backslope and does not limit or supersede any other requirements in this specification:

.1 Retain a blasting consultant to perform quality control.
.2 Submit blast designs for review and authorization by the Contract Administrator.
.3 Accurately survey locations of proposed blastholes.
.4 Drill holes, load explosives, detonate blast and remove muck pile.
.5 Check the excavation backslope to determine hole offsets, hole angles, hole alignment and compliance with allowable tolerances.
.6 Review blast results and make changes to blasting operations as necessary.
.7 Perform backslope stabilization to the satisfaction of the Contract Administrator before subsequent lifts are detonated.

.3 Blast Design

The Contractor shall provide and follow a blast design, approved and signed by the blasting consultant, not less than one week prior to commencing drilling and blasting operations and a minimum of one day before the Contractor proposes to implement any changes to the previously utilized drilling or blasting methods. The design may be prepared by the blaster, but shall be reviewed by the Contractor and forwarded to the blasting consultant for signing. The design shall contain full details of the drilling and blasting patterns and controls that the Contractor proposes to use for controlled

blasting. The blast design shall contain the following minimum information:

.1 Date the design was prepared and proposed date of blast.
.2 Station limits of proposed blast.
.3 Plan and section views of proposed drill pattern including free face, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height, hole depth, and sub-drill depth.
.4 The location of production (including buffer) and backline holes.
.5 Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming.
.6 Initiation sequence of blastholes including delay times and delay system.
.7 Manufacturer's data sheets for all explosives, primers, delays, and initiators to be used.
.8 Blasting consultant's signature, printed name, and company name.
.9 Blaster's signature, printed name, company name, and blaster's certificate number.

1.7 Seismic Survey and Monitoring

Delete 1.7 and replace with the following:

.1 Pre-blast Survey – The Contractor shall conduct a pre-blast survey a minimum of one day before blasting operations commence. The pre-blast survey shall include a complete description of the existing condition of any nearby buildings, structures, wells and utilities that potentially may be damaged by blasting operations. The survey method used shall be acceptable to the Contractor's insurance company.

.2 As-Built Blast Design – Within one day after each blast, the Contractor shall submit to the Contract Administrator and PIB as required, an as-built blast design showing all actual blast details in a format that permits direct comparison with the proposed blast design.

.3 Blasting Consultant's Field Report – The Contractor shall provide to the Contract Administrator and PIB the blasting consultant's field report within one day after each visit by the blasting consultant.

.4 Vibration Control Records – As required, the Contractor shall provide to the Contract Administrator and PIB all seismograph records of vibration monitoring and interpretation of results within one day after each blast.

.5 Peak Overpressure Records – As required, the Contractor shall provide to the Contract Administrator and PIB a permanent signed and dated record of the peak overpressure measurements within one day after each blast.

.6 Monitoring – Monitoring shall meet ISRM standards. Whenever vibration damage to adjacent structures is possible, the Contractor shall monitor each blast with approved seismograph(s) located between the blast area and the closest structure(s) subject to potential blast damage. The geophone shall be placed as close as possible to the structure(s) but not directly above the structure(s). The seismograph(s) shall be set to record particle velocity, accelerations, and frequency in the range generally found with controlled blasting. The peak particle velocity shall be calculated as the maximum vector

sum of three mutually perpendicular components of vibration. All components and peak particle velocity shall be recorded.

.7 Vibration Limits – Peak particle velocity, accelerations and frequency shall not be allowed to exceed the safe limits of the nearest structure subject to potential vibration damage. The Contractor shall employ a qualified vibration specialist to establish the safe vibration limits.

.8 Interpretation – The vibration specialist shall interpret the seismograph records to ensure that the seismograph data is effectively used in the control of the blasting operations with respect to the existing structures.

.9 Air Concussion and Noise Control

1. General – When requested by the Contract Administrator or PIB, an air concussion monitoring system shall be installed in a representative location between the blasting area and the nearest structure subject to potential blast damage or annoyance. The equipment used to make the air concussion measurements shall be the type specifically manufactured for that purpose.
2. Monitoring – The air concussion monitoring system shall be set to record air overpressure on the linear setting. When requested by the Contract Administrator or PIB, human annoyance (A weight setting) and human ear response (C weight setting) shall also be recorded.
3. Overpressure – Peak overpressure shall be controlled using appropriate blast hole patterns, detonation systems and stemming to prevent venting of blasts, and to minimize air concussion and noise levels produced by the blasting operations. The contractor shall use a qualified vibration specialist to establish safe overpressure limits.

3.0 EXECUTION

3.20 Connections to Existing Mains

Delete 3.20 and replace with the following:

.1 Make connections to existing sanitary sewer systems unless shown otherwise on the Contract drawings. Notify the Contract Administrator and PIB a minimum of 48 hours in advance of scheduled connection.

.2 Make connection in presence of PIB. To prevent damage to existing utilities. Excavate last 300mm over utility by hand.

3.0 EXECUTION

3.14 Connections to Existing Mains

Delete 3.14 and replace with the following:

.1 Make connections to existing storm sewer systems unless shown otherwise on the Contract drawings. Notify the Contract Administrator and PIB a minimum of 48 hours in advance of scheduled connection.

.2 Make connection in presence of PIB. To prevent damage to existing utilities. Excavate last 300mm over utility by hand.

1.0	**GENERAL**	Add 1.0.1 as follows:	.1	Section SS 34 41 17 refers to those portions of the work that are unique to the supply and installation of traffic signs. This section must be reference to and interpreted simultaneously with all other sections pertinent to the works described herein.
1.1	**Related Work**	Add 1.1 as follows:	.1	Painted Pavement Markings Section 32 17 23
			.2	Cast-In-Place Concrete Section 03 30 53
			.3	Precast Concrete Section 03 40 01
2.0	**PRODUCTS**			
2.1	**Materials**	Add 2.1 as follows:	.1	Signs shall be mounted on sheet aluminium, 0.018” minimum, alloy 5052-H38.
			.2	Sign posts shall be Telespar 50mm square perforated galvanized tubing with a 57mm square perforated break away base set in concrete.
			.3	Concrete shall be 32 MPa compressive strength.
3.0	**EXECUTION**			
3.1	**General**	Add 3.1 as follows:	.1	Layout and confirm the location of all signs with the Contract Administrator prior to installation.
			.2	Install signs, posts, and concrete bases in accordance with Contract Documents.

1.0	**GENERAL**			
1.7	**Scheduling of Work**	Delete 1.7.4 and replace with the following:	.4	Maximum interruption of water service to any given resident shall be limited to 6 hours and between 9:00am and 3:00pm Tuesday to Thursday, unless otherwise authorized by the Contract Administrator and PIB.
2.0	**PRODUCTS**			
2.1	**General**	Add 2.1.2	.2	Refer to the PIB Approved Products List for Waterworks.
2.2	**Mainline Pipe, Joints, and Fittings**	Add 2.2.1.3	.3	All ductile iron pipes to be completed with an 8mm polyethylene encasement conforming to AWWA C105, where soil conditions exceed requirements set out in AWWA C105, Section A.1.
		Delete 2.2.4.1		
		Add 2.2.4.9.3	.3	All bolts and nuts to be wrapped with petrolatum tape where soil conditions exceed requirements set out in AWWA C105, Section A.1.
		Add 2.2.4.10.3	.3	All nuts to be wrapped in petrolatum tape. All tie rods to be protected with liquid epoxy coating to AWWA C210 and touched up with hot applied coal tar enamel AWWA C203 where soil conditions exceed requirements set out in AWWA C105, Section A.1.
		Delete 2.2.4.12.4 and replace with the following:	.4	Anti-corrosion coating of interior and exterior centre sleeve and end rings to AWWA C213 fusion bonded epoxy.
		Delete 2.2.4.13.3 and replace with the following:	.3	Bolts and nuts high strength low alloy steel to AWWA C111/A21.11.
		Delete 2.2.4.13.4 and replace with the following:	.4	Tie rods to be high strength low alloy steel to AWWA C111/A21.11.
		Delete 2.2.4.14.1.4 and	.4	Tapping sleeves to have Fusion – Bonded Epoxy to AWWA C213.

		replace with the following:		
		Add to 2.2.4.14.1.5	Bolts and nuts to be wrapped with petrolatum tape where soil conditions exceed requirements set out in AWWA C105, Section A.1.	
		Add to 2.2.4.15	Bolts and nuts to be wrapped with petrolatum tape where soil conditions exceed requirements set out in AWWA C105, Section A.1.	
		Add 2.2.4.16	.16	All fittings, joint restraint devices, and repair clamps to be complete with an 8mm polyethylene encasement conforming to AWWA C105 and petrolatum tape seal each end of wrap where soil conditions exceed requirements set out in AWWA C105, Section A.1.
2.3	**Valves and Valve Boxes**	Delete 2.3.2.7 and replace with the following:	.7	Refer to PIB Approved Product List for acceptable manufacturers.
		Add 2.3.2.8	.8	All gate valves to be fusion epoxy coated to AWWA C213.
		Delete 2.3.5.1 and replace with the following:	.1	Ductile iron body.
		Add to 2.3.7.1	Where soil conditions exceed requirements set out in AWWA C105, Section A.1., the 14mm operating rod shall be stainless steel and the 25 NPS iron pipe and cast iron base are to be complete with 8mm polyethylene encasement, conforming to AWWA C105 and petrolatum tape to seal each end of encasement.	
		Add 2.3.9	.9	Where soil conditions exceed requirements set out in AWWA C105, Section A.1., corporation main stop to be wrapped in petrolatum tape, and the saddle and main stop are complete with 8mm polyethylene encasement conforming to AWWA C105, complete with petrolatum tape to seal each end of the encasement.

2.5	**Service Connections, Pipe, Joints and Fittings**	Delete 2.5.1 and replace with the following:	.1	Pipe diameter 19mm to 75mm to be Polyethylene to AWWA C901.
		Delete 2.5.3.3.2.2 and replace with the following:	.2	Ductile iron body to ASTM A536, grade 65-45-12, covered by black nylon fused coat, approximately 10-12mm thick with approximate dielectric strength of 1,000 v/mil: .1 Band – Stainless steel as per ASTM A 240, type 304.2 wide to "spread out" clamping forces on the pipe. Bolts – UNC rolled thread, stainless steel per ASTM A193, type 304. Nuts – Heavy hex, stainless steel per ASTM A240, type 304. Washers – Stainless steel per ASTM A240, type 304. Gaskets – NBR per ASTM MBC 610, compound for water and sewer service. Other compounds available on request. .2 Two type 304 stainless U-bolt straps, with minimum width per strap of 50mm, as specified in Contract Drawings.
2.6	**Hydrants**	Delete 2.6.1.6.3 and replace with the following:	.3	Hydrant ports must be supplied with a Storz Pumper Nozzle Connection.
		Delete 2.6.2 and replace with the following:	.2	All hydrants are to be painted red.
		Add 2.6.4	.4	Where soil conditions exceed requirements set out in AWWA C105, Section A.1., wrap buried hydrant section with 8mm polyethylene encasing AWWA C05 and petrolatum tape the seams. Do not wrap over the drain holes.
2.10	**Pipe Insulation**	Add 2.10	.1	Rigid extruded polystyrene foam shall meet the requirements of CGSB Specification 51 – GP20M (Type 4).

			.2	Rigid extruded polystyrene insulation Min. RSI: 0.87 Thickness as specified on Contract Drawings. Product: Dow Chemical Styrofoam H1-40 or approved equal.
3.0	**EXECUTION**			
3.6	**Pipe Installation**	Delete 3.6.1 and replace with the following:	.1	Handle pipe in accordance with pipe manufacturers recommendations. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends. Unless approved by PIB in writing, all pipe to be delivered from manufacturer with weatherproof plugs/bagging to prevent contamination while being delivered and during storage. Pipe to remain this way until placed into trench and installed.
		Delete 3.6.2 and replace with the following:	.2	Lay and join pipe to manufacturer's instructions and specifications except as noted otherwise herein. PVC pipe to AWWA M23 and C605, ductile iron pipe to AWWA C600. All ductile iron pipe to be installed complete with 8mm polyethylene encasement conforming to AWWA C105.
		Delete 3.6.6 and replace with the following:	.6	Do not exceed half the maximum joint deflection specified by the pipe manufacturer – AWWA C600 for ductile iron pipe and C605 for PVC pipe.
3.7	**Valve Installation**	Add 3.7.5	.5	Where soil conditions exceed requirements set out in AWWA C105, Section A.1., all mainline and hydrant valves to be installed complete with 8mm polyethylene wrap conforming to AWWA C105 and petrolatum tape seal each end of wrap.
3.11	**Tapping Sleeve Installation**	Add 3.11.2	.2	Where soil conditions exceed requirements set out in AWWA C105, Section A.1., petrolatum tape all bolts and nuts.

3.12	**Hydrants**	Delete 3.12.6 and replace with the following:	.6	For hydrants not in service, place an orange bag over the entire hydrant, secured at the bottom with tape and labeled in black "Not In Service." Remove bag once the watermain has been accepted by the Approving Officer and is in service.
3.20	**Disinfection, General**	Delete 3.20.2 and replace with the following:	.2	Disinfect and flush pipes in accordance with 3.21 of this section and AWWA C651.
3.23	**Connections to Existing Mains**	Delete 3.23.1 and replace with the following:	.1	Connections to the existing water systems will be made by the Contractor. The Contractor shall give written notice to the Contract Administrator and PIB at least 7 days before connecting to existing waterworks systems. Make connection in presence of Contract Administrator and PIB staff.
		Add 3.23.2	.2	The Contractor will be responsible for notifying all affected parties as per MMCD Section 01 58 01 – 1.2.2.1 Project Identification.
		Add 3.23.3	.3	The PIB Utility Department will be responsible for opening and closing any existing mainline water valves.
		Add 3.23.4	.4	Proposed works required for tie-ins shall be disinfected by swabbing in accordance with AWWA C651 followed by line flushing immediately after installation work is complete and placed back into service.
		Add 3.23.5	.5	PIB will not turn off the water until all pipes, fittings, couplings, miscellaneous materials and sufficient equipment and labour are made available at the tie-ins to ensure the tie-in can be completed within the maximum duration of water service disruption permitted. Further, PIB will not turn off the water until as much of the existing tie-in as possible is safely excavated and exposed.

Add 3.23.6	.6	Contractor to coordinate with PIB staff for suitable locations of hydrants and ditches for drainage of watermains.

SCHEDULE C

SUPPLEMENTARY STANDARD DETAIL DRAWINGS

SUPPLEMENTARY STANDARD DETAIL DRAWINGS

This schedule contains supplementary standard detail drawings to be applied in conjunction with the Standard Detail Drawings of the Master Municipal Construction Documents, dated 2009, both of which shall apply to all Works and Services constructed within the Penticton Indian Band Reserve Lands.

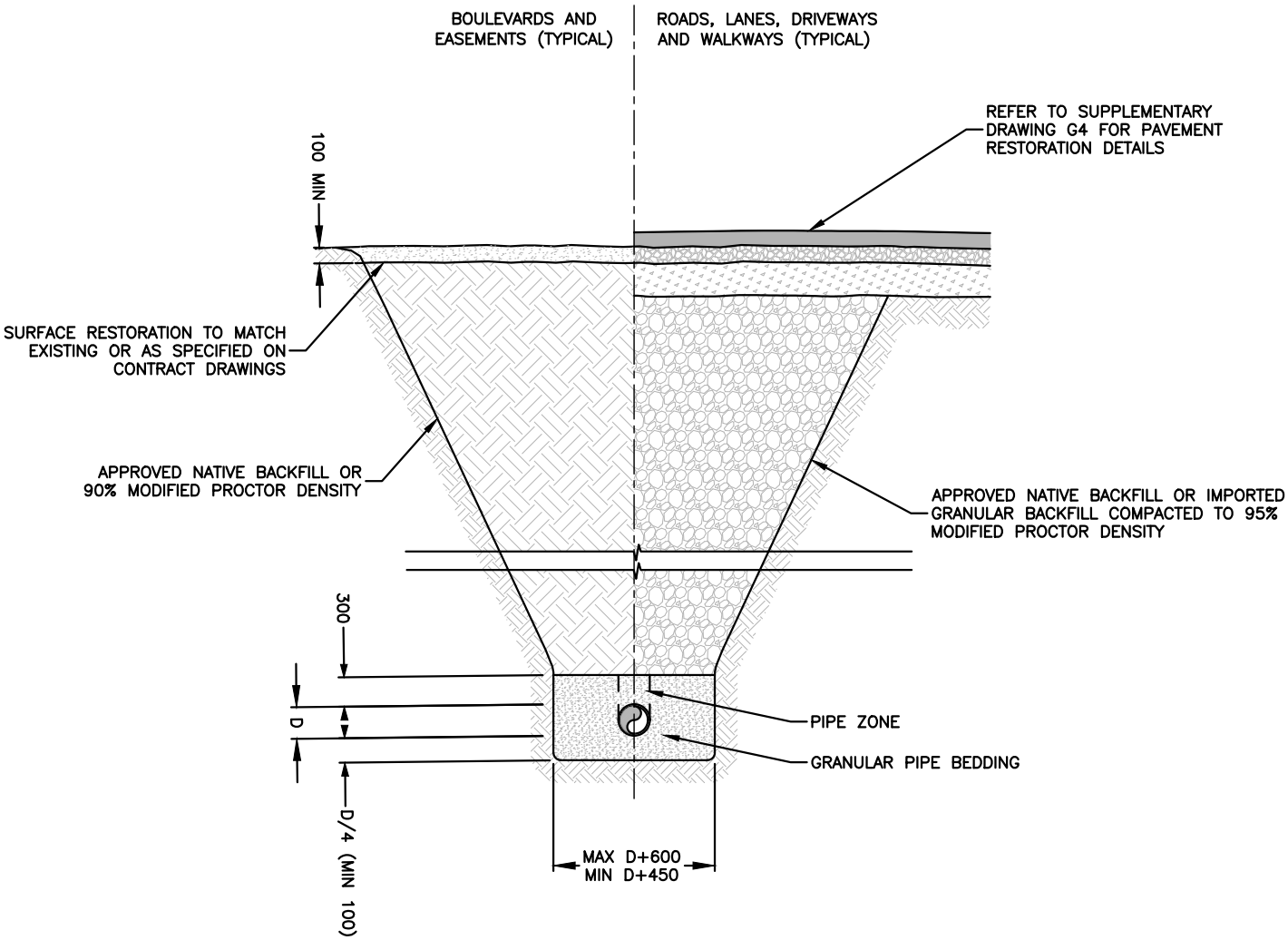
Supplementary Standard Detail Drawings contained within this Schedule supplement or supersede the Master Municipal Construction Document (MMCD). Where the Penticton Indian Band Supplementary Standard Detail Drawings are in conflict with the MMCD, the Penticton Indian Band Supplementary Standard Detail Drawings shall take precedence.

Drawing numbers in the Penticton Indian Band Supplementary Standard Detail Drawings coincide with the MMCD numbering protocol.

TABLE OF CONTENTS

DETAIL DRAWING

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:
1. TRENCHING TO COMPLY WITH ALL REQUIREMENTS OF WORKSAFE BC.
2. REFER TO CONTRACT DRAWINGS, SECTION 31 23 01 FOR DETAILED SPECIFICATIONS.

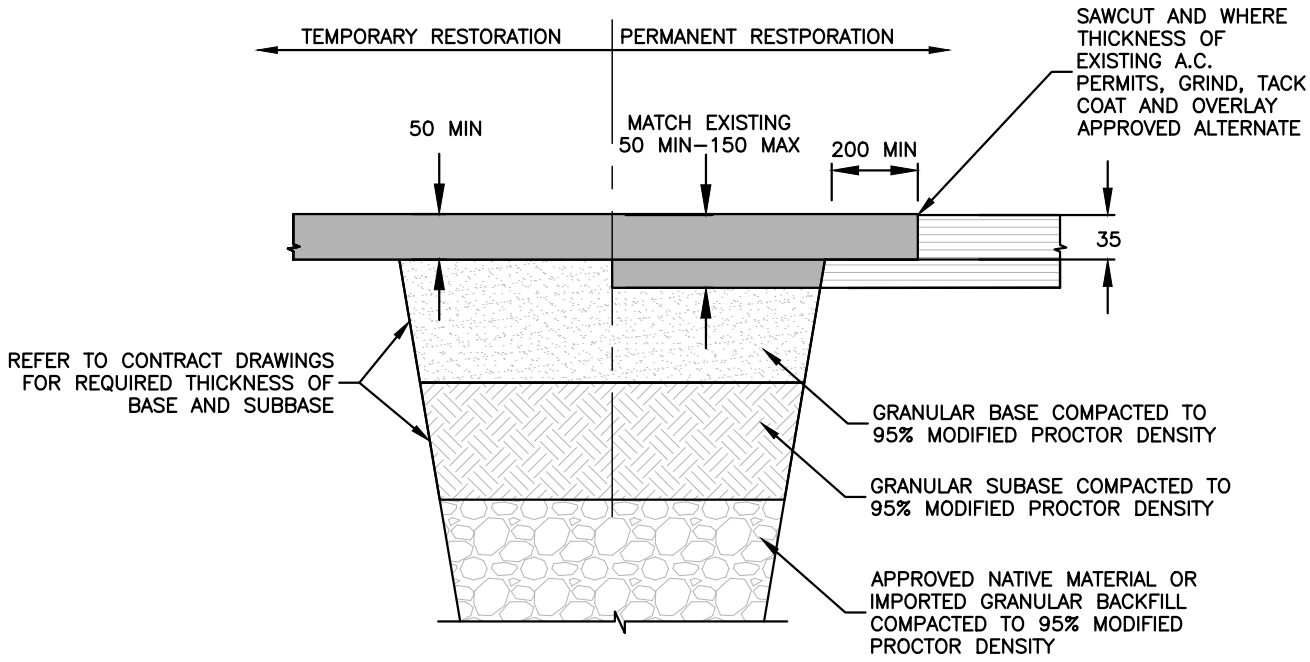
PENTICTON INDIAN BAND

Utility Trench

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–G4	0	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



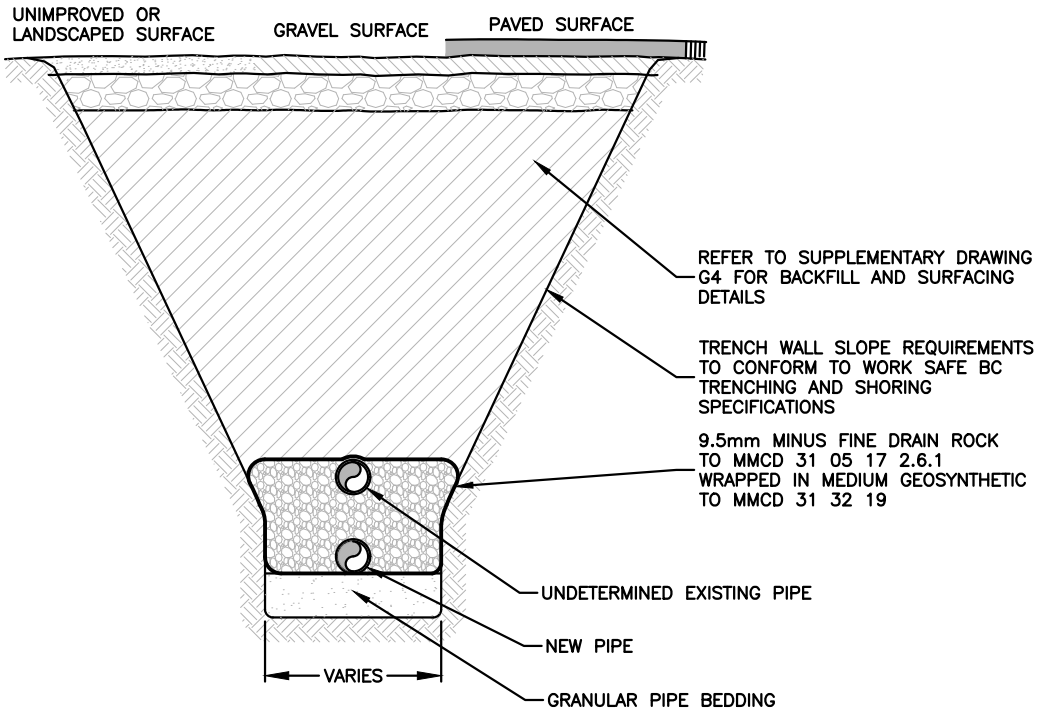
PENTICTON INDIAN BAND

Pavement Restoration

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–G5	0	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



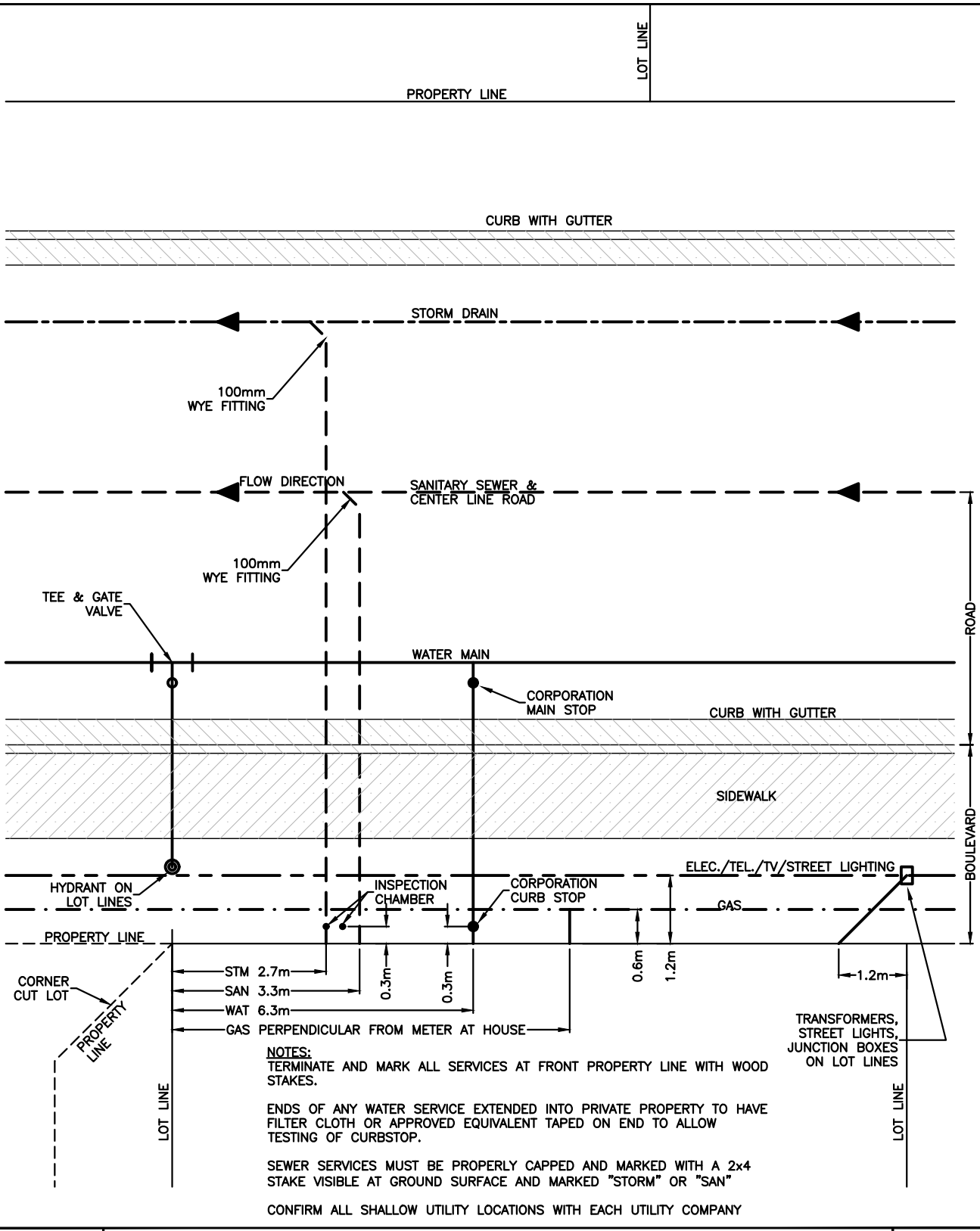
PENTICTON INDIAN BAND

Support for Undetermined Existing Pipe

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–G9	0	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:
TERMINATE AND MARK ALL SERVICES AT FRONT PROPERTY LINE WITH WOOD STAKES.

ENDS OF ANY WATER SERVICE EXTENDED INTO PRIVATE PROPERTY TO HAVE FILTER CLOTH OR APPROVED EQUIVALENT TAPED ON END TO ALLOW TESTING OF CURBSTOP.

SEWER SERVICES MUST BE PROPERLY CAPPED AND MARKED WITH A 2x4 STAKE VISIBLE AT GROUND SURFACE AND MARKED "STORM" OR "SAN"

CONFIRM ALL SHALLOW UTILITY LOCATIONS WITH EACH UTILITY COMPANY

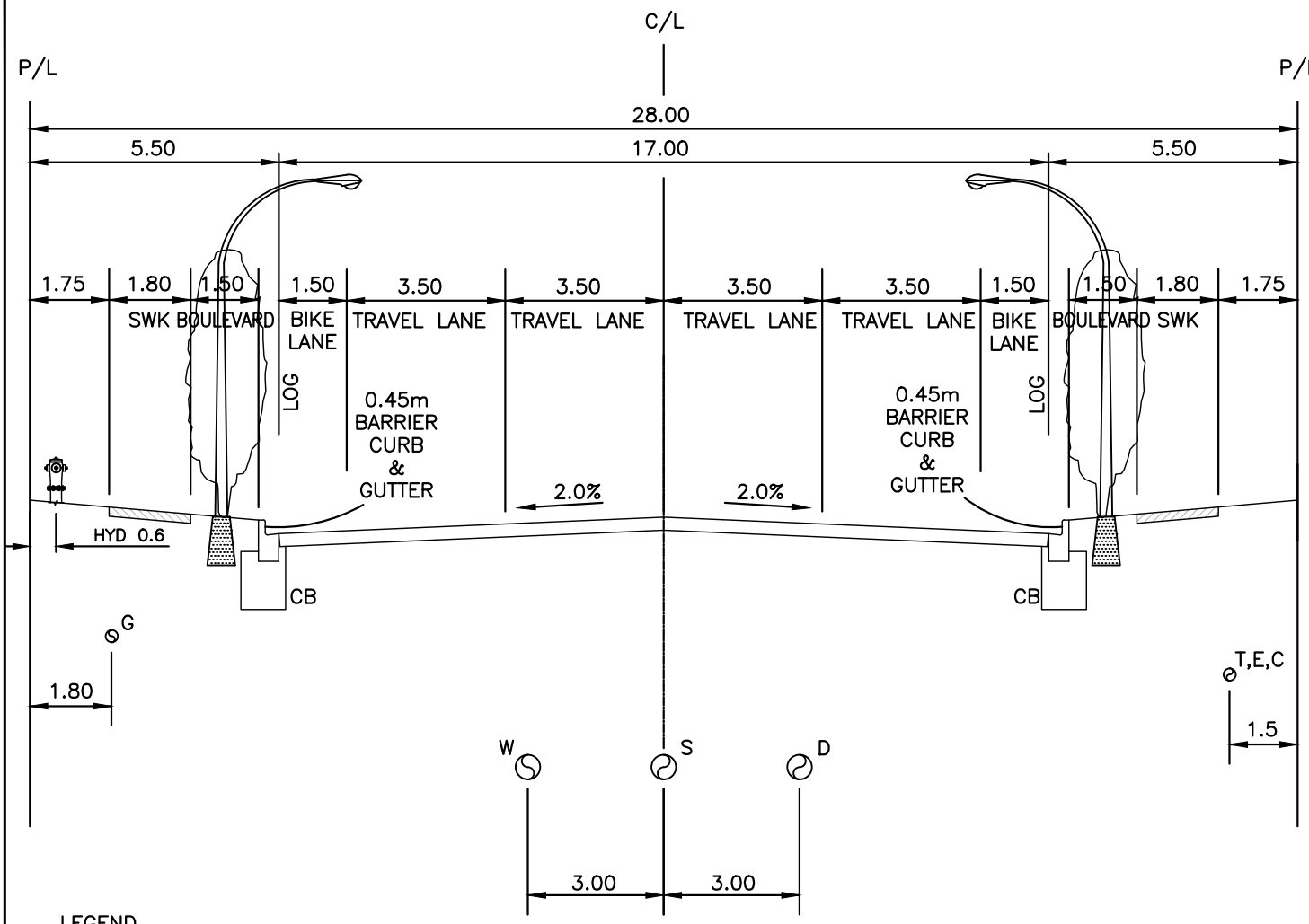
PENTICTON INDIAN BAND

Lot Service Locations

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–G10	0	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



LEGEND

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTER LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
LOG – LIP OF GUTTER
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1. NO ON–STREET PARKING PERMITTED

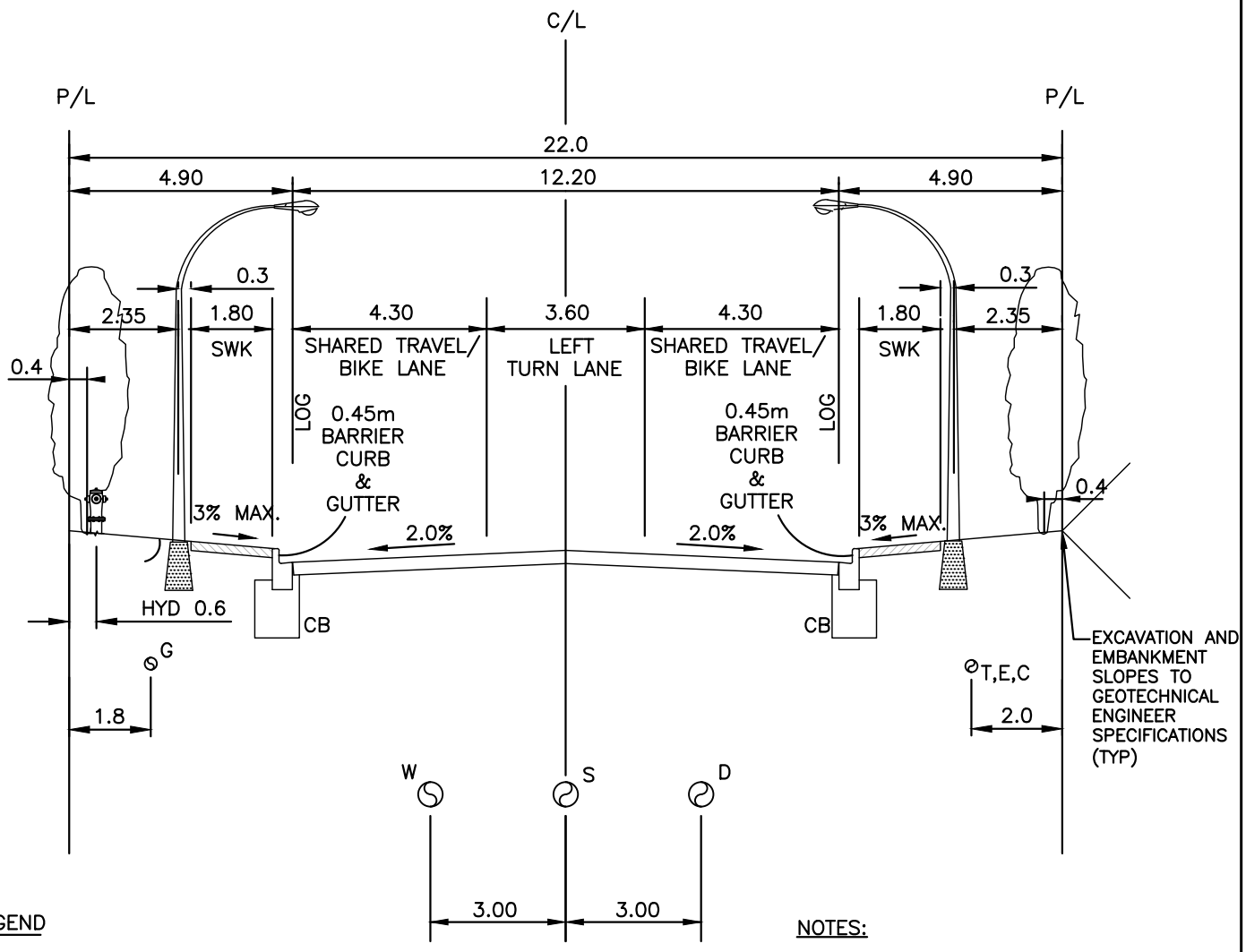
PENTICTON INDIAN BAND

Arterial Roadway

DRAWING NUMBER	SSD–R2
REVISION NUMBER	0
SCALE	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



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CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1. NO ON–STREET PARKING PERMITTED

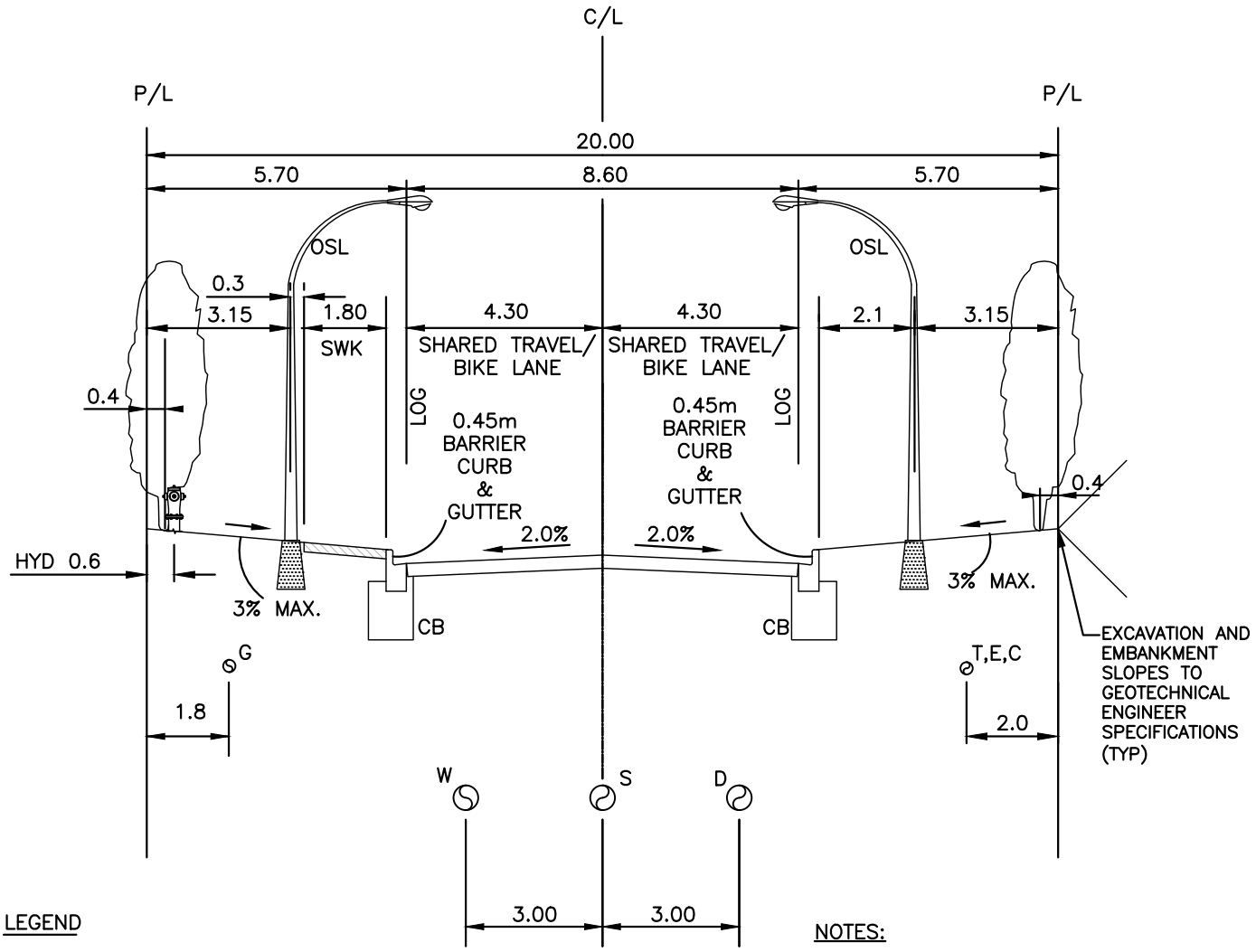
PENTICTON INDIAN BAND

Commercial Collector Roadway

DRAWING NUMBER	SSD–R3
REVISION NUMBER	0
SCALE	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



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CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1. NO ON–STREET PARKING PERMITTED

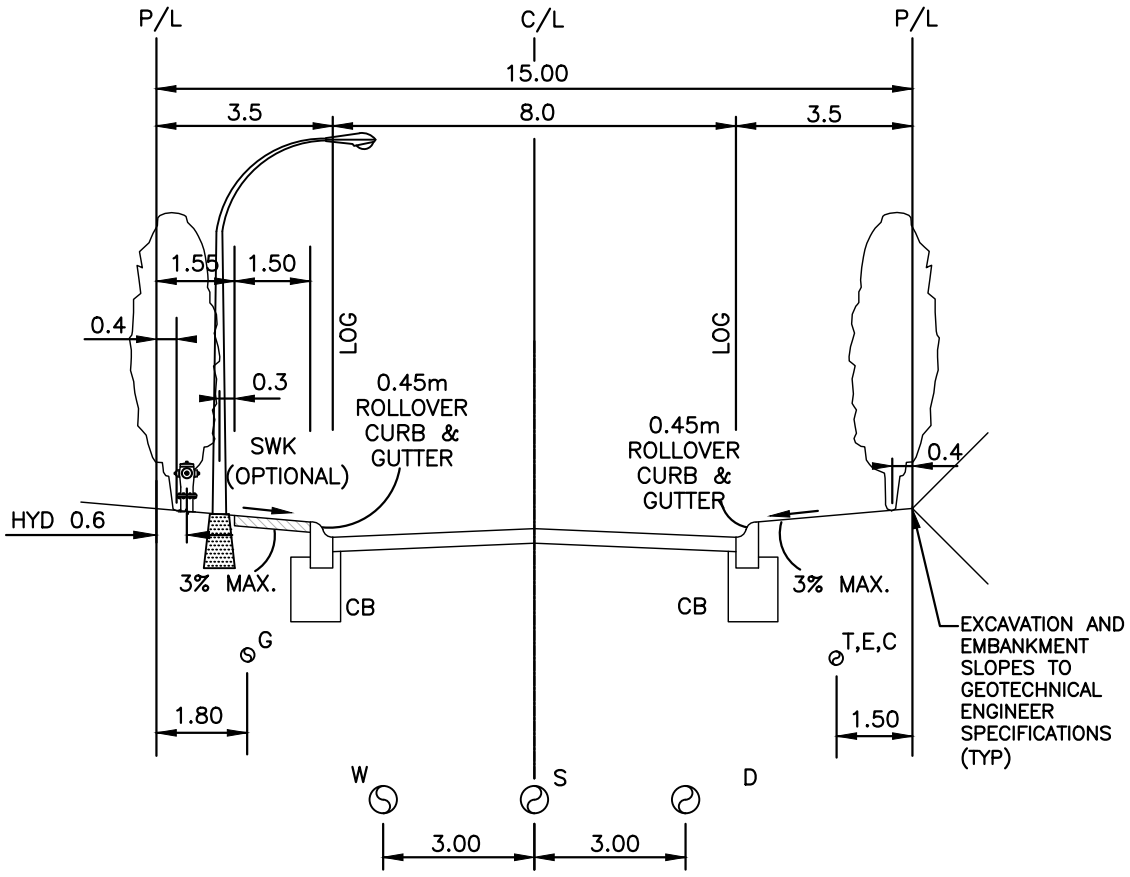
PENTICTON INDIAN BAND

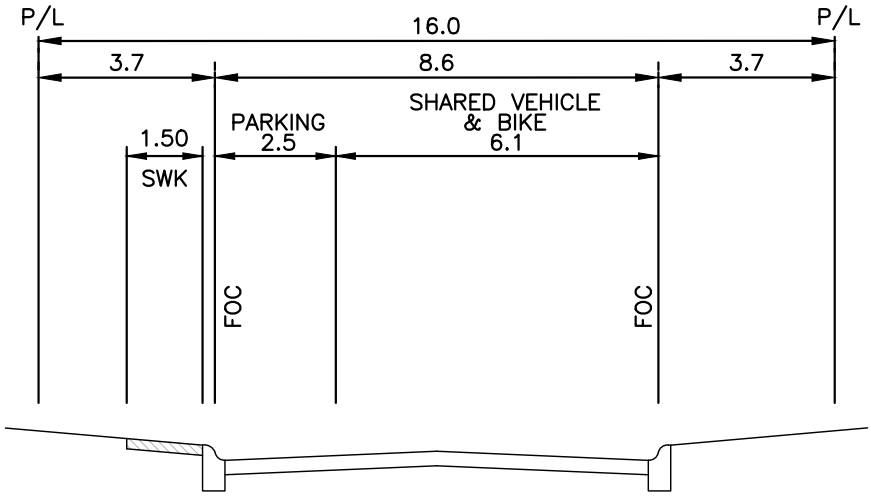
Residential Collector Roadway

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–R4	0	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING





WITH PARKING (OPTIONAL)

LEGEND

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CB – CATCH BASIN
OSL – STREET LIGHT

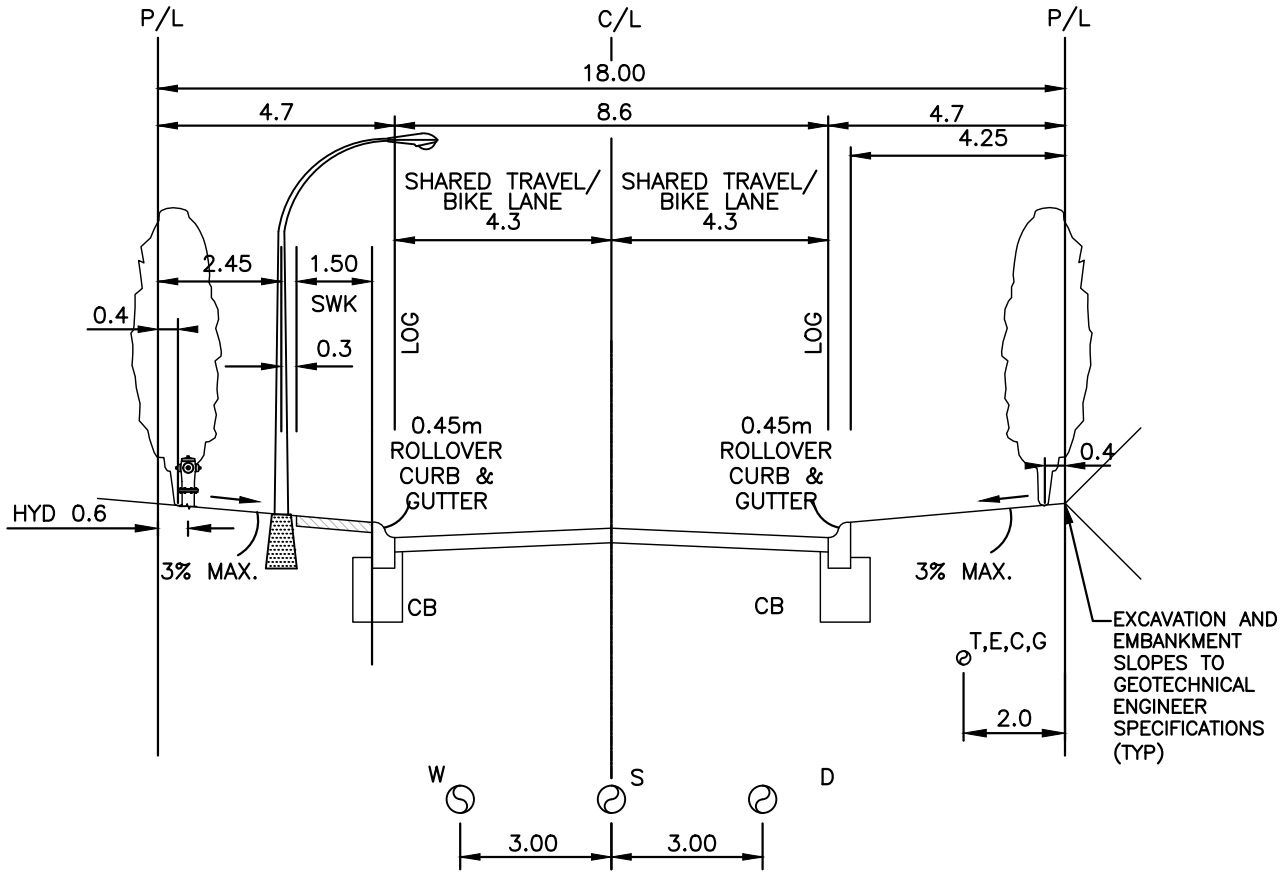
PENTICTON INDIAN BAND

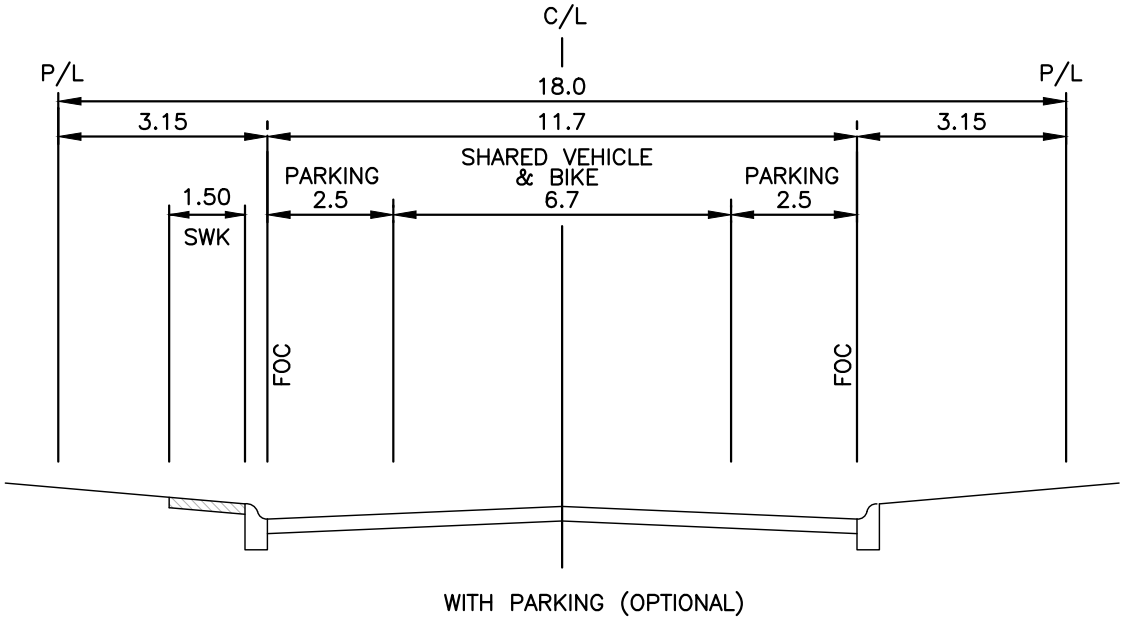
Residential Cul De Sac Roadway

DRAWING NUMBER	SSD–R5
REVISION NUMBER	0
SCALE	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING





WITH PARKING (OPTIONAL)

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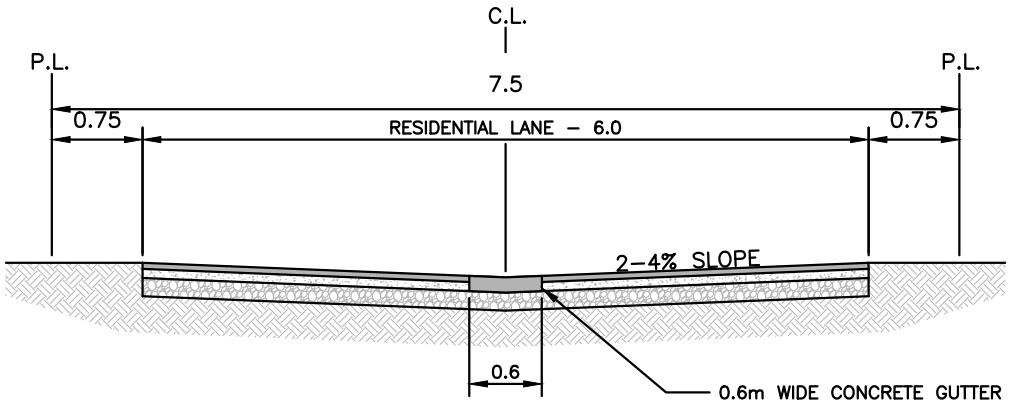
OSL – STREET LIGHT

PENTICTON INDIAN BAND

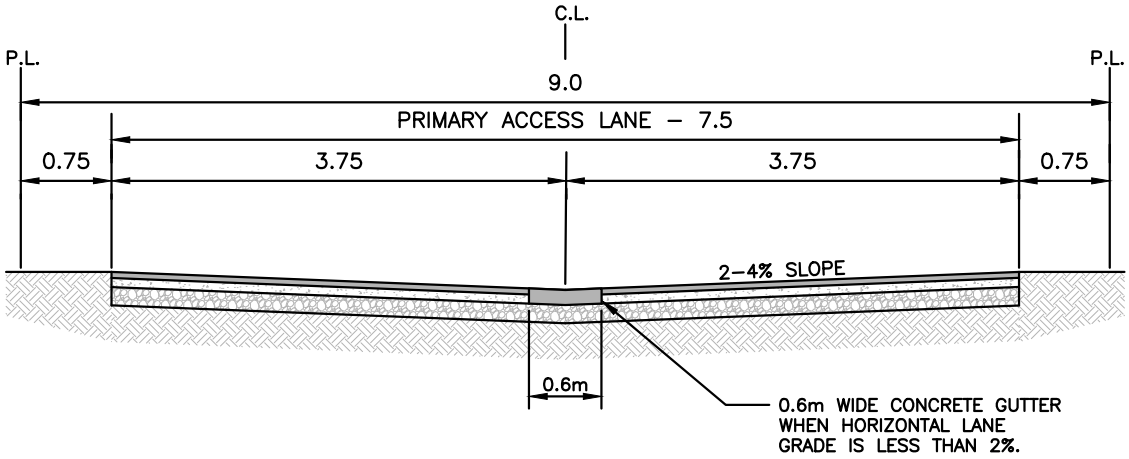
Residential Local Roadway

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–R6	0	NTS

01–30–2020

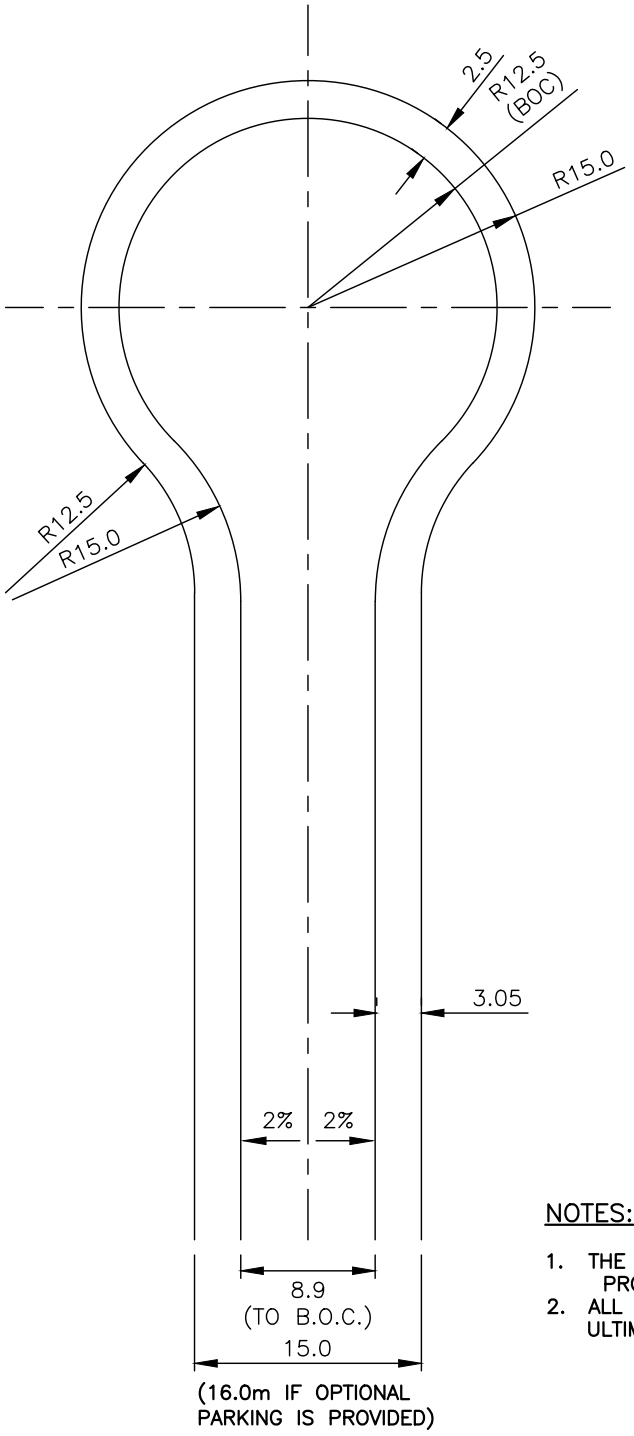


RESIDENTIAL, EMERGENCY AND PRIVATE ACCESS LANE



COMMERCIAL/MULTI–FAMILY PRIMARY ACCESS LANE

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:

1. THE APPROVING OFFICER MAY REQUIRE SPECIAL PROVISIONS FOR CUT AND FILL SLOPES.
2. ALL UTILITIES SHALL BE INSTALLED TO ACCOMMODATE ULTIMATE ROAD AND DRIVEWAY LOCATIONS.

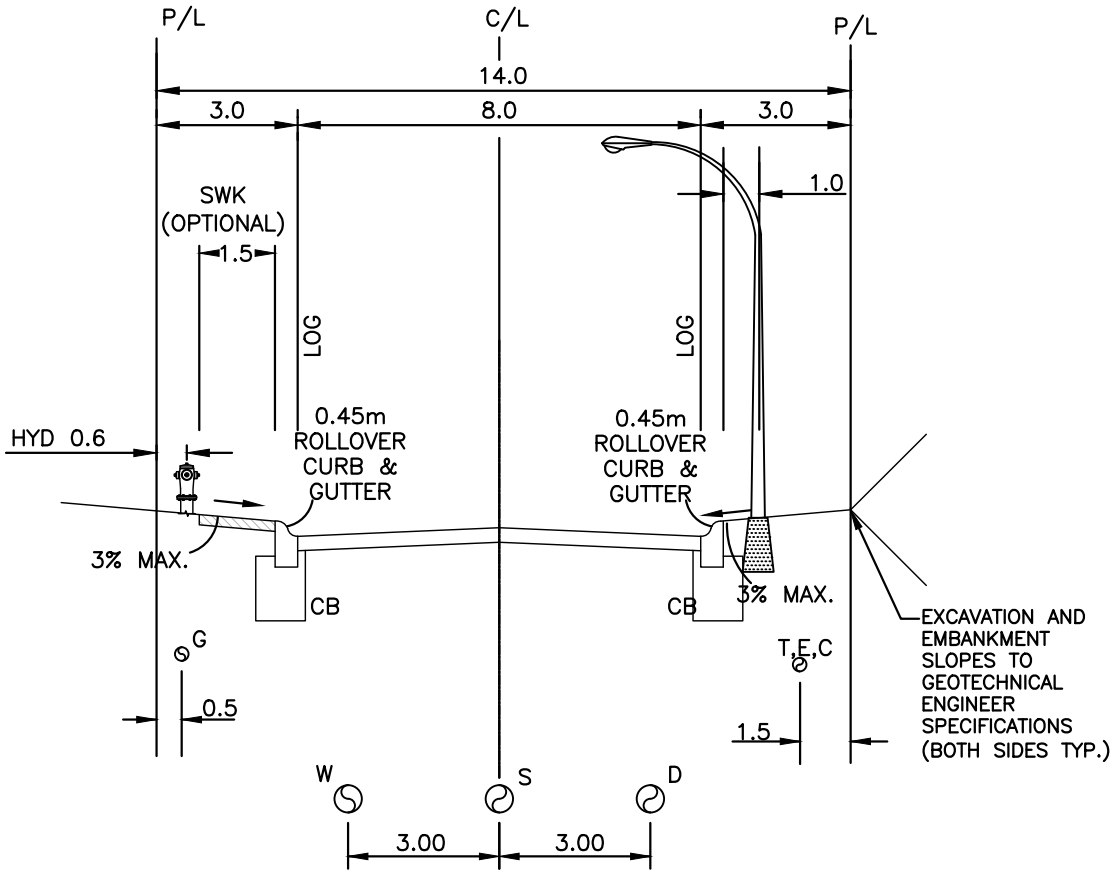
PENTICTON INDIAN BAND

Residential Local Cul De Sac Geometry

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–R8	0	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



LEGEND

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FOC – FACE OF CURB
LOG – LIP OF GUTTER
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1. NO ON–STREET PARKING PERMITTED

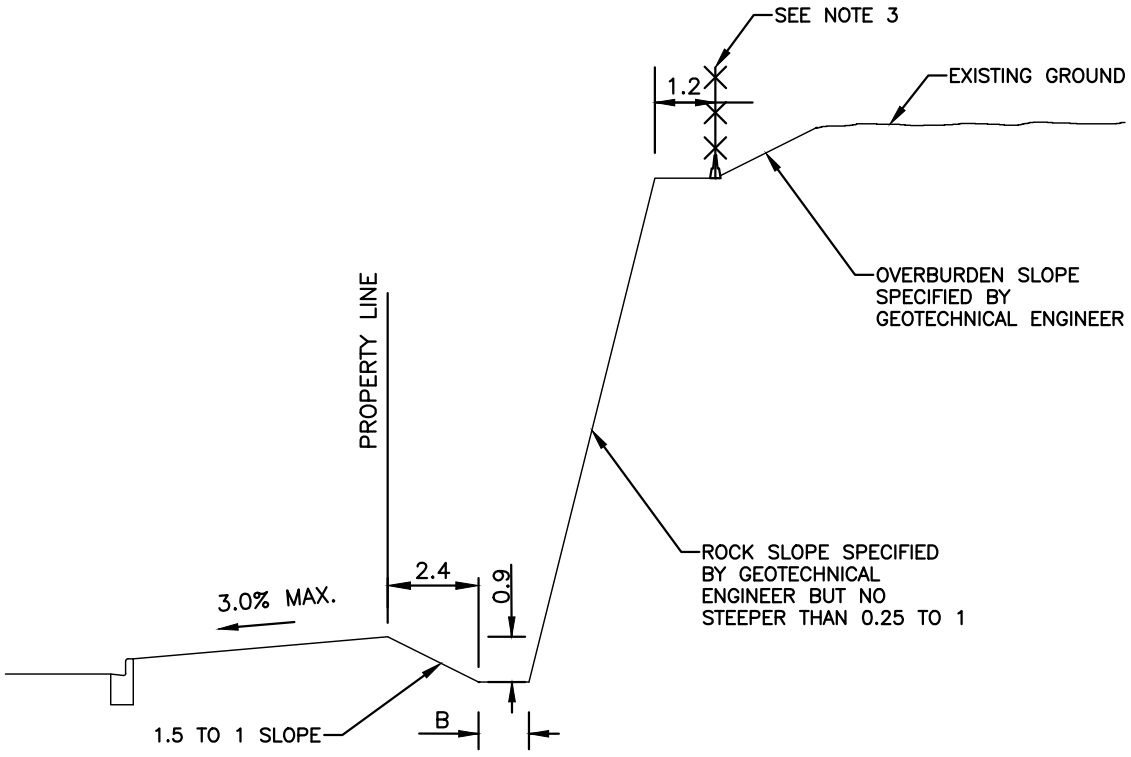
PENTICTON INDIAN BAND

Residential Strata Roadway

DRAWING NUMBER	SSD–R9
REVISION NUMBER	0
SCALE	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



ROCK FALL DITCH BOTTOM WIDTH "B"

1.25m FOR CUT HEIGHT LESS THAN 10m
2.75m FOR CUT HEIGHT GREATER THAN 10m

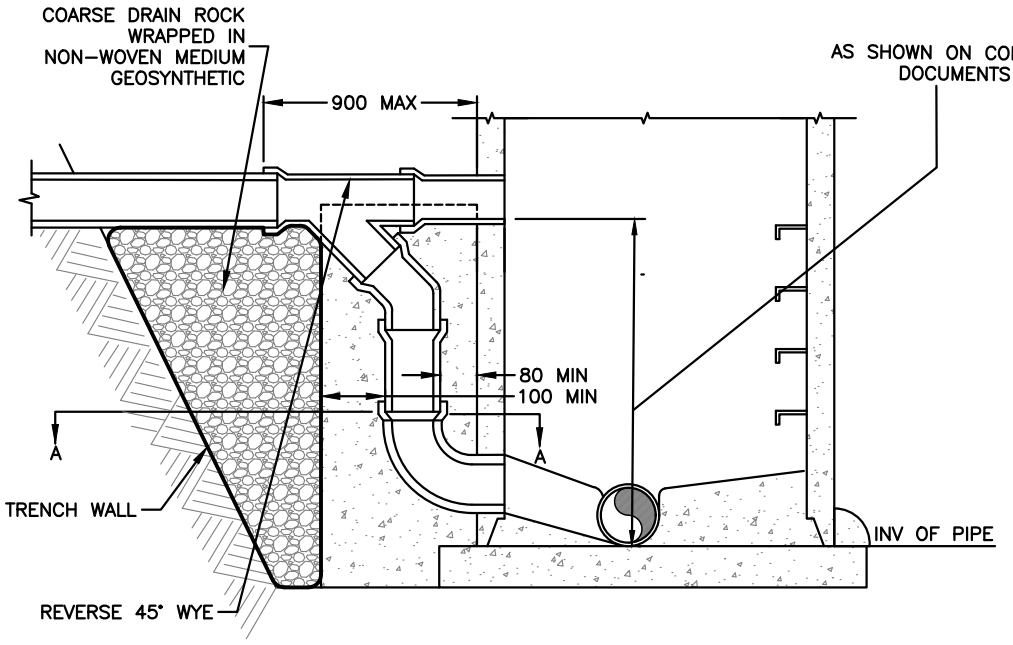
NOTES:

1. ROCK CUT HEIGHT IS MEASURED FROM DITCH BOTTOM TO TOP OF THE FACE OF ROCK EXCLUDING OVERBURDEN.
2. AN ADDITIONAL GEOTECHNICAL INVESTIGATION IS TO BE COMPLETED FOR ALL ROCK CUTS GREATER THAN 10m AND WHERE THE POTENTIAL FOR GEO-HAZARDS EXIST BEYOND THIS ROCK CUT.
3. DEPENDING ON OVERBURDEN SLOPE HEIGHT AND THE POTENTIAL FOR ROCKS TO ROLL DOWN THE SLOPE, IT MAY BE NECESSARY TO PROVIDE A BARRIER TO PREVENT ROCKS FROM ENTERING THE ROCK SLOPE AREA. THE GEOTECHNICAL ENGINEER TO ASSESS THE RISK AND PROVIDE A REPORT WITH RECOMMENDATIONS. HOWEVER, AS A MINIMUM, A 1.5m HIGH CHAIN LINK FENCE SHALL BE PROVIDED FOR ALL ROCK CUTS GREATER THAN 3m IN HEIGHT.

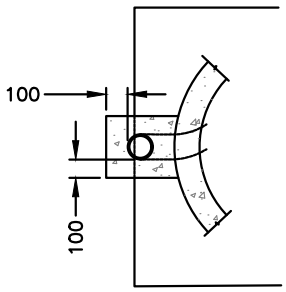
PENTICTON INDIAN BAND	Rock Cut Fall Protection	DRAWING NUMBER SSD-R10
		REVISION NUMBER 0
		SCALE NTS

01-30-2020

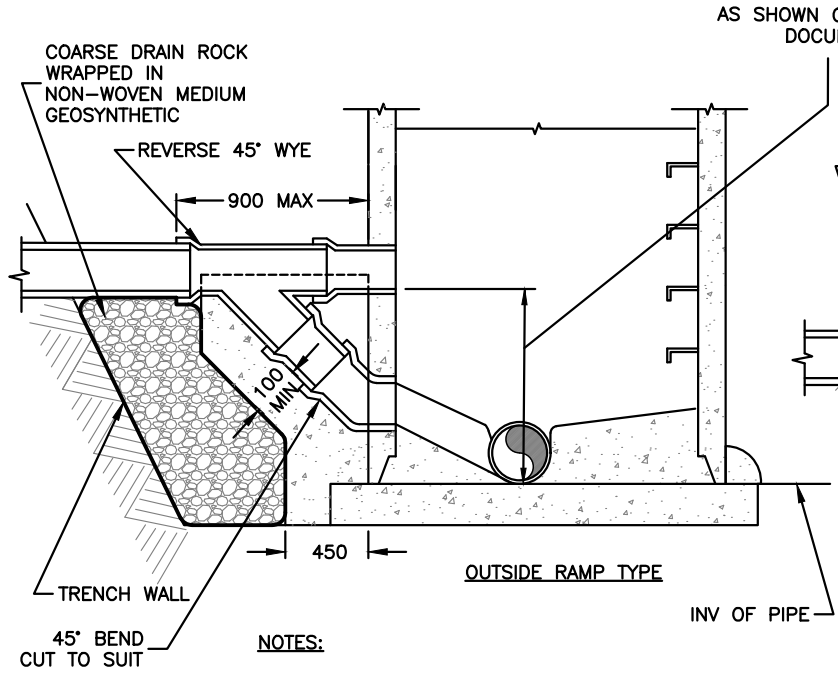
PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



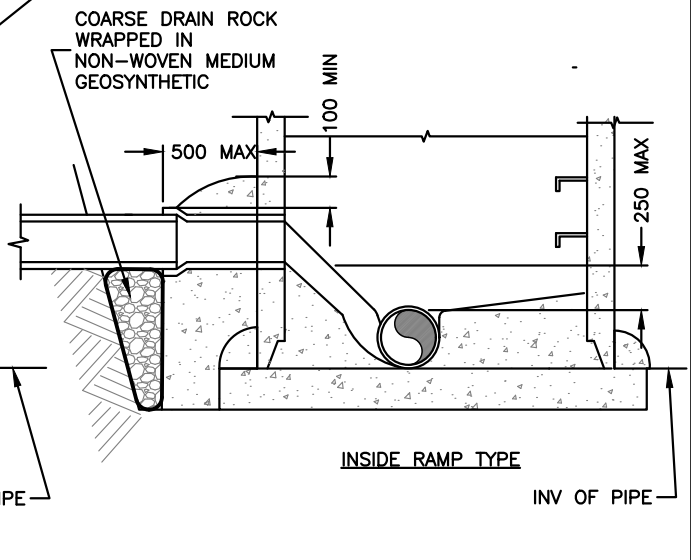
OUTSIDE DROP TYPE



SECTION A-A



OUTSIDE RAMP TYPE



INSIDE RAMP TYPE

NOTES:

1. THIS DRAWING SHOWS CONNECTION DETAILS ONLY, REFER TO DRAWING S1 FOR ALL OTHER DETAILS PERTAINING TO MANHOLE REQUIREMENTS AND INSTALLATION
2. REFER TO CONTRACT DRAWINGS, SECTION 33 44 01 FOR DETAILED SPECIFICATIONS

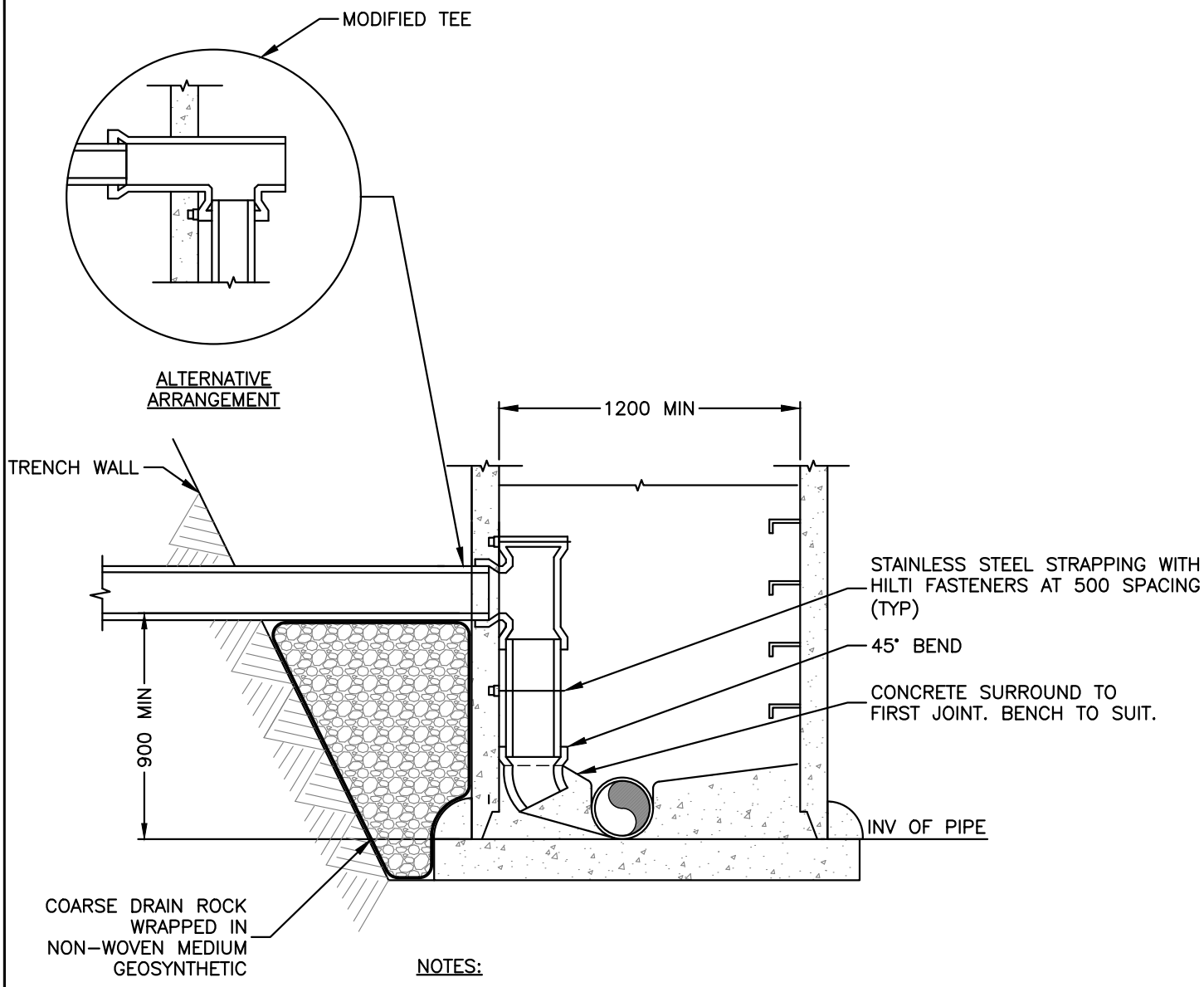
PENTICTON INDIAN BAND

Manhole Connection Details

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD-S3	0	NTS

01-30-2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:

1. INSIDE DROP TO BE USED ONLY WHERE SPECIFIED BY ENGINEER.
2. ALL INSIDE PIPE AND FITTINGS PVC DR 28/35.
3. THIS DRAWING SHOWS INSIDE DROP ONLY. SEE MMCD DRAWING S1 FOR ADDITIONAL MANHOLE REQUIREMENT DETAILS

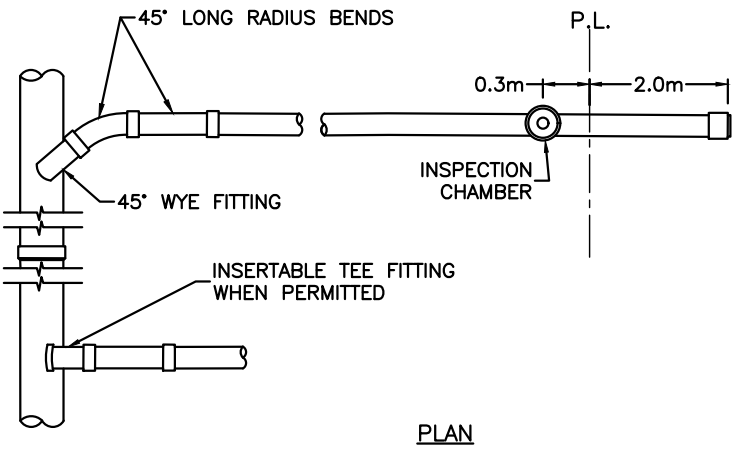
PENTICTON INDIAN BAND

Inside Drop Manhole

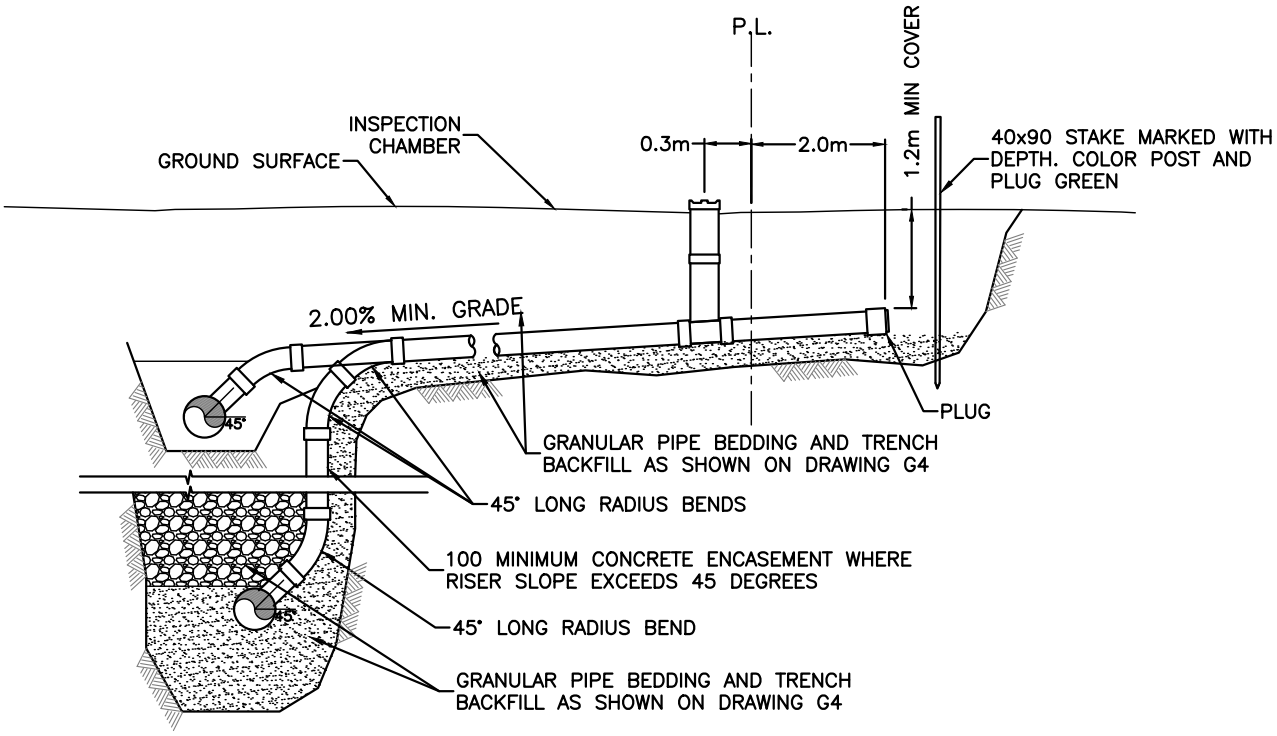
DRAWING NUMBER	REVISION NUMBER	SCALE
SSD-S4	0	NTS

01-30-2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



PLAN



ELEVATION

NOTES:

1. CONCRETE SEWER PIPES TO BE PROVIDED WITH SUPPLIER INSTALLED PVC STUB.
2. CONNECTIONS TO BE 100 MINIMUM OR LARGER AS SPECIFIED ON CONTRACT DRAWINGS.
3. RISER TYPE SERVICE TO BE USED ONLY WHEN SERVICE IS MORE THAN 2.4m ABOVE WYE INVERT OR AS DIRECTED BY CONTRACT ADMINISTRATOR
4. LOCATION OF SERVICE MARKER AS SHOWN ON CONTRACT DOCUMENTS

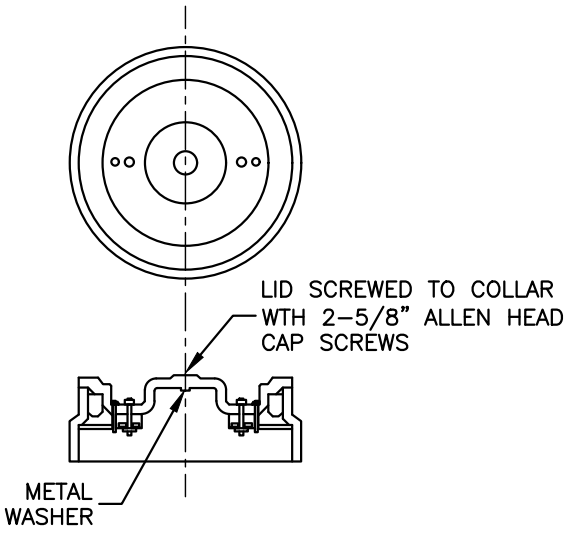
PENTICTON INDIAN BAND

Storm Sewer Service Connection

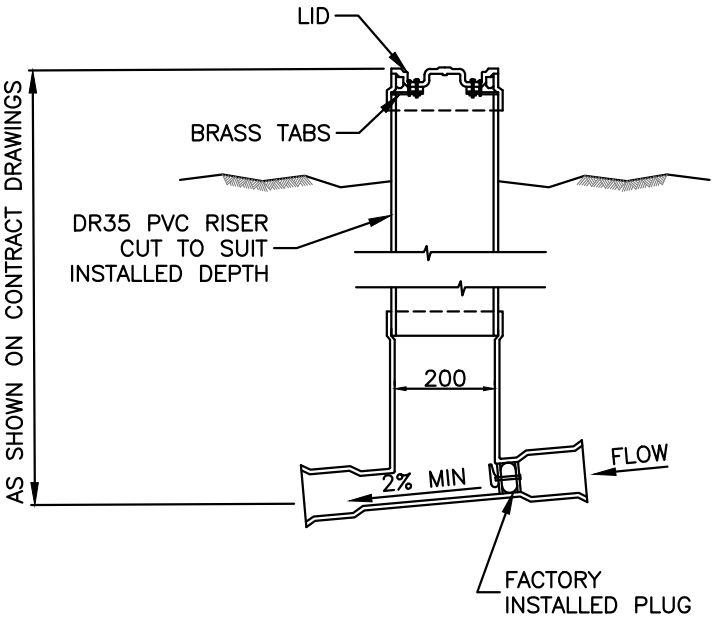
DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–S8	0	NTS

01–30–2020

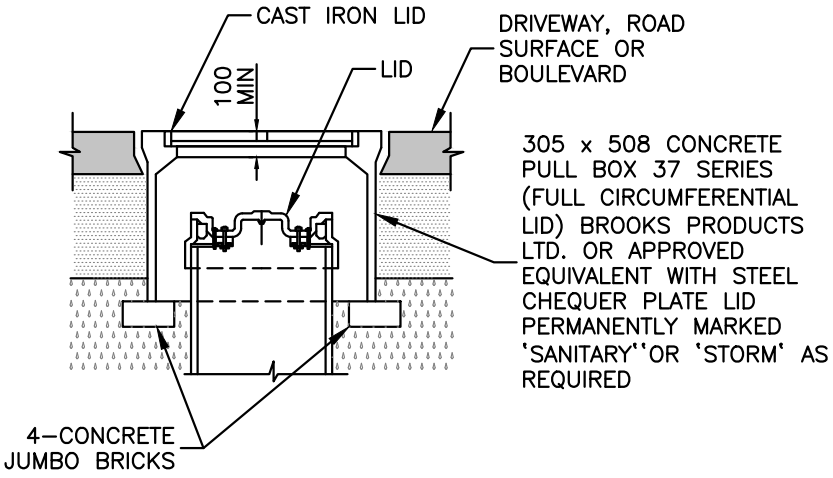
PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



LID DETAIL



INSTALLATION IN BOULEVARD



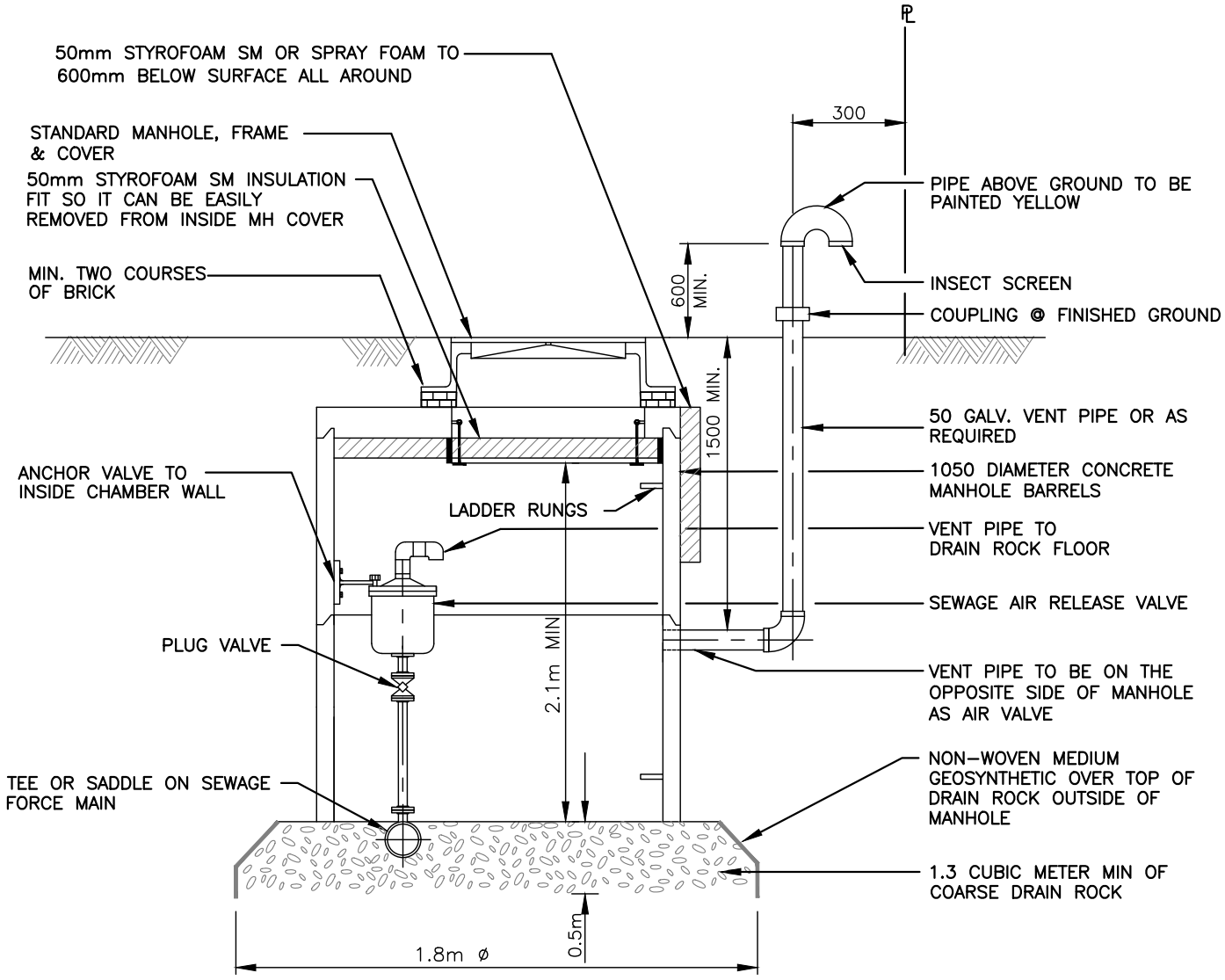
INSTALLATION IN DRIVEWAY AND ROAD

NOTES:
1. REFER TO DRAWING CSSD S7 AND CSSD S8 FOR INSTALLATION REQUIREMENTS.
2. INSPECTION CHAMBER TO BE APPROVED MANUFACTED FITTING.
3. REFER TO CONTRACT DRAWINGS FOR SITE SPECIFIC DIMENSIONS. REFER TO SECTION 33 30 01 FOR DETAILED SPECIFICATIONS.
4. ALL SERVICES TO BE EXTENDED 3.0m INTO PROPERTY UNLESS DESIGN DRAWINGS SHOW OTHERWISE.

PENTICTON INDIAN BAND	Inspection Chamber 100 to 150 Sanitary Sewer and Storm Connection	DRAWING NUMBER SSD–S9 REVISION NUMBER 0 SCALE NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



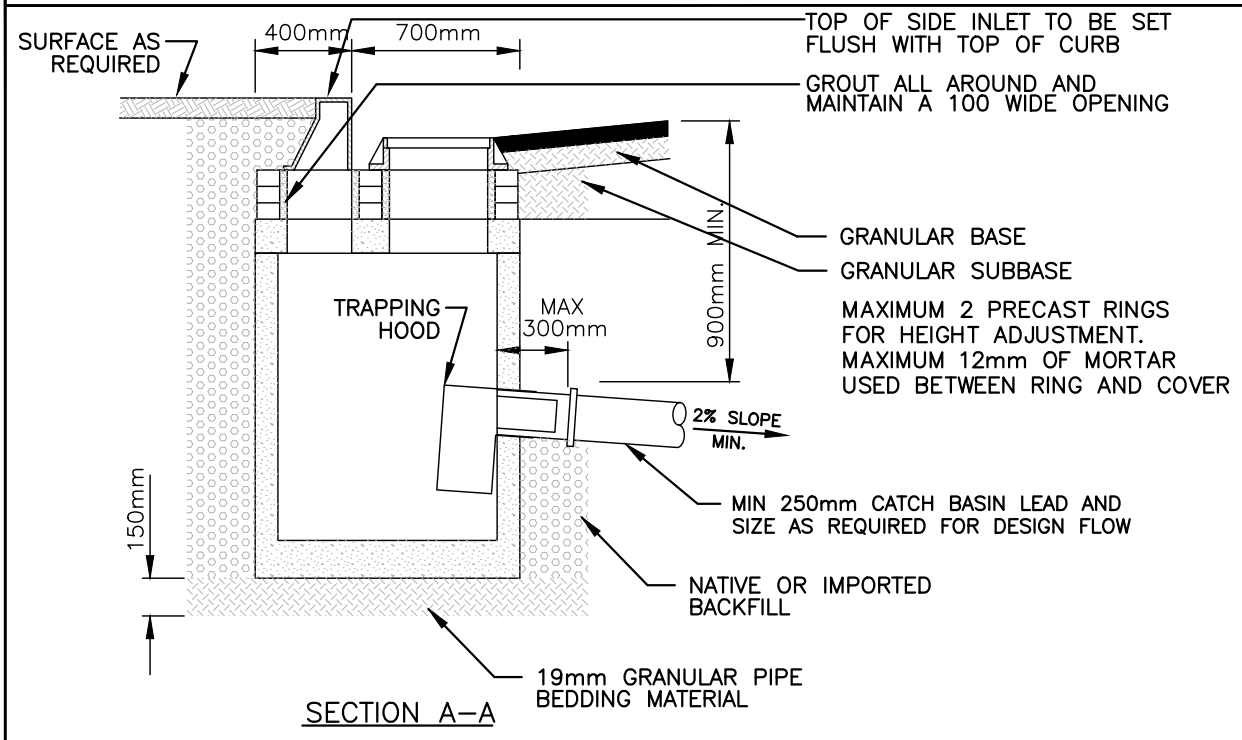
NOTES:

1. ALL DIMENSIONS IN MILLIMETERS.

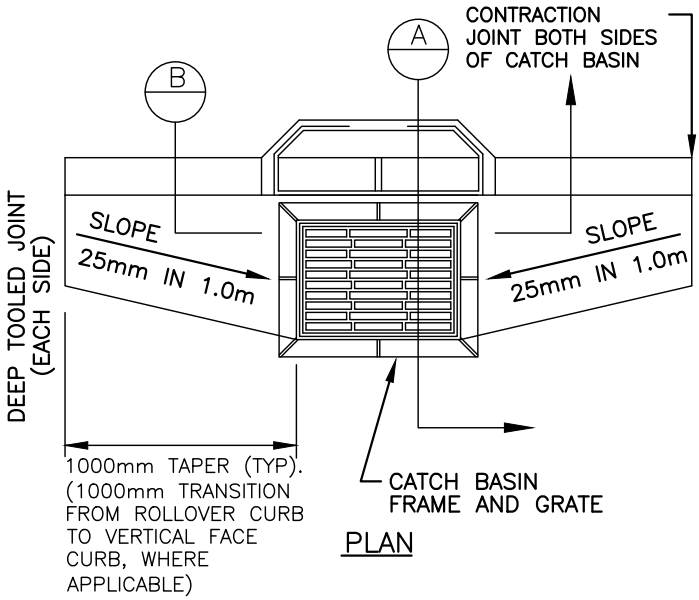
PENTICTON INDIAN BAND	Sewage Air Valve Assembly	DRAWING NUMBER SSD-S16
		REVISION NUMBER 0
		SCALE NTS

01-30-2020

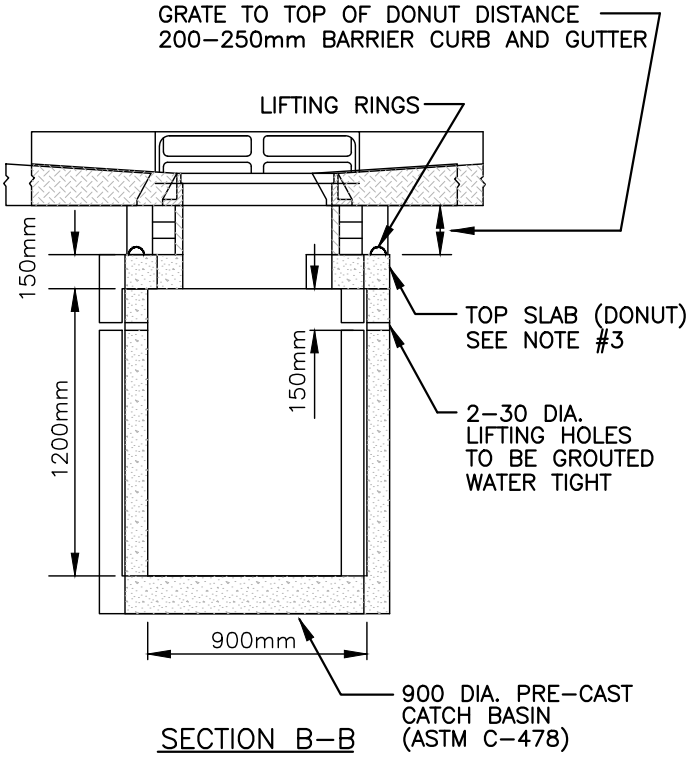
PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



SECTION A–A



PLAN



SECTION B–B

NOTES:

1. FOR DETAILS OF METAL CASTINGS AND TOP SLAB SEE S18.
2. a) METAL CASTINGS ADJUSTED TO GRADE WITH CONCRETE BRICKS. INSIDE SUFACES TO BE GROUTED SMOOTH.
   b) FOR INSTALLATION OF CATCH BASIN WITHOUT CURB AND GUTTER, BLOCK CURB INLET OPENING IN TOP SLAB WITH SOLID NON–DECOMPOSABLE MATERIAL.
3. GRATE TO BE SET BELOW FIRST LIFT OF ASPHALT WHERE FINAL LIFT IS NOT BEING INSTALLED WITHIN ONE MONTH.

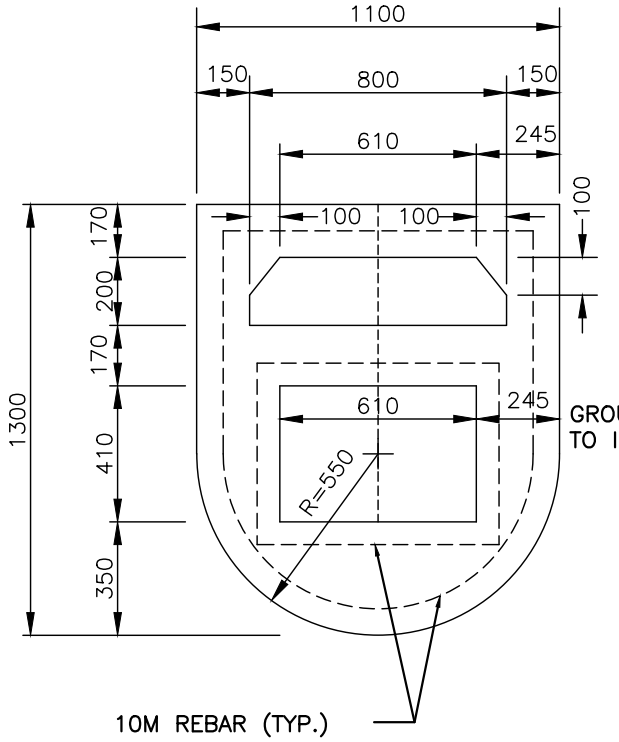
PENTICTON INDIAN BAND

Side Inlet Catch Basin

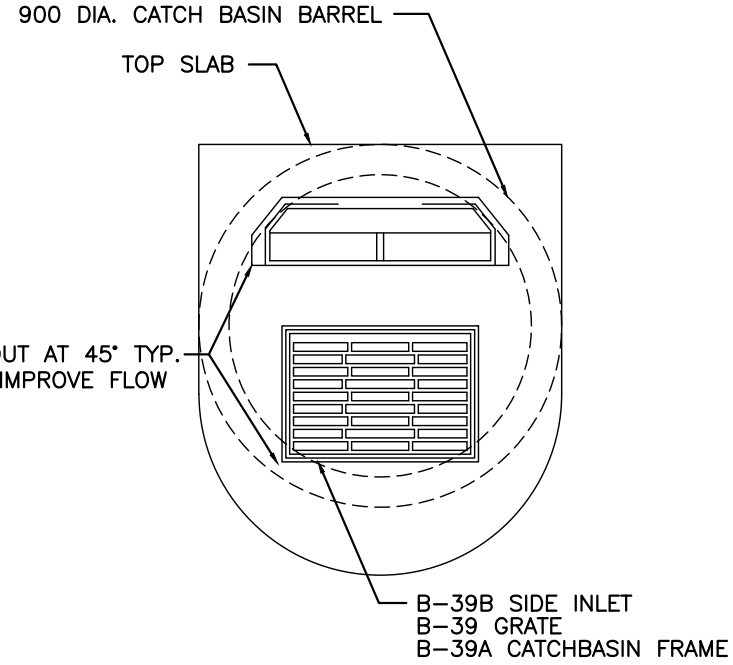
DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–S17	0	NTS

01–30–2020

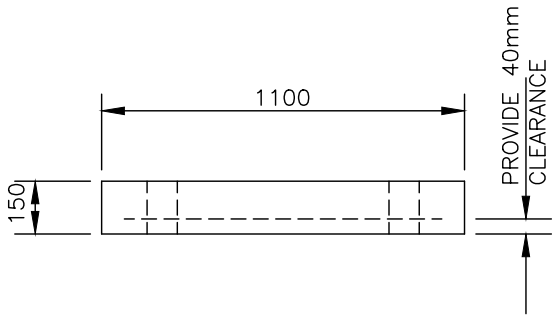
PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



PLAN TOP SLAB



POSITION OF TOP SLAB
ON 900mm DIA. CATCH BASIN



FRONT ELEVATION

NOTES:
1. ALL CONCRETE WORK TO BE A MINIMUM OF 30MPa STRENGTH AND DESIGNED FOR H-20 LOADING.

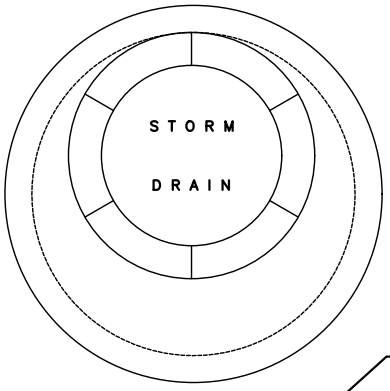
PENTICTON INDIAN BAND

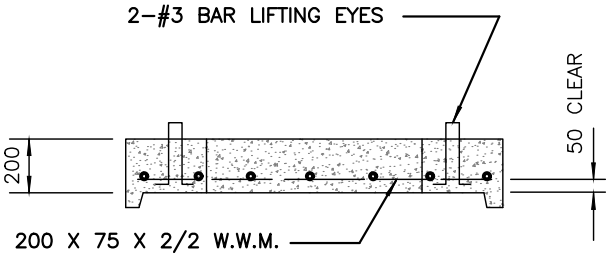
Side Inlet Catch Basin Top Slab

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD-S18	1	NTS

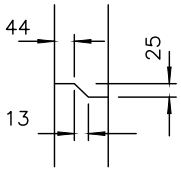
01-30-2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING

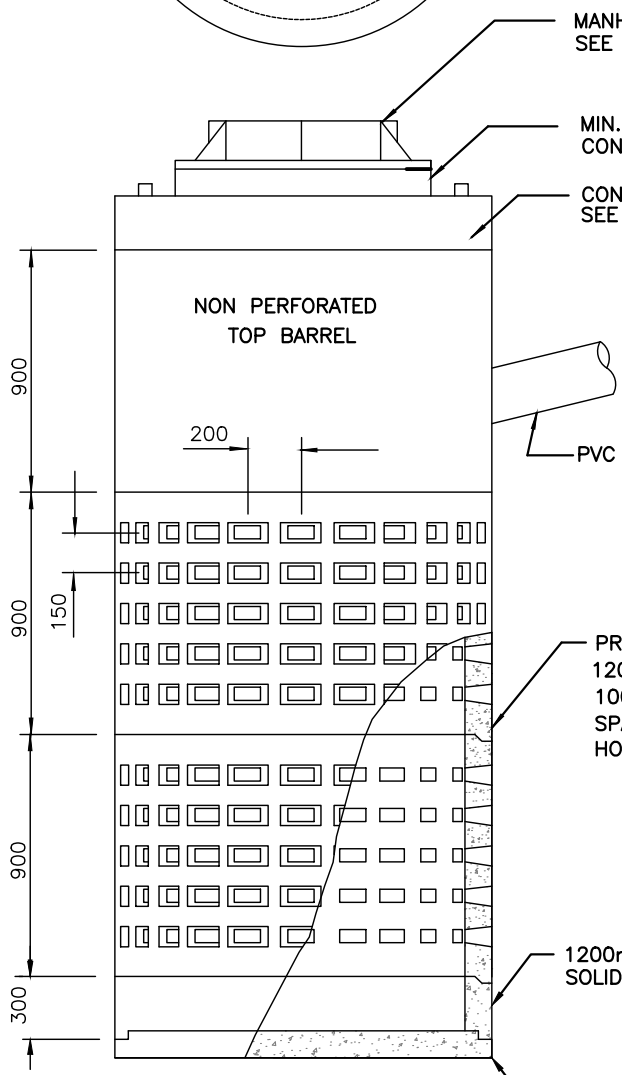


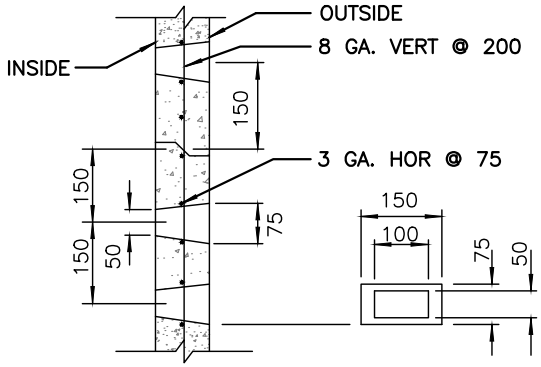


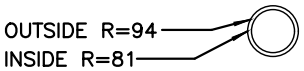
CONCRETE LID DETAIL



JOINT DETAIL

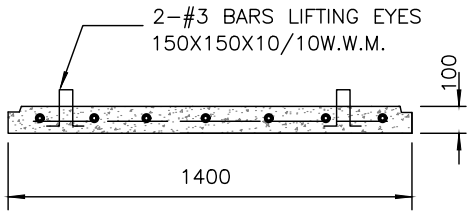






OPTIONAL HOLE SHAPE

SECTION–BARREL



BOTTOM SLAB DETAIL

NOTES:
1. LADDER RUNGS ARE REQUIRED.
2. SEE MANHOLE STD. DWG. FOR DETAILS.
3. SEE DRAINAGE DRYWELL INSTALLATION STANDARD FOR DETAILS.
4. THIS STANDARD IS ALLOWED ONLY ON–SITE AND IS NOT PERMITTED WITHIN PIB RIGHTS OF WAY

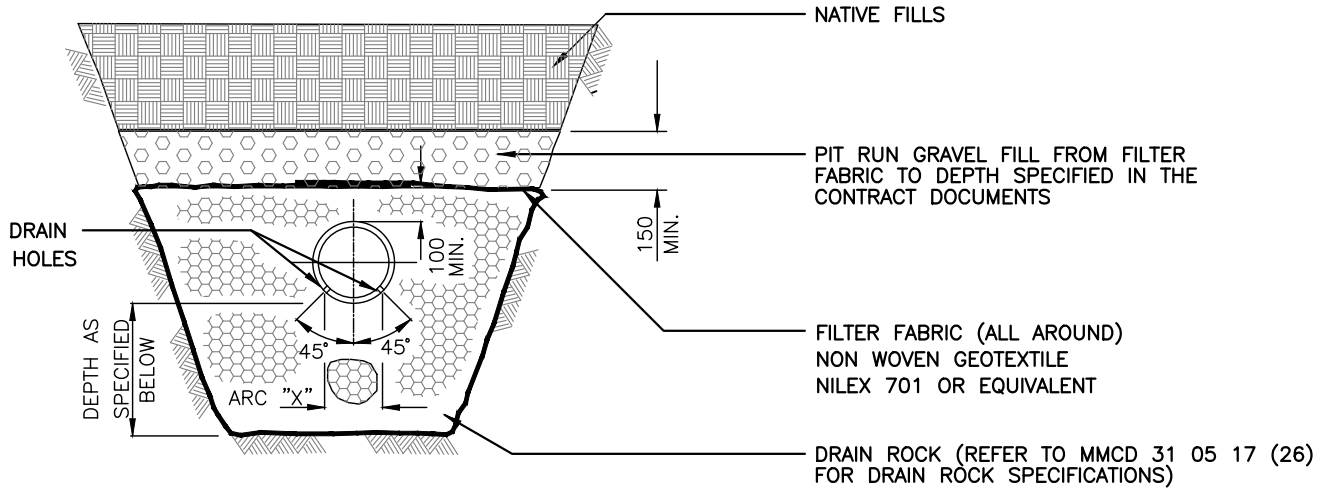
PENTICTON INDIAN BAND

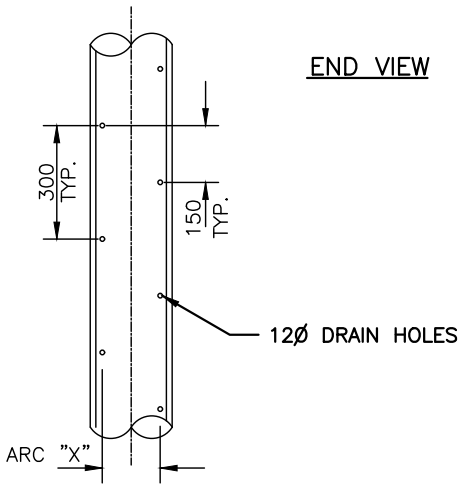
Drainage Drywell
On Site Only

DRAWING NUMBER	SSD–S19
REVISION NUMBER	1
SCALE	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING





GEOTEXTILE STRENGTH REQUIREMENTS				
STRENGTH TYPE	TEST METHOD	UNITS	CLASS 1	CLASS 2
GRAB TENSILE	ASTM D4632	N	800	360
PUNCTURE	ASTM D4833	N	370	200
BURST	ASTM D3786	kPa	1950	1030
TRAPEZOIDAL	ASTM D4533	N	260	130

1) CLASS 1: GEOTEXTILE INSTALLATION WHERE VERY COARSE SHAPE ANGULAR AGGREGATE IS USED.
COMPACTION > 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD)
DEPTH OF TRENCH > 3.0

2) CLASS 2: GEOTEXTILE INSTALLATION ON SMOOTH GRADED SURFACES HAVING NO SHARP ANGULAR AGGREGATE
COMPACTION 95% SPMDD

NOTES:
1. PERFORATION SECTION APPLIES TO USE OF PVC PIPE.
2. FIELD PERFORATION OF PIPE SHALL BE TO THIS STANDARD. FACTORY PERFORATED PIPE MUST BE APPROVED BY THE APPROVING OFFICER.
3. PROVIDE 0.5m MIN. FABRIC OVERLAP FOR LONGITUDINAL OR TRANSVERSE JOINTS IN FABRIC.
4. NUMBER OF DRYWELLS AND DEPTH OF DRAIN ROCK TO BE AS FOLLOWS:
   a) FOR PERCOLATION RATE OF 0–15MIN. PER 25mm
      – USE 5 PER HA.
      – USE 200mm DEPTH OF DRAIN ROCK UNDER PERF. PIPE
   b) FOR PERCOLATION RATE OF 15–30 MIN. PER 25mm
      – USE 10 DRYWELLS PER HA.
      – USE 300mm DEPTH OF DRAIN ROCK UNDER PERF. PIPE
   c) FOR PERCOLATION RATE OVER 30 MIN. PER 25mm, PERF. PIPE & DRYWELLS ARE NOT RECOMMENDED.

NOMINAL PIPE DIAMETER	ARC "X" (BASED UPON AVERAGE O.D.)
200	160
250	200
300	240
375	290
450	350

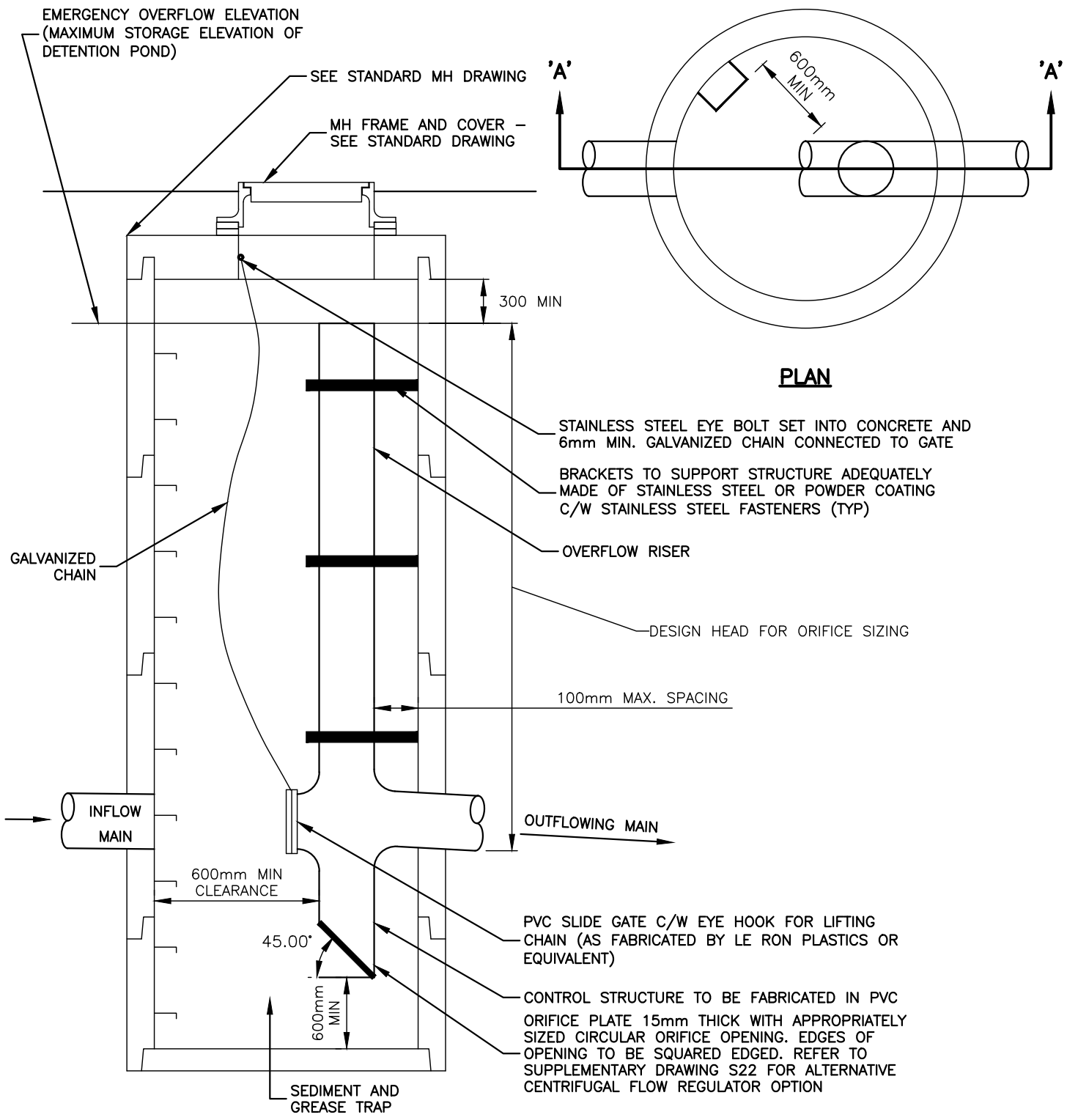
PENTICTON INDIAN BAND

Pipe Perforation and Begging Detail for Ground Recharge

DRAWING NUMBER: SSD–S20
REVISION NUMBER: 1
SCALE: NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



SECTION 'A – A'

NOTES:
1. ALL DIMENSION IN MILLIMETRES.

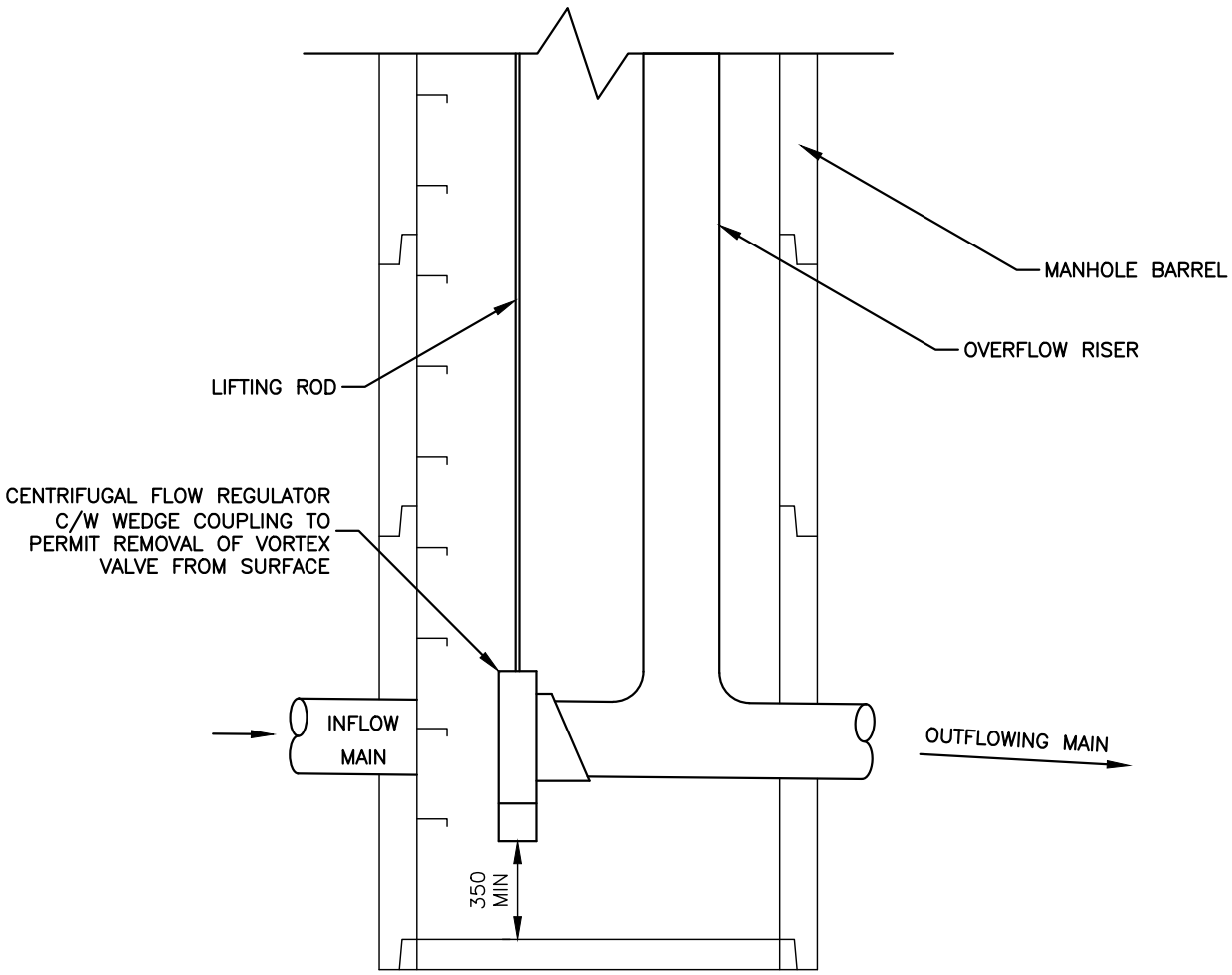
PENTICTON INDIAN BAND

Storm Control Manhole

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–S21	1	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:
1. ALL DIMENSION IN MILLIMETRES.

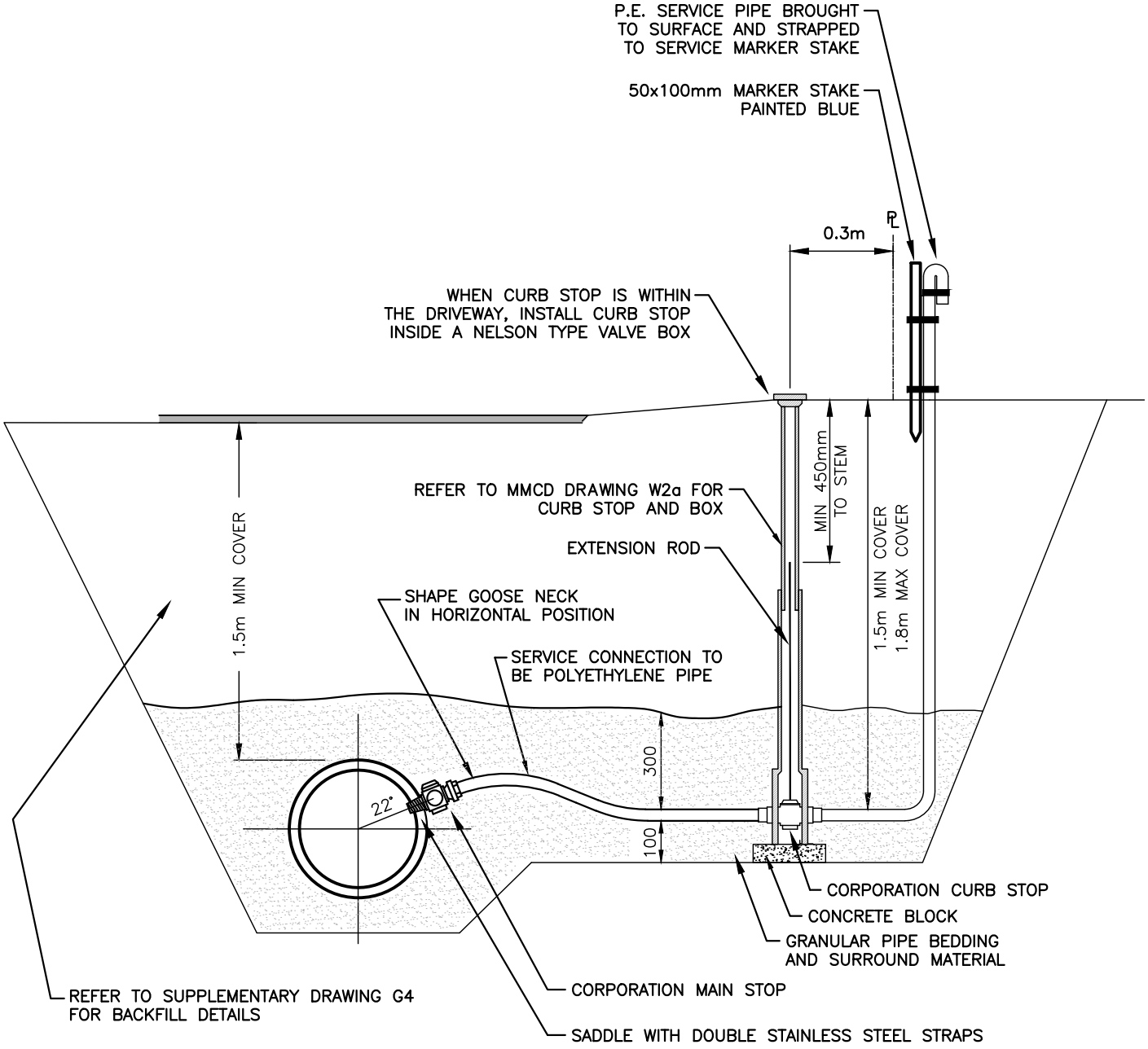
PENTICTON
INDIAN BAND

Storm Control Manhole
Alternative Flow Control Device

DRAWING NUMBER	SSD–S22
REVISION NUMBER	1
SCALE	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



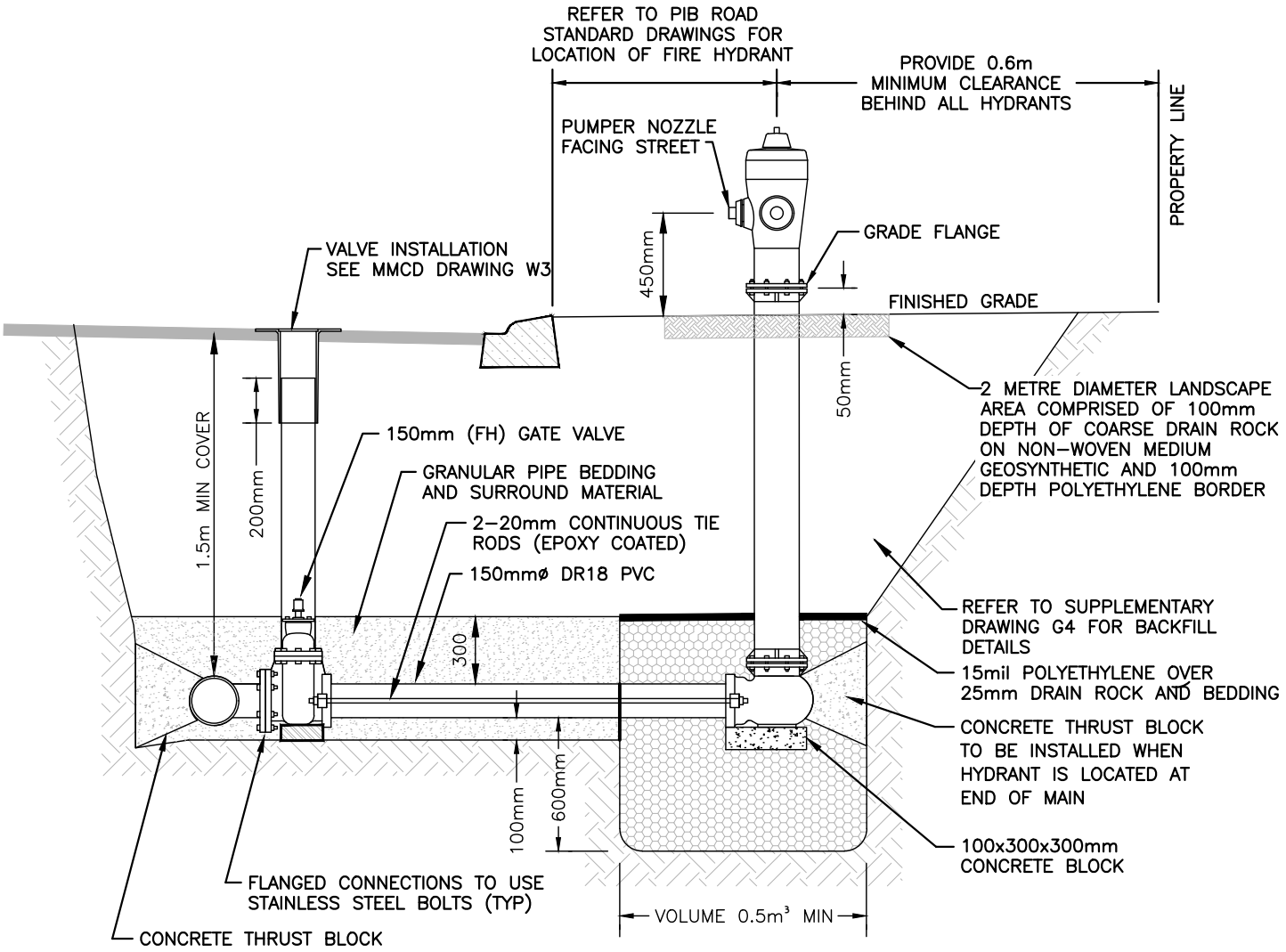
PENTICTON INDIAN BAND

Water Service Connection

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–W2	1	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



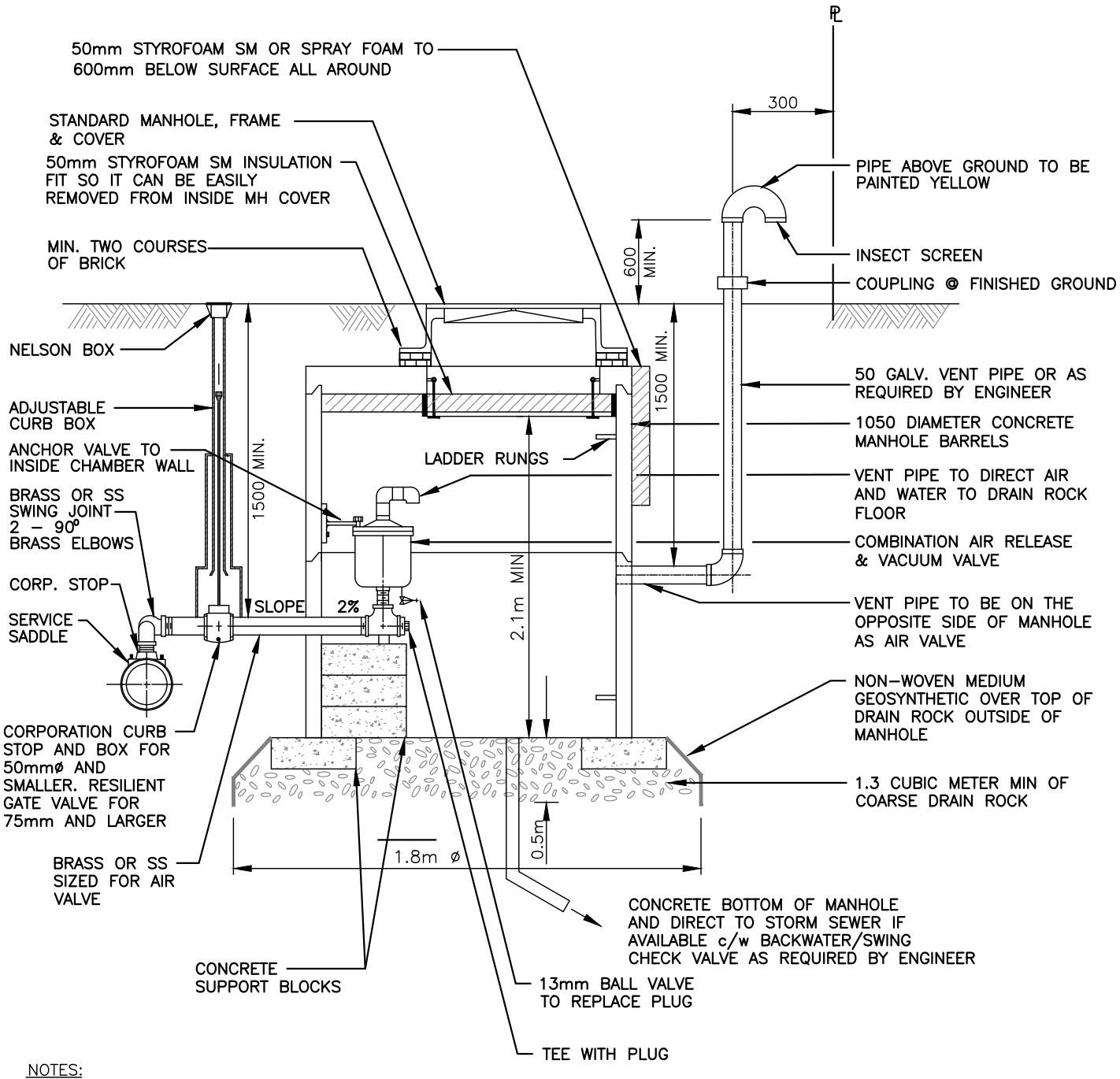
NOTES:

1. FIRE HYDRANTS SHALL BE TERMINAL CITY C71P c/w STORZ FITTINGS, AND WHERE APPLICABLE
   -1-100mm PUMPER PORT:-N.F.P.A SPECS. 100mm I.D., 130mm O.D. AMERICAN NATIONAL FIRE HOSE COUPLING THREADS
   -2-64mm OUTLETS:-B.C. STANDARD THREADS.
2. FOR INSTALLATIONS SHOWN ON CONTRACT DRAWINGS WHERE WATER TABLE (AT SEASONAL HIGH) IS ABOVE BASE OF DRAIN ROCK, INSERT THREADED PLUGS IN DRAIN HOLES AND SUBSTITUTE GRANULAR PIPE BEDDING FOR DRAIN ROCK. (COMPACT PIPE BEDDING TO 95% MODIFIED PROCTOR DENSITY)
3. HYDRANT COLOUR RED

PENTICTON INDIAN BAND	Fire Hydrant Installation	DRAWING NUMBER SSD-W4
		REVISION NUMBER 1
		SCALE NTS

01-30-2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:

1. AIR VALVE ASSEMBLY IS FOR 25 OR 50 AIR VALVES.
2. ALL DIMENSIONS IN MILLIMETERS.

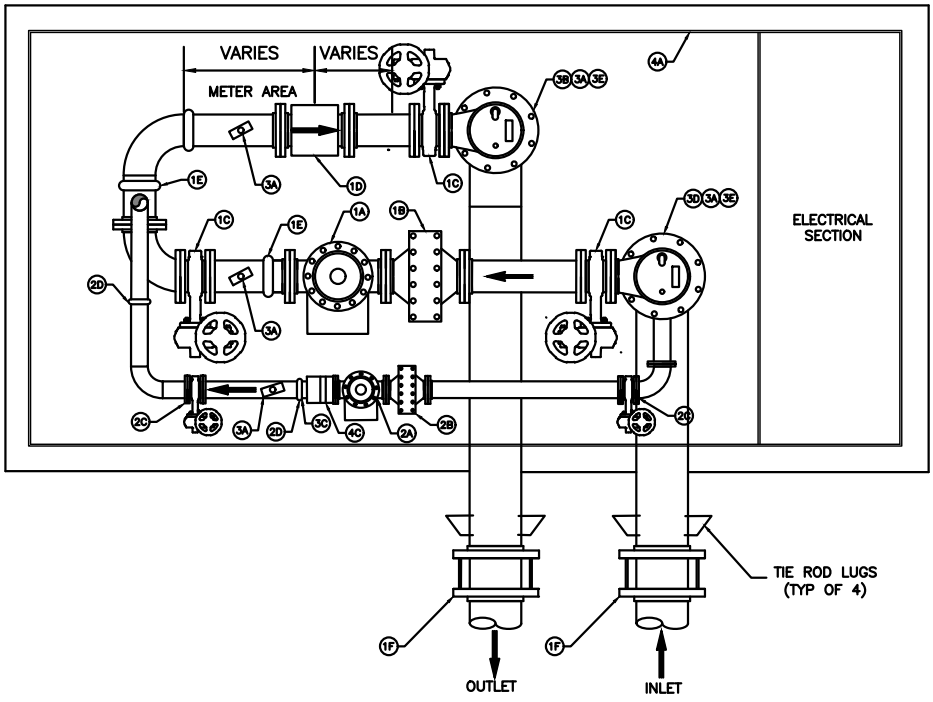
PENTICTON INDIAN BAND

Air Valve Assembly

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–W6	1	NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
1A	1	PRESSURE REDUCING VALVE
1B	1	STRAINER W/ DRAIN VALVE
1C	3	FLANGED BUTTERFLY VALVE
1D	1	10W MAGNETIC FLOW METER
1E	5	RIGID COUPLING
1F	2	MANUFACTURED TRANSITION COUPLING, EPOXY COATED W/ SS HARDWARE
2A	1	PRESSURE REDUCING/SUSTAINING VALVE
2B	1	STRAINER W/ DRAIN VALVE
2C	2	FLANGED BUTTERFLY VALVE
2D	3	RIGID COUPLING
3A	5	DIAL PRESSURE GAUGE W/ ISOLATION VALVE (0–200 PSI INLET, 0–100 PSI OUTLET)
3B	1	COMBINATION AIR/VACUUM VALVE W/ ISOLATION VALVE
3C	5	BALL VALVE W/ PLUG (DRAIN)
3D	1	AIR VALVE W/ ISOLATION VALVE
3E	2	PRESSURE TRANSMITTER (0–200PSI INLET, 0–100 PSI OUTLET)
4A	1	KIOSK ENCLOSURE W/ HEATER AND LIGHTS
4B	5	PIPE STAND FLANGE STYLE GALVANIZED
4C	2	PIPE STAND SADDLE STYLE GALVANIZED

NOTES:

1. ALL COMPONENTS AND METER SIZE TO BE DESIGNED BY A QUALIFIED PERSON
2. CONCRETE SLAB, KIOSK AND ELECTRICAL BY OTHERS

PENTICTON INDIAN BAND

PRV in Kiosk Installation

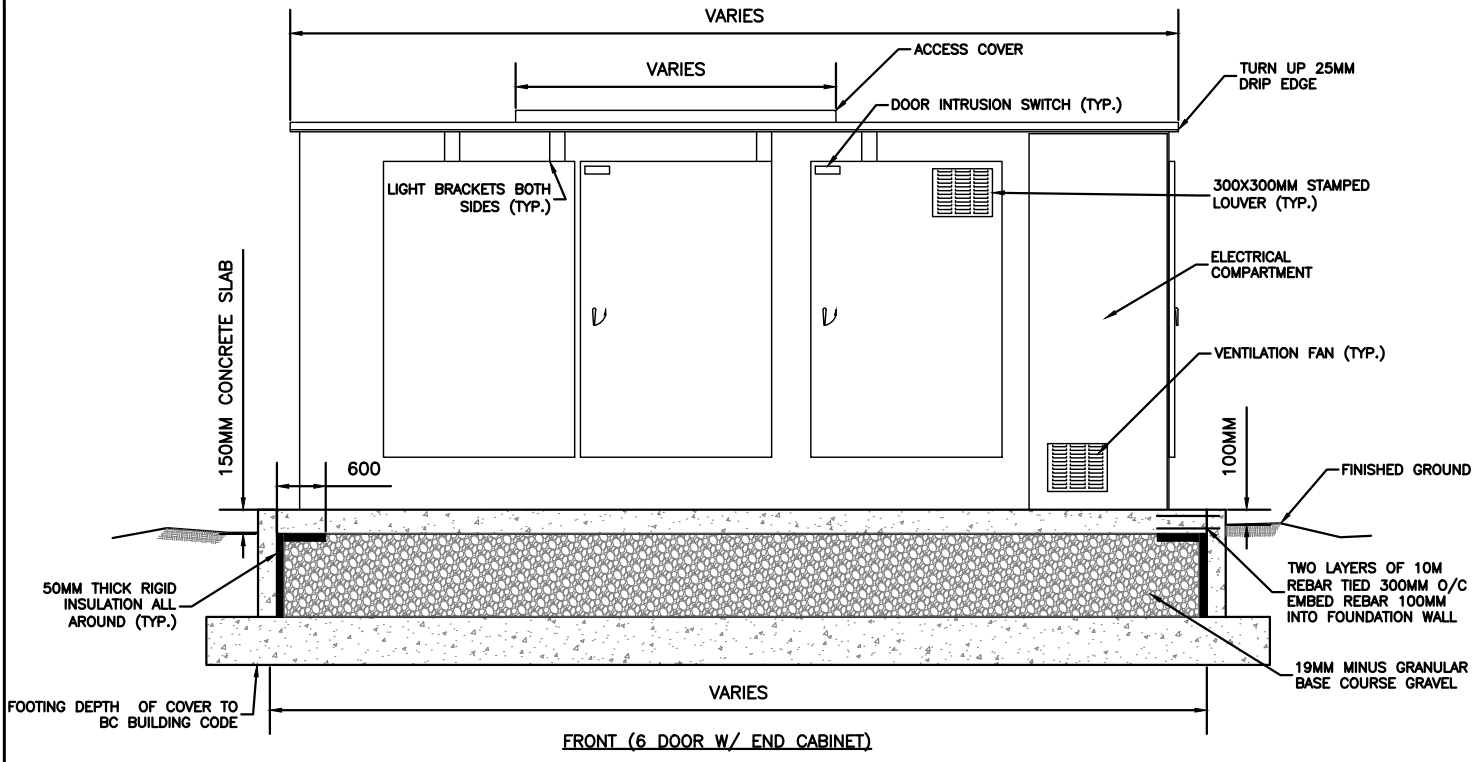
DRAWING NUMBER
SSD–W11a

REVISION NUMBER
1

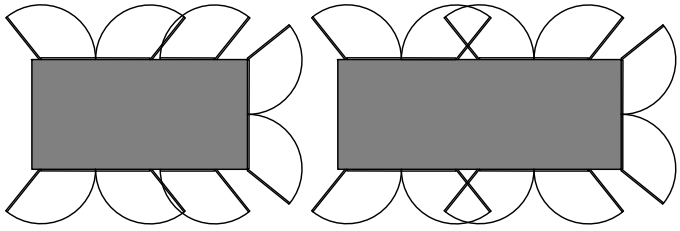
SCALE
NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



FRONT (6 DOOR W/ END CABINET)



6 DOOR W/ END CABINET

8 DOOR W/ END CABINET

NOTES:

1. UNLESS OTHERWISE NOTED ALL MATERIAL IS 1/8" THICK 5052–H32 ALUMINUM POWDER COATED PC117 GREEN
2. INTERIOR BACK AN SIDE PANELS ARE 14GA GALVANIZED STEEL POWDER COATED PC107 WHITE.
3. ALL DOORS WITH HANDLES HAVE LOCKABLE 3–POINT LATCHING SYSTEM.
4. ALL SIDES, ROOF, AND DOORS SHALL BE INSULATED WITH INSULATED WITH 2" THICK POLYISOCYANURATE INSULATION SHEATHING. ALL EDGES AND SEAMS TO BE SEALED WITH FOIL TAPE. ON DOORS, INSULATION SHOULD BE SEALED WITH FULL HEIGHT ALUMINUM SHEETS.
5. ALL DOORS HAVE DRIP LIP OVER OPENING.
6. END CABINET TO HAVE METER WINDOW WITH FOLD DOWN SHELF.
7. ACCESS OPENING TO BE REMOVABLE WITH FIXED LIFTING LUGS ON ALL ROOF COMPONENTS.

BILL OF MATERIALS

QTY	DESCRIPTION
1	4 JAW METER BASE
1	125A 24CCT LOAD CENTER C/W 100A MAIN
7	15A SINGLE POLE BREAKER
3	15A DOUBLE POLE BREAKER
1	SURGEBREAKER SURGE ARRESTOR
4	ALUMINUM WIREWAY
2	ALUMINUM WIREWAY END CAP
1	15A SINGLE POLE GFI BREAKER
3	15A 125V DUPLEX RECEPTACLE
3	DUPLEX RECEPTACLE BOX COVER
6	DUPLEX RECEPTACLE BOX
1	6" FAN FINGER GUARD
1	CLOSE ON FALL THERMOSTAT
2	CLOSE ON RISE THERMOSTAT
1	TEMPERATURE TRANSMITTER (0–50C)
5	120VAC SINGLE LED STRIP LIGHT
1	1000W 240C WHITE BASEBOARD HEATER
2	2000W 240C WALL HEATER C/W BUILT IN THERMOSTAT
2	10" KIOSK VENTILATION FAN
1	6" KIOSK VENTILATION FAN
5	SPDT LIMIT SWITCH BODY
5	SPDT LIMIT SWITCH ROLLER LEVER ARM

PENTICTON INDIAN BAND

PRV in Kiosk Installation

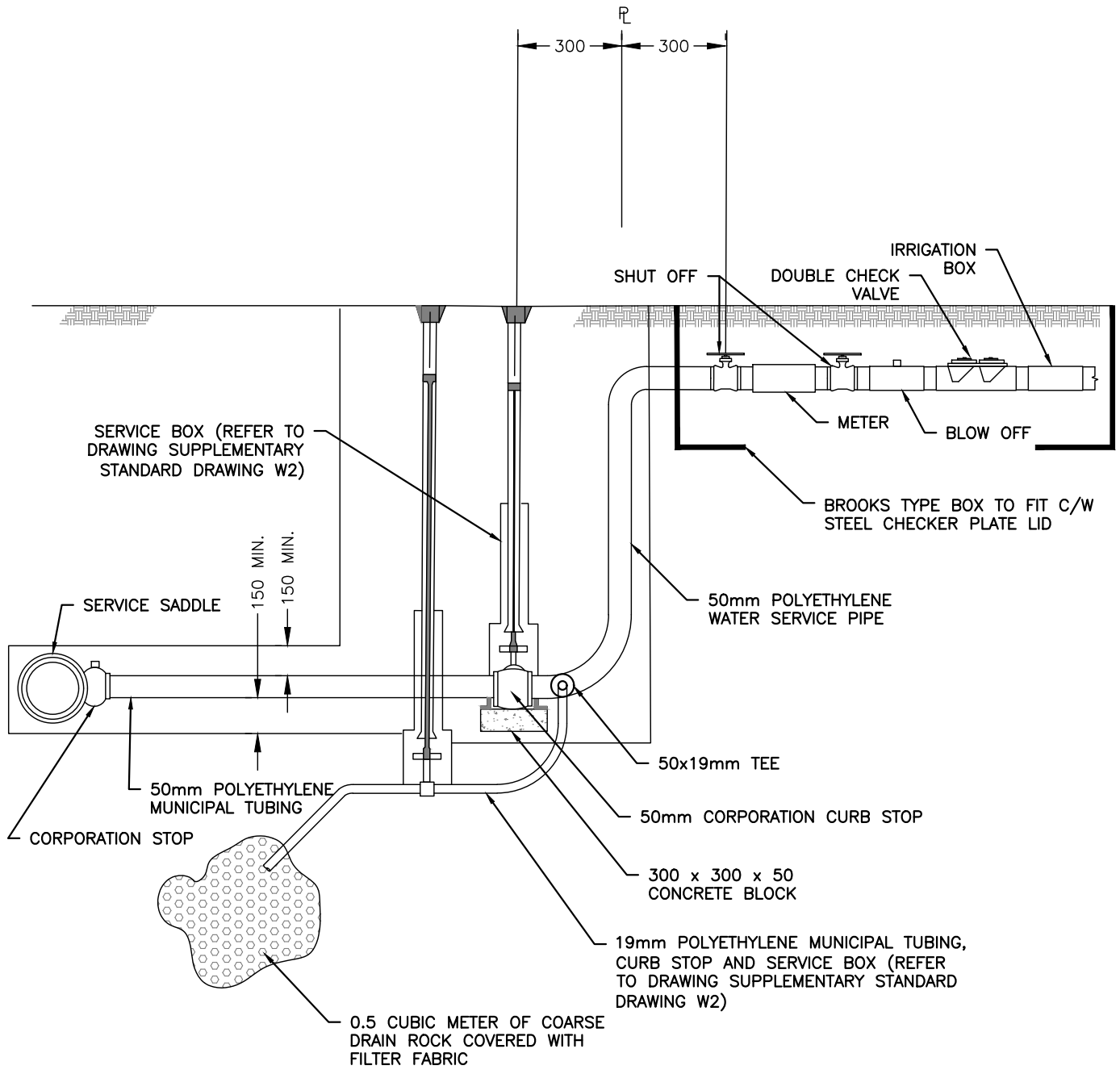
DRAWING NUMBER
SSD–W11b

REVISION NUMBER
1

SCALE
NTS

01–30–2020

PENTICTON INDIAN BAND
SUPPLEMENTARY STANDARD DETAIL DRAWING



NOTES:

1. REFER TO SUPPLEMENTARY DRAWING G4 FOR BEDDING AND BACKFILL DETAILS.

PENTICTON INDIAN BAND

Park Irrigation Service

DRAWING NUMBER	REVISION NUMBER	SCALE
SSD–W12	1	NTS

01–30–2020

SCHEDULE D

DESIGN AND RECORD DRAWING SUBMISSION STANDARDS

1.0 GENERAL STANDARDS

1.1 Introduction

This schedule outlines the minimum standards and requirements for Design and Record Drawing submissions for engineering Works and Services.

Where a standard drawing exists, it shall be sufficient to refer to the appropriate drawing by reference number and date of issue. Where a standard drawing does not exist, or is unsuitable for a particular case, detail drawings shall be prepared to accurately portray the various elements of the installation.

Where no standard is defined in this Schedule for the preparation of a drawing to portray a particular service, structure, or other item, instructions and requirements may be obtained by discussion with the *Approving Officer*.

1.2 General Requirements

Drawings shall clearly show existing and proposed locations of all utilities using offsets from property lines or boundaries of rights-of-way.

All drawings shall be signed and sealed be a Professional Engineer registered in the Province of British Columbia.

Elevations shall be referred to geodetic datum. Horizontal coordinates shall be referenced to UTM coordinate system NAD83.

1.3 Abbreviations

UTM	Universal Transverse Mercator
NAD83	1983 North American Datum
BOC	Back of Curb
EC	End of Curve
BC	Beginning of Curve
PI	Point of Intersection

DESIGN AND RECORD DRAWING SUBMISSION STANDARDS
DRAFTING STANDARDS

2.0 DRAFTING STANDARDS

2.1 Sheet Layout

Drawing sheet layout(s) shall conform to and include the following:

a) Sheet size to be ANSI D 558.8 x 863.6mm (22 x 34in)

b) A north arrow shall be placed close to the top right side of each plan view on the sheet. Where feasible, the north arrow shall point to the top of the page.

c) A title block which describes the contents of the drawing (e.g. Key Plan, Roads, etc.) and shall clearly indicate the location of the works by road name(s) and/or legal description.

d) Drawing scale, date, revision history block, and a detailed legend shall also be included on each sheet layout.

2.2 Dimension and Units

The following conventions must be used:

a) Dimensions and units must be shown in metric. No imperial units are permitted.

b) All distances, elevations, and coordinates shall be given in meters to accuracy of 3 decimal places.

c) Grades shall be given as a percentage to accuracy of 2 decimal places.

d) Areas shall be in square meters rounded to the nearest square meter.

e) All pipe sizes shall be given in millimeters as per ASTM specifications using:

1" = 25mm

f) Existing imperial dimensions, except for pipe sizes, are to be soft converted using the factors:

1 inch = 2.54 millimeters

1 foot = 0.3048 meters.

2.3 Lettering

a) Lettering is to be an open style of Vertical Gothic (e.g. Leroy or AutoCAD – 'romans').

b) All lettering to maintain a 1:10 ratio between plotted text height and plotted pen thickness.

c) The minimum plotted text height shall be 1.5mm.

d) The maximum plotted text height shall be 5.0mm.

e) The standard lettering height is 2.0mm.

2.4 Scales

The following scales shall normally be used:

f)	Location and Key plans	1:1000; 1:2500; 1:5000; 1:10000
g)	Composite Plans	1:500; 1:1000; 1:2500
h)	Plan/Profile Drawings	Horizontal 1:500 or 1:250 Vertical 1:50 or 1:25
i)	Cross Sections	Horizontal 1:100 Vertical 1:50
j)	Details	1:100; 1:20; 1:10

DRAWING STANDARDS (DIGITAL)

JUNE, 2020

DESIGN AND RECORD DRAWING SUBMISSION STANDARDS
DRAWING STANDARDS (DIGITAL)

3.0 DRAWING STANDARDS (DIGITAL)

3.1 General Requirements

The Owner will be required to submit to PIB a complete set of electronic drawings of the Subdivision or Development in AutoCAD DWG and PDF format upon completion of the proposed works.

All drawing object colour and linetype properties shall be set to “bylayer”.

All drawings must be purged and audited

3.2 Drawing Conventions

3.2.1 Layer Names

PIB uses the following convention for naming AutoCAD layers:

<Classification>-<Phase>-<Feature Type>-<Description> (Optional)

The available classifications are defined in Table 3.2.1a; phases are defined in Table 3.2.1b; feature types are defined in Table 3.2.1c. The description is optional.

For example, walk could be used to describe a “Feature Type” of a proposed sidewalk as in *ROAD*-P-WALK-CONCRETE where P signifies Proposed, or *ROAD*-P-WALK-TEXT would describe text associated with the proposed sidewalk.

Table 3.2.1a

CLASSIFICATION	DESCRIPTION
ALGN	Alignments
LEGL	Legal Information
MISC	Miscellaneous (Landscape, Hatches, etc)
ROAD	Roads
SANI	Sanitary Sewer
STRM	Storm Sewer
STRL	Structural and Hard Surface Features
PNTS	Survey Points Information
TITL	Title Block information
UTIL	Shallow Utilities (Gas, Tel and Cable)
WATR	Water System

Table 3.2.1b

PHASE SUFFIX	DESCRIPTION	RANGE
A	As Constructed	Varies
E	Existing Features	8
P	Proposed Works	Varies
F	Future works	Varies

Table 3.2.1c

TYPE	DESCRIPTION
TEXT	Text
DWY	Driveway
HYD	Hydrant
WV	Water Valve
MH	Manhole
PIPE	Water, Storm or Sanitary main

3.2.2 Special Layers

Exceptions to the layer naming convention described above are described in Table 3.2.2a

Table 3.2.2a

LAYER CATEGORY	CATEGORY DESCRIPTION	COLOUR PEN #	PLOT STATE
-VP	Viewports	30	No Plot
-IMAGE	Images	7	
-XCLIP	Xref clip boundary	7	No Plot
-XREF	External References	7	

3.2.3 Lineweight Conventions

Layers lineweight is set by a colour-dependent plot style tables (CTB) as specified in Table 3.2.3a. PIB will provide upon request, a digital copy of the CTB files for full size and half size line weights. The digital template is available upon request.

Table 3.2.3a

WFN COLOR TABLE - WFN.CTB

PEN COLOUR		PEN NO.	PLOT COLOR	PEN WIDTH	SHADE %
RED		1	BLACK	0.25	100
YELLOW		2	BLACK	0.50	100
GREEN		3	BLACK	0.13	100
CYAN		4	BLACK	0.35	100
BLUE		5	BLACK	0.70	100
MAGENTA		6	BLACK	0.35	100
WHITE		7	BLACK	0.35	100
GREY		8	BLACK	0.18	100
L.GREY		9	BLACK	0.09	100
RED 1		10	BLACK	0.7	100
		11	BLACK	0.5	100
		12	BLACK	0.35	100
		13	BLACK	0.25	100
		14	BLACK	0.2	100
		15	BLACK	0.09	100
		32	BLACK	0.18	100
GREEN		90	BLACK	0.7	100
GREEN		94	BLACK	0.18	100
BLUE		150	BLACK	0.18	100
PURPLE		190	BLACK	0.18	100
SHADE 1		31	OBJECT COLOR	0.15	20
ORANGE		40	OBJECT COLOR	0.7	100
BLUE 1		140	OBJECT COLOR	0.7	100
PURPLE		200	OBJECT COLOR	0.7	100
RED		240	OBJECT COLOR	0.7	100
SHADE 2		252	OBJECT COLOR	0.15	60
SHADE 3		253	OBJECT COLOR	0.15	40
SHADE 4		254	8	0.15	20

ANNOTATIVE TEXT WHENEVER POSSIBLE
WITH PAPER SPACE SIZES AS FOLLOWS:

*DEFAULT PEN WIDTH 0.20

TEXT SIZE	1:1000	1:750	1:500	1:250	1:200	1:125	1:100
S60	1.50	1.13	0.75	0.38	0.30	0.19	0.15
S80	2.00	1.50	1.00	0.50	0.40	0.25	0.20
S100	2.50	1.88	1.25	0.63	0.50	0.31	0.25
S140	3.50	2.63	1.75	0.88	0.70	0.44	0.35
S175	4.20	3.20	2.20	1.13	0.84	0.56	0.42

3.2.4 Layer List, Linetypes and Layer Colour

Table 3.2.4a

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
0		7 - White	Continuous	No Plot
DEFPOINTS		7 - White	Continuous	No Plot
VP-XREF				
-IMAGE	images	7 - White	Continuous	
-VP	All view ports in paper space	30 - Orange	Continuous	No Plot
-XCLIP	Xref clip boundary	7 - White	Continuous	No Plot
-XREF	Xrefs layer	7 - White	Continuous	

ALIGNMENT				
ALGN	alignment objects	3 - Green	CENTER	
ALGN-P-GUT	alignment for gutterline	1 - Red	CENTER	
ALGN-LABEL	alignment labels	7 - White	Continuous	
ALGN-LABEL-CURVE	alignment label for curves	2 - Yellow	Continuous	
ALGN-LABEL-GEOM	alignment label for geometries	7 - White	Continuous	
ALGN-P-ETW	alignment Edge of Travel Way	13 - Dark Pink	CENTER	
ALGN-P-EPS	alignment Edge of Paved Shoulder	13 - Dark Pink	CENTER	
ALGN-P-ROW	alignment Right of Way	4 - Cyan	CENTER	
ALGN-TABLE	alignment Table	7 - White	Continuous	
LEGAL				
LEGL-E-BLOCKLINE	non-cogo exterior lot lines	8 - Grey	Continuous	
LEGL-E-COGOBLOCKLINE	coordinate geometry exterior lot lines	8 - Grey	Continuous	
LEGL-E-COGOPROPLINE	coordinate geometry interior lot lines	8 - Grey	Continuous	
LEGL-E-EASE	registered easement lines	8 - Grey	DASHED	
LEGL-E-EASE-TEXT	easement text	8 - Grey	Continuous	
LEGL-E-LOTTEXT	legal lot text	9 - Grey	Continuous	
LEGL-E-LPUG	lead plug	10 - Grey	Continuous	
LEGL-E-PLANTEXT	legal plan text	11 - Grey	Continuous	
LEGL-E-PROPLINE	interior lot lines	12 - Grey	Continuous	
LEGL-E-ROADTEXT	existing road name text	13 - Grey	Continuous	
LEGL-E-STR_NUM	street number (address)	14 - Grey	Continuous	
LEGL-E-SUR-MON	survey monuments	15 - Grey	Continuous	
LEGL-E-WATERBOUDARY	lake boundary and creeks	16 - Grey	Continuous	
LEGL-E-WATERTEXT	lake boundary and creek text	17 - Grey	Continuous	
LEGL-P-EASE	proposed easement	4 - Cyan	DASHED	
LEGL-P-EASE-TEXT	proposed easement text	11 - Pink	Continuous	
LEGL-P-LOT	proposed lots	2 - Yellow	Continuous	
LEGL-P-LOT-DIM	proposed lot dimension	7 - White	Continuous	
LEGL-P-LOT-FILL	proposed lot fill	253 - Grey	Continuous	
LEGL-P-LOT-LINE	proposed lot line	2 - Yellow	Continuous	
LEGL-P-NO-PLOT	No plot lots	30 - Orange	Continuous	No Plot
LEGL-P-ROADTEXT	proposed road text - plan\profile	5 - Blue	Continuous	
LEGL-P-SROW	proposed Right of Way	4 - Cyan	Continuous	
LEGL-P-TABLE	proposed legal table	7 - White	Continuous	
LEGL-P-TEXT	proposed legal text	7 - White	Continuous	
MISCELLANEOUS				

MISC-E-HATCHLINES	lines used to create an existing hatch boundary	8 - Grey	Continuous	
MISC-E-NOTES	existing general notes	8 - Grey	Continuous	
MISC-NARROW	North arrow	8 - Grey	Continuous	
MISC-MATCHLINE	Alignment matchline	2 - Yellow	Continuous	
MISC-MATCHLINE-TEXT	Matchline text	11 - Pink	Continuous	
MISC-P-TEMP	Temporary layer	2 - Yellow	Continuous	No Plot
MISC-P-NOTES	Proposed notes	11 - Pink	Continuous	
MISC-P-TEXT	Proposed text	11 - Pink	Continuous	
MISC-P-VIEWFRAME	Viewframe object	7 - White	Continuous	
MISC-P-VIEWFRAME-BORDER	Viewframe border	5 - Blue	Continuous	
MISC-P-VIEWFRAME-TEXT	Viewframe text	7 - White	Continuous	
MISC-P-DETAIL	all detail objects and text	7 - White	Continuous	
MISC-P-HATCHLINES	lines used to create a hatch boundary	1 - Red	Continuous	
MISC-P-NOTES	proposed general notes	7 - White	Continuous	
MISC-P-TYP-X	typical road section	7 - White	Continuous	
POINTS				
PNTS-ALL POINTS	survey points	8 - Grey	Continuous	
PNTS-E-CTRL	survey points	8 - Grey	Continuous	
PNTS-E-ELEC	survey points (elec boxes, power poles, etc.)	8 - Grey	Continuous	
PNTS-E-ELEC-GUY WIRE	survey points	8 - Grey	Continuous	
PNTS-E-ELEC-LARGE ELEC BOX	survey points	8 - Grey	Continuous	
PNTS-E-LEGL-IP	survey points	8 - Grey	Continuous	
PNTS-E-LEGL-LEFT PROPERTY LINE	survey points	8 - Grey	Continuous	
PNTS-E-LEGL-RIGHT PROPERTY LINE	survey points	8 - Grey	Continuous	
PNTS-E-LOT-CORNER	existing lot corner	1 - Red	Continuous	
PNTS-E-RAIL	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-ASPHALT DRIVEWAY	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-ASPHALT FLARE	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-ASPHALT LANE	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-ASPHALT SIDEWALK	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-BACK OF WALK	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-	survey points	8 - Grey	Continuous	

CARPORT				
PNTS-E-ROAD-CL	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-CONCRETE DRIVEWAY	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-CROWN	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-EXTENDED EDGE OF ASPHALT	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-FACE OF CURB	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-FACE OF WALK	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-GRAVEL DRIVEWAY	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-GRAVEL LANE	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-LEFT EDGE OF ASPHALT	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-LEFT GUTTER	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-LIP OF EA	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-LIP OF GUTTER	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-PAINT LINES	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-RIGHT EDGE OF ASPHALT	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-RIGHT GUTTER	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-SIGNS	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-TOP OF CURB	survey points	8 - Grey	Continuous	
PNTS-E-ROAD-TOP OF WALK	survey points	8 - Grey	Continuous	
PNTS-E-SANI-IC	survey points	94 - Green	Continuous	
PNTS-E-SANI-MH	survey points	94 - Green	Continuous	
PNTS-E-SITE-BOTTOM OF BANK	survey points	8 - Grey	Continuous	
PNTS-E-SITE-BOW	existing bottom retaining wall	8 - Grey	Continuous	
PNTS-E-SITE-CONCRETE PAD	survey points	8 - Grey	Continuous	
PNTS-E-SITE-GROUND	survey points	8 - Grey	Continuous	
PNTS-E-SITE-SITEFEATURES-OFF	survey points	8 - Grey	Continuous	
PNTS-E-SITE-	survey points	8 - Grey	Continuous	

SITEFEATURES-ON				
PNTS-E-SITE-TOP OF BANK	survey points	8 - Grey	Continuous	
PNTS-E-SITE-TOW	existing top retaining wall	8 - Grey	Continuous	
PNTS-E-SITE-TREES	survey points	8 - Grey	Continuous	
PNTS-E-STRM-CB	survey points	190 - Purple	Continuous	
PNTS-E-STRM-DITCH	survey points	8 - Grey	Continuous	
PNTS-E-STRM-MH	survey points	190 - Purple	Continuous	
PNTS-E-STRM-SWALE	survey points	8 - Grey	Continuous	
PNTS-E-SURF-TIN POINTS	survey points	8 - Grey	Continuous	
PNTS-E-UTIL-INVERTS	survey points	8 - Grey	Continuous	
PNTS-E-WATR	survey points	150 - Blue	Continuous	
PNTS-E-WATR-STEM	survey points	8 - Grey	Continuous	
PNTS-E-WATR-VALVE	survey points	150 - Blue	Continuous	
PNTS-LABEL	all point labels layer - need for style creation	7 - White	Continuous	
PNTS-P-ALGN	alignment points	2 - Yellow	Continuous	
PNTS-P-LOT-CORNER	proposed lot corner	2 - Yellow	Continuous	
PNTS-P-MINUS	cut-fill points	20 - Red	Continuous	
PNTS-P-PLUS	cut-fill points	84 - Green	Continuous	
PNTS-P-ROAD-CL	road CL points	2 - Yellow	Continuous	
PNTS-P-SITE-BOW	proposed bottom retaining wall	2 - Yellow	Continuous	
PNTS-P-SITE-TOW	proposed top of retaining wall	2 - Yellow	Continuous	
PNTS-TABLE	survey points	7 - White	Continuous	
ROAD				
ROAD-E-ASPH	existing asphalt	8 - Grey	Continuous	
ROAD-E-CURB	existing curb	8 - Grey	Continuous	
ROAD-E-DWY	existing driveway	8 - Grey	Continuous	
ROAD-E-GUT	existing gutter	8 - Grey	Continuous	
ROAD-E-LANE	existing lane	8 - Grey	Continuous	
ROAD-E-NAME	existing road name	11 - Pink	Continuous	
ROAD-E-SW	existing sidewalk	8 - Grey	Continuous	
ROAD-E-WLINE	crosswalk, stop and white lines, bike lanes, etc.	254- Grey	Continuous	
ROAD-E-YLINE	yellow lines	253- Grey	Continuous	
ROAD-P-ASPH	proposed asphalt	3 - Green	Continuous	
ROAD-P-GUT	proposed gutter line	7 - White	Continuous	
ROAD-P-NAME	proposed road name	11 - Pink	Continuous	
ROAD-P-SIGNS	proposed signs	170 - Blue	Continuous	
ROAD-P-SW	proposed sidewalk	4 - Cyan	Continuous	
ROAD-P-TEXT	proposed road text	11 - Pink	Continuous	

SANITARY				
SANI-A-MH	asbuilt sanitary manholes - plan\profile	11 - Pink	Continuous	
SANI-A-PIPE	asbuilt sanitary mains - plan\profile	10 - Red	Continuous	
SANI-A-SERV	asbuilt sanitary service - plan\profile	7 - White	Continuous	
SANI-A-TEXT	asbuilt sanitary text - plan\profile	11 - Pink	Continuous	
SANI-E-FM	sanitary forced main	94 - Green	Dashed	
SANI-E-MH	existing sanitary manholes - plan	94 - Green	Continuous	
SANI-E-MH-PROF	existing sanitary manholes - prof	94 - Green	Continuous	
SANI-E-PIPE	existing sanitary mains - plan	94 - Green	SAN	
SANI-E-PIPE-PROF	existing sanitary mains - prof	94 - Green	SAN	
SANI-E-SEC	existing sanitary section	94 - Green	Continuous	
SANI-E-SERV	existing sanitary service connection - plan	94 - Green	Continuous	
SANI-E-SERV-PROF	existing sanitary service connection - prof	94 - Green	Continuous	
SANI-E-TEXT	existing sanitary text - plan	94 - Green	Continuous	
SANI-E-TEXT-PROF	existing sanitary text - prof	94 - Green	Continuous	
SANI-F-MH	future sanitary manholes - plan	94 - Green	Continuous	
SANI-F-MH-PROF	future sanitary manholes - prof	94 - Green	Continuous	
SANI-F-PIPE	future sanitary pipe - plan	94 - Green	SAN	
SANI-F-PIPE-PROF	future sanitary pipe - prof	94 - Green	SAN	
SANI-F-SEC	future sanitary section	94 - Green	Continuous	
SANI-F-TEXT	future sanitary text - plan	94 - Green	Continuous	
SANI-F-TEXT-PROF	future sanitary text - prof	94 - Green	Continuous	
SANI-P-IC	proposed sanitary inspection chamber - plan	11 - Pink	Continuous	
SANI-P-IC-PROF	proposed sanitary inspection chamber - prof	11 - Pink	Continuous	
SANI-P-MH	proposed sanitary manhole - plan	11 - Pink	Continuous	
SANI-P-MH-PROF	proposed sanitary manhole - prof	10 - Red	Continuous	
SANI-P-PIPE	proposed sanitary mains - plan	10 - Red	SAN	
SANI-P-PIPE-PROF	proposed sanitary mains - prof	10 - Red	SAN	
SANI-P-SEC	proposed sanitary section	10 - Red	Continuous	

SANI-P-SERV	proposed sanitary service - plan	7 - White	Continuous	
SANI-P-SERV-PROF	proposed sanitary service - prof	7 - White	Continuous	
SANI-P-SERV-TEXT	proposed sanitary service text	11 - Pink	Continuous	
SANI-P-TEXT	proposed sanitary text - plan	11 - Pink	Continuous	
SANI-P-TEXT-PROF	proposed sanitary text - prof	11 - Pink	Continuous	
SHALLOWS UTILITIES				
UTIL-E-ELEC	existing electrical conduit	8 - Grey	ELECTRICAL	
UTIL-E-GAS	existing gas conduit	8 - Grey	GAS	
UTIL-E-GAS-TEXT	existing gas conduit text	8 - Grey	Continuous	
UTIL-E-HTC	existing HTC conduit	8 - Grey	TEL	
UTIL-E-HTC-TEXT	existing HTC conduit text	8 - Grey	Continuous	
UTIL-E-LAMP	existing lamp	8 - Grey	Continuous	
UTIL-E-LAMP-TEXT	existing lamp-text	8 - Grey	Continuous	
UTIL-E-TRAF	existing traffic conduit	8 - Grey	ELEC	
UTIL-P-ELEC	proposed electrical conduit	7 - White	ELECTRICAL	
UTIL-P-GAS	proposed gas conduit	2 - Yellow	GAS	
UTIL-P-GAS-TEXT	proposed gas conduit text	11 - Pink	Continuous	
UTIL-P-HTC	proposed HTC conduit	6 - Magenta	TEL	
UTIL-P-HTC-TEXT	proposed HTC conduit text	11 - Pink	Continuous	
UTIL-P-LAMP	proposed lamp	7 - White	Continuous	
UTIL-P-LAMP-TEXT	proposed lamp-text	11 - Pink	Continuous	
STORM				
STRM-A-CB	asbuilt storm catch basins	11 - Pink	Continuous	
STRM-A-DW	asbuilt storm drywell	11 - Pink	Continuous	
STRM-A-LEAD	asbuilt storm leads	10 - Red	Continuous	
STRM-A-MH	asbuilt storm manholes - plan\profile	11 - Pink	Continuous	
STRM-A-PIPE	as built storm pipe	10 - Red	STORM	
STRM-A-TEXT	asbuilt storm text - plan\profile	11 - Pink	Continuous	
STRM-E-CB	existing catch basin - plan	190 - Purple	Continuous	
STRM-E-CB-PROF	existing catch basin - prof	190 - Purple	Continuous	
STRM-E-DW	existing storm drywell - plan	190 - Purple	Continuous	
STRM-E-DW-PROF	existing storm drywell - prof	190 - Purple	Continuous	
STRM-E-LEAD	existing storm lead	190 - Purple	Continuous	
STRM-E-MH	existing storm manholes -	190 - Purple	Continuous	

	plan			
STRM-E-MH-PROF	existing storm manholes - prof	190 - Purple	Continuous	
STRM-E-PIPE	existing storm mains - plan	190 - Purple	STORM	
STRM-E-PIPE-PROF	existing storm mains - prof	190 - Purple	STORM	
STRM-E-TEXT	existing storm text - plan	190 - Purple	Continuous	
STRM-E-TEXT-PROF	existing storm text - prof	190 - Purple	Continuous	
STRM-F-CB	future storm catch basin - plan	190 - Purple	Continuous	
STRM-F-CB-PROF	future storm catch basin - prof	190 - Purple	Continuous	
STRM-F-DW	future storm drywell - plan	190 - Purple	Continuous	
STRM-F-DW-PROF	future storm drywell - prof	190 - Purple	Continuous	
STRM-F-LEAD	future storm lead	190 - Purple	Continuous	
STRM-F-MH	future storm manhole - plan	190 - Purple	Continuous	
STRM-F-MH-PROF	future storm manhole - prof	190 - Purple	Continuous	
STRM-F-PIPE	future storm main - plan	190 - Purple	STORM	
STRM-F-PIPE-PROF	future storm main - prof	190 - Purple	STORM	
STRM-F-SEC	future storm section	190 - Purple	Continuous	
STRM-F-TEXT	future storm text - plan	190 - Purple	Continuous	
STRM-F-TEXT-PROF	future storm text - prof	190 - Purple	Continuous	
STRM-P-CB	proposed catch basin - plan	11 - Pink	Continuous	
STRM-P-CB-PROF	proposed catch basin - prof	10 - Red	Continuous	
STRM-P-DW	proposed drywell - plan	11 - Pink	Continuous	
STRM-P-DW-PROF	proposed drywell - prof	10 - Red	Continuous	
STRM-P-LEAD	proposed storm lead	10 - Red	Continuous	
STRM-P-MH	proposed storm manhole - plan	11 - Pink	Continuous	
STRM-P-MH-PROF	proposed storm manhole - prof	10 - Red	Continuous	
STRM-P-PIPE	proposed storm mains - plan	10 - Red	STORM	
STRM-P-PIPE-PROF	proposed storm mains - prof	10 - Red	STORM	
STRM-P-SERV	proposed storm service - plan	6 - Magenta	Continuous	
STRM-P-SERV-PROF	proposed storm service - prof	6 - Magenta	Continuous	
STRM-P-SERV-TEXT	proposed storm service text	11 - Pink	Continuous	
STRM-P-TEXT	proposed storm main text - plan	11 - Pink	Continuous	

STRM-P-TEXT-PROF	proposed storm main text - prof	11 - Pink	Continuous	
TITLE BLOCK				
TITL-BLOCK	title block	7 - White	Continuous	
TITL-BLOCKTEXT	title block text	7 - White	Continuous	
TITL-BORDER	title block border	5 - Blue	Continuous	
TITL-JOBDESC	text in titleblock	7 - White	Continuous	
TITL-JOBNUMBER	text in titleblock	5 - Blue	Continuous	
TITL-LEGEND	titleblock legend	7 - White	Continuous	
TITL-MAGRID	major grid on titleblock	7 - White	Continuous	
TITL-MIGRID	minor grid on titleblock	3 - Green	Continuous	
TITL-NARROW	north arrow	8 - Grey	Continuous	
TITL-PAVE-LEGEND	pave legend in title block	7 - White	Continuous	
TITL-RDLEGEND	road legend in titleblock	7 - White	Continuous	
WATER				
WATR-A-HYD	asbuilt hydrant	11 - Pink	Continuous	
WATR-A-PIPE	asbuilt water mains - plan\profile	10 - Red	Water	
WATR-A-SERVICE	asbuilt water service	7 - White	Continuous	
WATR-A-TEXT	asbuilt water main text - plan\profile	11 - Pink	Continuous	
WATR-A-VALVE	asbuilt water valve	11 - Pink	Continuous	
WATR-E-BO	existing water blow-off	150 - Blue	Continuous	
WATR-E-HYD	existing water hydrant	150 - Blue	Continuous	
WATR-E-PIPE	existing water mains - plan	150 - Blue	Water	
WATR-E-PIPE-PROF	existing water mains - prof	150 - Blue	Water	
WATR-E-SERV	existing water service	150 - Blue	Continuous	
WATR-E-TEXT	existing water main text - plan	150 - Blue	Continuous	
WATR-E-TEXT-PROF	existing water main text - prof	150 - Blue	Continuous	
WATR-E-VALVE	existing water valve	150 - Blue	Continuous	
WATR-F-BO	future water blow-off	150 - Blue	Continuous	
WATR-F-HYD	future water hydrant	150 - Blue	Continuous	
WATR-F-PIPE	future water main - plan	150 - Blue	Water	
WATR-F-PIPE-PROF	future water main - prof	150 - Blue	Water	
WATR-F-SERV	future water service	150 - Blue	Continuous	
WATR-F-TEXT	future water text - plan	150 - Blue	Continuous	
WATR-F-TEXT-PROF	future water text - prof	150 - Blue	Continuous	
WATR-F-VALVE	future water valve	150 - Blue	Continuous	
WATR-P-BO	proposed water blow-off	10 - Red	Continuous	
WATR-P-HYD	proposed hydrant	11 - Pink	Continuous	
WATR-P-PIPE	proposed water mains - plan	10 - Red	Water	

WATR-P-PIPE-PROF	proposed water mains - prof	10 - Red	Water	
WATR-P-SERV	proposed water service - plan	7 - White	Continuous	
WATR-P-SERV-PROF	proposed water service - prof	7 - White	Continuous	
WATR-P-TEXT	proposed water main text - plan	11 - Pink	Continuous	
WATR-P-TEXT-PROF	proposed water main text - prof	11 - Pink	Continuous	
WATR-P-VALVE	proposed water valve	11 - Pink	Continuous	

REQUIRED DRAWINGS

JUNE, 2020

DESIGN AND RECORD DRAWING SUBMISSION STANDARDS
REQUIRED DRAWINGS

4.0 REQUIRED DRAWINGS

4.1 Cover Sheet (Title Page)

In addition to any other requirements presented in this policy, the cover sheet shall show the following information:

a) Name of Development or Project.

b) Name and Address of Owner and *Consulting Engineer*.

c) Site location plan of Development or project.

d) Legal description of subject properties.

e) File numbers of approving authorities (i.e. PIB and/or Ministry).

f) Complete drawing index of all sheets belonging to the set.

Note: The standards defined in Sections 2.1 (c), 2.1 (d), and 2.3 do NOT apply to the cover sheet.

4.2 Key Plan(s)

In addition to any other requirements presented in this policy, Key Plans shall show the following information:

a) Lot numbers, plan numbers, and road names of the subject Development and adjoining properties.

b) Cross reference of the drawings by outlining the area contained in each drawing and referencing that drawing by drawing number.

c) General Construction notes.

4.3 Building Envelope Plan (if applicable)

In addition to any other requirements presented in this policy, Building Envelope Plan shall show the following information:

a) Overall plan of current phase.

b) Lot numbers.

c) Roads, curbs, gutters and sidewalks.

d) Rights of Way and Easements.

e) Offset lines from all property boundaries indicating required building setbacks.

f) 10 meter by 10 meter square on each parcel indicating the required minimum building envelope.

g) Notes that indicate the required setbacks from all property boundaries pursuant to the *Zoning Bylaw.*

4.4 Composite Plan(s) (as required)

In addition to any other requirements presented in this policy, Composite Plans shall show the following information:

a) All existing and proposed utilities, roads, walkways, and sidewalks.

b) All rights of way and easements including widths.

c) Control monuments with identification number.

d) All legal information, including bearings, dimensions, Lot numbers, block numbers, legal plan numbers, and street names. All lots must be numbered.

e) Show legal Lot line dimensions.

f) All roadway dimensions including width of right of way, BOC to BOC and BOC to edge of right of way.

g) Area of each parcel.

4.5 Plan / Profile Drawings

In addition to any other requirements of this policy, Plan / Profile drawings shall show the following information:

4.5.1 General

a) Both plan and profile stationing must be tied to a property line or Road boundary.

b) The profile shall be shown at true centerline length and projected below the plan in as close a horizontal relationship as possible.

c) The top half of a Plan/Profile sheet shall show the plan view and shall show the legal layout with legal descriptions of all properties, the location of all sidewalks, catch basins, underground utilities such as sewer, water, telephone, television power, manholes, valves, hydrants, and all survey monuments, etc.

d) Drawings shall also show existing dwellings, fences, trees, hedges, unusual ground features, existing Roads and driveways including the type such as asphalt, concrete or gravel.

e) Plan/Profile drawings for various services may be combined on one plan (must be clear and readable) in the following manner:
- Roads & Storm Drains
- Sanitary Sewers & Water

4.5.2 Road Plan / Profile Drawings (May be Combined with Storm Drains)

Road Plan views shall show the following information:

a) Drawings shall show width of Road, width of shoulders, and the offset of curb from property line.

b) Chainages of the B.C. and E.C. of horizontal curves shall be shown together with the delta angle, centerline radius, tangent length, and centerline arc length. Curb radii are not required if the centerline radius and road width are shown, except on curb returns at intersections and at the end of Cul-de-sacs.

c) Quarter point gutter elevations for Cul-de-sac.

d) Catchbasin rim elevations.

Road profile views shall show the following information:

a) The design gutter and/or centerline grade (%).

b) Vertical curve chainage and elevations of B.C., E.C. and P.I.; the external value, e; the length of vertical curve; the chainage and elevation of the low spot of sag curves; and, K value of vertical curvature (crest on sag).

c) Existing ground elevation along the centerline of proposed roadway and/or the edge of existing asphalt.

4.5.3 Water Plan/Profile Drawings (may be combined with Sanitary Sewer and Storm Mains)

Water plan views shall show the following information:

a) Offset of pipelines from property lines.

b) Length and size of pipe.

c) Offset of connections from property lines.

d) The locations of manholes, hydrants, valves, services, end-of-main, or other appurtenances referenced to nearest property line.

e) Information on any curves or pipe deflections.

f) Easements (existing and/or required).

g) Location and connection details for all values and fittings.

Water profile views shall show the following information:

a) Surface profiles (existing and design, if applicable) over proposed main.

b) Length, size, grade, type, and material of pipe.

c) Profiles of invert and crown of pipes.

d) Location, type and invert elevation of all crossing utilities.

e) Stationing of all valves, fittings and appurtenances.

f) Anchor block locations.

4.5.4 Storm Drains and Sanitary Sewer Plan/Profile Drawings

Storm & Sanitary plan views shall show the following information:

a) The drawings shall show the structural details of all manholes and chambers, etc. not covered by standard drawings. Where the sanitary sewers and storm drains or other utilities are to be installed in a common trench, a typical cross-section showing vertical and horizontal distances between pipes and classes of pipe and bedding shall be shown.

b) Offset of pipelines from property lines.

c) The size of pipe.

d) Offset of connections from property lines.

e) The locations of manholes, clean-outs and services relating to

property lines.

f) Information on any curves or pipe deflections.

g) Easements (existing and/or required).

h) Future curb & gutter lines (if applicable).

i) Manhole identification numbers.

j) Inverts of service connections at property line (if applicable).

k) For storm drainage, features such as ditches, culverts, streams, channels, etc.

Storm & Sanitary profile views shall show the following information:

a) Surface profiles (existing and design, if applicable) over proposed main.

b) Length, size, grade, type, and material of pipe.

c) Profiles of invert and crown of pipes.

d) Location, type and invert elevation of all crossing utilities.

e) Invert elevations of manholes.

f) Alignment station of manhole.

g) Manhole identification number.

h) Rim elevations of proposed or adjusted manholes.

4.6 Grading Plan(s)

In addition to any other requirements presented in this policy, grading plans shall show the following information:

4.6.1 General

a) Pre-Development contour lines. The topographic information shall extend a minimum 30.0m outside the Development site;

b) Proposed contours, slopes, grades, and spot elevations;

c) The minor (10-Year return) storm sewer system with the flows noted per section and the accumulated flows from all upstream sections. Provision must be made for upstream Development potential where applicable;

d) The major (100-Year return) system. The *Consulting Engineer* shall note wherever the major system is not in the pipe or the roadway, showing the routing and flows for the 100-Year return storm;

e) All swales proposed to affect the submitted Storm Water Management Plan;

f) How the Development proposal will affect adjacent lands, attempts should be made to "meet" existing elevations along the Development boundary;

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

4.6.2 Lot Grading

a) All existing corner Lot elevations (uncircled);

b) All proposed corner Lot elevations (circled);

c) The proposed building envelope with the Minimum Basement Elevation (MBE) noted;

d) The slope of the lot (directional arrow), noting a minimum 2% grade on the lots.

4.7 Landscape Plans

In addition to any other requirements presented in this Law, landscape plans shall show the following information:

a) Extent of proposed landscape Works and Services;

b) Existing and proposed property information, including lot lines, easements, legal descriptions, addresses and dimensions;

c) Existing and proposed contours, slopes, grades and spot elevations for landscaped areas (if not already shown on grading plan);

d) Existing and proposed buildings, structures, Roads, curbs, sidewalks, walls, fences, signs, site features and other appurtenances;

e) Existing vegetation proposed to be removed, relocated or retained;

f) Areas of proposed preservation, naturalization, restoration, lawn and landscaping, including soil types, depths and amendments;

g) Proposed plant species name (botanical and common), size and planting condition;

h) Existing and proposed irrigation systems; and

i) Construction details and specifications as required.

4.8 Storm Water Management Plan

In addition to any other requirements presented in this Law, Storm Water Management Plans shall show the following information:

a) Site and surrounding area (400 m minimum outside Development) showing roads and major features. A small location plan of the watershed is also to be included.

b) Contours of existing ground (1.0 m intervals where slope <20%, 2.0 m >20%) for the site and surrounding area mentioned above.

c) Major flood routing (100-Year); show as arrows and indicate if in pipe or on surface show an "open" arrow for surface routes and the same arrow "shaded" for routes in pipes).

d) Detention pond details, if applicable.

e) Area, in hectares, of Development and the total area of drainage basin.

f) Directional arrows of flow within the site and on surrounding areas.

g) Sub-catchment boundaries, coefficients and areas.

h) Pipe system including size, grade, and minor and major flows (a table may be utilized).

i) The subject Development is to be highlighted.

4.9 Erosion and Sediment Control Plan(s)

This plan is to detail methods and procedures that will be used to prevent or minimize soil displacement and transport of sediment from the Development site. This is to include methods to prevent or minimize soil transport onto adjacent properties or onto existing roads adjacent to the site (i.e. tracking from vehicles). Preventative methods of soil displacement on the site are to be detailed. In addition to any other requirements presented in this policy, the drawing shall show the following:

a) Existing contours of the site at an interval sufficient to determine drainage patterns.

b) Final contours if the existing contours are significantly changed.

c) Final drainage patterns/boundaries.

d) Existing vegetation such as significant trees, shrubs, grass, and unique vegetation.

e) Limits of clearing and grading.

f) Erosion and sediment control measures (temporary and permanent) including locations, names and details, in accordance with "Land Development Guidelines for the Protection of Aquatic Habitat".

g) Storm Drainage systems including drain inlets, outlets, pipes, and other permanent drainage facilities (swales, waterways, etc.).

The plan must have a narrative section describing the land, the disturbing activity and details of the methods used for controlling erosion and sedimentation. Include a description of the procedures for *Construction* and maintenance of the control measures and note the persons involved in maintenance and provide a maintenance schedule that is to be followed. Where the land area to be subdivided is less than 10 hectares, this plan may be combined with the Stormwater Management Plan.

4.10 Street Lighting Plan(s)

A plan view of the street lighting shall be provided. There shall be General Notes, complete with a table of design criteria, included on the plan noting reference(s) to the Municipal Standards and Specifications and the appropriate design criteria.

4.11	**Street Sign, Paint Marking, and Traffic Control Device Plans**	A drawing identifying signs (including reference number and image), markings, and required control devices is required. Detailed drawings may be required for traffic control devices.
4.12	**Traffic Management Plan(s)**	Detail routes for *construction* traffic and traffic controls for traffic on existing roads affected by *construction* is required.
4.13	**Road Cross Section Plans**	Shall be scaled at 1:100 horizontal and 1:150 vertical and shall note the existing ground elevation, the proposed elevations of the road centreline, the curb and gutter (or road edge), and property lines. Cross-sections are required at 20.0m intervals and key section changes.
4.14	**Construction Details**	Show all details for *construction* including those which are not covered by, or specifically detailed in the provisions of this Law or MMCD. Where there is a Standard Drawing, it is expected the drawings will refer to the Standard Drawing Number.
4.15	**Electrical, Gas, and Communication Utilities**	Per appropriate authority (individual utilities may provide separate drawings)

DESIGN AND RECORD DRAWING SUBMISSION STANDARDS
DRAWING SUBMISSIONS

5.0 DRAWING SUBMISSIONS

5.1 Design Submissions

2 Paper copies and digital files (PDF format) of all Design Drawings are required for design submissions.

5.2 Record Submission

Upon completion of the Works, and prior to the *Approving Officer* certifying completion of the Work, the *Developer* shall submit to the *Approving Officer* a certificate from the *Developer*'s Engineer certifying that the Works were installed and constructed in accordance with the Development Plan.

Record Drawings must be submitted after the completion of the Works and Services. Electronic file (PDF and AutoCAD) Record Drawings shall be submitted for WFN review prior to submitting the hard copies and CD. The final submission of Record Drawings shall include all drawing sheets submitted for the "Certificate to Proceed with Construction" unless specifically exempted by the *Approving Officer*.

- 2 full size paper sets of final Record Drawings of all Work constructed hereunder, signed and sealed by a Professional Engineer.
- 1 electronic submission containing the following:
  - Digital files of the Record Drawings in PDF, ACAD and SHAPE format;
  - All field inspection reports as prepared by the project inspector during *construction*;
  - Inspection test results for any materials and installations;
  - Inspection photographs that document project *construction*; and
  - Any commissioning reports and Operation & Maintenance manuals for equipment installed in the project.

5.3 Electronic Drawings

5.3.1 General Requirements

The Owner shall submit to the PIB a complete set of electronic drawings of the Subdivision or Development in AutoCAD DWG format and exported to Shape file format for integration in the GIS.

The electronic drawing shall be prepared in accordance with Section 2.0 and the conventions prescribed in Section 3.0.

All external files associated with the electronic drawing (e.g. special fonts, line types, and/or images) shall also be supplied with the electronic drawing submission.

No drawing shall be submitted that contains any external references

(xrefs). All externally referenced drawings shall be bound prior to submittal.

5.4 Digital Hard Copies

A digital hard copy is any digital file that is reproducible without the ability to modify the drawing's contents or appearance.

5.4.1 General Requirements

Adobe's Portable Document Format 9*.pdf) is the preferred file type.

Drawing sets submitted as a digital hard copy shall be electronically sealed by the Owner's Engineer.

5.4.2 Device/Document Settings for Plotting Adobe Portable Document Format

Ensure all text is legible and the shading and hatching ordered so as not to block or hide other line work and/or text.

The following settings shall be used when plotting the drawings to Adobe PDF:

- Paper size to be ANSI D 558.8mm x 863.6mm (22" x 34").
- Layout to be "Landscape".
- Graphic print quality to be no less than "600 dpi".

SCHEDULE E

LETTERS OF ASSURANCE

SCHEDULE E-1
CONFIRMATION OF COMMITMENT BY PARCEL HOLDER
AND BY COORDINATING REGISTERED PROFESSIONAL
RE: DESIGN AND FIELD RIEVEW OF CONSTRUCTION

Note: This Confirmation of Commitment shall be submitted at the time of Application for Development.

The Coordinating Registered Professional shall submit a Schedule E-2 and E-6 if the Coordinating Registered Professional undertakes work for the Works and Services other than coordination of the other Registered Professionals.

TO: Penticton Indian Band
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Schedule E-1, unless the context otherwise requires, all words and expressions shall have the same meaning assigned to them as the like word or expressions contained in the Penticton Indian Band's ("PIB") Subdivision, Development and Servicing Bylaw.

2. This Letter of Assurance must be signed by the Parcel Holder or its appointed agent and by the Coordinating Registered Professional who is a Registered Professional. An agent's letter of appointment must be attached. If the Parcel Holder is a corporation, this Confirmation of Commitment must be signed by a signing officer of the corporation and the signing officer must set out his or her position in the corporation.

3. In this Confirmation of Commitment:

   a. **"Compliance Coordination"** means the activities necessary to ascertain that the Registered Professionals of record for the various components of the Works and Services:
      (i) have reasonably interpreted the Standards and other applicable PIB Development Approval Requirements governing the design of such components;

(ii) have incorporated the Standards and other applicable PIB Development Approval Requirements into their designs;
(iii) have coordinated the design, meeting the Standards and other applicable Band Development Approval Requirements so that all designs are compatible with the designs of all other disciplines;
(iv) have fulfilled the requirements of the Standards and other applicable Band Development Approval Requirements; and
(v) will provided field reviews in respect to their respective components of the Works and Services.

b. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

c. **"PIB Development Approval Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, the Canadian Environmental Assessment Act as amended or superseded, the Band's Heritage Bylaw and Heritage Policy, reports or other materials prepared by Registered Professionals retained by or on behalf of the Parcel Holder and accepted by the Band, and any requirements imposed by the Band, in respect of heritage, environmental or geotechnical matters;

d. **"Registered Professional"** means:
(i) a person who is registered or licensed in good standing to practice as a Professional Engineer under the Engineers and Geoscientists Act (British Columbia); or
(ii) a person who is registered or licensed in good standing to practice as an Architect under the Architects Act (British Columbia); or
(iii) a person who is a professional with expertise and experience in the area of work being carried out by him or her in relation to the Works and Services;
and who is accepted as a Registered Professional or the Coordinating Registered Professional by the PIB;

e. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then the standards set forth in the MMCD will apply.

4. _____(the "Parcel Holder") has retained

_____

as its Coordinating Registered Professional to:

a. Provide responsibility and authority for Compliance Coordination of the design work and field reviews of the related Registered Professionals required for the Works and Services, in order to ascertain that the design and construction of the Works and Services will substantially comply in all material respects with the applicable requirements of the Subdivision, Development and Servicing Bylaw and all other written instructions provided by the Approving Officer;

b. Obtain or cause to be obtained any necessary permits inspections and approvals and ensure that the work is carried out by qualified persons, in accordance with applicable statutes, regulations, codes, standards and other PIB development and approval requirements relating to the design and construction of all Works and Services.

c. At the time of Application for Development as described in Section 9.1 of the Subdivision, Development and Servicing Bylaw, deliver to the Approving Officer Letters of Assurance in the forms set forth in Schedules E-2 through E-8, as may be applicable, of the Subdivision, Development and Servicing Bylaw, with any amendments that may be approved in writing by the Approving Officer or another authorized person of the PIB, from each of the related Registered Professionals required for the Works and Services;

d. At the time of Final Approval Submission as described in Section 9.7 of the Subdivision, Development and Servicing Bylaw, deliver to the Approving Officer the Letters of Assurance from each of the related Registered Professional required for the Works and Services, on the forms attached as Schedules E-2 through E-8, as may be applicable, or as otherwise approved by the Approving Officer;

e. Maintain a record of the Field Reviews over which the Coordinating Registered Professional has responsibility and of any corrective action taken as a result;

f. Every two weeks, submit a written progress report to the Approving Officer and include all other records described in clause 4.e above by other Registered Professionals;

g. Review the reports of the testing and inspection agencies and Registered Professionals and where necessary, comment on their acceptability, determine the corrective action to take if unacceptable and maintain a detailed record of every such report and comment;

h. Advise the Approving Officer in writing of any matter of design or construction that does not substantially comply in all material aspects with the applicable requirements of the approved Design Drawings as described in Section 9.4 of the Subdivision, Development and Servicing Bylaw, the PIB Development Approval Requirements and all other written instructions provided by the Approving Officer as related to design and construction of the required Works and Services;

i. Coordinate any corrective measures necessary to bring work into substantial compliance with the applicable requirements of the approved Design Drawings as described in Section 9.4 of the Subdivision, Development and Servicing Bylaw, the PIB Development Approval Requirements and all other written instructions provided by the Approving Officer as related to design and construction of the Works and Services;

j. Provide such other services to the Parcel Holder as may be required from time to time by the Approving Officer, acting reasonably.

5. The Parcel Holder and the Coordinating Registered Professional shall each notify the Approving Officer of the date the Coordinating Registered Professional or any Registered Professional ceases to be retained by the Parcel Holder at any time during the Subdivision and Development Permit Process as described in Section 9 of the Subdivision, Development and Servicing Bylaw, before the date the Coordinating Registered Professional or the Registered Professional ceases to be retained or, if that is not possible, then as soon as possible after the Coordinating Registered Professional or the Registered Professional ceases to be retained, and in any event no later than seven (7) days after that has occurred.

6. The Parcel Holder and the Coordinating Registered Professional each agree with the PIB that where the Coordinating Registered Professional or any Registered Professional ceases to be retained at any time during the Subdivision and Development Permit Process as described in Section 9 of the Subdivision, Development and Servicing Bylaw, they will cause work to cease as of that date, until such time as a new Coordinating Registered Professional or Registered Professional, as applicable, is retained, and new Letters of Assurance are provided to the Approving Officer.

7. The undersigned Coordinating Registered Professional:

    a. Certifies that he or she is a Registered Professional;
    b. Acknowledges that he or she has been retained as described in this Letter of Assurance; and
    c. Covenants that he or she or the firm that he or she is a member of carries professional liability insurance in the amount no less than $2,000,000, or such greater amount as may be required by the Approving Officer or the PIB. A copy of the insurance certificate is attached to this Confirmation of Commitment.

COORDINATING REGISTERED PROFESSIONAL	**PARCEL HOLDER**
_____	_____
Coordinating Registered Professional (print name)	Parcel Holder (print name)
_____	_____
Coordinating Registered Professional's Signature	Parcel Holder or Parcel Holder's appointed agent's signature. If Parcel Holder is a corporation, the signature of a signing officer must be given here. If the signature is that of the agent, a copy of the document that appoints the agent must be attached.
_____	_____
Date	Date
	_____
	Name of Agent or Signing Officer (print name)
_____	_____
_____	_____
_____	_____
Address (print)	Address (print)
_____	_____
Telephone	Telephone
_____	_____
Fax or Email Address	Fax or Email Address
_____	
Occupation or Discipline (print)	
(Affix Coordinating Registered Professional's seal here)	

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____, and I sign this letter of behalf of the firm.

1.

SCHEDULE E-2
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL
OF PROFESSIONAL DESIGN AND COMMITMENT
FOR FIELD REVIEW

Note: This Letter of Assurance shall be submitted at the time of Application for Development. A separate letter shall be submitted by each Registered Professional.

TO: Penticton Indian Band
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Schedule E-2, unless the context otherwise requires, all words and expressions shall have the same meaning assigned to them as the like word or expressions contained in the Penticton Indian Band's ("PIB") Subdivision, Development and Servicing Bylaw.

2. In this Letter of Assurance:

   a. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

   b. **"Other Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, reports or other materials prepared by the Registered Professional retained by or on behalf of the Parcel Holder and accepted by the PIB, and any requirements imposed by the PIB;

   c. **"Registered Professional"** means:

(i) a registered professional retained by the Parcel Holder; and
(ii) a person who is registered or licensed in good standing to practice as a Professional Engineer under the Engineers and Geoscientists Act (British Columbia); or
(iii) a person who is registered or licensed in good standing to practice as an Architect under the Architects Act (British Columbia); or
(iv) a person who is a professional with expertise and experience in the area of work being carried out by him or her in relation to the Works and Services;

and who is accepted as a Registered Professional by the PIB.

d. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then the standards set forth in the MMCD will apply.

3. The undersigned hereby gives assurance and certifies that the design of the components of the plans and supporting documents prepared and to be prepared by this Registered Professional in support of the Application for Development as described in Section 9.1 and 9.4 of the Subdivision, Development and Servicing Bylaw will substantially comply in all material respects with the provisions of the PIB's Subdivision, Development and Servicing Bylaw, as amended and superseded from time to time, and other applicable permits, bylaws, standards, laws, regulation and approvals which apply to the construction of the Works and Services.

The following items listed below apply (initial those that apply and cross out those that do not apply):

STORM DRAINAGE SYSTEM including, but not limited to the following:
- Location, alignment, size and grade of all pipes and culverts;
- Spacing of manholes and catch basins;
- Drywells;
- Materials used for pipes, culverts, manholes, catch basins, pipe and fitting joints, service connections, inlet and outlet structures;
- Materials used for pipe bedding and for backfilling of trenches;
- Workmanship in the construction and installation of all materials;
- Other – specify: _____

SANITARY SEWER SYSTEM including, but not limited to the following:
- Location, alignment, size and grade of all pipes;
- Spacing of manholes and catch basins;
- Materials used for pipes, manholes, pipe and fitting joints, service connections;
- Materials used for pipe bedding and for backfilling of trenches;
- Sewage lift stations;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

WATER DISTRIBUTION SYSTEM including, but not limited to the following:
- Location, alignment, size and grade of all pipes;
- Spacing of hydrants and gate valves

- Materials used for pipes, mechanical joint restraint, fittings, gate valves, valve boxes, hydrants, service connections, corporation main stops, corporation curb stops and boxes, air valves and chambers and blow offs.
- Materials used for pipe bedding and for backfilling of trenches;
- Meter stations, ground water wells, pumping stations, treatment facilities and storage reservoirs;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

ROADS including, but not limited to the following:

- Alignments, width and grade of all roads;
- Road excavation and embankment to subgrade;
- Materials used for granular subbase and base preparation;
- Materials used for hot-mix asphalt concrete paving;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

CURBS, GUTTERS AND SIDEWALKS including but not limited to the following:

- Width and grade of sidewalks and boulevards;
- Alignment and grade of curbs and gutters;
- Materials used for granular subbase and base preparation and for surfaces;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

STREET LIGHTING, ELECTRICAL AND COMMUNICATIONS WIRING AND GAS INSTALLATIONS including, but not limited to the following:

- Location and spacing of street light poles and luminaires;
- Materials used for street lighting, electrical and communications wiring and gas installations;
- Materials used for bedding and backfilling of trenches;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

LANDSCAPING AND IRRIGATION including but not limited to the following:

- Location and spacing of trees, shrubs and all other landscape materials
- Materials used for trees, shrubs and all other landscaping
- All other materials including topsoil, back mulch and bed surfaces, landscape edging, hard surfaces including concrete unit pavers;
- All aspects of irrigation design, spacing, equipment and materials including materials used for bedding and backfilling of trenches;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;

- Other – specify: _____

GEOTECHNICAL – TEMPORARY including, but not limited to the following:

- Excavations;
- Shoring;
- Underpinning;
- Temporary construction dewatering;
- Other – specify: _____

GEOTECHNICAL – PERMANENT including, but not limited to the following:

- Bearing capacity of soils for road structures, building (residential, commercial, institutional and utility) foundation support and seismic loading for buried structures including sewage lift stations and storage reservoirs;
- Geotechnical aspects of deep foundations;
- Suitability of native soils for reuse as structure fill for road embankments, structural filling of lots and for trench backfilling including placement and compaction requirements;
- Location of groundwater and bedrock
- Permanent excavation and embankment slopes, slope stability and slope protection;
- Rock excavation slopes;
- Permanent dewatering requirements;
- Permanent underpinning requirements;
- Other – specify: _____

4. The undersigned hereby undertakes, in relation to the above-stated components, to:

   a. Design the above-stated components and be responsible during construction for Field Reviews; maintain a record of the Field Reviews; and if correction action is taken as a result of a Field Review, make the record available to Coordinating Registered Professional and PIB;

   b. Certify under his or her professional seal, all plans, documents, materials and information which are provided by him or her in respect of all above-stated components of the Works and Services;

   c. Certify that the design of the above-stated components will substantially comply in all material aspects with the Standards and Other Requirements;

   d. Certify that the construction of the above-stated components will substantially comply in all material aspects with the approved design, the Standards and the Other Requirements;

   e. Provide quality assurance to ensure that the above-stated components substantially comply in all material aspects with the applicable requirements of the Standards and the Other Requirements;

   f. Be responsible during construction for Field Reviews of the above-stated components; maintain a record of the Field Reviews and of any corrective action taken as a result of the Field Reviews; and make the record available to the Coordinating Registered Professional;

   g. At any time after the Approving Officer authorizes the Applicant in writing to proceed with construction of the Works and Services, unforeseen conditions or circumstances become known which make it

necessary that changes in design by made to complete the above-stated components substantially in compliance in all material aspects with the Standards and the Other Requirements; ensure that any such changes are reviewed and approved in writing by the Coordinating Registered Professional and the Approving Officer or another authorized representative of the PIB;

h. Record the details of any field design or construction change to the plans and supporting documents prepared by this Registered Professional in respect of the above-stated components;

i. Ensure that all necessary information for the preparation of the "as constructed" record drawings is recorded;

j. Review for adequacy and acceptability all oral or written reports with respect to the testing, inspection or Field Review requirements; maintain a detailed record of such reports or comments; and make the record available to the Coordinating Registered Professional every two weeks during construction;

k. Advise the Coordinating Registered Professional in writing of any matter of design or construction that does not substantially comply in all material respects with the applicable requirements of the Standards and Other Requirements;

l. Ensure that any corrective measures necessary to bring work into substantial compliance with the applicable requirements of the Standards and Other Requirements are carried out;

m. Before the Parcel Holder applies for Final Approval as described by Section 9.7 of the Subdivision, Development and Servicing Bylaw in respect of the Works and Services, deliver to PIB a Letter of Assurance of Professional Field Review and Compliance in respect of the above-stated components of the Works and Services; and

n. Notify the PIB in writing if the undersigned's contract with the Parcel Holder or the Coordinating Registered Professional is terminated, or the Registered Professional resigns, at any time during construction, within seven (7) days of such termination or resignation.

5. The undersigned Registered Professional:

a. Certifies that he or she is a Registered Professional as defined below;

b. Acknowledges that he or she has been retained by _____, (the "Parcel Holder") to carry out the work and undertake the responsibilities described above; and

c. Covenants that he or she or his or her firm presently carries professional liability insurance in the amount of $2,000,000 or such greater amount as is required by the PIB for the performance of the Registered Professional's work in relation to the design and construction of the Works and Services. A copy of the certificate of insurance is attached.

_____

Registered Professional's Name (print)

_____ _____

Registered Professional's Signature Date

_____

_____

Address (print) (Affix Professional Seal here)

_____

Phone

_____

Email Address and/or Fax

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____,
and I sign this letter of behalf of the firm.

SCHEDULE E-3
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL
OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW
(ENVIRONMENTAL)

Note: This Letter of Assurance shall be submitted at the time of Application for Development.

TO: Penticton Indian Band
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Schedule E-3, unless the context otherwise requires, all words and expressions shall have the same meaning assigned to them as the like word or expressions contained in the Penticton Indian Band's ("PIB") Subdivision, Development and Servicing Bylaw.

2.
   a. **"Registered Professional"** means:
      (i) a registered professional biologist retained by the Parcel Holder; and
      (ii) a person who is registered or licensed in good standing to practice as a Registered Professional biologist under the College of Applied Biology Act (British Columbia),

   and who is accepted as a registered professional by the PIB.

   b. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

c. **"Other Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, the Canadian Environmental Assessment Act as amended or superseded, reports or other materials prepared by the Registered Professional retained by or on behalf of the Parcel Holder and accepted by the PIB, and any requirements imposed by the PIB, in respect of environmental matters;

d. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then the standards set forth in the MMCD will apply.

3. The undersigned hereby gives assurance and certifies that the design of the components of the plans and supporting documents prepared and to be prepared by this Registered Professional in support of the Application for Development as described in Section 9.1 and 9.4 of the Subdivision, Development and Servicing Bylaw will substantially comply in all material respects, without limitations, with the Canadian Environmental Assessment Act, as amended or superseded, including all further reports, plans and other materials required or recommended in or under the environmental screening record, that relate to the environment or the protection, preservation, restoration or enhancement of it (the "Environmental Requirements").

   The following items listed below apply (initial those that apply and cross out those that do not apply):

   STORM DRAINAGE SYSTEM including, but not limited to the following:
   - Location, alignment, size and grade of all pipes and culverts;
   - Spacing of manholes and catch basins;
   - Drywells;
   - Materials used for pipes, culverts, manholes, catch basins, pipe and fitting joints, service connections, inlet and outlet structures;
   - Materials used for pipe bedding and for backfilling of trenches;
   - Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
   - Other – specify: _____

   SANITARY SEWER SYSTEM including, but not limited to the following:
   - Location, alignment, size and grade of all pipes;
   - Spacing of manholes and catch basins;
   - Materials used for pipes, manholes, pipe and fitting joints, service connections;
   - Materials used for pipe bedding and for backfilling of trenches;
   - Sewage lift stations;
   - Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
   - Other – specify: _____

   WATER DISTRIBUTION SYSTEM including, but not limited to the following:
   - Location, alignment, size and grade of all pipes;
   - Spacing of hydrants and gate valves

- Materials used for pipes, mechanical joint restraint, fittings, gate valves, valve boxes, hydrants, service connections, corporation main stops, corporation curb stops and boxes, air valves and chambers and blow offs.
- Materials used for pipe bedding and for backfilling of trenches;
- Meter stations, ground water wells, pumping stations, treatment facilities and storage reservoirs;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

ROADS including, but not limited to the following:

- Alignments, width and grade of all roads;
- Road excavation and embankment to subgrade;
- Materials used for granular subbase and base preparation;
- Materials used for hot-mix asphalt concrete paving;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

CURBS, GUTTERS AND SIDEWALKS including but not limited to the following:

- Width and grade of sidewalks and boulevards;
- Alignment and grade of curbs and gutters;
- Materials used for granular subbase and base preparation and for surfaces;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

STREET LIGHTING, ELECTRICAL AND COMMUNICATIONS WIRING AND GAS INSTALLATIONS including, but not limited to the following:

- Location and spacing of street light poles and luminaires;
- Materials used for street lighting, electrical and communications wiring and gas installations;
- Materials used for bedding and backfilling of trenches;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

LANDSCAPING AND IRRIGATION including but not limited to the following:

- Location and spacing of trees, shrubs and all other landscape materials
- Materials used for trees, shrubs and all other landscaping
- All other materials including topsoil, back mulch and bed surfaces, landscape edging, hard surfaces including concrete unit pavers;
- All aspects of irrigation design, spacing, equipment and materials including materials used for bedding and backfilling of trenches;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

GEOTECHNICAL – TEMPORARY including, but not limited to the following:

- Excavations;
- Shoring;
- Underpinning;
- Temporary construction dewatering;
- Other – specify: _____

GEOTECHNICAL – PERMANENT including, but not limited to the following:

- Bearing capacity of soils for road structures, building (residential, commercial, institutional and utility) foundation support and seismic loading for buried structures including sewage lift stations and storage reservoirs;
- Geotechnical aspects of deep foundations;
- Suitability of native soils for reuse as structure fill for road embankments, structural filling of lots and for trench backfilling including placement and compaction requirements;
- Location of groundwater and bedrock
- Permanent excavation and embankment slopes, slope stability and slope protection;
- Rock excavation slopes;
- Permanent dewatering requirements;
- Permanent underpinning requirements;
- Other – specify: _____

4. The undersigned hereby undertakes, in relation to the Environmental Requirements components, to:

   a. Certify that the design of the Works and Services will substantially comply in all material respects with the Environmental Requirements;

   b. Provide quality assurance to ensure that the Works and Services substantially complies in all material respects with the Environmental Requirements;

   c. With respect to the plans and supporting documents prepared by this Registered Professional in respect to the Works and Services, record the details of any field design or construction changes to such plans and supporting documents, and ensure that all necessary information for the preparation of the "as constructed" record drawings is recorded;

   d. Advise the Coordinating Registered Professional in writing of any matter of design or construction of the Works and Services that does not substantially comply in all material respects with the Environmental Requirements;

   e. Ensure that any corrective measures necessary to bring work into substantial compliance with the Environmental Requirements are carried out;

   f. Before the Parcel Holder applies for Final Approval as described by Section 9.7 of the Subdivision, Development and Servicing Bylaw in respect of the Works and Services, deliver to PIB a Letter of Assurance of Professional Field Review and Compliance in respect of the above-stated components of the works and Services; and

g. Notify the PIB in writing if the undersigned's contract with the Parcel Holder or the Coordinating Registered Professional is terminated or the Registered Professional resigns, at any time during construction, within seven (7) days of such termination or resignation.

5. The undersigned Registered Professional:

   a. Certifies that he or she is a Registered Professional as defined below;

   b. Acknowledges that he or she has been retained by _____, (the "Paracel Holder") to carry out the work and undertake the responsibilities described above; and

   c. Covenants that he or she or his or her firm presently carries professional liability insurance in the amount of $2,000,000 or such greater amount as is required by the PIB for the Performance of the Registered Professional's work in relation to the design and construction of the Works and Services. A copy of the certificate of insurance is attached.

_____
Registered Professional's Name (print)

_____ _____
Registered Professional's Signature Date

_____

_____
Address (print) (Affix Professional Seal here)

_____
Phone

_____
Email Address and/or Fax
If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____, and I sign this letter of behalf of the firm.

SCHEDULE E-4
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL
OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW
(CULTURE AND HERITAGE)

Note: This Letter of Assurance shall be submitted at the time of Application for Development.

TO: Penticton Indian Band
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____
(the "Project")

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Schedule E-4, unless the context otherwise requires, all words and expressions shall have the same meaning assigned to them as the like word or expressions contained in the PIB Subdivision, Development and Servicing Bylaw.

2. In this Letter of Assurance:

   a. **"Registered Professional"** means:

      (i) a registered professional retained by the Parcel Holder; and

      (ii) a person who is a professional with expertise and experience in the area of cultural and heritage work that is required by the PIB to be carried out by him or her in relation to the Works and Services required for the above-noted Project;

   and who is accepted as a Registered Professional in the area of Indigenous culture and heritage by PIB.

   b. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work

substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

c. **"Other Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, the PIB Heritage Requirements as amended or superseded, reports or other materials prepared by the Registered Professional retained by or on behalf of the Parcel Holder and accepted by the PIB, and any requirements imposed by the PIB, in respect of culture and heritage matters;

d. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then any standards set forth in the MMCD and the Heritage Construction Act of British Columbia will apply.

3. The undersigned hereby gives assurance and certifies that the design of the components of the plans and supporting documents prepared and to be prepared by this Registered Professional in support of the Application for Development as described in Section 9.1 and 9.4 of the Subdivision, Development and Servicing Bylaw will substantially comply in all material respects, without limitations, with the provisions of the Penticton Indian Band's ("PIB") Heritage Bylaw and PIB's Heritage Policy, as amended or superseded (the "Heritage Requirements").

   The following items listed below apply (initial those that apply and cross out those that do not apply):

   STORM DRAINAGE SYSTEM including, but not limited to the following:
   - Location, alignment, size and grade of all pipes and culverts;
   - Spacing of manholes and catch basins;
   - Drywells;
   - Materials used for pipes, culverts, manholes, catch basins, pipe and fitting joints, service connections, inlet and outlet structures;
   - Materials used for pipe bedding and for backfilling of trenches;
   - Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
   - Other – specify: _____

   SANITARY SEWER SYSTEM including, but not limited to the following:
   - Location, alignment, size and grade of all pipes;
   - Spacing of manholes and catch basins;
   - Materials used for pipes, manholes, pipe and fitting joints, service connections;
   - Materials used for pipe bedding and for backfilling of trenches;
   - Sewage lift stations;
   - Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
   - Other – specify: _____

   WATER DISTRIBUTION SYSTEM including, but not limited to the following:
   - Location, alignment, size and grade of all pipes;
   - Spacing of hydrants and gate valves
   - Materials used for pipes, mechanical joint restraint, fittings, gate valves, valve boxes, hydrants, service connections, corporation main stops, corporation curb stops and boxes, air valves and chambers and blow offs.

- Materials used for pipe bedding and for backfilling of trenches;
- Meter stations, ground water wells, pumping stations, treatment facilities and storage reservoirs;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

ROADS including, but not limited to the following:

- Alignments, width and grade of all roads;
- Road excavation and embankment to subgrade;
- Materials used for granular subbase and base preparation;
- Materials used for hot-mix asphalt concrete paving;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

CURBS, GUTTERS AND SIDEWALKS including but not limited to the following:

- Width and grade of sidewalks and boulevards;
- Alignment and grade of curbs and gutters;
- Materials used for granular subbase and base preparation and for surfaces;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

STREET LIGHTING, ELECTRICAL AND COMMUNICATIONS WIRING AND GAS INSTALLATIONS including, but not limited to the following:

- Location and spacing of street light poles and luminaires;
- Materials used for street lighting, electrical and communications wiring and gas installations;
- Materials used for bedding and backfilling of trenches;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

LANDSCAPING AND IRRIGATION including but not limited to the following:

- Location and spacing of trees, shrubs and all other landscape materials
- Materials used for trees, shrubs and all other landscaping
- All other materials including topsoil, back mulch and bed surfaces, landscape edging, hard surfaces including concrete unit pavers;
- All aspects of irrigation design, spacing, equipment and materials including materials used for bedding and backfilling of trenches;
- Ensuring that the workmanship in the construction and installation of all materials meets the requisite Standards;
- Other – specify: _____

GEOTECHNICAL – TEMPORARY including, but not limited to the following:

- Excavations;
- Shoring;
- Underpinning;
- Temporary construction dewatering;
- Other – specify: _____

GEOTECHNICAL – PERMANENT including, but not limited to the following:

- Bearing capacity of soils for road structures, building (residential, commercial, institutional and utility) foundation support and seismic loading for buried structures including sewage lift stations and storage reservoirs;
- Geotechnical aspects of deep foundations;
- Suitability of native soils for reuse as structure fill for road embankments, structural filling of lots and for trench backfilling including placement and compaction requirements;
- Location of groundwater and bedrock
- Permanent excavation and embankment slopes, slope stability and slope protection;
- Rock excavation slopes;
- Permanent dewatering requirements;
- Permanent underpinning requirements;
- Other – specify: _____

4. The undersigned hereby undertakes, in relation to the Heritage Requirements, to:

   a. Certify that the design of the Works and Services will substantially comply in all material respects with the Heritage Requirements;

   b. Provide quality assurance to ensure that the Works and Services substantially complies in all material respects with the Heritage Requirements;

   c. With respect to the plans and supporting documents prepared by this Registered Professional in respect to the Works and Services, record the details of any field design or construction changes to such plans and supporting documents, and ensure that all necessary information for the preparation of the "as constructed" record drawings is recorded;

   d. Advise Coordinating Registered Professional in writing of any matter of design or construction of the Works and Services that does not substantially comply in all material respects with the Heritage Requirements;

   e. Ensure that any corrective measures necessary to bring work into substantial compliance with the Heritage Requirements are carried out;

   f. Before the Parcel Holder applies for Final Approval as described by Section 9.7 of the Subdivision, Development and Servicing Bylaw in respect of the Works and Services, deliver to PIB a Letter of Assurance of Professional Field Review and Compliance in respect of the above-stated components of the works and Services; and

   g. Notify the PIB in writing if the undersigned's contract with the Parcel Holder or the Coordinating Registered Professional is terminated, or the Registered Professional resigns, at any time during construction, within seven (7) days of such termination or resignation.

5. The undersigned Registered Professional:

   a. Certifies that he or she is a Registered Professional as defined below;

   b. Acknowledges that he or she has been retained by _____ (the "Parcel Holder") to carry out the work and undertake the responsibilities described above; and

   c. Covenants that he or she or his or her firm presently carries professional liability insurance in the amount of $2,000,000 or such greater amount as is required by the PIB for the Works and Services. A copy of the certificate of insurance is attached.

_____
Registered Professional's Name (print)

_____ _____
Registered Professional's Signature Date

_____

_____
Address (print) (Affix Professional Seal here)

_____
Phone

_____
Email Address and/or Fax

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____,
and I sign this letter of behalf of the firm.

SCHEDULE E-5
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL
OF FIELD REVIEW AND COMPLIANCE
(COORDINATING REGISTERED PROFESSIONAL)

Note: This Letter of Assurance shall be submitted at the time of application for Final Approval.

TO: Penticton Indian Band ("PIB")
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____
(the "Project")

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

As the Coordinating Registered Professional, I hereby give assurance and certify that:

1. I have fulfilled my obligations as the Coordinating Registered Professional required for the Works and Services, as defined in the PIB's Subdivision, Development and Servicing Bylaw, as outlined in the previously submitted Schedule E-1, "Confirmation of Commitment by Parcel Holder and by Coordinating Registered Professional Re: Design and Field Review of Construction"; and

2. I am a Registered Professional: check one or more

   a. ___ retained by the Parcel Holder,

   b. ___ a person who is registered or licensed in good standing to practice as a Professional Engineer under the Engineers and Geoscientists Act (British Columbia),

   c. ___ a person who is registered or licensed in good standing to practice as an Architect under the Architects Act (British Columbia), or

   d. ___ who is a professional with expertise and experience in the area of work being carried out by me; in relation to the Works and Services required for the above-described Project.

_____

Registered Professional's Name (print)

_____ _____

Registered Professional's Signature Date

_____

_____

Address (print) (Affix Professional Seal here)

_____

Phone

_____

Email Address and/or Fax

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____,
and I sign this letter of behalf of the firm.

SCHEDULE E-6
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL
OF FIELD REVIEW AND COMPLIANCE
(REGISTERED PROFESSIONAL)

Note: This Letter of Assurance shall be submitted at the time of application for Final Approval. A separate letter must be submitted by each Registered Professional.

TO: Penticton Indian Band ("PIB")
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____
(the "Project")

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Letter of Assurance all defined terms in the PIB's Subdivision, Development and Servicing Bylaw are incorporated by reference. In addition, the following definitions apply:

   a. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

   b. **"Other Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, reports or other materials prepared by the Registered Professional retained by or on behalf of the Parcel Holder and accepted by the PIB, and any requirements imposed by the PIB;

   c. **"Registered Professional"** means:

      (i) a registered professional retained by the Parcel Holder,

(ii) a person who is registered or licensed in good standing to practice as a Professional Engineer under the Engineers and Geoscientists Act (British Columbia),

(iii) a person who is registered or licensed in good standing to practice as an Architect under the Architects Act (British Columbia), or

(iv) a person who is a professional with expertise and experience in the area of work being carried out by him or her in relation to the Works and Services required for the above-noted Project;

and is accepted as a Registered Professional by the PIB.

d. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then the standards set forth in the MMCD will apply.

e. **"Subject Components"** means those components of the Works and Services for the Project that I have been responsible for overseeing and initialed by me in the Schedule E-2 that I have previously provided to the PIB.

2. As a Registered Professional, I hereby give assurance and certify that:

a. I have fulfilled my obligations as a Registered Professional for Field Reviews and compliance of the Works and Services as outlined in the previously submitted Schedule E-2, "Assurance by Registered Professional of Professional Design and Commitment for Field Review";

b. I have inspected the Subject Components and carried out or caused to be carried out any examinations or tests set out in the Standards or recommended by good engineering practice to determine whether the Subject Components meet the applicable requirements of the Standards and Other Requirements;

c. The Subject Components are complete and substantially comply in all material respects with:

- The applicable requirements of the Standards and Other Requirements; and
- All plans and supporting documents with respect to the approved Detailed Design Submission as described in Sections 9.4 and 9.5 of the Subdivision, Development and Servicing Bylaw.

d. A complete set of as-constructed drawings of the Subject Components at the same scale an in the same format as the construction drawings, prepared in accordance with the Standards and good engineering practice has been submitted to PIB;

e. I am the Registered Professional as set forth below.

_____

Registered Professional's Name (print)

_____ _____

Registered Professional's Signature Date

_____

_____
Address (print) (Affix Professional Seal here)

_____
Phone

_____
Email Address and/or Fax

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____,
and I sign this letter of behalf of the firm.

SCHEDULE E-7
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL OF FIELD REVIEW AND COMPLIANCE (ENVIRONMENTAL)

Note: This Letter of Assurance shall be submitted at the time of application for Final Approval.

TO: Penticton Indian Band ("PIB")
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____
(the "Project")

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Letter of Assurance all defined terms in the PIB's Subdivision, Development and Servicing Bylaw are incorporated by reference. In addition, the following definitions apply:

   a. "**Environmental Requirements**" has the meaning as described in Schedule E-3.

   b. **"Other Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, the Canadian Environmental Assessment Act as amended or superseded, reports or other materials prepared by the Registered Professional retained by or on behalf of the Parcel Holder and accepted by the PIB, and any requirements imposed by the PIB, in respect of environmental matters;

   c. **"Registered Professional"** means:

      (i) a registered professional biologist retained by the Parcel Holder; and
      (ii) a person who is registered or licensed in good standing to practice as a Registered Professional biologist under the College of Applied Biology Act (British Columbia),

      and who is accepted as a registered professional by the PIB.

   d. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and

Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

e. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then the standards set forth in the MMCD will apply.

f. **"Subject Components"** means those components of the Works and Services for the Project that I have been responsible for overseeing and initialed by me in the Schedule E-2 that I have previously provided to the PIB.

2. As a Registered Professional, I hereby give assurance and certify that:

a. I have fulfilled my obligations as a Registered Professional for field review and compliance of the Works and Services as outlined in the previously submitted Schedule E-3, "Assurance by Registered Professional of Professional Design and Commitment for Field Review (Environmental)";

b. I have inspected those components of the Works and Services opposite my initials in the previously submitted Schedule E-3 (the "Subject Components") and carried out or caused to be carried out any examinations or tests set out in the Standards or recommended by good environmental practice to determine whether the Subject Components meet the applicable requirements of the Standards and Other Requirements;

c. The Works and Services substantially comply in all material respects with:

- The Environmental Requirements; and
- All plans and supporting documents with respect to the approved Detailed Design Submission as described in Sections 9.4 and 9.5 of the Subdivision, Development and Servicing Bylaw.

d. Where the design plans and supporting materials and information were prepared by me for the Works and Services, complete set of as-constructed drawings of the Subject Components at the same scale an in the same format as the construction drawings, prepared in accordance with the Standards and good environmental practice has been submitted to PIB;

e. I am the Registered Professional as defined below.

_____

Registered Professional's Name (print)

_____ _____

Registered Professional's Signature Date

_____

_____

Address (print) (Affix Professional Seal here)

_____

Phone

_____

Email Address and/or Fax

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____,
and I sign this letter of behalf of the firm.

SCHEDULE E-8
LETTER OF ASSURANCE BY REGISTERED PROFESSIONAL OF FIELD REVIEW AND COMPLIANCE (CULTURE AND HERITAGE)

Note: This Letter of Assurance shall be submitted at the time of application for Final Approval.

TO: Penticton Indian Band ("PIB")
841 Westhills Drive
Penticton, BC, V2A 0E8
Attn: Approving Officer

PROJECT: _____

_____

_____
(the "Project")

LOCATION: Penticton Indian Reserve No ___

Lot _____

Plan _____

1. In this Letter of Assurance all defined terms in the PIB's Subdivision, Development and Servicing Bylaw are incorporated by reference. In addition, the following definitions apply:

   a. "**Heritage Requirements**" has the meaning as described in Schedule E-4.

   b. **"Field Reviews"** means such reviews of the work at the Works and Services site to which any approval to construct or other approval relates and, where applicable, at fabrication locations where Works and Services components are fabricated for use at the Works and Services site, that a Registered Professional, in his or her professional discretion, considers to be necessary to ascertain that the work substantially complies in all material aspects with the plans and supporting documents prepared by the Registered Professional for which the approval to construct or other approval is issued;

   c. **"Registered Professional"** means:
      - a registered professional retained by the Parcel Holder; and
      - a person who is a professional with expertise and experience in the area of cultural and heritage work that is being carried out by him or her in relation to the Works and Services required for the above-noted Project;

      and who is accepted as a Registered Professional in the area of Indigenous culture and heritage by the PIB.

d. **"Other Requirements"** means applicable permits, bylaws, standards, laws, regulations and approvals other than the Standards which apply to the Works and Services including, without limitation, the PIB Heritage Requirements as amended or superseded, reports or other materials prepared by the Registered Professional retained by or on behalf of the Parcel Holder and accepted by the PIB, and any requirements imposed by the PIB, in respect of heritage matters;

e. **"Standards"** means the standards set forth in the PIB's Subdivision, Development and Servicing Bylaw, as amended or superseded from time to time. If there are no applicable standards in that Bylaw then the standards set forth in the MMCD will apply.

f. **"Subject Components"** means those components of the Works and Services for the Project that I have been responsible for overseeing and initialed by me in the Schedule E-2 that I have previously provided to the PIB.

2. As a Registered Professional, I hereby give assurance and certify that:

a. I have fulfilled my obligations as a Registered Professional for Field Reviews and compliance of the Works and Services as outlined in the previously submitted Schedule E-4, "Assurance by Registered Professional of Professional Design and Commitment for Field Review (Heritage)";

b. I have inspected the Subject Components and carried out or caused to be carried out any examinations or tests set out in the Standards or recommended by good environmental practice to determine whether the Subject Components meet the applicable requirements of the Standards and Other Requirements;

c. The Project substantially complies in all material respects with:

- The Heritage Requirements; and
- All plans and supporting documents with respect to the approved Detailed Design Submission as described in Sections 9.4 and 9.5 of the Subdivision, Development and Servicing Bylaw.

d. Where the design plans and supporting materials and information were prepared by me for the Works and Services, complete set of as-constructed drawings of the Subject Components at the same scale an in the same format as the construction drawings, prepared in accordance with the Standards and good environmental practice has been submitted to PIB;

e. I am the Registered Professional as set forth below.

_____

Registered Professional's Name (print)

_____ _____

Registered Professional's Signature Date

_____

_____

Address (print) (Affix Professional Seal here)

_____

Phone

_____

Email Address and/or Fax

If the Registered Professional is a member of a firm, complete the following:

I am a member of the firm _____,
and I sign this letter of behalf of the firm.

SCHEDULE F

WORKS AND SERVICES AND WARRANTY SECURITY AGREEMENTS

SCHEDULE F-1

WORKS AND SERVICES AGREEMENT PRIOR TO COMPLETION OF CONSTRUCTION OF ALL WORKS AND SERVICES

THIS AGREEMENT made this ____ day of _____, 20___

BETWEEN:

Penticton Indian Band
841 Westhills Drive
Penticton, BC, V2A 0E8

(hereinafter called the "PIB")

OF THE FIRST PART

AND:

(hereinafter called the "Parcel Holder")

OF THE SECOND PART

A. The Parcel Holder is the registered lessee of a Parcel or a person holding a Certificate of Possession of lands situate, lying and being in in Penticton Indian Reserve No. ___, and more particularly known and described as:

(hereinafter called the "Land")

B. The Parcel Holder wishes to construct on the Land, or part thereof, in the manner shown on Detailed Design Drawings, Plans and Specifications, approved by the Approving Officer, a copy of which is attached as Schedule "A"; and

C. The Parcel Holder wishes to enter into this Agreement with PIB to obtain a Building Permit or Final Approval of the Subdivision prior to completion of the Construction and installation of all Works and Services required by PIB to be constructed on the Land and adjacent and abutting Highways by the Parcel Holder in accordance with PIB Subdivision, Development and Servicing Bylaw #2020-01 and the Detailed Design Drawings, Plans and Specifications attached as Schedule "A".

NOW THIS AGREEMENT WITNESSES that in consideration of the premises and of the mutual covenants and agreements herein contained, the parties hereto covenant and agree as follows:

1. In this Agreement, unless the context otherwise requires, all words and expressions shall have the same meaning assigned to them as the like word or expressions contained in the Subdivision, Development and

Servicing Bylaw and all of the provisions of that Bylaw, including all schedules appended thereto, apply to this Agreement.

2. The Parcel Holder covenants and agrees to construct and install on the Land and adjacent to the Land, as the case may be, in accordance with the Detailed Design Drawings, Plans and Specifications approved by the Approving Officer, a copy of which is attached as Schedule "A", the following Works and Services: (cross out and initial those not applicable)

   a) Works and Services on all Highways abutting and adjacent to the Land for the benefit of the project to be constructed on the Land including:
      - Roadway clearing and grubbing, grading, excavation and embankment
      - Drainage works and services
      - Water works and services
      - Sanitary sewage works and services
      - Roadway structure including granular materials and paving
      - Curbs and gutters
      - Sidewalks
      - Street lighting
      - Shallow utilities including electrical, telephone, cable TV and gas
      - (specify any other types of works) _____

   b) Works and Services on the Land including:
      - Site and lot grading including clearing and grubbing, excavation and embankment
      - Roadway clearing and grubbing, grading, excavation and embankment
      - Drainage works and services
      - Water works and services
      - Sanitary sewage works and services
      - Roadway structure including granular materials and paving
      - Curbs and gutters
      - Sidewalks
      - Trails and pathways
      - Street lighting
      - Shallow utilities including electrical, telephone, cable TV and gas
      - (specify any other types of works) _____

3. Each of the parties hereto acknowledges having in its possession a true copy of the Detailed Design Drawings, Plans and Specifications attached in Schedule "A" and acknowledges and agrees that the Detailed Design Drawings, Plans and Specifications are incorporated into and made part of this Agreement.

4. The Parcel Holder shall cause all construction and installation of the Works and Services to be in accordance with the Detailed Design Drawings, Plans and Specifications, approved by the Approving Officer and in accordance with the provisions of the Subdivision, Development and Servicing Bylaw of the PIB from time to time in force, and as may be amended, and under the supervision of the Coordinating Registered Professional.

5. Whenever the Detailed Design Drawings, Plans and Specifications and the Subdivision, Development and Servicing Bylaw conflict, the Parcel Holder shall promptly notify the Approving Officer of the conflict and shall not proceed without the written approval of the Approving Officer.

6. The cost of providing, constructing and installing the Works and Services shall be entirely borne by the Parcel Holder.

7. The Parcel Holder shall obtain and provide to the PIB free of charge true copies of all contracts and subcontracts entered into by the Parcel Holder or its contractors, including the Coordinating Registered Professional, and relating to the construction and installation of the Works and Services.

8. The decision of the Approving Officer shall be final and binding on all parties hereto in determining whether or not the construction and installation of the Works and Services or any part thereof has been carried out and completed in accordance with the provisions of this Agreement.

9. The Parcel Holder shall cause the construction and installation of the Works and Services to achieve Substantial Performance not later than the ____ day of _____, 20__ and achieve Total Performance not later than the ___ day of _____, 20__ (the "Completion Date"). All other requirements for Final Approval are as specified in the Subdivision, Development and Servicing Bylaw.

10. The Parcel Holder covenants and agrees to pay to PIB all inspection fees, administration fees, engineering fees, and legal costs incurred by PIB related to the development of the Land and construction and installation of the Works and Services within thirty (30) days of an invoice being sent to the Parcel Holder at the address set forth in this Agreement.

11. As security for due and proper performance by the Parcel Holder of all its obligations under Article 2, the Parcel Holder has deposited with PIB cash, a bond in a form acceptable to the PIB, funds held in a solicitor's trust account or an irrevocable letter of credit in the amount of $_____, (the "Security") being the cost, as estimated by the Approving Officer, of constructing and installing the Works and Services required to be constructed and installed by the Parcel Holder under the terms of this Agreement.

    a) The Parcel Holder agrees that if the Works and Services or any part thereof are not completed in accordance with the provisions of this Agreement and by the Completion Date, or if the Parcel Holder shall be in default of any of its covenants herein contained, and such default shall continue for a period of fourteen (14) days after notice thereof has been give by PIB to the Parcel Holder, PIB may call for and receive the funds secured by the Letter of Credit and PIB may complete the Works and Services at the cost of the Parcel Holder and deduct from any funds held by PIB as security hereunder, the cost of such completion, and the balance of the security, if any, shall be returned to the Parcel Holder less any administration fees required by PIB. For greater certainty the Parcel Holder hereby authorizes any financial institution supplying the Security to release all or a portion of the Security to the PIB at the request of the PIB.

    b) If there is insufficient money on deposit with PIB under the Security, then the Parcel Holder shall pay such deficiency to PIB within fifteen (15) days of the PIB rendering an invoice to the Parcel Holder for completing the Works and Services.

    c) It is understood and agreed that PIB may do such Works and Services by itself, or by contractors retained by PIB.

    d) Any invoice rendered by PIB to the Parcel Holder under the provisions of this Article 11 shall be regarded as charges for work done or services provided to the Land and may in addition to any other remedy available to PIB, be collected in the same manner and with the like remedies as taxes upon the Land or as judgment has been rendered against the Parcel Holder in favour of the PIB.

e) In the event PIB elects to complete the Works and Services at the cost of the Parcel Holder, the Parcel Holder agrees to provide to PIB all Detailed Design Drawings, Plans and Specifications for the Works and Services that are in the Parcel Holder's possession or under the control of the Parcel Holder, and to transfer to PIB all of the Parcel Holder's right and title to any materials of any nature and wherever located, that the Parcel Holder has purchased, or acquired a legal or possessory interest in, for the construction and installation of the Works and Services.

12. PIB may, at its sole discretion, consent in writing to reductions in the amount of Security provided under Article 11 of this Agreement from time to time as portions of the Works and Services are completed. The amount of each reduction will be equal to the value of the portion of Works and Services completed less 25%. The Parcel Holder's Coordinating Registered Professional shall provide the amount of each reduction, if agreed to, on a form acceptable to PIB and sealed by the Coordinating Registered Professional. Upon Total Completion of all of the Works and Services as agreed to in writing by the PIB, the Security will be released and Article 13 will apply.

13. The Parcel Holder agrees to remedy at its expense any defects in the Works and Services appearing during the period commencing on the Completion Date as confirmed in writing by the PIB and ending at midnight on the date that is one year thereafter (the "Warranty Period"), and agrees to repair any damage to other works or property, including works to which the Works and Services are connected, that is caused by such defects, but nothing in this Agreement requires the Parcel Holder to remedy any condition caused by the negligence of PIB, its employees, agents or contractors.

14. If the revision of any as-built drawing or operation manual is, in the reasonable opinion of the Approving Officer, necessary as a result of the Parcel Holder remedying any defect in the Works and Services, the Parcel Holder shall at his or her or its sole expense promptly supply to PIB revised drawings or manuals as the case may be.

15. Prior to undertaking any work in compliance with Article 13, the Parcel Holder shall obtain the written approval of the Approving Officer.

16. The Approving Officer may, at any time during the Warranty Period, inform the Parcel Holder of the existence of defects in the Works and Services of which PIB becomes aware, and require the Parcel Holder to remedy the defect in accordance with Article 13, and in such cases the approval referred to in Article 15 shall be deemed to have been given. If, in the reasonable opinion of the Approving Officer, the defect requires an immediate remedy and PIB is unable, upon making reasonable efforts, to contact the Parcel Holder, or the Parcel Holder fails or refuses to immediately remediate the defects PIB may undertake the remediation of the defect in the Works and Services at the Parcel Holder's expense and the provisions of Article 20 shall apply as if the Parcel Holder had failed to remedy a defect in the Works and Services.

17. In the event of any disagreement between the Parcel Holder and PIB as to whether any particular condition constitutes a defect in the Works and Services, the Detailed Design Drawings, Plans and Specifications shall govern the matter, and if the Detailed Design Drawings, Plans and Specifications do not address the issue, then the standards and specifications in the Subdivision, Development and Servicing Bylaw shall govern the matter. The Approving Officer's interpretation of the Bylaw shall be determinative.

18. For the purpose of remedying defects in the Works and Services in accordance with this Agreement, PIB permits the Parcel Holder to occupy and use those of PIB's Highways as are required in order to remedy the

defects subject to such terms and conditions as may be imposed by the Approving Officer in issuing approvals under Article 16.

19. The Parcel Holder shall not employ or retain any person or contractor in the construction and installation of the Works and Services required by the Agreement, or permit the Coordinating Registered Professional to employ or retain such person or contractor, who, in the reasonable opinion of the Approving Officer, is unfit or incapable, or does not have the necessary skills or experience, to carry out that portion of the Works and Services to the requisite standard, and shall employ, or have the Coordinating Registered Professional, an Architect, a Professional Engineer or a contractor retained by the Parcel Holder employ and keep at the work site on the Land during any work performed under this Agreement a competent general works superintendent capable of speaking, reading and writing the English language and with the skills and experience necessary to ensure that the Works and Services are performed to the requisite standard. Any directions and requirements communicated to the superintendent by PIB shall be deemed to have been communicated to the Parcel Holder.

20. As security for the performance of its obligation under Articles 13 and 14, the Parcel Holder agrees that PIB may retain from the Security provided under Article 11, 5% of the cost of the Works and Services. In the event the Parcel Holder fails to remedy any defect in the Works and Services or supply any drawing or manual within a reasonable time of being required to do so, PIB may remedy the defect or supply the document at the Parcel Holder's expense and draw on the Security to cover the cost. Any shortfall shall be recoverable from the Parcel Holder by the PIB as a contract debt and in a manner as if judgment had been rendered against the Parcel Holder in favour of the PIB. If the Warranty Period has not expired at the time the Security is drawing upon, the Parcel Holder shall immediately increase or replace the Security to the amount set out in this Agreement. Any unused Security shall be returned to the Parcel Holder without interest on the expiry of the Warranty Period provided that all defects have been remedied to the satisfaction of the PIB.

21. The Parcel Holder shall at its expense take out and maintain until the end of the Warranty Period comprehensive general liability insurance against claims for bodily injury including death and property damage or loss, arising from the Parcel Holder's operations on PIB's Highways in carrying out its obligations under this Agreement. Such insurance shall name PIB as an additional or named insured and shall insure PIB and the Parcel Holder in the same manner and to the same extent as if individual policies in the amount of a minimum of five million dollars ($5,000,000.00) had been issued to each. The policy shall contain a provision requiring the insurer to give PIB thirty (30) days written notice before any alteration or cancellation of the policy shall be effective. A certificate of such insurance shall be provided to PIB before the Parcel Holder enters on any Highway to perform the Parcel Holder's obligations under this Agreement.

22. The Parcel Holder indemnifies and saves PIB harmless from:

    a. All costs , expenses, damages, claims, demands, actions, suits and liabilities by whomever brought or made and however arising whether directly or indirectly from any defect in the construction and installation of the Works and Services or from any injury or damage caused by such defect or any work done pursuant to this Agreement to remedy such defect, whether to persons or property, except any injury or damage caused by the negligence or wilful misconduct of the PIB;

    b. All costs and expenses incurred by PIB in constructing, repairing, replacing or maintaining any Works and Services or property affected by any defect in the Works and Services and which PIB either owns or is by duty or custom obliged to construct, repair, replace or maintain;

c. All expenses and costs incurred by reason of liens, or the equivalent of liens, for non-payment of labour or material, Workers' Compensation Board assessments, unemployment insurance, or federal or provincial tax; and

d. All other expenses and costs incurred by the PIB as a result of the Parcel Holder breaching or otherwise failing to comply with this Agreement or the requirements under it, including but not limited to, legal costs on a solicitor and own client basis.

23. The Parcel Holder shall at its sole expense obtain for the benefit of PIB and in the PIB's standard form for such instructions, any right of way, easement or permit required for any portion of the Works and Services that is located on any land that is not a Highway.

24. The Parcel Holder acknowledges that no part of the Works and Services constitutes excess or extended services, other than any part expressly identified as such in this Agreement.

25. Any demand or notice required or permitted to be given under the provisions of this Agreement shall be in writing and may be given by mailing such notice by prepaid registered post to the party concerned at the address for such party first above recited, and any such notice or demand mailed as aforesaid shall be deemed to have been received by the party to whom it is addressed on the second business day after the date of posting thereof.

26. The Parcel Holder acknowledges and agrees that immediately upon issuance by the Approving Officer of its certificate stating the Works and Services have achieved Total Performance, all right, title and interest in the Off-Site Works and Services shall immediately pass to and vest in the PIB, but nothing herein contained shall derogate from the obligation of the owner to maintain the Off-Site Works and Services throughout the Maintenance Period. All Works and Services on the Land will remain owned by the Parcel Holder and their servicing, maintenance and repair shall remain the sole responsibility of the Parcel Holder.

27. It is understood and agreed that the PIB has made no representations, covenants, warranties, guarantees, promises or agreements (oral or otherwise) with the Parcel Holder other than those contained in this Agreement. In the event that any part of this Agreement is declared to be void by a court of competent jurisdiction, then such part shall be deemed to be severed from this Agreement and the remainder shall continue in full force and effect.

28. Wherever the singular or masculine is used herein, the same shall be construed as meaning the plural, feminine or body corporate or politic where the text or the parties so require.

29. Time is of the essence of this Agreement.

30. This Agreement and the terms, covenants and conditions herein contained shall enure to the benefit of and be finding upon the parties hereto and their respective heirs, executors, administrators, successors and assigns.

31. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original copy of this Agreement and all of which, when taken together, shall be deemed to constitute a single agreement. No such counterpart need contain the signatures of all parties to this Agreement and the exchange of signed counterparts by each of the parties, including exchange by facsimile or electronic transmission or similar means, shall constitute effective execution and delivery of this agreement.

IN WINESS WHEREOF the parties hereto have executed this Agreement at Penticton, Province of British Columbia, the day and year first above written.

PENTICTION INDIAN BAND

_____	_____
CHIEF	PARCEL HOLDER
_____	_____
CHIEF ADMINISTRATIVE OFFICER	PARCEL HOLDER

(FOR USE WHERE THE PARCEL HOLDER IS A CORPORATION, SEE BELOW)

The Corporate Seal of

_____

Was hereunto affixed in the presence of:

_____

SCHEDULE F-2

WORKS AND SERVICES WARRANTY AGREEMENT

THIS AGREEMENT made this ____ day of _____, 20___

BETWEEN:

Penticton Indian Band
841 Westhills Drive
Penticton, BC, V2A 0E8

(hereinafter called the "PIB")

OF THE FIRST PART

AND:

(hereinafter called the "Parcel Holder")

OF THE SECOND PART

WHEREAS: The Parcel Holder has installed Works and Services on PIB's Highways in connection with the Subdivision or Development, or both, of the Parcel Holder's land legally described as:

(hereinafter called the "Land"); and

WHEREAS: It is the responsibility of the Parcel Holder to install the Works and Services in accordance with the Detailed Design Drawings, Plans and Specifications prescribed by PIB, which standards and specifications include a requirement that the Parcel Holder remedy any defect in the Works and Services becoming apparent during the first year of operation of the Works and Services commencing on the Completion Date (the "Warranty Period"); and

WHEREAS: The Parcel Holder has requested the issuance of Final Approval of the Works and Services on the Land immediately following completion of the Works and Services and achieving Total Performance, and before the expiry of the Warranty Period;

THIS AGREEMENT is evidence that, inconsideration of the mutual promises set out in the Agreement and the payment of one dollar by the PIB to the Parcel Holder, the receipt of which is acknowledged by the Parcel Holder, the parties agree as follows:

1. All defined terms in the PIB's Subdivision, Development and Servicing Bylaw #2020-01, and all of the provisions of that Bylaw, including all schedules appended thereto, apply to this Agreement.

2. The Parcel Holder agrees to remedy at its expense any defects in the Works appearing during the period commencing on the Completion Date of the Works and Services as confirmed in writing by the Approving Officer and ending at midnight on the date that is one year thereafter (the "Warranty Period"), and agrees

to repair any damage to other works or property, including works to which the Works and Services are connected, that is caused by such defects, but nothing in this Agreement requires the Parcel Holder to remedy any condition caused by the negligence of PIB, its employees, agents or contractors.

3. If the revision of any as-built drawing or operation manual is, in the reasonable opinion of the Approving Officer, necessary as a result of the Parcel Holder remedying any defect in the Works and Services, the Parcel Holder shall at it expense promptly supply to PIB revised drawings or manuals as the case may be.

4. Prior to undertaking any work in compliance with Article 2, the Parcel Holder shall obtain the written approval of the Approving Officer.

5. The Approving Officer may, at any time during the Warranty Period, inform the Parcel Holder of the existence of defects in the Works and Services of which PIB becomes aware, and require the Parcel Holder to remedy the defect in accordance with Article 1 within the time specified by the Approving Officer, and in such cases the approval referred to in Article 3 shall be deemed to have been given. If in the reasonable opinion of the Approving Officer the, defect requires an immediate remedy and PIB is unable, upon making reasonable efforts, to contact the Parcel Holder, or the Parcel Holder fails or refuses to immediately undertake the required work, the PIB may undertake the remediation of the defect in the Works and Services at the Parcel Holder's expense and the provisions of Article 8 shall apply as if the Parcel Holder had failed to remedy a defect in the Works and Services. The PIB may also charge a 15% administration fee for performing such work.

6. In the event of any disagreement between the Parcel Holder and PIB as to whether any particular condition constitutes a defect in the Works and Services, the Detailed Design Drawings, Plans and Specifications shall govern the matter, and if the Detailed Design Drawings, Plans and Specifications do not address the issue, then the standards and specifications in the Subdivision, Development and Servicing Bylaw shall govern the matter. The Approving Officer's interpretation of the Bylaw shall be determinative. If neither the Detailed Design Drawings, Plans and Specifications nor the Subdivision, Development and Servicing Bylaw cover the matter and the parties can not resolve the disagreement the matter will be referred to dispute resolution in accordance with Article 12 of this Agreement.

7. For the purpose of remedying defects in the Works and Services in accordance with this Agreement, PIB permits the Parcel Holder to occupy and use PIB's Highways subject to such terms and conditions as may be imposed by the Approving Officer in issuing approvals under Article 3.

8. The Parcel Holder shall not employ or retain any person or contractor in the construction and installation of the Works and Services required by the Agreement, or permit the Coordinating Registered Professional to employ or retain such person or contractor, who, in the reasonable opinion of the Approving Officer, is unfit or incapable or does not have the necessary skills or experience to carry out that portion of the Works and Services to the requisite standard, and shall employ, or have the Coordinating Registered Professional, an Architect, a Professional Engineer or a contractor retained by the Parcel Holder employ and keep at the work site on the Land during any work performed under this Agreement a competent general works superintendent capable of speaking, reading and writing the English language and with the skills and experience necessary to ensure that the Works and Services are performed to the requisite standard. Any directions and requirements communicated to the superintendent by the PIB shall be deemed to have been communicated to the Parcel Holder.

9. As security for the performance of its obligations under this Agreement, the Parcel Holder has deposited with PIB cash, a bond acceptable to the PIB or an irrevocable letter of credit in the amount of $_____,

being 5% of the cost of constructing the Works and Services as estimated by the Approving Officer (the "Security"). In the event that the Parcel Holder fails to remedy any defect in the Works and Services within the time of being required to do so under Article 4 or supply revised drawings or manuals under Article 2, the PIB may remedy the defect or supply the documents at the Parcel Holder's expense and draw on the Security to cover the cost. Any shortfall shall be recoverable from the Parcel Holder by PIB as a contract debt or as if judgment had been rendered against the Parcel Holder in favour of the PIB. If the Warranty Period has not expired at the time the Security is drawn upon, the Parcel Holder shall immediately increase or replace the Security to the amount set out in this Article. Any unused Security shall be returned to the Parcel Holder without interest on the expiry of the Warranty Period, subject to all defects having been remedied.

10. The Parcel Holder shall at its expense take out and maintain until the end of the Warranty Period comprehensive general liability insurance against claims for bodily injury including death and property damage or loss, arising from the Parcel Holder's conducting the Works and Services on the PIB's Highways in carrying out its obligations under this Agreement and all other agreements between the Parcel Holder and the PIB. Such insurance shall name PIB as an additional or named insured and shall insure PIB and the Parcel Holder in the same manner and to the same extent as if individual policies in the amount of a minimum of five million dollars ($5,000,000.00) had been issued to each. The policy shall contain a provision requiring the insurer to give PIB thirty (30) days written notice before any alteration or cancellation of the policy shall be effective. A certificate of such insurance shall be provided to PIB before the Owner enters on any Highway to perform the Parcel Holder's obligations under this Agreement and the Subdivision, Development and Servicing Bylaw.

11. The Parcel Holder indemnifies and saves PIB harmless from:
    a. All costs , expenses, damages, claims, demands, actions, suits and liabilities by whomever brought or made and however arising whether directly or indirectly from any defect in the construction and installation of the Works and Services or from any injury or damage caused by such defect or any work done pursuant to this Agreement to remedy such defect, whether to persons or property, except any injury or damage caused by the negligence or wilful misconduct of the PIB;

    b. All costs and expenses incurred by PIB in constructing, repairing, replacing or maintaining any Works and Services or property affected by any defect in the Works and which PIB either owns or is by duty or custom obliged to construct, repair, replace or maintain;

    c. All expenses and costs incurred by reason of liens, or the equivalent of liens, for non-payment of labour or material, Workers' Compensation Board assessments, unemployment insurance, or federal or provincial tax; and

    d. All other expenses incurred by the PIB as a result of the Parcel Holder breaching or otherwise failing to comply with this Agreement or the requirements under it, including, but not limited to, legal costs on a solicitor and own client basis.

12. Should the parties be unable to resolve a dispute or disagreement, the parties will utilize the procedures set forth as follows:

    a. <u>Mediation</u>

(i) If a dispute arises between the parties relating to this Agreement, or arising out of this Agreement, the parties agree to use the following procedure as a condition precedent to either party pursuing other available remedies;

A. Any party may notify the other by written notice ("Notice") of the existence of a dispute or disagreement and a desire to resolve the dispute or disagreement by mediation.

B. A meeting will be held promptly between the parties, attended by individuals with decision-making authority regarding the dispute or disagreement, to attempt in good faith to negotiate a resolution of the dispute.

C. If, within 14 days after such meeting or such further period as is agreeable to the parties, the parties have not succeeded in negotiating a resolution of the dispute or disagreement, they agree to submit the dispute to mediation and to bear equally the costs of mediation.

D. The parties will jointly appoint a mutually acceptable mediator, seeking assistance from the British Columbia International Commercial Arbitration Centre, if they have been unable to agree upon such appointment within 20 days following the conclusion of the negotiation period.

E. The parties agree to participate in good faith in the mediation and negotiations related thereto for a period of 30 days following appointment of the mediator, or for such longer period as the parties may agree.

F. The costs of mediation will be shared equally between the parties. Costs will not include costs incurred by a party for representation by legal counsel.

b. Arbitration

(i) If a disagreement or dispute is not resolved within 30 days after the appointment of the mediator, or such longer period as the parties have agreed upon, then, upon application by either party, the disagreement will be referred and resolved by a single arbitrator pursuant to the *Arbitration Act* (British Columbia). The decision of the arbitrator on all issues or matters submitted to the arbitrator for resolution shall be conclusive, final and binding on both of the parties. The cost of the arbitrator shall be borne equally by the parties unless the arbitrator determines otherwise.

13. Time is of the essence of this Agreement.

14. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original copy of this Agreement and all of which, when taken together, shall be deemed to constitute a single agreement. No such counterpart need contain the signatures of all parties to this Agreement and the exchange of signed counterparts by each of the parties, including exchange by facsimile or electronic transmission or similar means, shall constitute effective execution and delivery of this Agreement.

IN WINESS WHEREOF the parties hereto have executed this Agreement at Penticton, Province of British Columbia, the day and year first above written.

PENTICTION INDIAN BAND

_____	_____
CHIEF	PARCEL HOLDER
_____	_____
CHIEF ADMINISTRATIVE OFFICER	PARCEL

(FOR USE WHERE THE OWNER IS A CORPORATION, SEE BELOW)

The Corporate Seal of

_____
Was hereunto affixed in the presence of:

_____

REFERENCE DOCUMENTS

APPROVED PRODUCT LIST

CONTACT PIB PUBLIC WORKS FOR CHICAGO STORMS EXCEL SPREADSHEET

CONTACT PIB PUBLIC WORKS FOR MOST RECENT REFERENCE DOCUMENTS

Penticton Indian Band

Approved Products List

JUNE, 2020

Note: Products must conform to CSA Standard, where applicable

Item		Item Description	Approved Product	Standard	Comments/Restrictions
1. Waterworks					
1.1 Pipe	1.1.1	Polyvinyl Chloride Pipe	Ipex Rehau Royal Flex-Loc	CSA B137.3 AWWA C900 DR25, 18 and 14 AWWA C905 DR41, 32.5, 25 and 18	C900 Sizes 100 – 300 mm C905 Sizes 350 – 900 mm
	1.1.2	Ductile Iron	Canada Pipe US Pipe	AWWA C151 Cement Mortar lined to AWWA C104	Installed with a polyethylene encasement to AWWA C104 Canada Pipe 400 to 750mm US Pipe 750mm and up
1.2 Fittings	1.2.1	Cast Iron Fittings	TC/ACS Norwood Foundry Sigma Corporation	ASTM C110-82 ASTM B16.1-1975 Exterior Coating to ANSI/AWWA C151/A21.5.1 Coal Tar Enamel to AWWA C203 Cement Mortar Lined to ANSI/AWWA C104/A21.4	North American Controlled Manufactured MJ/TJ Bell 100 – 600 mm MJ Bell 750 mm Stainless steel bolts Epoxy coated
	1.2.2	PVC Extruded Fittings	Ipex Inc.	CSA B137.2 and B137.3 AWWA C907 (100-900 mm)	Long Body 5° Bends
1.3 Couplings	1.3.1	Couplings	Ford	FC1-ESH & FCA-ESH 100-600mm FC2W Ultra Flex 100-300mm	Fusion Bonded Epoxy Coated Ductile Iron Complete with Zinc or Cadmium plated bolts. All bolts to be denso paste and taped.
			Robar	1506 & 1506R - 100-600mm 1726 Multi-Fit - 100-300mm	
			Smith Blair	411, 413,415,441 - 100-600mm	
			Canada Pipe	Style CDB – 100-600mm	
			Viking Johnson	Maxi-Fit & Maxi-Step – All Sizes	
			T.P.S	Hymax 2000 – 50-600mm	
			Romac	XR 501 Extended Range – 100-300mm	
	1.3.2	Adapter Flanges	Uni-Flange	ANSI B16.1 125lb/ANSI D16.5 150lb	

Note: Products must conform to CSA Standard, where applicable

Item		Item Description	Approved Product	Standard	Comments/Restrictions
1.4 Restraining Devices			Uni-Flange/Ford Meter Box Co.- Series 1300 – 1390 for PVC Pipe Smith Blair- Model 982 Sigma – PV-LOC Series EBAA Iron – Series 1500 PVC Canada Pipe – Thrust Loc Series Sigma – Zip Flange	ASTM A536 Grade 65-45-12 ANSI/AWWA C111/A21.11 ANSI/AWWA C153/A21.53	100-600mm Subject to Engineers Design and Approval Complete with Zinc or Cadmium plated bolts. All bolts to be denso paste and taped.
1.5 Tapping Sleeves			Robar –	2606DB - 100-600mm	Up to 25mm boss With Stainless Steel Straps
				2706DS - 100-600mm	
			Canada Pipe –	SC-2 - 100-400mm	
			Ford	FS303 - 100-300mm	
				202BS - 100-900mm	
			Cambridge Brass –	812 - 100-900mm	
			Romac-	202NS – 100-900mm	Nylon Coated saddle with double stainless steel straps
1.6 Fire Hydrants			Clow – Brigadier Canada Valve - Century	AWWA C502	Painted Red (Hydrant) c/w Storz Fittings 1.5 m Minimum Cover
1.7 Repair Clamps			Robar Industries Ltd. Mueller Canada Pipe Clow Canada Ford	Stainless Steel "Two Piece Type"	Sizes 100 – 600 mm
1.8 Valves	1.8.1	Mainline Gate Valves	Clow Canada – Clow	AWWA C505	Complete with Zinc or Cadmium

Note: Products must conform to CSA Standard, where applicable

Item		Item Description	Approved Product	Standard	Comments/Restrictions
			Reslilient – 50-600mm	Electrostatically Applied Fusion Bonded	plated bolts/tie rods.
			Mueller – Super Seal – 50-300mm		
			Mueller – AWWA C-515 A2361 – 350-1050mm		
	1.8.2	Air Valves	Golden Anderson	945 E – 25-100mm	Internally Coated
			Apco	143C, 145C, 147C, 149C, & 150C – 25-150mm	
			Valmatic	201C, 202C, 203C, & 204C – 25-150mm	
			Crispin	All Models – 25-150mm	
			Cla-Val	All Models – 25-150mm	
	1.8.3	Valve Boxes-Mainline	TC/ACS Norwood Foundry Dobney Foundry D-5	Minimum 375mm Vertical Dimension	Nelson Type
	1.8.4	Valve Boxes-Services	Mueller	A-726 – 20-25mm A-728 – 37-50mm	Stainless Steel Rods & SS-RHD or MD-RHD Clevis Ends
			Trojan	VSB1 – 20-25mm VSB2 – 37-50mm	
	1.8.5	Check Valves	Apco Mueller Watts		Sizes 100 – o400 mm AWWA C504 Flanges Stainless steel bolts Epoxy coated
1.9 Water Service	1.9.1	Water Service Pipe 19 – 50 mm	All suppliers for Polyethylene	WWT-799 ASTM F1281 CSA 137.1 AWWA C901	Pressure Class 200 DR9 polyethylene tubing (Certified to CSA B137.1) All PE: ID must be equivalent to copper tube flow capacity
1.10 Brass Service	1.10.1	Corporation Stops	Mueller	B-25008 – 20-50mm	Full Port Only

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Item		Item Description	Approved Product	Standard	Comments/Restrictions
Fittings					
			A.Y. McDonald	4701BQ – 20-50mm	Full Port Only
			Ford	FB 1000 – 20-50mm	Full Port Only
			Cambridge Brass	Series 301 – 20-50mm	Full Port Only c/w new Mueller gasket
	1.10.2	Curb Stops	Mueller	B-25209 – 20-50mm	Full Port Only
			A.Y. McDonald	6100XQ – 20-50mm	Full Port Only
			Ford	B44 Series – 20-50mm	Full Port Only models 333, 444, 555, 666, & 777
			Cambridge Brass	Series 202 – 20-50mm	
	1.10.3	Service Line Couplers	Ford	C44 Series – 20-50mm	Models C44-1 to C44-88
			Mueller	H-15403 – 20-50mm	H15403, H15404, & H12940
			Cambridge Brass	Series 118 & 119 – 20-50mm	
1.11 Water Meter	1.11.1	Water meter for single family, multi-family, commercial, institutional	Badger	20mm and larger	Consult PIB for specific model
2. Sewer					
2.1 Storm Pipe	2.1.1	Concrete Pipe	Ocean Construction	ASTM C14, C76 A443, C655	600 mm and Larger Type 50 Cement
	2.1.2	Polyvinyl Chloride Pipe	Ipex. Royal Flex-Loc Pipe Ltd. Rehau Industries Ltd. Loc Pipe	CSA B182.2 ASTM D2412 AD NQ3624-060	DR28 100 – 150 mm DR35 150 – 900 mm
	2.1.3	Ultra-Rib Ultra – X-2	Ipex Rehau Industries Ltd. Ipex	CSA B182.4 ASTM F794	300 mm -600mm 750mm-900mm
	2.1.4	Corrugated High Density Polyethylene	Big O Boss 2000 Big O Boss 1000 (Culverts	ASTM D3350, CSA B182.6 – M92 ASTM D1248, F405, F667	Bell and Spigot with Gaskets Screw on Couplers

Note: Products must conform to CSA Standard, where applicable

Item		Item Description	Approved Product	Standard	Comments/Restrictions
		Pipe	Only)		
	2.1.5	Corrugated Steel Pipe Spir-L-Ok	Armtec Inc. (Culverts Only)	CSA CAN3-G401, M81	2.0 mm Gauge Minimum 400 mm Galvanized Coated
2.2 Vaults		Pre-Cast Reinforced Concrete	Grosso Kemp A & E Kon Kast		Precast Concrete Minimum 960 Opening H20/CS-600 Loading Type 50 Cement
2.3 Catchbasins	2.3.1	Barrels	Grosso Kemp Kon Kast Ocean	ASTM C478	Pre-Cast Concrete 750 mm and 900 mm Diameter 1500 Deep H20/CS-600 Loading Type 50 Cement
	2.3.2	Complete Bases and Lids	Grosso Kemp Kon Kast Ocean	ASTM 478	Pre-Cast Concrete 360 maximum 640 mm Opening H20/CS-600 Loading Type 50 Cement
	2.3.3	Lawn Basin	Le-Ron Plastics Inc. Ocean		70A06 with B33 Grate Type 50 Cement
	2.3.4	Frame and Grate	Dobney Foundry Alf's Casting K.C. Castings Trojan		Type 1 B23 Grate and 24 Frame LH or RH Type 2 Style B39B, B18 and B19 Type 3 B24 Adjustable Frame B23 Grate TF-33
2.4 Headwalls		Pre-Cast Concrete	Grosso Kemp Kon Kast		Pre-Cast Concrete

Note: Products must conform to CSA Standard, where applicable

2.5 Storm Manholes	2.5.1	Barrels-Storm	Grosso Kemp Kon Kast Ocean	ASTM C478	Pre-Cast Concrete Minimum 1050 mm H20/CS-600 Loading
	2.5.2	Concrete Lid-Storm	Grosso Kemp Kon Kast Ocean	ASTM C478	Pre-Cast Concrete Minimum 1050 mm H20/CS-600 Loading
	2.5.3	Pre-Cast Bases-Storm	Grosso Kemp Kon Kast Ocean		GU Liners
	2.5.4	Frame and Cover	Dobney Foundry Alf's Casting K.C. Castings Trojan		C18 Frame and Cover C18D Frame and Cover H20/CS-600 Loading TF-39
2.6 Storm Sewer Services	2.7.1	PVC Pipe	Ipex Rehau Industries Ltd. Royal Flex-Loc	CSA B182.2 ASTM B2412 AD NQ 3624-060	DR28 100 – 150 mm
	2.7.2	Service Wyes	Ipex Le-Ron Plastics Inc.	CSA B182.2 ASTM D3034, AD F1336	DR28 Bell and Spigot All new mainline construction
	2.7.3	Saddles	Ipex Le-Ron Plastics Inc.	CSA B182.2 ASTM D3034 ASTM F1336	Double Strap Wye Only on existing mains
	2.7.4	Inspection Chamber	Le-Ron Plastics Inc.		100 mm and 150 mm 70A4WOP or 70A6WOP Chamber 73A08HSL Locking Collar 71ALID086L Locking Lid Green – Storm