Subdivision and Development Servicing
Bylaw No. 1000

Consolidated to 4 June 2019
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CITY OF LANGFORD
Subdivision, Development and Servicing Bylaw Number No. 1000

WHEREAS Council may appoint a person to be called an Approving Officer to exercise the jurisdiction conferred on him by the Land Title Act or the regulations or any other Act or regulations;

AND WHEREAS the Approving Officer appointed by the City of Langford has established procedures for examining proposed subdivisions which information is available to the public;

AND WHEREAS the Council may by bylaw impose subdivision application fees pursuant to Section 931 of the Local Government Act;

AND WHEREAS Council may by bylaw regulate and require the provision of works and services in respect of the subdivision or development of land, pursuant to Section 938 of the Local Government Act;

NOW THEREFORE the Council of the City of Langford in open meeting assembled enacts as follows:

1.0 TITLE

1.1 This Bylaw may be cited as the “Langford Subdivision and Development Servicing Bylaw No. 1000, 2009”.

2.0 APPLICATION

2.1 The provisions of this Bylaw apply to all lands within the area incorporated as the City of Langford. This Bylaw does not apply to any subdivision or building permit for which application was made prior to the date of coming into force of this Bylaw provided that such application is completed within 12 months of adoption of Bylaw 1000.

2.2 The purpose of this Bylaw is to regulate the subdivision and development of land and the arrangement, design and construction of highways, works and services, in order to:

(a) Promote orderly, efficient, economical and aesthetically pleasing development.

(b) Ensure that subdivisions and developments are developed in harmony with the environment and are suited to the use for which they are intended.

2.3 This Bylaw should be used in conjunction with the Schedules to this bylaw, Langford Zoning Bylaw, 1999 (No. 300) and the Langford Official Community Plan Bylaw, 2008 (No. 1200). Users of this Bylaw are advised that they should also be knowledgeable of the requirements of other applicable enactments including without limitation the:

(a) Land Title Act;
(b) Local Government Act;
(c) Community Charter
(d) Strata Property Act and Bare Land Strata Regulations;
(e) Agricultural Land Commission Act;
2.4 As a condition of

a) The approval of a subdivision, or
b) The issuance of a Building Permit

The owner of the land is required to provide works and services in accordance with the standards established in this bylaw, on that portion of a highway immediately adjacent to the site being subdivided or developed, up to the center line of the highway.

3.0 SEVERABILITY

3.1 No provision of this Bylaw depends for its validity on any other provision and if any section, subsection, clause, sub-clause or phase of this Bylaw is for any reason held to be invalid by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Bylaw.

4.0 DEFINITIONS

In this Bylaw,

Deleted. (Bylaw No. 1494)

“Acceptance of Substantial Performance” means the Director of Engineering’s acceptance in writing of the Engineer of Record’s issuance of Substantial Performance of the approved Works and Services as defined by the Master Municipal Construction Documents (MMCD) (latest edition). (Bylaw No. 1669)

“Applicant” means a person applying for approval of a subdivision or development, whether as the owner or as agent for the owner.

“Approved Product List” means the product list established by the City Engineer from time to time for the purposes of this Bylaw. (Bylaw No. 1817)

“Approving Officer” means the Approving Officer appointed pursuant to the Land Title Act for the City of Langford.

“Blast or Blasting” means the use of explosives for the purpose of moving, displacing or breaking rock or other material;
“Blaster” means the person, firm or corporation engaged by the Owner to conduct Blasting and includes an agent, contractor or employee of the Blaster;

“Boundary Adjustment” means an adjustment in existing boundaries between legally defined parcels of land that does not create additional parcels.


“Cal” or “caliper” means the diameter of the tree trunk measured 15 cm from the ground level or from the top of the root ball in the case of a tree grown in a nursery. (Bylaw No. 1494)

“Capital Regional District Water Services (CRDWS)” includes any organization assuming the responsibility for the retail water supply in Langford.

“City” means the City of Langford.

“City Engineer” means the company, person or persons appointed from time to time by the Council as City Engineer or Director of Engineering, or any employee authorized to act on their behalf. (Bylaw No. 1669)

“City of Langford Supplements” are supplements to the Master Municipal Construction Documents (MMCD), latest edition.

“Community Plan” means the Langford “Official Community Plan Bylaw No. 1200, 2008” and as amended.

“Completion” - for the purpose of assessing applications, means a Servicing Agreement has been executed or a pre-construction meeting has been held with City representatives.

“Construction Acceptance” means the City’s acceptance of the construction of Works and Services provided by a Developer pursuant to this Bylaw, subject to the obligation of the Developer to remedy defects and deficiencies becoming apparent during the Warranty Period. (Bylaw No. 1494)

“Contractor” is the person, firm or corporation under contract with the City or developer to provide labour, equipment and materials for the execution of the works.

“Core Area” as defined in Zoning Bylaw 300.

“Cul-de-sac” means a highway of which one end is designed to be permanently closed to motor vehicles, or which is terminated by a natural feature and which provides a vehicular turning area.

“Deep Sewers” means those installed at greater than 3.0 metres below finished grade.

“Developer” means the owner or authorized agent engaged in the process of subdividing or developing the subject property.
“Development” means any improvement to residential, commercial, industrial, institutional or municipal lands, highways and rights-of-way, including the construction, alteration or repair of a building pursuant to a building permit.

“Engineer or Geoscientist of Record” or “Record Engineer” or “Record Geoscientist” means a Professional Engineer or Geoscientist engaged by a Developer to provide certifications required by this Bylaw, a Statement of Conditions, a Development Permit or a Building Permit. (Bylaw 1513)

“Final Acceptance” means the City’s acceptance of Works and Services provided pursuant to this Bylaw at the end of the warranty period with all defects and deficiencies remedied to the satisfaction of the City Engineer. (Bylaw No. 1494)

“Final Approval” means the Approving Officer’s signature on the final plan of subdivision. (Bylaw No. 1669)

“Highway” includes a street, road, lane, bridge, viaduct and any other way open to the use of the public, but does not include a right-of-way on private property, other than an access route in a bare land strata plan that, in the opinion of the City Engineer must be designed to City standards in the interest of public safety and emergency access.

“Landscape Retaining Wall” means a retaining wall that is not a Structural Retaining Wall. (Bylaw 1513)

“Lane” means a Highway which provides a secondary means of vehicle access to one or more Parcels of land. (Bylaw 1513)

“Medical Health Officer” means the Medical Health Officer for the Vancouver Island Health Authority.

“Municipal Sewer System” means the network of pipes and infrastructure placed so as to receive and direct sewage from two or more parcels of land to a treatment facility, which is owned and operated, by municipal government or City.

“Parcel” means any lot, block or other area in which real property is held or into which real property is subdivided, but does not include a highway or portion thereof and includes the remainder of a parcel.

"Parks Manager" means the person appointed to that position from time to time by the Council and includes any person authorized by the Parks Manager to perform duties under this Bylaw. (Bylaw No. 1494)

“Potable Water” means water, which is approved for drinking purposes by the Medical Health Officer pursuant to the Health Act.
“Professional Engineer” or “Consulting Engineer” means a person who is registered or licensed and in good standing in the Province of British Columbia as such under the provisions of the *Engineers and Geoscientists Act*.

“Professional Geoscientist” means a person who is registered or licensed as such and is in good standing under the provisions of the *Engineers and Geoscientists Act*. (Bylaw 1513)

“Right-of-Way” means land or any interest in land acquired for the purpose of:

(a) public rights of passage with or without vehicles; or
(b) erecting and maintaining any pole-line; or
(c) laying, placing and maintaining drains, ditches, pipes, transmission lines or wires for the conveyance, transmission or transportation of water, electric power, forest products, oil or gas or both oil and gas or solids as defined in the *Pipeline Act*; or
(d) the transmission or disposal of sanitary sewage, storm water or drainage;
(e) the operation and maintenance of any other undertaking of the City; and shall include a statutory right-of-way as defined in the *Land Title Act*.

“Road” means the portion of a highway constructed for vehicular traffic.

“Statement of Conditions” means the letter issued by the Approving Officer for the City to a land owner or agent that outlines the legal, servicing and procedural conditions that must be met prior to obtaining subdivision approval.

“Structural Retaining Wall” means a wall that is structurally independent from a building or structure but is required to support the building or structure, or a wall that supports a road. (Bylaw 1513)

“Subdivision” means the division of land into two or more parcels, whether by plan, descriptive words or otherwise, and includes boundary adjustments.

“Subdivision Approval” means approval of the subdivision of land granted by the Approving Officer when all relevant requirements of this bylaw, the *Land Title Act* and any other relevant bylaws and legislation have been fulfilled.

“Substantial Performance” means the stage of construction completion when all Works and Services as certified by the Engineer of Record, are capable of completion or correction and are ready for use or being used for the purpose intended. (Bylaw No. 1669)

Deleted. (Bylaw No. 1494)

“Walkway” means an area of land improved primarily for the use of pedestrian traffic.

“Warranty Period” means a period of one year starting from the date of Substantial Performance, unless a greater period is specified in this Bylaw in relation to particular Works or Services, during which the Developer must remedy any defects in materials or workmanship and other deficiencies that become apparent in the Works and Services. (Bylaw No. 1669)
“Works and Services” means construction such as roadways, lanes, gas, drainage, water and sewer systems, earthworks and slope stabilization, sidewalks, walkways, boulevards, landscaping, street lighting and underground wiring, and includes works and services whether on highways, rights of way or common property, to be provided for in a subdivision or development of land under this bylaw.

“Works and Services Agreement” means an agreement between the City and the owner in accordance with s. 940 of the Local Government Act that works and services will be completed to service a subdivision or development by a date specified in the agreement and that sufficient security has been provided to the City to secure the construction of those works.

“Zone” means a zone established by the “Langford Zoning Bylaw, 1999 (No. 300)” and as amended from time to time.

REPEAL

“City of Langford Subdivision Servicing Bylaw No. 500 and all amendments thereto are hereby repealed.

READ a first time this 1st day of February, 2010.

READ a second time this 1st day of February, 2010.

READ a third time this 1st day of February, 2010.

ADOPTED this 15th day of February, 2010.

___________________    _____________________
MAYOR      ADMINISTRATOR
City of Langford  
Subdivision and Development Servicing Bylaw No. 1000  
List of Amendments to Bylaw No. 1000

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Bylaw Number</th>
<th>Date Adopted</th>
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<tbody>
<tr>
<td>1</td>
<td>s.944 Delegation Bylaw – Delegate the Power of Exemption of Minimum Frontage Requirements to theApproving Officer</td>
<td>1321</td>
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<tr>
<td>2</td>
<td>Minor adjustments to improve the usability of the bylaw</td>
<td>1292</td>
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<td>3</td>
<td>Redefine the definition of Development</td>
<td>1352</td>
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<td>4</td>
<td>Replacing Section 6.1.1 and adding a map as Appendix A as Figure 6.1 within Section 6.1</td>
<td>1361</td>
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<td>5</td>
<td>To amend the definition of “Development” and replacing Section 6.1.</td>
<td>1376</td>
</tr>
<tr>
<td>6</td>
<td>To delegate the power of exemption of minimum frontage requirements to the Approving Officer</td>
<td>1459</td>
</tr>
<tr>
<td>7</td>
<td>Housekeeping issues, sanitary servicing clarification and addition of Schedule 14 for landscaping</td>
<td>1494</td>
</tr>
<tr>
<td>8</td>
<td>Add definitions to Section 4.0, Replace Section 1.1.2.3, Replace Section 2.1.1, Replace Section 3.1.3, Replace Section 3.1.5, Remove drawings R13 to R16 from Schedule 4 and add Drawing R18 and R19, Replace Table 4.1, Add a new paragraph to the end of Section 5.1.1, Remove Figure 6.1, Replace the phrase “Strata Title conversion of an existing two-family dwelling” to “a strata subdivision of a two family dwelling, Replace text below Section 6.1.2.1 ii, Delete Section 9, Replace Section 9.3, Delete Section 9.6 and Replace Section 9.7.</td>
<td>1513</td>
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<td>10</td>
<td>Replacing Table 1-1 “Applications and Fees”</td>
<td>1539</td>
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<tr>
<td>11</td>
<td>Amending Section 1.12.1 and replacing Sections 6.4.5 and 9.3</td>
<td>1555</td>
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<tr>
<td>12</td>
<td>Replacing Sections 4.11.4, 4.15.1.3, 4.15.1.5, and Drawing C15</td>
<td>1574</td>
</tr>
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<td>13</td>
<td>Replacing Sections 4.18.1, 4.18.1.5, 4.18.3, 4.18.13.1.5, adding Section 4.18.1.11, amending Schedule 11, and replacing Drawings E3, E4, and E7 in Section 11</td>
<td>1618</td>
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<td>14</td>
<td>Replacing Table 1-1 “Applications and Fees” in Schedule 1 Procedures and Fees.</td>
<td>1635</td>
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<td>15</td>
<td>Omnibus Amendment.</td>
<td>1669</td>
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<td>16</td>
<td>Replacing Table 1-1 “Applications and Fees” in Schedule 1 Procedures and Fees.</td>
<td>1707</td>
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<td>17</td>
<td>Replacing the phrase “six month” in Section 1.5.1 with &quot;twelve month, Replacing the phrase &quot;six month&quot; in Section 1.5.1.3 with &quot;twelve month, adding section 1.5.1.4, inserting section 1.8 Air Space Parcel Subdivision and renumbering subsequent sections accordingly and Replacing Table 1-1 “Applications and Fees” in Schedule 1 Procedures and Fees.</td>
<td>1783</td>
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<td>18</td>
<td>Omnibus Amendment.</td>
<td>1817</td>
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<td>19</td>
<td>Replacing Table 1-1 “Applications and Fees”</td>
<td>1849</td>
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CITY OF LANGFORD
BYLAW NO. 1849

A BYLAW TO AMEND THE SUBDIVISION AND DEVELOPMENT SERVICING BYLAW

The Council of the City of Langford, in open meeting assembled, enacts as follows:

1. City of Langford Subdivision and Development Servicing Bylaw No. 1000 is amended as follows:
   i) By replacing Table 1 – 1 “Applications and Fees” in Schedule 1 Procedures and Fees with the table attached.

2. This Bylaw may be cited as “Subdivision and Development Servicing Bylaw, Amendment No. 19 (Fee Schedule), Bylaw No. 1849”.

READ A FIRST TIME this 21st day of May, 2019.

READ A SECOND TIME this 21st day of May, 2019.

READ A THIRD TIME this 21st day of May, 2019.

ADOPTED this 4th day of June, 2019.

MAYOR
STEWART YOUNG
MAYOR

(Certified Correct)
CORPORATE OFFICER
Braden Hutchins
Corporate Officer
<table>
<thead>
<tr>
<th>Section Number</th>
<th>Application Type</th>
<th>Admin Fee</th>
<th>Unit Fee</th>
</tr>
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<tbody>
<tr>
<td>1.1.1</td>
<td>Application for the Approving Officer’s Statement of Conditions (Residential Lots)</td>
<td>$500</td>
<td>Plus, per new lot created:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• $50 for &lt;500m² lots (any zone)</td>
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<td></td>
<td></td>
<td></td>
<td>• $50 for &gt;500m² and &lt;835m² lots in an R2 zone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• $50 all other residential</td>
</tr>
<tr>
<td>1.1.1</td>
<td>Application for the Approving Officer’s Statement of Conditions (Commercial or Industrial)</td>
<td>$600</td>
<td>Plus, per new lot created:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• $500 for Commercial or Industrial</td>
</tr>
<tr>
<td>1.3.1</td>
<td>Boundary Adjustment</td>
<td>$840</td>
<td>Plus $250 per each additional lot line to be adjusted</td>
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<tr>
<td>1.4.1</td>
<td>Revised application for a Statement of Conditions (when applied for within one year of original application)</td>
<td>$840</td>
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<tr>
<td>1.5.1</td>
<td>Extension of a Statement of Conditions</td>
<td>$300</td>
<td>12-month extension</td>
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<tr>
<td>1.5.1</td>
<td>Signature Expiration (or re-signature)</td>
<td>$115</td>
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<tr>
<td>1.6</td>
<td>Approval of a Phased Strata Plan; or amendment of Phased Strata Plan (due upon Form P submission)</td>
<td>$560</td>
<td>$500 Per phase</td>
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<td>1.7.1</td>
<td>Strata-Title Conversion Residential Compliant</td>
<td>$840</td>
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<tr>
<td>1.7.1</td>
<td>Strata-Title Conversion Residential Non-Compliant</td>
<td>$2300</td>
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<td>1.7.1</td>
<td>Strata-Title Conversion Commercial/Multi Family/Industrial Compliant</td>
<td>$1670</td>
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<td>1.7.1</td>
<td>Strata-Title Conversion Commercial/Multi Family/Industrial Non-Compliant</td>
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<td>1.8.1</td>
<td>Air Space Parcel</td>
<td>$600</td>
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<td></td>
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<td></td>
<td>• $400 Residential and other non commercial or industrial uses</td>
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<td></td>
<td>• $500 Commercial, Industrial</td>
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<td>Plus $5,000 for legal review, the unused portion of which shall be refunded</td>
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<td></td>
<td>Council Consideration</td>
<td>$150</td>
<td>For Council to consider an application that proposes a lot width where the frontage for a lot is less than 10% of the lot perimeter</td>
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<tr>
<td>1.9.1</td>
<td>Application for Pre-Design Meeting</td>
<td>$600</td>
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<td></td>
<td></td>
<td></td>
<td>• $200 for &lt;500m² lots (any zone)</td>
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<td></td>
<td>• $300 for &gt;500m² and &lt;835m² lots in an R2 zone</td>
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<td></td>
<td>• $500 all other residential</td>
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<td></td>
<td></td>
<td></td>
<td>• $500 Commercial or Industrial</td>
</tr>
<tr>
<td>1.10.1</td>
<td>Application to Construct – On Site (Construction Administration Fee)</td>
<td>$785</td>
<td>Plus 2.5% of engineers estimate of cost of works and services up to $200 000 and 1% of the remainder</td>
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<tr>
<td></td>
<td>Application to Construct – Off Site (in existing road ROW) (Construction Administration Fee)</td>
<td></td>
<td>In accordance with Highway Use Bylaw (Bylaw No. 33) To include all utilities except Hydro</td>
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<td>1.12.2</td>
<td>Application for Final Approval of a Subdivision</td>
<td>$500</td>
<td></td>
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<td></td>
<td>• $150 for &lt;500m² lots (any zone)</td>
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<tr>
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<td>• $200 for &gt;500m² and &lt;835m² lots in an R2 zone</td>
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<td></td>
<td>• $400 all other residential</td>
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<td></td>
<td>• $500 Commercial or Industrial</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• DCC Payment Due (Residential ONLY)</td>
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SCHEDULE 1 PROCEDURES AND FEES

1.1. Application for the Approving Officers Statement of Conditions for the Approval of a Subdivision.

1.1.1. Any property owner or other person wishing to subdivide land must obtain a statement from the Approving Officer of the complete conditions which must be fulfilled in order to obtain approval of a subdivision and shall pay an application fee plus an additional fee for each parcel proposed to be created in addition to the number of existing parcels.

1.1.2. The application shall be accompanied by:

1.1.2.1. DELETED (Bylaw No. 1292);

1.1.2.2. Copies of all rights of way, easement and covenant documents pertaining to the subject property;

1.1.2.3. One (1) paper copy and a digital PDF drawing of the proposed subdivision; (Bylaw No. 1669)

1.1.2.4. Legal description;

1.1.2.5. The location and setbacks of all existing structures;

1.1.2.6. The location of protected areas, elements and / or natural areas;

1.1.2.7. All road frontages with existing road names;

1.1.2.8. Size and dimensions of existing and proposed lots;

1.1.2.9. Existing water bodies and water courses;

1.1.2.10. Topographic information at 0.5m contour lines;

1.1.2.11. Registered Covenants pertaining to existing rights of way or easements;

1.1.2.12. A letter of authorization from the owner if an agent is acting on their behalf.

1.1.3. In considering a subdivision (application for Statement of Conditions, or request for Final Approval or at any time during), the Approving Officer may request that additional information be provided by a registered professional in regards to natural and or geotechnical hazards, both on-site and off-site, which may impact the subdivision (as noted in s.86 of the Land Title Act). These may include but are not limited to: avalanche, debris torrent, earthquake, erosion, flooding, fire, rock fall, land slippage and unstable soils and tsunami.
1.1.3.1 The registered professional preparing the reports noted in Section 1.1.3 shall provide a statement in that report that the report in question may be relied upon by the City for the purpose of confirming the feasibility of the subdivision.

1.1.4 All reports that relate to the feasibility of any lands within or adjacent to the project are being prepared by the registered professional and to be provided to the City.

1.1.5 The design engineer that is providing their professional seal and signature in regards to the works must ensure that any reports and reviews (including geotechnical work) shall be provided. The work must also be identified on the plans and coordinated with a registered professional of that field. This shall include all private lands, municipal works and lands, and adjacent lands that have been directly or indirectly impacted by the subdivision as necessary.

1.2. Referrals

1.2.1. The City will forward referrals to all relevant City departments and external agencies whose input is required by law or required in the opinion of the Approving Officer regarding the application for subdivision approval. Should the agency require a fee for this referral, the City will provide this information to the applicant. The applicant will be responsible for paying the applicable fees to that agency at that time. The City will not process payments to other agencies.

1.3. Boundary Adjustments

1.3.1. Where the proposed subdivision is a boundary adjustment the appropriate application fee is required in accordance with Table 1.

1.4. Revision to the Layout

1.4.1. If, in the opinion of the Approving Officer, the subdivision layout has changed substantially so that additional referrals and a new Statement of Conditions is necessary, or the Statement of Conditions has expired without application for an extension, the existing file will be closed and a new application and fees will be required.

1.5. Extensions

1.5.1. If the applicant cannot apply for approval of the subdivision within one calendar year from the date of issuance of the Approving Officer’s Statement of Conditions, the applicant may request one twelve month extension and pay the extension fee in accordance with Table 1. (Bylaw No. 1783)

1.5.1.1. The applicant may be subject to new bylaw requirements or fees after one year of the initial application even if an extension has been granted.
1.5.1.2. If no request for extension has been made prior to the expiration of the Statement of Conditions, the applicant must apply for a new Statement of Conditions.

1.5.1.3. If, in the opinion of the Approving Officer the delay in subdivision approval is due to unreasonable delays on the part of the City, the extension may be granted beyond the twelve month period. (Bylaw No. 1783)

1.5.1.4. Despite subsection 1.5.1, the Approving Officer may consider issuing more than one extension if, in the opinion of the Approving Officer, work has substantially progressed towards completion during the period of the current extension and is reasonably expected to achieve subdivision approval prior to the expiry of the newly requested extension. (Bylaw No. 1783)

1.6. Phased Strata

1.6.1. Applications for approval of a phased strata plan must be accompanied by a fee in accordance with Table 1.

1.7. Bare Land Strata Conversion to Fee Simple Lots

1.7.1. For a Bare Land Strata plan that amends the plan to create fee simple lots, the fee to examine the plan shall be in accordance with Table 1, Unit fees for Pre-Design Meeting of a Subdivision.

1.8. Air Space Parcel Subdivision. (Bylaw No. 1783)

1.8.1. Applications for approval of an Air Space Parcel Subdivision must be accompanied by a fee in accordance with Table 1. (Bylaw No. 1783)

1.9. Pre-Design Meeting

1.9.1. Any applicant intending to construct works or services required for the approval of a subdivision or development shall arrange for a pre-design meeting and pay, at the request for the meeting, an administration fee and a fee for each parcel to be created in addition to the number of existing parcels.

1.10. Works and Services for Subdivision or Development.

1.10.1. All construction drawings required for subdivision or land development that require the review of the City Engineer for approval to construct on site works and services, shall be accompanied by a fee in accordance with Table 1 of this Bylaw.

1.10.2. The applicant shall submit one (1) copy of drawings for those Works and Services prepared by a Professional Engineer for approval by the City Engineer. See Schedule 12 for Drafting Requirements. (Bylaw No. 1669)
1.10.3. Concurrent with the submission of construction drawings, any Professional Engineer engaged by the applicant must provide the City with a letter that:

1.10.3.1. The Professional Engineer’s scope of engagement shall include, but is not limited to, assurance of the completeness of the design, certification and submission of construction drawings, coordination of engineering sub-consultants and Record drawings and certification that the design and construction of all Works and Services substantially meet Bylaw 1000 requirements. (Bylaw No. 1669)

1.10.3.2. States the following:

“I __________________________, a Professional Engineer qualified and eligible to practice in the Province of British Columbia, hereby certify that the following works ___________ as set out on the drawings submitted currently with this letter have been designed to good engineering standards and in substantial accordance with the latest edition of Subdivision and Development Servicing Bylaw No. 1000, and the Master Municipal Construction Documents (MMCD – latest edition), adopted by the City of Langford.” (Signature) (Bylaw No. 1669)

1.10.3.3. States that the Professional Engineer will advise the City Engineer of any severance of engagement during the course of design and construction.

1.10.3.4. Sets out construction cost estimates for the Works and Services, certified by the Record Engineer. (Bylaw No. 1669)

1.10.3.5. States that the Professional Engineer will provide Storm Water Management declarations as outlined in Section 5.14.

1.10.4. Any construction of works and services required under this Bylaw prior to approval to construct by the City Engineer is at the owner’s risk.

1.10.5. Boulevard, street tree and irrigation design shall be provided by the professional Engineer or other recognized professional. Any street enhancements within a City right of way or easement shall require design by a recognized professional unless otherwise dictated by the City Parks Manager.

1.11. Acceptance of Civil Works and Services by the City. (Bylaw No. 1669)

1.11.1. The City will not issue Construction Acceptance of Civil Works and Services that are to be owned and maintained by the City until the Works and Services have been approved and installed, and: (Bylaw No. 1669)

1.11.1.1. The Record Engineer has certified Substantial Performance and concurrently identifies all defects and deficiencies in the Works and Services and any outstanding items; and (Bylaw No. 1669)
1.11.1.2. An application is made by the Record Engineer to the Director of Engineering to acknowledge Substantial Performance. (Bylaw No. 1669)

1.11.2. Upon being satisfied with the application and certifications of the Record Engineer, the Director of Engineering will issue, in writing, an Acknowledgement of Substantial Performance. (Bylaw No. 1669)

1.11.3. Upon Acknowledgement of Substantial Performance the City will add the Works and Services to the City’s maintenance contract. (Bylaw No. 1669)

1.11.4. The developer shall remedy any defects or deficiencies and complete all uncompleted work identified at time of Acknowledgement of Substantial Performance and shall provide to the City, in addition to the security required by Section 1.15.1, security in the amount of 2 times the amount estimated by the Record Engineer as the cost of remedying defects and deficiencies and completing the Works and Services. The return of this security is conditional upon correction of defects and deficiencies and completion of the Works and Services. Security may be in the form of cash or a letter of credit. (Bylaw No. 1669)

1.11.5. Any defects or uncompleted work identified at time of Acknowledgement of Substantial Performance shall be completed within 2 months (or other period as agreed with the Director of Engineering), failing which the City may perform the work and recover its cost from the security. Construction Acceptance by the City will not be issued until all deficient matters are addressed to the satisfaction of the Director of Engineering. (Bylaw No. 1669)

1.11.6. Geotechnical certification required by Schedule 3 of this bylaw shall be submitted prior to Acknowledgement of Substantial Performance. (Bylaw No. 1669)

1.11.7. The developer shall provide to the Director of Engineering within 2 months of Acknowledgement of Substantial Performance: (Bylaw No. 1669)

1.11.7.1. One AutoCAD and one PDF copy of the Record drawings. (Bylaw No. 1669)

1.11.7.2. As-constructed inventory sheet, supplied by the City, to be completed and submitted to the City as a signed and sealed document by a Professional Engineer. (Bylaw No. 1669)

1.11.7.3. Acceptance by the appropriate utility of all utilities installed within road rights of way. (Bylaw No. 1669)

1.11.7.4. Electrical declaration from the provincial safety authority. (Bylaw No. 1669)

1.12. Application for Subdivision Approval

1.12.1. Any applicant intending to apply for final approval of a subdivision shall pay the appropriate application fee.
1.12.2. If the Approving Officer’s signature has expired and the plans require re-approval due to delays beyond the control of the City, a fee must be paid in accordance with Table 1.

1.12.2.1. Final approval of the subdivision will not be granted to the applicant by the Approving Officer unless the City has issued Construction Acceptance, or the applicant has entered into a Works and Services Agreement with the City. Subdivision plans submitted for final subdivision approval must be accompanied by: (Bylaw No. 1494)

- A state of title certificate current within seven days of final approval application;
- All executed legal documentation as required by the Approving Officer, complete with priority agreements if necessary;
- Deleted. (Bylaw No. 1669)
- Approved road names included on the plan (Road names must be approved by the Fire Department and in accordance with City street naming policies);
- One Auto CAD digital copy to NAD83 coordinates, referenced to two monuments;
- One PDF copy of the subdivision plan;

1.11.4 The owner must provide proof that property taxes are up to date prior to final approval.

1.13. Works and Services Agreements

1.13.1. In the event that an owner of land wishes to obtain approval of a subdivision or issuance of a building permit prior to the construction and installation of works and services required by this bylaw, the owner may enter into a servicing agreement with the City. All Works and Services Agreements may be executed by the City of Langford Council. (Bylaw No. 1555)

1.13.2. A Works and Services Agreement will only be considered after approval has been given for Construction of Works.

1.13.3. Any owner intending to enter into a servicing agreement pursuant to this section must provide to the City a letter of credit, or cash equal to 100% of the cost of the works and services required, the estimate of which is to be certified by a Professional Engineer, and must provide a date for the completion of the works and services for the purposes of s.940 of the Local Government Act. The security shall be returned to the owner upon Construction Acceptance by the City, less any amount retained as security for the owner’s obligations during the Warranty Period. (Bylaw No. 1494)

1.14. Deleted. (Bylaw No. 1669)
1.14.1. Deleted. (Bylaw No. 1669)

1.14.2. Deleted. (Bylaw No. 1669)

1.15. Warranty Period and Security

1.15.1. During the Warranty Period, the developer shall remedy all defects and deficiencies becoming apparent in the Works and Services, and shall provide upon Acknowledgement of Substantial Performance by way of cash or a letter of credit, security in the amount of 10% of the actual cost of the Works and Services as certified by the Record Engineer, to ensure performance of the Developer’s obligations during the Warranty Period, which shall be returned to the Developer upon Final Acceptance. (Bylaw No. 1669)

1.15.2. The actual cost of the Works and Services for the purposes of Section 1.15.1 shall be certified by a Professional Engineer and approved by the City. (Bylaw No. 1494)

1.15.3. The City may draw upon the Warranty Bond in whole or in part at any time prior to the expiration of the one year warranty period for repairs pertaining to the installation of the works and services, if the developer fails to do so within a reasonable time period as stipulated by the City Engineer.

1.15.4. Should a deficiency be noted at any time during the one-year warranty period, the warranty provider will be notified and given 30 days to repair the deficiency to City standards. After acceptance of the repair, the City may elect to extend the warranty period for the repaired item for up to one year.

1.15.5. The one year warranty bond shall be returned at final acceptance.

Table 1 – 1: Applications and Fees

<table>
<thead>
<tr>
<th>Section Number</th>
<th>Application Type</th>
<th>Admin Fee</th>
<th>Unit Fee</th>
</tr>
</thead>
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<tr>
<td>1.1.1</td>
<td>Application for the Approving Officer’s Statement of Conditions (Residential Lots)</td>
<td>$500</td>
<td>Plus, per new lot created: &lt;br&gt; - $50 for &lt;500m² lots (any zone) &lt;br&gt; - $50 for &gt;500m² and &lt;835m² lots in an R2 zone &lt;br&gt; - $50 all other residential</td>
</tr>
<tr>
<td>1.1.1</td>
<td>Application for the Approving Officer’s Statement of Conditions (Commercial or Industrial)</td>
<td>$600</td>
<td>Plus, per new lot created: &lt;br&gt; - $500 for Commercial or Industrial</td>
</tr>
<tr>
<td>1.3.1</td>
<td>Boundary Adjustment</td>
<td>$840</td>
<td>Plus $250 per each additional lot line to be adjusted</td>
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<tr>
<td>1.4.1</td>
<td>Revised application for a Statement of Conditions (when applied for within one year of original application)</td>
<td>$840</td>
<td></td>
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<tr>
<td>Section 1.5.1</td>
<td>Description</td>
<td>Fee</td>
<td>Description</td>
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<tr>
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<tr>
<td>Extension of a Statement of Conditions</td>
<td>$300</td>
<td>12-month extension</td>
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<td>Signature Expiration (or re-signature)</td>
<td>$115</td>
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<td>Approval of a Phased Strata Plan; or amendment of Phased Strata Plan (due upon Form P submission)</td>
<td>$560</td>
<td>$500 Per phase</td>
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<td>Strata-Title Conversion Residential Compliant</td>
<td>$840</td>
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<tr>
<td>Strata-Title Conversion Residential Non-Compliant</td>
<td>$2300</td>
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<td>Strata-Title Conversion Commercial/Multi Family/Industrial Compliant</td>
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<td>Strata-Title Conversion Commercial/Multi Family/Industrial Non-Compliant</td>
<td>$3340</td>
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<tr>
<td>Air Space Parcel</td>
<td>$600</td>
<td>Plus, per new lot created:</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• $400 Residential and other non commercial or industrial uses</td>
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<td></td>
<td></td>
<td>• $500 Commercial, Industrial</td>
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<td></td>
<td></td>
<td>Plus $5,000 for legal review, the unused portion of which shall be refunded</td>
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</tr>
<tr>
<td>Council Consideration</td>
<td>$150</td>
<td>For Council to consider an application that proposes a lot width where the frontage for a lot is less than 10% of the lot perimeter</td>
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<tr>
<td>Application for Pre-Design Meeting</td>
<td>$600</td>
<td>Plus, per new lot created:</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• $200 for &lt;500m² lots (any zone)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• $300 for &gt;500m² and &lt;835m² lots in an R2 zone</td>
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<tr>
<td></td>
<td></td>
<td>• $500 all other residential</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• $500 Commercial or Industrial</td>
<td></td>
</tr>
<tr>
<td>Application to Construct – On Site (Construction Administration Fee)</td>
<td>$785</td>
<td>Plus 2.5% of engineers estimate of cost of works and services up to $200,000 and 1% of the remainder</td>
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<tr>
<td>Application to Construct – Off Site (in existing road ROW) (Construction Administration Fee)</td>
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<td>In accordance with Highway Use Bylaw (Bylaw No. 33) To include all utilities except Hydro</td>
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</tr>
<tr>
<td>Application for Final Approval of a Subdivision</td>
<td>$500</td>
<td>Plus, per new lot created:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• $150 for &lt;500m² lots (any zone)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• $200 for &gt;500m² and &lt;835m² lots in an R2 zone</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• $400 all other residential</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• $500 Commercial or Industrial</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DCC Payment Due (Residential ONLY)</td>
<td></td>
</tr>
</tbody>
</table>
SCHEDULE 2 GENERAL REQUIREMENTS

2.1 Servicing of Lands

2.1.1 Every owner of land proposed for subdivision or development shall provide, locate and construct at their own expense; Canada Post community mailboxes, highways, sidewalks, boulevards, street trees, irrigation systems, plant material, lawn, transit bays, street lighting, water distribution systems, fire hydrant systems, sewage collection systems and drainage disposal systems on the lands or highways immediately adjacent to the lands being subdivided or developed as required by this bylaw, in accordance with the City of Langford Supplements and the Master Municipal Construction Documents (MMCD) latest edition, in that order. (Bylaw 1513)

2.2 Service Locations

2.2.1 All services shall be provided underground and within the municipal road right of way unless otherwise exempted by this Bylaw.

2.2.2 No statutory rights of way on private property for City or private utility services are permitted without the approval of the City Engineer. Any permitted rights of way shall have the City of Langford named as a third party.

2.2.3 Rights of way for storm or sanitary services, where permitted, shall have a width equal to twice the depth of the service, unless certified for trench stability and construction safety by the geotechnical engineer of record or a different width is approved or required by the Director of Engineering. Rights of way shall be unobstructed and be reasonably accessible for maintenance as approved by the Director of Engineering. (Bylaw No. 1669)

2.2.4 If the storm drain and sanitary sewer are located in the same trench, the right of way width shall be measured from the centre line of each pipe.

2.2.5 Applications for approval of proposed construction crossing a high-pressure gas distribution main, trunk water main or railway must be made by the Professional Engineer with the consent of the City Engineer to the proper authorities.

2.3 Community Mailboxes

2.3.1 Community Mailbox location and accessible access shall be shown on the construction drawings and must adhere to Canada Post current standards. Canada Post shall review and approve all new community mailbox locations.

2.4 Transit Services

2.4.1 Where applicable, publicly accessible transit stops shall be designed and installed in accordance with the requirements of the service provider.
2.5. Mitigation Planning

2.5.1. The City Engineer may request that the owner of lands for which an application to subdivide or develop has been submitted be required to prepare and submit a mitigation plan at the owner’s expense in accordance with sections 2.5.2 through 2.5.6 as they may apply to the lands. The mitigation plan is required where there are reasonable grounds to anticipate discharge of contaminants, pollutants, silts, airborne particulates (dust) or toxic material to natural watercourses, municipal ditches and sewage systems, public or private lands, waters or the atmosphere.

2.5.2. The plan shall include a statement of the expected nature, amount and concentration of contaminants, pollutants silts, airborne particulates (dust) and toxic materials from the land which are expected to be discharged to adjoining lands, water, natural watercourses, utility systems or the atmosphere during the course of subdivision, construction and development of the land.

2.5.3. The mitigation plan shall state the pertinent environmental standards that will govern the proposed discharge of contaminants, pollutants silts, airborne particulates (dust) or toxic materials to the air, soil or water during the course of subdivision, construction and development of the land.

2.5.4. The mitigation plan which requires works and services or facilities to control pollution or discharge during subdivision and development of the lands will include detailed plans and specifications of the works and services or facilities sealed by a Professional Engineer. Where a mitigation plan requires these works and services or facilities, the owner of the lands or their designated representative shall submit a letter of supervision that is an undertaking to inspect the construction, operation and decommissioning of the pollution control works and services and facilities.

2.5.5. Where applicable, the mitigation plan shall be referred to the Ministry authority having jurisdiction including Provincial and Regional agencies, where a discharge is anticipated to a municipal utility system or to the atmosphere.

2.6. During construction of the subdivision or development, the developer must ensure that all streets adjacent to the subdivision or development are cleaned every Friday before 3:00 p.m. for the duration of works on site, and as required by the City Engineer. If the developer fails to do so, the City may arrange for the street cleaning at the cost of the developer, which cost shall be payable to the City immediately upon the presentation of the City’s invoice to the developer.
3.1 Geotechnical General

3.1.1. A geotechnical plan showing the intent and scope of all geotechnical works on and off site is be required and must be certified by a Professional Engineer and submitted with the construction drawings for approval.

3.1.1.1 The Professional Engineer must apprise the City Engineer of any changes, alterations or unforeseen circumstances relating to the geotechnical works.

3.1.1.2 Inspection reports for all geotechnical works and findings relating to on and off site works for the subdivision or development are to be copied to the City Engineer.

3.1.2. The Professional engineer shall provide a digital photographic record of all complete and certified works. This shall include a photograph of each prepared building site, retaining walls and slopes. The elevation of walls or slopes shall be indicated by a levelling rod.

3.1.3. For retaining walls greater than 1.2 meters above finished grade:

3.1.3.1 Structural Retaining Walls must be certified by a registered Professional Engineer to meet the B.C. Building Code earthquake design standard.

3.1.3.2 Landscape Retaining Walls must be certified by a registered Professional Engineer to be capable of withstanding a 1:475 earthquake event (10% probability of occurring once every 50 years). (Bylaw1513)

3.1.4. Stacked rock (non-face mortar) and lock block walls are not permitted adjacent to collector roads unless part of a comprehensive landscape design and as approved by the Parks Manager (Bylaw No. 1817)

3.1.5. All retaining walls within the existing or future road rights of way must be approved by the Director of Engineering and Parks Manager on a case by case basis with regard to the effect on surrounding uses, maintenance, and visual impact. (Bylaw No. 1669)

3.1.6. Masonry walls may not be constructed on top of non-mortared stacked boulder walls without express written permission from the City Engineer and certification from the Professional Engineer of record.

3.1.7. All slopes greater than 30% created by the construction of the development or subdivision are to be shown on the as-constructed drawings and certified stable by a registered Professional Engineer, for the B.C. Building Code earthquake design.

3.1.8. Areas of fill must be recorded on the engineer’s as-constructed drawings and certified by a Professional Engineer as to load carrying capability and long term stability for intended use.
3.1.9. The as-constructed drawings shall show any retaining structures including geo grid ties backs, anchors and other Mechanically Stabilized Earth (MSE) devices as certified by the geotechnical engineer, all relative to the property lines. The digital as-constructed drawings shall be to UTM coordinates.

3.1.10. Any retaining wall, cut or fill slope greater than 45 degrees from the horizontal and greater than 1.2m in height finished grade to finished grade, must be fenced with 1.2m high black chain link at the top of the wall of slope. Alternative fence types may be approved by the Director of Engineering, with s.219 covenants in place to ensure maintenance over time. (Bylaw No. 1669)

3.2. Blasting Requirements

3.2.1. Notification and monitoring for any blasting required for the construction of a building, subdivision, development, utility installation and/or road works are required in accordance with this section. These requirements apply where the volume of rock to be blasted for the entire site exceeds 500m³ (in situ), except that no blasting shall be done within 300 metres of a School or Hospital, until notice as required in this bylaw has also been given to the Senior Administrator of the School or Hospital by the owner or contractor and has provided notice to the City Engineer. Further notice must be given to the Senior Administrator, or their designate, at least two hours prior to each actual blast, stating the approximate time of the blast.

3.2.2. Where blasting is required for site development and servicing, the blasting contractor shall indicate the estimated location and approximate quantity of the proposed blasting program and shall include a blasting schedule.

3.2.3. A certificate of insurance providing a minimum of $5,000,000 general liability coverage for the Blaster, the Owner and the City of Langford against liability for loss or damage to persons or property as a result of blasting must be submitted to the City Engineer prior to the commencement of any blasting on site.

3.2.4. Where the volume of rock to be blasted for the entire site exceeds 500m³ (in situ), the City Engineer and owners and occupiers within 300 metres of the perimeter of the blast site shall be given 48 hours notice in writing of the commencement of any blasting by the Blaster and at least seven (7) days notice shall be given of any blasting expected to continue for more than one calendar week. The area of proposed notification shall be submitted to the City Engineer and may be modified at the discretion of the City Engineer on the basis of the likely impact of blasting, and all notification of owners and occupiers required under this bylaw shall be given in the area as approved by the City Engineer, with a copy of the notification provided to the City for public display.

3.2.5. The notice shall describe the work to be done, the expected date of commencement, duration of the project, methods to be used to safeguard life and property and warning methods used to signal an impending blast and the name and phone number of the representative of the Blaster or Owner who will provide additional information.
3.2.6. Blasting shall be exempt from all provisions of this section if the blasting is specifically authorized by a statute or regulation other than the *Local Government Act*, or if the blasting is, in the opinion of the City Engineer, required on an urgent basis to lessen or eliminate an imminent threat to life, safety, property or public transportation routes and communication systems.

3.2.7. Deleted. (Bylaw No. 1669)

3.2.8. Every person who fails to comply with any of the requirements of this section is liable to a fine and penalty of not more than $10,000 for each offence and each day that an offence continues shall constitute a separate offence.

3.2.9. Blasting for the purposes of Development is not allowed on any subdivision or single property after 18 months following the first blast on the site. (Bylaw No. 1669)
SCHEDULE 4 ROAD DESIGN AND CONSTRUCTION

4.1. Classification and Width

4.1.1. The City Engineer shall determine the classification of the highways to be constructed or improved. The width of right-of-way and the design speed for horizontal elements shall be determined from the highest future classification of the highway which, in the opinion of the City Engineer, will result from the subdivision or development proposed and in accordance with the Official Community Plan. Reference shall be made to the City of Langford Street Atlas for road classifications and attached road cross sections in this bylaw.

4.2. Vertical Curves

4.2.1. Vertical curve criteria shall be in accordance with the Transportation Association of Canada (TAC) standards for the appropriate level of service.

4.3. Road Grades and Crown

4.3.1. Road grades and crown are to be in accordance with Table 4-1 and Figure 4-1 of this Bylaw and the following criteria:

4.3.1.1. Minimum grade of roads shall be 0.5% measured at the gutter line. Maximum grade of roads shall be 12% measured at the gutter line.

4.3.1.2. Maximum grade in any direction on the turnaround of cul-de-sac shall be 6.0%

4.3.1.3. Maximum grade of local road or cul-de-sac approach to a collector shall be 5% for a 15 m length measured from the edge of the collector right-of-way.

4.3.1.4. Maximum grade of local road, cul-de-sac or collector approach to an arterial shall be 3% for a 15 m length measured from the arterial right-of-way edge.

4.3.1.5. Normal crown shall be 2%.

4.3.1.6. Intersections with Ministry of Transportation and Infrastructure roads shall be to Ministry of Transportation and Infrastructure standards.

4.3.1.7. Deleted. (Bylaw No. 1669)

4.3.1.8. A design speed of 30 km/h is permitted for local roads and cul-de-sacs subject to approval by the Director of Engineering. Cautionary speed signs must be posted on all roads with a design speed 30 km/h. (Bylaw No. 1669)

4.4. Super-elevation

4.4.1. Horizontal curves on local roads and cul-de-sacs shall not be super-elevated unless approved by the City Engineer. Collector and Arterial roads with a design speed of 60 km/h or greater and with no direct access to the road from the adjacent development, may be super-elevated in accordance with the Transportation Association of Canada (TAC), current edition.
### Table 4-1 ROAD CLASSIFICATIONS – ROAD CLASSIFICATION AND DESIGN TABLE

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<thead>
<tr>
<th>ELEMENT</th>
<th>COLLECTOR</th>
<th>INDUSTRIAL</th>
<th>LOCAL</th>
<th>ARTERIAL</th>
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<td>URBAN</td>
<td>RESIDENTIAL LOTS</td>
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<td>R2</td>
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<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td>BIKE LANES</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>PARKING</td>
<td>2.6 (1)</td>
<td>2.6 (1)</td>
<td>2.8</td>
<td>2.6 (1)</td>
</tr>
<tr>
<td>STREET LIGHTS</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>SIDEWALK</td>
<td>2.2 (1)</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>MAX. BOULEVARD</td>
<td>1.85 (7)</td>
<td>1.5 (7)</td>
<td>1.7</td>
<td>1.73 (8)</td>
</tr>
<tr>
<td>R.O.W. WIDTH</td>
<td>20.0</td>
<td>20.0</td>
<td>23.0</td>
<td>23.0</td>
</tr>
</tbody>
</table>

* 4.3 METER WIDE CURB LANES, 4.0 METER WIDE CENTRE LANES, BIKE LANE INCLUDED IN CURB LANE WIDTH

** PARKING INCLUDED IN LANE WIDTH

*** CAN BE USED IN LIEU OF DEDICATED BIKE LANES

**** MAY BE ELIMINATED IF NO DESTINATION EXISTS BEYOND THE END OF THE CUL-DE-SAC

(1) INDICATES ONE SIDE OF R.O.W. ONLY

a/b ROAD IS OFFSET WITHIN THE R.O.W. TO ACHIEVE EQUAL BOULEVARD WIDTHS OR WIDER BOULEVARD ON ONE SIDE ONLY.
4.5. Horizontal Alignment

4.5.1. Where possible, the horizontal alignment of the road shall be centred in the highway right-of-way. This may be varied by the City Engineer to suit local conditions.

4.5.2. The minimum centreline radius of curve shall be in accordance with the Transportation Association of Canada (TAC) standards, current edition based on design speed.

4.5.3. Where, in the opinion of the City Engineer, a local road or cul-de-sac, has been designed to ensure consistently low driving speeds, the minimum centre line radius may be reduced to suit the minimum service vehicle.

4.5.4. All horizontal curve design must be suitable for the use and design speed.

4.6. Cut and Fill Slopes

4.6.1. Cut and fill slopes, including ditch slopes, within four metres of the road edge shall be a maximum grade of 6 horizontal to 1 vertical. These slopes shall be planted with grass or trees and shall be made stable under all conditions up to the predicted 1 in 200-year weather or earth movement events. The Director of Engineering may approve alternate cut and fill slopes on a case by case basis and as certified by the Geotechnical Engineer of Record. (Bylaw No. 1669)

4.6.2. Slopes greater than 4 horizontal to 1 vertical, the stability of which, in the opinion of the City Engineer, directly affect the safety or stability of the highway, must be completely within the road right-of-way or subject to a Covenant under s.219 of Land Title Act or a Statutory Right-of-Way agreement which, in the opinion of the City Engineer, provide reasonable guarantees for the safety and stability of the highway.

4.6.3. Hand rails or traffic barriers are required for public safety unless otherwise dictated by the City Engineer.

4.7. Cross Sections

4.7.1. Cross Sections shall be in accordance with Table 4-1 and the reference drawings that accompany this schedule.

4.8. Structural Design of Road

4.8.1. The minimum compacted gravel base and asphalt requirements shall be in accordance with this Bylaw.

4.8.2. A Typical Road Structure shall be in accordance with the reference drawing (Typical Road Pavement Structure – TYP) that accompanies this schedule.

4.9. Stripping of Road Bed

4.9.1. All topsoil and organic material shall be removed from the roadways and walkways prior to placement of fills on or cuts of the subgrade as directed by the Professional Engineer.
4.10. Curb and Gutter

4.10.1. Where the longitudinal road grade is less than 3%, invert gutters shall be continuous through the parking space and barrier curbs are permitted for the parking space.

4.10.2. Curbs shall be non-mountable on all roads except cul-de-sacs, roads within intensive residential development and local roads.

4.10.3. Curbs shall be continuous through private road (up to three lanes in width) or driveway intersections with a public highway. The curb shall be continuous with either a curb drop or invert gutter.

4.10.4. If the storm water management plan for the subdivision or development requires bioswales parallel to the road, flat concrete curbs are permitted.

4.10.5. Backfill material behind curbs and islands shall consist of growing medium to meet the current edition of BC Landscaping Design Standards based on road classification.

4.11. Parking

4.11.1. A parking plan is to be provided concurrent with the drawings submitted for construction review and approval. The City Engineer may require additional parking and no parking signage based on the width of proposed roadway.

4.11.2. Curb-side parking shall be allowed for against one (1) road edge where the road’s paved width is equal to or greater than 8.5m. “No Parking” signage shall be installed on the non-parking road edge as per MUTCD guidelines.

4.11.3. No road-edge parking shall be allowed where the road’s paved width is less than 8.5m unless provided for in dedicated parking stalls or scallops. “Parking in Designated Areas Only” signage (or signage as allowed for by MUTCD) shall be installed in conjunction with the parking scallops.

4.11.4. One on-street parking stall shall be provided for every two lots in a residential development. (Bylaw No. 1574)

4.12. Temporary Turning Areas

4.12.1. Where a local road terminates and there is future access to lands beyond; a turnaround shall be provided to the satisfaction of the Fire Chief and may be provided on private property if protected by a right-of-way and covenant registered in favour of the City. The turnaround shall be signed as a ‘fire access’ with no parking allowed. The right-of-way and covenant shall be discharged when the road connection is complete.

4.13. Sidewalks and Walkways

4.13.1. Sidewalks shall be brick pavers in areas designated on Figure 4-4, attached. All other areas shall be concrete sidewalks.
4.13.2. Concrete sidewalks shall be 150mm thick at driveway crossings and where mountable curbs are specified, 100mm thick where non-mountable curbs are specified, and shall be 200mm thick at industrial and large format (greater than 10,000 sq m building area) commercial driveway crossings. (Bylaw No. 1669)

4.13.3. Brick paver sidewalks shall be 60mm thick where non-mountable curbs are specified and 80mm thick at driveway crossings, crosswalks and parking bays.

4.13.4. Sidewalks shall be continuous grade and not drop through the driveways.

4.13.5. Sidewalks shall be located in accordance with the appropriate road cross section classification.

4.13.6. The crossfall of the sidewalk shall be no less than 2% and no more than 5% towards the road. The back, of sidewalk can be dropped such that the maximum crossfall does not exceed 5%. (Bylaw Nos. 1669, 1817)

4.13.7. Where non-mountable curbs are required, ramps shall be provided at all intersections.

4.13.8. One Tactile warning strips in accordance with CSA B651-12 must be provided on each side of all driveway drops and on all driveways serving commercial, industrial and multi-family residential developments. Tactile warning strips shall be exposed aggregate for brick sidewalks and shall be a two brick wide stamped pattern if the sidewalk is concrete, adjacent to driveways, drops in grade and crosswalks. (Bylaw No. 1669)

4.13.9. In addition to the sidewalk requirements for each classification of road, the sidewalk width shall increase by 25% for sidewalks fronting schools, playgrounds, shopping centres, bus stops, trail systems, beaches and other community facilities, and for proper circulation of pedestrian traffic.

4.13.10. Sidewalks are to meander where possible to avoid existing trees and natural features where deemed appropriate by the City Engineer.

4.13.11. Service boxes shall be located in boulevards where possible. Where inadequate boulevard exists or there are utility conflicts, services boxes may be located in sidewalk if utility lids are non-slip. Where grades exceed 4% the Director of Engineering may approve utility lids within the sidewalk on a case by case basis as part of the comprehensive design. Service boxes may be located within drive ways in accordance with the specifications of the individual utility provider. (Bylaw No. 1669)

4.13.12. If a manhole is permitted in a brick paver sidewalk, a 150mm thick x 150mm minimum wide square apron shall be provided around the manhole castings.
4.13.13. Sidewalks are not required for cul-de-sacs that service 10 lots or less unless a sidewalk is required to access an existing or future trail, walking connection, park, school, or adjacent development.

4.13.14. Sidewalks adjacent to cul-de-sacs shall terminate at the curb return at the bulb, unless sidewalks are required to provide access to amenities in or beyond the bulb.
City of Langford
Sidewalk and Lighting Designations

Legend
- Yellow: Brick Pavers with Burgundy Banner Basket Lights
- Red: Concrete with Burgundy Banner Basket Lights
4.14. **Street Signage**

4.14.1. New or replacement street signage within the development and at interfaces with existing roads shall be provided by the developer.

4.14.2. Proposed street sign locations are to be identified on the construction drawings.

4.14.3. Name blades are to be mounted on approved post-top cast aluminum brackets. See Table 4-2.

4.14.4. All Regulatory and Warning signs (as classified in MUTCD) are to be High Intensity Grade Encapsulated Lens Retro reflective material. All other signage may be Engineer Grade.

4.14.5. All new or replacement signs are to be in accordance with the standards and specifications of the Manual of Uniform Traffic Control Devices. (Bylaw No. 1669)

4.14.6. All materials will meet the CGSB Specifications as to quality and colour in accordance with Section 308 of the General Specifications for Highway Construction.

4.14.7. Delineator reflective sheeting will be a minimum of 100 mm wide by 200 mm long and will be in accordance with CGSB Specification 62-GP-11M.

4.14.8. Sign posts will be telspar or approved equal with 1.75” x 15” long telspar break offs secured with 3/8” hex bolts or “J” bolts.

4.14.9. Sign bases shall be 16” high, have a 10” square bottom, a 8” square top and shall have a 2” telspar inset strengthened with 2-1/4” telspar. The top of the base shall be flush with the finished grade.

4.14.10. Sign posts in the core area as identified in the Official Community Plan shall have galvanized sleeves for the full height of the post from concrete post base to the underside of the sign to post fastening assembly.

4.14.11. All necessary hardware for installation of signs, such as lag screws and washers, will be of non-corrosive material to avoid discoloration of sign and delineator faces.


4.14.13. New installations and replacement of street name blades are to be installed according to the following table (4-2):
Table 4-2: Street Name Blade Placement Requirements

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
<th>Colours</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>All intersections in the Core area</td>
<td>Two sided extruded aluminum</td>
<td>100mm ‘Helvetica Medium, uppercase black IP vinyl lettering on white EG reflective background, c/w full-colour coat of arms</td>
<td>150mm x 400mm – 800mm</td>
</tr>
<tr>
<td>All Collector Roads</td>
<td>Two sided extruded aluminum</td>
<td>100mm ‘Helvetica Medium, uppercase black IP vinyl lettering on white EG reflective background, c/w full-colour coat of arms and detailing</td>
<td>230mm x 400mm – 800mm</td>
</tr>
<tr>
<td>Private</td>
<td>Two sided extruded aluminum</td>
<td>100mm ‘Helvetica Medium’, uppercase white EG reflective lettering on blue EG reflective background</td>
<td>150mm x 400mm – 800mm</td>
</tr>
<tr>
<td>Other</td>
<td>Two sided extruded aluminum</td>
<td>100mm ‘Helvetica Medium, uppercase black IP vinyl lettering on white EG reflective background c/w black IP vinyl coat of arms</td>
<td>150mm x 400mm – 800mm</td>
</tr>
</tbody>
</table>

4.15. Driveways

4.15.1. Any driveway unable to meet the following criteria must obtain written approval from the City Engineer.

4.15.1.1. The minimum driveway width shall be 4.5 metres pavement from road edge to property line.

4.15.1.2. The maximum driveway widths as per drawing C15, attached.

4.15.1.3. The maximum driveway width is the greater of:

   a) The relevant width indicated in Drawing C15, or
   b) 50% of the lot frontage if the frontage exceeds 12.0m, or
   c) 7.5m for dwellings with suites or on lots whose zoning permits suites, if all off street parking requirements can be met and as approved by Development Permit, to a maximum driveway width of 8.0m at the property line. (Bylaw No. 1669)

4.15.1.4. A driveway access will not be permitted within 7.5m measured from the edge of the driveway to the edge of the closest curb return.

4.15.1.5. Driveways shall be minimum 1.2m from any street tree, streetlight, fire hydrant, utility kiosk or any above ground structure within the right of way, unless the utility can be protected by a bollard or curb to the satisfaction of the City Engineer. Water meters are not permitted within the driveway. All other requirements for individual utility providers must be met. (Bylaw No. 1574)

4.15.1.6. Proposed driveways shall be shown on the design review drawings.
4.15.1.7. A Bylaw 33 permit for driveway construction from the curb to the property line shall accompany all building permits, and is required for modification to existing driveways and addition of new driveways within the road right of way.

4.16. Cul de Sac Road Specifications

4.16.1. The length of a cul de sac road may not exceed 305 metres measured from the centreline of the intersection highway to the centre of the cul de sac bulb.

4.16.2. Notwithstanding the above, the length of a cul de sac may not exceed 183 metres in areas of extreme hazard severity classification as identified in the wild land/urban interface and urban/urban intermix assessment in Chapter 2 of NFPA299 1997 edition as amended.

4.16.3. The cul de sac bulb right-of-way radius shall be 15.0 metres with a paved surface radius of 13.0 metres and as shown in MMCD Supplement RS1.

4.16.4. The cul de sac bulb shall have an island located at the center of the bulb. Parking spaces within cul de sac islands shall be provided. Parking spaces shall be delineated by line painting.

4.16.5. Cul de sac islands shall be in-filled with 150mm thick coloured stamped concrete in a brick paver design or landscaped. If landscaping is selected for cul de sac islands, it shall be approved by the City Parks Manager.

4.16.6. The City Engineer may approve a temporary two point turn in lieu of a cul de sac for local roads less than 120 metres in length and the geometry is approved by the Fire Chief for emergency access if the road is to be extended in the foreseeable future. The road must be appropriately signed for fire access and shall substantially comply with the Building Bylaw for geometry.

4.16.7. Where roads are designed to a roads cross section:

4.16.7.1 The road must be designated with a maximum speed of 50km/h or as specified by the City Engineer.

4.16.7.2 For all cul-de-sacs, the radius of paved surface is to be a minimum of 13.0m in a 15.0m radius right of way.

4.16.8. Local road and access lanes are permitted to a maximum of 45m in length with no turn around when accessed via a local road only and approved by the Fire Chief. (Bylaw No. 1669)
4.17. Emergency Access

4.17.1. Any portion of any road constructed under this bylaw must be within 305 metres of a highway that has two routes available to emergency vehicles to access that point on the highway. These routes shall be constructed in accordance with the City of Langford Building Bylaw or a higher standard and may be constructed on private land provided that they are protected by a statutory right-of-way for emergency access in favour of the City of Langford. The maximum length of road allowed past the emergency access road is 183m.

4.17.2. Emergency fire, police and medical access must be available to every parcel within a subdivision or development in accordance with the following criteria and City of Langford Building Bylaw.

4.17.3. An emergency access plan must be evident on the construction drawings and be reviewed by the City of Langford Fire Chief prior to approval. The plan must show how emergency access routes will be protected and what, if any signage will be provided by the developer.

4.17.4. A emergency access road may be greater than 12% grade, but not more than 14% for 100 metres or more if, in the opinion of the City Engineer, a fire-fighting staging area can be reasonably provided. The City Engineer and Fire Chief may waive any of the requirements of this section if they each determine that the overall emergency access plan for the subdivision is acceptable.

4.17.5. Fire hydrants shall be located within 10 metres of fire fighting staging areas.

4.17.6. If fire staging areas are required as part of the overall emergency access plan approved by the Fire Chief for the development, they shall be a minimum of 8 metres long (measured in the direction of travel) by a minimum of 6 metres wide and have a maximum grade of 6% in any direction. The staging area must have drive-in access for a fire truck from the adjacent road. (Bylaw No. 1669)

4.17.7. Where the fire-fighting staging area is located on private property it must be protected by a right-of-way. The developer must provide breakaway bollards that must not cause any delay in access, as well as signage to prohibit parking or other obstruction of the fire-fighting staging area.

4.17.8. The subdivision or development plan must show driveway grades that have a maximum 6% grade for 4 metres of driveway directly adjacent to the proposed building for emergency medical access.

4.18. Street Lighting

4.18.1. All public highways and hard surfaced walkways shall have street lighting installed. (Bylaw No. 1618)
4.18.1.1. The type, colour and standard of street light shall be in accordance with the applicable road cross section for the location of the development.

4.18.1.2. All wiring to service these lights shall be installed underground in ducts and labelled in the junction box.

4.18.1.3. Lighting shall be designed by a Professional Engineer for any public street lighting on collector and arterial roads and at local road intersections with the above noted classifications.

4.18.1.4. Designer to consider wattage and distribution to avoid lighting trespass.

4.18.1.5. The design shall not consider existing BC Hydro davit arms and are to note their removal on the design drawings. (Bylaw No. 1618)

4.18.1.6. Conduits must be extended to the limits of the project and contain a string in the junction box.

4.18.1.7. Designer must confirm no overhead or underground conflicts prior to construction.

4.18.1.8. Lighting levels shall be in accordance with the most recent edition American National Standard for Roadway Lighting published by Illuminating Engineering Society of North America.

4.18.1.9. For trails and walkways that are not adjacent to roadways, low mount pedestrian lighting such as bollards is permitted.

4.18.1.10. Nothing shall be attached in any manner to a streetlight pole or base with out the permission of the City Engineer.

4.18.1.11. Davit (‘cobra’) overhead street lighting shall use GE Evolve light-emitting diode (LED) lighting fixtures, Refer to the Approved Product List for model numbers.

This requirement may be waived by the City Engineer should the lighting be installed in an area of existing high-pressure sodium (HPS) lighting. In areas where HPS lighting is required, designs are to use Philips Lumec Helios Series fixtures. (Bylaw Nos. 1618, 1669, 1817)

4.18.2. Construction shall be in accordance with MMCD and the BC Electrical code published by the BC Safety Branch.

4.18.3. Where a street light installations shall have a controller base with a secure lockable compartment provided in accordance with the manufacturer’s specifications and as noted on Drawing E9, unless the new street lights are connecting to an existing circuit with a controller base. (Bylaw No. 1618)
4.18.4. The controller base shall include on/off/auto switch, photo cell override and a hydro disconnect. The on/off OVERRIDE switch and panel shall be designed to accommodate the number of lights in the circuit as well as seasonal lighting and be upgradeable for future extensions.

4.18.5. Concrete Bases

4.18.5.1. Shall be in accordance with MMCD: Type B for post-top lights; Type C for ornamental streetlights; and Type C for davit (‘cobra’) overhead streetlights. (Bylaw No. 1817)

4.18.5.2. The City Engineer may approve a poured in place concrete base if site conditions preclude the installation of a pre-cast concrete base. Poured in place concrete base must be designed and certified by the Professional Engineer.

4.18.6. Where traffic signals, electrical outlets, irrigation timers, signage or other forms of infrastructure other than a streetlight require electrical power, then a BC Hydro approved metered service is required, refer to the Approved Product List. In instances where the estimated power consumption is very minor and a separate BC Hydro meter is not economically warranted, the City may approve an alternate solution, for example battery power or sub-meters from adjoining private services. (Bylaw Nos. 1669, 1817)

4.18.7. Electrical outlets are required for all davit (cobra) streetlights unless waived by City Engineer.

4.18.8. In cases where the streetlighting might be extended, the City Engineer may require the conduits to be upsized.

4.18.9. All streetlights to be fitted with an anti-cycling device.

4.18.10. Streetlights must be fitted with an appropriate baffle or shield to deflect light away from private residences without compromising the effectiveness of the light on roads and walkways.

4.18.11. All streetlights requiring banner arms shall have the banners supplied and installed at the tie of streetlight installation. Banner arms are to be installed as per detail E10 and banner material is to match specifications in B1. (Bylaw No. 1669)

4.18.12. All streetlights with basket arms must include irrigation.

4.18.13. Drawings:

4.18.13.1. All submission and as constructed drawings must include:

4.18.13.1.1. Controller base locations

4.18.13.1.2. Photo cell locations

4.18.13.1.3. Power source locations
4.18.13.1.4. Illuminance drawings showing isoline levels

4.18.13.1.5. Table showing IESNA lighting design criteria and design achieved illumination levels and uniformity (Bylaw No. 1618)

4.18.13.1.6. Volt drop calculations

4.18.13.1.7. Conduit and wiring size

4.18.14. Construction Acceptance for all streetlighting will require: (Bylaw No. 1494)


4.18.14.3. All lights must be energized and functioning.


4.19. Hot-Mix Asphalt Concrete Paving Testing Intervals:

4.19.1. Documentation from the asphalt plant shall be provided for all projects (this will include reference to the mix design type for the material provided and the most recent applicable mix test report(s)).

4.19.2. Asphalt sampling at paver:

4.19.2.1. One sample shall be taken each day of operation. If the amount of asphalt concrete mix placed exceeds 500 tonnes (metric), an additional sample shall be collected each time after that limit is reached. These sampling requirements shall be adhered to unless specified and recorded otherwise at the project pre-construction meeting.

4.19.2.2. A Marshall Test Report shall be provided for each sample taken.

4.19.3. The project Engineer shall provide certification for both the final product and all works and services. Refer to work requirements in MMCD.

4.19.4. Core testing shall be performed upon project completion to verify asphalt thickness and density. The requirement for core testing may be adjusted or waived at the discretion of the City Engineer.

4.20 Case-in-Place Concrete Testing Intervals

4.20.1. Documentation Documentation from the concrete plant shall be provided for all projects (this will include mix design information and daily batch reports for the material provided).
4.20.2 Concrete sampling at project location:

4.20.2.1 One sample shall be taken each day of operation. If the length of curb, gutter or sidewalk installed within one day exceeds 300m lineal or 100m³ (whichever is first), an additional sample shall be collected each time after that limit is reached. For all other installations, if the volume of concrete cast exceeds 100m³, an additional sample shall be collected each time after that limit is reached, unless the installation is a specialized poured-in place structure(s), in which case sampling shall be performed for every delivery.

4.20.2.2 A Concrete Test Summary Report shall be provided for each sample taken.

4.20.2.3 These sampling requirements shall be adhered to unless specified and recorded otherwise at the project pre-construction meeting. Additional sampling and testing may be required at the discretion of the City Engineer.

4.20.3 Deleted. (Bylaw No. 1669)
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<th>DWG #</th>
<th>LEVEL OF SERVICE</th>
<th>RIGHT OF WAY</th>
<th>MAX. LENGTH OF CUL DE SAC</th>
<th>TRAVELED SURFACE</th>
<th>CURB</th>
<th>SIDEWALK</th>
<th>STREET LIGHTS</th>
<th>OTHER</th>
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<td>BM1</td>
<td>Local Urban &amp; Cul-de-Sac Intensive Res.</td>
<td>12.0m</td>
<td>110.0m</td>
<td>6.0m</td>
<td>mountable</td>
<td>1.8m one side</td>
<td>Heritage single Black &amp; gold One side</td>
<td></td>
</tr>
<tr>
<td>BM2</td>
<td>Local Urban R2 Density</td>
<td>12.0m</td>
<td>100m</td>
<td>8.0m</td>
<td>mountable</td>
<td>2.0m one side</td>
<td>Heritage single Black &amp; gold One side</td>
<td></td>
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<td>BM3</td>
<td>Local Urban &amp; Cul-de-sac R2 Density</td>
<td>14.0m</td>
<td></td>
<td>8.0m</td>
<td>mountable</td>
<td>1.8m one side</td>
<td>Heritage single Black &amp; gold One side</td>
<td></td>
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<td>BM4</td>
<td>Local Urban R2 Density</td>
<td>15.0m</td>
<td></td>
<td>8.0m</td>
<td>mountable</td>
<td>1.8m one side</td>
<td>Heritage single Black &amp; gold One side</td>
<td></td>
</tr>
<tr>
<td>BM5</td>
<td>Local Urban &amp; Cul-de-Sac - Entrance Island</td>
<td>16.0m</td>
<td></td>
<td>36m + 3.6m</td>
<td>mountable</td>
<td>1.8m both sides</td>
<td>Heritage double Black &amp; gold centre</td>
<td>Median with NMC</td>
</tr>
<tr>
<td>BM6</td>
<td>Rear lane</td>
<td>6.0m</td>
<td>n/a</td>
<td>5.0</td>
<td>Invert in centre 600mm</td>
<td>none</td>
<td>none</td>
<td>Invert crown</td>
</tr>
<tr>
<td>BM7</td>
<td>Bear Mtn. Pkwy. Minor Collector</td>
<td>18.4m</td>
<td>n/a</td>
<td>4.3m + 4.3m</td>
<td>Flat 300mm</td>
<td>1.8m one side</td>
<td>Heritage double Black &amp; gold centre</td>
<td>Median with NMC</td>
</tr>
<tr>
<td>BM8</td>
<td>Bear Mtn. Pkwy. Minor Collector</td>
<td>18.4m</td>
<td>n/a</td>
<td>10.6m</td>
<td>Flat 300mm</td>
<td>1.8m one side</td>
<td>Heritage single Black &amp; gold One side</td>
<td>No median</td>
</tr>
<tr>
<td>BM9</td>
<td>Bear Mtn. Pkwy. Minor Collector Split (southbound)</td>
<td>10.7m</td>
<td>n/a</td>
<td>4.3m one lane</td>
<td>Flat 300mm</td>
<td>none</td>
<td>Heritage single Black &amp; gold One side</td>
<td>Wetland split</td>
</tr>
<tr>
<td>BM10</td>
<td>Bear Mtn. Pkwy. Minor Collector Split (northbound)</td>
<td>10.0m</td>
<td>n/a</td>
<td>4.3m one lane</td>
<td>Flat 300mm</td>
<td>1.8m one side</td>
<td>Heritage single Black &amp; gold One side</td>
<td>Wetland split</td>
</tr>
<tr>
<td>BM11</td>
<td>Bear Mtn. Pkwy. Minor Collector Village Centre</td>
<td>24.5m</td>
<td>n/a</td>
<td>12.9m centre turn lane</td>
<td>Invert 600mm</td>
<td>2.0m both sides</td>
<td>Village standard</td>
<td>Landscaped median w/ centre lights possible</td>
</tr>
</tbody>
</table>
LOCAL ROAD CROSS SECTION

NOTES:
- Special design for traffic calming as required by City Engineer.
- Services to be located as shown in drawing.
- Water:
  - Must be 1.5m clear of underground hydro.
  - Must be 3m clear of sanitary & storm sewers.
  - Must be 1.5m clear of lamp standards.
- Hydrants:
  - Must be 3.0m clear of any above ground structures and lamp standards.
  - Location of fire hydrant in accordance with fire plan.

PLAN VIEW

BEAR MOUNTAIN ESTATES

15m R/W - 8m ROAD

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2004
DRAWN: ID
Scale: APPROVED: MM

Last Revised: Bylaw 1609, February 2017
NOTES:
* SPECIAL DESIGN FOR TRAFFIC CALMING
   AS REQUIRED BY CITY ENGINEER
* SURFACES TO BE LOCATED AS SHOWN IN DRAWING.

WATER:
- MUST BE 1.5m CLEAR OF UNDERGROUND HYDRO.
- MUST BE 3.0m CLEAR OF SANITARY & STORM SEwers.
- MUST BE 1.0m CLEAR OF LAMP STANDARD BASES.

MOIST:
- MUST BE 3.0m CLEAR OF ANY ABOVE-GROUND STRUCTURES
  AND LAMP STANDARDS.
- LOCATION OF FIRE HYDRANT IN ACCORDANCE WITH FIRE PLAN.

BEAR MOUNTAIN ESTATES
16m R/W
ENTRANCE

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2004
DRAWN: ID
SCALE: NTS
APPROVED: MM

Last Revised: Bylaw 1659, February 2017
ROAD CROSS SECTION BEAR MOUNTAIN PARKWAY

NOTES:

- SPECIAL DESIGN FOR TRAFFIC CALMING AS REQUIRED BY CITY ENGINEER
- SPECIFIED TO BE LOCATED AS SHOWN IN DRAWING

NOTES:

- MUST BE 1.5m CLEAR OF UNDERGROUND HYDRO.
- MUST BE 3.0m CLEAR OF SANITARY & STORM SEWER
- MUST BE 1.0m CLEAR OF LAMP STANDARD BASE
- MUST BE 3.0m CLEAR OF ANY ABOVE-GROUND STRUCTURES

LOCATION OF FIRE HYDRANT IN ACCORDANCE WITH FIRE PLAN

BEAR MOUNTAIN ESTATES

10m R/W

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2004
DRAWN: ID
SCALE: NTS
APPROVED: MM

Last Reviwed: Bylaw 1000, February 2017
"LUMPA STYLE" LUMINARIES SPACED ALTERNATELY WITH TREES AS PER C.O.L. BYLAW 1000, PLANTED AS PER VMCD (BOTH SIDES) AND SPECIFIED BY CITY ENGINEER. (TYPICAL ALL SUBDIVISION ROADS)

ROAD CROSS SECTION BEAR MOUNTAIN PARKWAY

NOTES:
* SPECIAL DESIGN FOR TRAFFIC CALMING
  • AS REQUIRED BY CITY ENGINEER
  • STRUCTURES TO BE LOCATED AS SHOWN IN DRAWING
  1. **Must be 1.5m clear of underground HERO.**
  2. **Must be 3.0m clear of sanitary & storm sewers.**
  3. **Must be 1.0m clear of lamp standard bases.**
  4. **Must be 3.0m clear of any above ground structures and lamp standards.**
  5. Location of fire hydrant in accordance with fire plan.

PLAN VIEW

BEAR MOUNTAIN ESTATES

10m R/W

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2004
DRAWN: ID
SCALE: NTS
APPROVED: MM

DWG No. BM6

Last Revised: Bylaw 1009, February 2017
TYPICAL ROAD CROSS SECTION BEAR MOUNTAIN PARKWAY
WITH CENTRE MEDIAN
(STA. 13+76.5 to STA. 32+00.0)

BEAR MOUNTAIN ESTATES
18.4m R/W
WITH MEDIAN

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2003
DRAWN: ID
SCALE: NTS
APPROVED: MM

Last Revised: Sylv 1989, February 2017

ROAD DESIGN AND CONSTRUCTION Schedule 4 - 24
TYPICAL ROAD CROSS SECTION BEAR MOUNTAIN PARKWAY
WITHOUT CENTRE MEDIAN
(STA. 10+00 TO 11+00)

18.4m R/W
WITHOUT MEDIAN

BEAR MOUNTAIN ESTATES

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2003
DRAWN: ID
SCALE: NT8
APPROVED: MM

Last Revised: Bylaw 1568, February 2017

ROAD DESIGN AND CONSTRUCTION Schedule 4 - 25
"LUMICA STYLE" LUMINARIES SPACED INTERMITTENTLY WITH TREES. TREES TO BE SPACED AS PER CITY PARKS MANAGER, PLANTED AS PER MUCD (BOTH SIDES) AND SPECIFIED BY OWNER. (TYPICAL ALL SUBDIVISION ROADS)

ROAD CROSS SECTION BEAR MOUNTAIN PARKWAY
SOUTHBOUND AROUND WETLAND
(STA. 1+00.0 to STA. 4+53.5)

BEAR MOUNTAIN ESTATES

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2003
DRAWN: ID
SCALE: NTS
APPROVED: MM

BM9

Last Revised: Sylow 1660, February 2013
"LUMA STYLE" LUMINARIES SPACED INTERMITTENTLY WITH TREES. TREES TO BE SPACED AS PER CITY PARKS MANAGER, PLANTED AS PER VMCD (BOTH SIDES) AND SPECIFIED BY OWNER. (TYPICAL ALL SUBDIVISION ROADS)

ROAD CROSS SECTION BEAR MOUNTAIN PARKWAY
NORTHBOUND AROUND WETLAND
(STA. 11+00.0 TO 13+76.5)

BEAR MOUNTAIN ESTATES
10 R/W

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: FEB 2003
DRAWN: ID
SCALE: NTS
APPROVED: MM

Last Revised: Below 1609, February 2017
TYPICAL LEFT TURN ROAD CROSS SECTION
BEAR MOUNTAIN PARKWAY
THRU VILLAGE

1:4 SLOPE IN ROCK
100mm OF 20mm MINUS CRUSHED GRAVEL
200mm TOPSOIL AND SEEDED PLANTED TO THE SATISFACTION OF THE ENGINEER
0.5m THICK 75mm OF ASPHALT PAVING IN TWO LIFTS
100mm OF 20mm MINUS CRUSHED GRAVEL
300mm OF 80mm MINUS PIT RUN GRAVEL
* PLACED ON A SUBGRADE APPROVED BY A GEOTECHNICAL ENGINEER

FUTURE PARKING (BOTH SIDES)
200mm TOPSOIL AND SEEDED PLANTED TO THE SATISFACTION OF THE ENGINEER
APPROVED FILL BEHIND CURB
INVERTED GUTTER BOTH SIDES

BEAR MOUNTAIN ESTATES
24.5m R/W
LEFT TURNING LANE

CITY OF LANGFORD
ENGINEERING DEPARTMENT
DATE: FEB 2003
DRAWN: ID
SCALE: NTS
APPROVED: BM11

ROAD DESIGN AND CONSTRUCTION
Schedule 4 - 28
NOTES:
1. NO DRIVEWAYS SHOWN.
   AS REQUIRED BY THE
   ENGINEER, ACCESS
   POINTS UNDER APPROVAL
   OF CITY ENGINEER.

2. BIKE LANE TO BE
   INCREASED TO 1.8m ON
   INCLINES GREATER THAN 5%

3. TREE, HYDRANT AND LIGHT
   PLACEMENT SUBJECT TO
   DESIGN DRAWN
   SCHEMATICALLY.

URBAN COLLECTOR
2 LANES + PARKING, 20m ROW

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Dec-10
DRAWN: TWB
DWG No. R1

SCALE: NTS
APPROVED:

Last Revised: Jun 7, 2011
URBAN COLLECTOR
3 LANES - 23m ROW, 1 SWK

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Dec-10  DRAWN: TWB  DWG No. R3
SCALE: NTS  APPROVED:

NOTES:
1. NO DRIVEWAYS SHOWN AS ROADWAY IS CONTROLLED ACCESS.
   ACCESS UNDER APPROVAL OF CITY ENGINEER.
2. BIKE LANNES TO BE INCREASED TO 1.8m ON INCLINES GREATER THAN 5%.
3. TREE, HYDRANT AND LIGHT PLACEMENT SUBJECT TO DESIGN SHOWN SCHEMATICALLY.

Last Revised: Jan 7, 2011
URBAN COLLECTOR
3 LANES - 25.0m ROW

NOTES:
1. NO DRIVEWAYS SHOWN
   AS ROADWAY IS
   CONTROLLED ACCESS
   ACCESS UNDER APPROVAL
   OF CITY ENGINEER.
2. BIKE LANES TO BE
   INCREASED TO 0.9m ON
   INCLINES GREATER THAN 5%
3. TREE, HYDRANT AND LIGHT
   PLACEMENT SUBJECT TO
   DESIGN SHOWN
   SCHEMICALLY.

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Dec-10
DRAWN: TWB
DWG No. R4

SCALE: NTS
APPROVED:

Last Revised: Jan 7, 2011
URBAN COLLECTOR
3 LANES - 26m ROW

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Dec-10  DRAWN: TWB  DWG No. R5
SCALE: NTS  APPROVED:

NOTES:
1. NO DRIVEWAYS SHOWN AS ROADWAY IS
CONTROLLED ACCESS.
2. BIKE LANES TO BE INCREASED TO 1.5m ON
INCLINES GREATER THAN 3%.
3. TREE, HYDRANT AND LIGHT
PLACEMENT SUBJECT TO
DESIGN SHOWN
SCHEMATICALLY.

Last Revised: Jan 7, 2011
NOTES:
1. NO DRAWSHOWN AS ROADWAY IS
   CONTROLLED ACCESS.
   ACCESS UNDER APPROVAL
   OF CITY ENGINEER.
2. TREE, HYDRANT AND LIGHT
   PLACEMENT SUBJECT TO
   DESIGN SHOWN
   SOBRIQUALLY.
INDUSTRIAL COLLECTOR
3 LANES - 20.0m ROW

NOTES:
1. NO DRIVEWAYS SHOWN AS ROADWAY IS CONTROLLED ACCESS.
   ACCESS UNDER APPROVAL OF CITY ENGINEER.
2. TREE, HYDRANT AND LIGHT PLACEMENT SUBJECT TO
   DECISION SHOWN SCHEMATICALLY.

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Dec-10  DRAWN: TWB  DWG No. R8
SCALE: NTS  APPROVED:

Last Revised: Jan 7, 2011
URBAN LOCAL
2 LANES, 18m ROW

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 15-Sept-09
DRAWN: 
SCALE: NTS
APPROVED: 

NOTE:
PARKING SHALL BE PROVIDED ALONG 1 ROAD EDGE. NO PARKING SIGNS SHALL BE PLACED ON OPPOSITE SIDE OF PARKING.
NOTES:
1. PARKING SHALL BE PROVIDED ALONG EACH ROAD EDGE. NO PARKING SIGNS SHALL BE PLACED ON THE OPPOSITE SIDE OF PARKING.
2. TRAFFIC, HYDRANT AND LIGHT PLACEMENT SUBJECT TO DESIGN SHOWN SCHEMATICALLY.
SMALL LOT
15m ROW, 2 LANES - 4.25m WIDTH
LOCAL RURAL
2 LANES, 20m ROW

NOTES:
1. PARKING SHALL BE PROVIDED ALONG 1 ROAD COIL NO PARKING SIGNS SHALL BE PLACED ON OPPOSITE SIDE OF PARKING.
2. TREE AND HYDRANT PLACEMENT SUBJECT TO DESIGN SHOWN SCHEMATICALLY.

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Dec-10
DRAWN: TWB
SCALE: NTS
APPROVED: R17

Last Revised: Jan 7, 2011
SMALL LOT
2 LANES, 14.0m ROW

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE:        DRAWN:       DWG No.
Apr-2014     TWB          R18

SCALE:       APPROVED:
NTS          MM

Last Revised: Apr 7, 2014
50mm ASPHALT
75mm OF 20mm MINUS CRUSHED GRAVEL
250mm OF 80mm MINUS PIT RUN GRAVEL PLACED ON SUBGRADE APPROVED BY A GEOTECHNICAL ENGINEER.
BIKE LANE
CONFLICT ZONE
SPECIFICATIONS

NOTES:
1. LAFERREZA MMA CHROMA GREEN WITH BRILLIANT WHITE.
2. XM DETERMINED AT DRAWING APPROVAL.
3. BPM (BRITISH PONDUM NUMBER) MUST BE > 70 BPM.

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 12-MAR-19  DRAWN: MB  DWG No. R20
SCALE: NTS  APPROVED: MM

Road Design and Construction
Schedule 4 - 44
SCHEDULE 5 - STORM WATER MANAGEMENT

5.1. Storm Water Management General

5.1.1. SD-1 illustrates the major water courses within the City of Langford. Existing major storm water control and/or treatment areas are shown. These areas are to be preserved unless professional storm water management studies indicate otherwise. The areas of the municipality where storm water infiltration and storm water detention (storage) are required for development are also shown on SD-1.

The City Engineer may allow or require the use of storm water infiltration works in areas designated on SD-1 for storm water detention, if the City Engineer is of the opinion that soil conditions on the site in question are suitable for storm water infiltration, and may allow or require the use of storm water detention works in areas designated on SD-1 for storm water infiltration if the City Engineer is of the opinion that the soil conditions on the site in question are not suitable for storm water infiltration. The City Engineer’s opinion shall be based on the contents of a storm water management plan for the site prepared by the Engineer or Geoscientist of Record. (Bylaw 1513)

5.1.2. For all subdivisions and developments in all areas of the City of Langford, drainage structures and features are required that will maintain the quality of site drainage water, minimize erosion and retain sediments.

5.1.3. In the infiltration areas, the sandy and gravely soils have high infiltration potential and surface drainage conveyance structures are limited, therefore the primary means of storm water discharge will be by infiltration.

5.1.4. In the detention areas, storm water storage is required to control post development storm water release rates. Storm water storage may also be used in other (non-detention) areas as an alternative to upgrading downstream conveyance capacity if analysis shows capacity to be inadequate for the design flows. Except where infiltration is required and achievable, a municipal storm drain is required to serve each existing and newly created lot.

5.1.5. Where parkland in excess of 0.25 ha has been dedicated to the City in conjunction with the proposed subdivision or development, storm water detention and treatment facilities may be located within the park, if in the opinion of the City Engineer the treatment and detention area will not detract from the aesthetics of the park and will not affect environmentally sensitive areas within the park and the usefulness to and safety of the public.

5.1.6. If, in the opinion of the City Engineer, a community detention area for future developments within a specific storm drainage catchment area would be preferable to permanent on site storage facilities, then permanent storage and treatment areas on site may not be required. The developer shall provide land dedication or cash in lieu of this community detention area (by DCC or otherwise) and shall provide temporary facilities and the infrastructure to direct storm water to those future detention areas in
accordance with this bylaw. Any lands required for the temporary facilities shall have a
right-of-way in favour of the City of Langford for storm drainage which may expire when
the community detention area is constructed.

5.1.7. A storm water management plan prepared by a Professional Engineer is required which
will show: (Bylaw No. 1669)

5.1.7.1 Scaled topographic site plan with existing cadastral and proposed development
layout.

5.1.7.2 Drainage catchment areas showing contributory area to the site, onsite
subcatchments, cumulative catchments and points of discharge.

5.1.7.3 Predevelopment and post development flows.

5.1.7.4 Internal drainage structures for conveyance, control and treatment.

5.1.7.5 Existing and proposed offsite works.

5.1.7.6 Erosion and sediment control works.

5.1.8. Within the areas where storm water detention is required, the Professional Engineer
shall certify that for all events up to the estimated 200 year runoff event there will be no
increase in water levels or rates of erosion at any point in the watershed as a result of
the development compared to original site conditions, before the removal of natural
vegetation.

5.2. Flood Plain Elevation Criteria

5.2.1. All structures intended for occupancy shall be designed with the underside of the floor
system situated 600 mm (1000 mm adjacent to Millstream Creek, between the Trans
Canada Highway and Treanor Ave.) above the 200 year peak flood elevation.
(Reference: City of Langford Official Community Plan, Map 16, 200 Year Flood Plain.)
Where adjacent flood elevations are not available the hydraulic profile shall be
extended through hydraulic analysis to the development site, except where the site is
clearly above the estimated flood elevations. All habitable structures shall also be
protected from flooding by grading drainage away from the structure and providing
overland flow routes through the site that are capable of safely conveying the 200 year
runoff event. These routes, if not on roadways, shall be maintained in perpetuity and
protected with rights of way in favour of the City.

5.3. Storm Drainage Systems Design Criteria

5.3.1. All minor systems, those designed and installed as part of the works and services for the
subdivision or development, shall be designed for a 10 year peak flow rate. The site
must allow for 200mm of ponding onsite to be directed to an overflow route either
piped or overland.
5.3.2. All minor systems associated with a commercial, industrial, multi family or institutional development as described by City of Langford Zoning Bylaw shall be designed for the 1:25 year storm.

5.3.3. Previously undeveloped areas must create an overland route within the subdivision or development for the 1:200 year rainfall event to allow for the failure of the drainage system. This route must be physically protected and have a right-of-way in favour of the City.

5.3.4. Where, in the opinion of the City Engineer, future development or subdivision shown in the Official Community Plan for the City is probable for the lands adjacent to the development or subdivision, storm sewers must be extended to the property boundary and terminated with a cleanout or a manhole. A right-of-way in favour of the City must be provided for this storm sewer on private property for access and maintenance.

5.3.5. Storm drainage conveyance or disposal systems are required in the road right-of-way adjacent to the subdivision or development for all new and existing highways.

5.3.6. If a vertical seepage pit is installed for in ground storm water disposal for the 1:25 year storm, the developer is not required to treat storm water with a oil separation device prior to disposal unless the disposal system is constructed in conjunction with required improvements for an auto repair or service facility, gas stations, or property zoned for industrial uses. Vertical seepage pits shall be designed in accordance with SD-7.

5.4. Tributary Area Schematic

5.4.1. Runoff calculation for subdivisions and development of Small Sites may be by the Rational Method. Analysis of upland and downstream catchments, up to a maximum of 10 ha, may also be calculated with the Rational Method. Calculations shall be submitted in tabular form in accordance with SD-2 and certified by a Professional Engineer. For larger catchments reference shall be made to the Storm water Management Plan for pre-calculated values. The values shall be verified by the City prior to use by the developer’s engineer. Original calculations for Large Sites and areas exceeding 10 ha shall be performed with a hydrograph method. Design parameters shall reflect BC west coast conditions.

5.4.2. If in the opinion of the City Engineer conditions warrant, a tributary area plan shall accompany the runoff calculation and include:

5.4.2.1 Scaled topographic site plan with existing cadastral and proposed development layout.

5.4.2.2 Drainage catchment areas showing contributory areas to the site, on-site subcatchments for each inlet, manhole and outlet.

5.4.2.3 Locations of other drainage structures including silt traps, oil grit separators, and storage chambers.
5.4.2.4 Provision shall be made for servicing lands beyond (upstream) from the site by providing a point of access on a right of way and adequate conveyance capacity within the subdivision or development.

5.4.3 Rainfall intensity shall be taken from the intensity-duration-frequency (IDF) curves provided in SD-3. The minimum initial time of concentration shall be 10 minutes. For catchments which will remain undeveloped, the time of concentration shall be calculated using good engineering judgement.

5.4.4 Where soils will be exposed by land clearing, measures shall be taken to minimize potential erosion following the concepts illustrated in SD-4, including:

5.4.4.1 Scheduling works for the period April through October inclusive, to the extent practical.

5.4.4.2 Clearing the minimum possible land area.

5.4.4.3 Clearing immediately before construction commences.

5.4.4.4 Restricting vehicle access and providing a surfaced working area.

5.4.4.5 Suspending construction activities during rainy periods and when soils are saturated.

5.4.5 All disturbed surfaces shall be protected against the loss of soils through the use of silt fencing as shown in SD-5 to be located wherever surface drainage will leave the site as overland flow. Watercourses and ditches shall be protected by placing the silt fencing along the bank of the channel. Bare areas subject to erosion shall be covered by hand placed straw mulch.

5.4.6 Where disturbed catchment areas exceed 0.20 ha, a sediment basin as described in SD-6, shall be constructed. This requirement may be waived in rocky areas or if construction is completed in the April to October period and finished with a non-erodible surface. Erosion and sediment control measures shall be constructed before clearing and earthworks commence and remain in place until at least 80% of all building construction and landscaping are complete. Sediment traps may be converted to constructed wetlands at this time. Sediment traps shall be clear of sediments on September 30 each year and re-excavated any time the available storage has been reduced by one-third of the original volume.

5.4.7 Despite the requirements of this section it shall be the responsibility of the professional engineer to specify appropriate measures and ensure that sediment-laden water and any other deleterious substances do not leave the site or reach aquatic habitat areas.
5.5 Pipe Main Parameters

5.5.1 Specifications

<table>
<thead>
<tr>
<th>Roughness coefficients</th>
<th>Concrete 0.013, PVC 0.013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum diameter</td>
<td>300 mm</td>
</tr>
<tr>
<td>Minimum velocity</td>
<td>0.61 m/sec (flowing full or half full)</td>
</tr>
<tr>
<td>Maximum velocity</td>
<td>6.1 m/sec</td>
</tr>
</tbody>
</table>

Above this maximum velocity, special consideration must be given by the Professional Engineer to incorporate pipe materials and construction methods, including pipe anchorage, scour protection and energy dissipation to the satisfaction of the City Engineer.

The choice of pipe material shall be in accordance with the current edition of MMCD. No corrugated metal pipe (CMP) or corrugated steel pipe (CSP) is permitted. (Bylaw Nos. 1669, 1817)

5.5.2 Pipes may be laid to the minimum vertical and/or horizontal radius of 60 metres or as recommended by the manufacturer, providing the design velocity (full pipe) is increased to 0.914 m/s for the curved section.

5.5.3 Mains shall have at least 1.0m cover and be deep enough to provide drainage to 0.6m below the existing or proposed basement floor elevation of each property being serviced based on a 2.0% grade from the main obvert.

5.5.4 When a stormwater pipe is installed such that it crosses below an existing asbestos cement (alc) watermain, the existing watermain material shall be replaced with ductile iron pipe for a distance of at least two (2) metres beyond each edge of the trench of the service crossing the watermain.

5.6 Manholes

5.6.1 Manhole structures shall be in accordance with MMCD S1 and S2.

5.6.2 Manholes shall be provided at all changes in grade, pipe size, horizontal alignment (for non-curvilinear sewers) and at the upper end of mains not to be extended in the future. Only one curve, horizontal and/or vertical, is permitted between manholes. In addition to the foregoing, additional manholes shall be constructed so that the maximum distance between manholes is as follows:

<table>
<thead>
<tr>
<th>Pipe size (mm Ø)</th>
<th>Maximum Distance (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>375 and smaller</td>
<td>125</td>
</tr>
<tr>
<td>450 and 750</td>
<td>155</td>
</tr>
<tr>
<td>900 and larger</td>
<td>185</td>
</tr>
</tbody>
</table>
5.6.3 Cleanout structures may be used at the upper terminus where the main will not be extended and the end of the present construction is within 45m of an existing manhole. Cleanout structures shall be constructed in accordance with drawing SS-S6.

5.6.4 Outside drop manholes will be permitted, if in the opinion of the City Engineer, the circumstances preclude the use of normal manholes. These shall be constructed wherever the change in invert elevations though the manhole are greater than 600mm. Elevations changes greater than 600mm shall be by way of an outside drop only. Allowance shall be made in the design for the effect of the resulting turbulence on the hydraulic capacity of the system.

5.6.5 The relative elevations entering and leaving a manhole must not reduce the hydraulic capacity of the system.

5.6.6 Allowances for energy losses or changes in velocity are to be determined in accordance with sound hydraulic principals.

5.6.7 The City Engineer may approve situations involving a large pipe flowing into a smaller pipe at steeper grade.

5.6.8 Stubs shall be placed in manholes to allow for future connections. The length of the stubs shall be 600mm maximum from the outside of the manhole. The end shall be securely capped to the satisfaction of the City Engineer. Grades shall be suitable for future extension of the system.

5.6.9 Manhole benching shall be a steel trowel finish with a constant grade from the inlet(s) to the outlet. The benching inside radius shall be no less than three times the branch diameter. Pre-benched manholes are permitted.

5.6.10 All channels shall be constructed to permit use of a pan and tilt camera having dimensions of 600mm x 150mm diameter.

5.6.11 The obvert of pipes entering a manhole shall not be lower than 50mm above the obvert of the outlet pipe. The internal channel in the manhole shall have an elevation difference of 5% from the inlet to the outlet.

5.6.12 Manhole and cleanout lids are to be set to match existing or planned grades both longitudinally and transversely. If the highway grade is greater than 6%, manhole castings shall be encased in a concrete surround poured to 150mm below the rim.

5.6.13 All manhole barrel and sections shall be installed with rubber gaskets and mastic and shall be grouted inside with rapid set non-shrink grout. If, in the opinion of the City Engineer the water table may be high enough to affect the manhole, fibreglass bases in a concrete liner may be required.

5.6.14 Inlet and outlet pipes shall be grouted inside the manhole with rapid set non-shrink grout.
5.6.15 All manhole lids and cleanouts must be cast to include “Lanford Storm”. (Bylaw No. 1817)

5.7 Service Connections

5.7.1 Storm sewer service connections of adequate size, but not less than 100mm Ø shall be provided from a main to the property line of each new or existing parcel, which forms part of the development or which fronts a highway or other right-of-way in which the sewer is to be constructed and shall be constructed in accordance with MMCD S8. (Bylaw No. 1817)

5.7.2 All service connections shall be provided with an inspection chamber at the property line or at service the right-of-way boundary in accordance with drawing SS-S9.

5.7.3 All service connections shall terminate a distance inside the property line equal to the depth at the property line for new parcels unless otherwise approved by the City Engineer and at property line for existing parcels at a location agreed upon by the owner. All stubs must have a 1% minimum gradient from the inspection chamber into private property in accordance with the Building Code and 2% minimum from the sewer main to the inspection chamber, in accordance with the MMCD Documents.

5.7.4 Where deep sewers exist, the service stub shall be terminated within 1.0 vertical meters of the minimum basement floor elevation and marked with a 2x4 stake. The service connection shall have a long radius sweep and be installed at no more than 45 degrees from the vertical.

5.7.5 Duplex lots shall have a 200mmØ service connection with two 100mmØ stubs and two inspection chambers or may terminate at a 100x100x100 duplex inspection chamber. The storm drain duplex inspection chamber shall have a grit sump.

5.7.6 Wherever possible, adjoining lots shall be serviced with one 150mmØ service connection with one 100mmØ stub and one inspection chamber for each lot, or may terminate at a 150x100x100 duplex inspection chamber.

5.7.7 All service connection locations shall be located with a 40mm x 90mm stake painted green complete with a green insulated wire from a nail on the stake to the service connection cap and the depth to invert marked.

5.8 Inspection Chambers

5.8.1 All inspection chamber (IC) lids and collars shall be installed in accordance with drawing SS S9. The lid cams shall be securely tightened to ensure that they are not subject to vandalism or misuse. (Bylaw No. 1494)

5.8.2 All inspection chambers shall have a cast iron chamber cover and concrete surround in accordance with drawing SS S9.
5.8.3 Any inspection chamber set in a slope greater than 3% shall have a cast iron chamber cover and concrete surround in accordance with SS S9.

5.8.4 Wherever a inspection chamber is covered by a cast iron chamber cover, the clearance between the cast iron lid and the plastic lid shall be a minimum of 75mm.

5.8.5 Inspection chambers shall be supplied and installed without plugs.

5.8.6 The inspection chamber lid shall be fastened to the riser pipe with a stainless steel machine bolt as provided by the manufacturer.

5.8.7 Where property line is within 1 meter of the backside of a sidewalk or curb the inspection chamber shall be installed using cast iron inspection chamber cover specified in drawing SS S9, in a cast in place concrete apron protruding from the sidewalk or curb toward the property. This apron shall be constructed to the same engineering specifications as the sidewalk and shall provide a minimum of 200mm of concrete from the edge of the cast iron lid to the edge of the apron. An expansion joint at the sidewalk or curb to apron interface shall be provided.

5.8.8 Inspection chambers shall be a minimum of one meter apart from centre to centre when installed, unless, in the opinion of the City Engineer the clustering of services would be beneficial to site servicing and layout, in which case the sewer and drain connections may be installed on one adjoining property line.

5.9 Testing

5.9.1 CCTV videos and reports are to be accompanied with half size drawings. Air test and CCTV videos are required prior to hot-mix asphalt concrete paving.

5.9.2 If in the opinion of the City Engineer conditions warrant, the storm drainage system must be flushed and re-videoed prior to the 1 year warranty inspection.

5.9.3 Minimum quality control test frequencies specified are the minimum number required to determine sufficient trench compaction. The contractor shall perform as many tests as are necessary to ensure that the works and services conform to the requirements of the contract regardless of the minimum number required as follows):

5.9.3.1 Trench bedding (mainline) – one test for every 75m of trench. Minimum one between any two manholes.

5.9.3.2 Trench backfill (mainline) – one test for every 75m of trench at each 1.0m fill depth. Minimum one between any two manholes.

5.9.3.3 Trench bedding (service) – one per road crossing.

5.9.3.4 Trench backfill (service) – one per road crossing at each 1.0m fill depth.

5.9.3.5 Roadbase – one per road crossing.
5.9.3.6 Roadbase – one for every 75m of trench with a minimum of one between any two manholes.

5.10 Catch Basins

5.10.1 Catch basins are detailed as per drawing SS S11 shall be provided as required to collect from a maximum area of 400 square metres of road, at the beginning of curb returns to which water flows and at low points. Leads will be a minimum 150 mm diameter. Rim elevations shall be 25 mm below finished pavement grade. (Bylaw No. 1817)

5.10.2 The catch basin grate must be a ¾ grate. (Bylaw No. 1817)

5.11 Inlet Structures

5.11.1 Storm sewer inlet structures shall be provided when the following conditions are encountered:

5.11.1.1 Type I inlet (MMCD drawing No. S13) used where a ditch carries storm water into the storm system of the proposed subdivision or development.

5.11.1.2 Lawn basin (MMCD drawing No. S12) in local low spots where storm water is unable to reach the storm system by a ditch.

5.11.2 Headwalls other than those described in Sections 5.11.1.1 and 5.11.1.2 must be mortared rock or precast concrete. Sandbag inlet headwalls are permitted for repairs to existing sandbag headwalls only. (Bylaw No. 1669)

5.12 Outfall Structures

5.12.1 Inlet and outlet structures shall be mortared rock or precast concrete unless otherwise approved by the City Engineer.

5.12.2 Cast in place reinforced concrete outfall structures shall be provided at all watercourses. In all cases energy dissipation shall be provided to reduce maximum outlet flow velocity to 1.0 m/s.

5.13 Treatment Options

5.13.1 Stormwater detention (storage) may be combined with a constructed wetland or oil/grit separator chamber or provided in a separate detention facility such as a pond or underground chamber. The 2 year event shall be controlled to prevent watercourse and aquatic habitat impacts. The 10 year event shall be controlled to protect downstream conveyance capacity. The required live storage volumes and corresponding release rates are tabulated below. Where both 2 year and 10 year control is required, the combined storage requirement is also provided.
5.13.1.1 Proprietary systems including enhanced manholes, swirl concentrators and deflection screen technologies may be used providing the Professional Engineer can clearly demonstrate that the proposed system will treat storm water to the same criteria as 5.13.3 and the proposed system is certified for performance by the Professional Engineer for the specific site.

5.13.1.2 Infiltration systems shall incorporate appropriate pre-treatment systems (for example an oil/grit separator) to protect contamination of the disposal area.

5.13.2 Where in-ground disposal is permitted, vertical seepage pits shall be provided and installed in accordance with drawing SD-7. Seepage pits shall be protected by a catch basin.

5.13.3 Drainage water quality improvements for all subdivisions and land developments shall be achieved preferably with a constructed wetland as shown in SD-8 and to the satisfaction of the City Engineer. With outlet control and sufficient live storage, the wetland may also serve as a detention pond. The permanent water surface area (as defined by the outlet culvert invert) shall be a minimum of 1% of the contributory catchment area. The constructed wetland shall have a normal outlet capacity for the peak 10 year design flow and an emergency overflow capacity for the 200 year peak design flow that is routed in such a way that it does not flood downstream property or subject it to erosion. Constructed wetlands should have maintenance vehicle access.

Where constructed wetlands are not used, proprietary systems with filtration media may be approved if certified performance and a specification for the site are submitted for approval by the City Engineer.

For Small Sites, or small catchments within Large Sites that cannot be directed to a constructed wetland, the following alternative storm water treatment techniques may be used:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SD-9</td>
<td>Grass Swale</td>
</tr>
<tr>
<td>SD-10</td>
<td>Filter Strip</td>
</tr>
<tr>
<td>SD-11</td>
<td>Oil/Grit Separator Chamber with External High Flow Bypass</td>
</tr>
<tr>
<td>SD-12</td>
<td>Oil/Grit Separator - Type 1</td>
</tr>
<tr>
<td>SD-13</td>
<td>Oil/Grit Separator - Type 2</td>
</tr>
<tr>
<td></td>
<td>Permeable Pavement, in accordance with product specifications</td>
</tr>
</tbody>
</table>

These treatment facilities shall be designed on the basis of the post development peak "6-month" event which is deemed to be 60% of the 2-year peak flow. Oil/grit separator chambers may be proprietary or non-proprietary. Design criteria for non-proprietary separators are included on the standard drawings. These concepts are expected to remove approximately 90% of the sediment particles larger than 100 microns (0.1 mm).
5.13.4 For these subdivisions and developments the designer is encouraged to use combinations of engineered wetlands and ponds to conform to the water quality and runoff rate requirements.

<table>
<thead>
<tr>
<th>Site Soils</th>
<th>2 year</th>
<th>10 year</th>
<th>2 and 10 year combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocky &lt;500 mm of soil</td>
<td>100</td>
<td>120</td>
<td>180</td>
</tr>
<tr>
<td>Controlled release rate</td>
<td>10</td>
<td>20</td>
<td>10 and 20</td>
</tr>
<tr>
<td>Soils &gt;500 mm of silts and clays</td>
<td>110</td>
<td>135</td>
<td>200</td>
</tr>
<tr>
<td>Controlled release rate</td>
<td>8</td>
<td>16</td>
<td>8 and 16</td>
</tr>
<tr>
<td>Soils &gt;500 mm of sands and gravels</td>
<td>125</td>
<td>150</td>
<td>2 and 10 year combined 225</td>
</tr>
<tr>
<td>Controlled release rate</td>
<td>5</td>
<td>10</td>
<td>5 and 10</td>
</tr>
</tbody>
</table>

5.13.5 The following facilities may be used alone or in combination to achieve the desired detention and treatment.

5.13.5.1 SD-14 shows a typical flow control manhole for use at stormwater detention facilities where only the two year event is being controlled.

5.13.5.2 SD-15 shows a combined detention and oil/grit separator.

5.13.5.3 SD-16 illustrates a detention facility that will serve a 0.5 to 1.0 ha site that will have no remaining native vegetation and is rocky with 15% slopes and must provide detention for both the 2 year (watercourse protection) and 10 year (storm drain capacity protection) events.

5.13.6 Stormwater storage volumes may be reduced if used in combination with an infiltration system designed in accordance with good engineering practice. The reduction in the storage requirement shall be proportional to the percentage of peak 2 year event post development discharge that is infiltrated to ground. Stormwater storage may be eliminated if the peak 2 year event post development discharge downstream from an infiltration system does not exceed the release rate tabulated above.
5.14 Storm Water Management Guideline

5.14.1 An applicant for subdivision or building permit may be required to submit a storm water management report by a professional engineer. The report must make reference to Land Development Guidelines for the Protection of Aquatic Habitat and Stream Stewardship: A Guide for Planners and Developers, available from BC Environment, and must indicate how the development conforms to those guidelines. The engineer designing this system may have the proposal assessed with the City of Langford’s watershed computer model. (Bylaw No. 1669)

5.14.2 The following statement by the design engineer for the stormwater management system is required in the report as described above in Section 5.14.1: (Bylaw No. 1669)

“I confirm that the Storm Water works and services have been designed in accordance with the Subdivision and Development Servicing Bylaw No. 1000 (and as amended from time to time), and to meet normal standards of safety for the public and the occupant of the land and surroundings. To the best of my knowledge, no nuisance or increase in flood levels are expected resulting from the project for the design storm events in the bylaw. Overland flow routes for the major event have been accommodated in the design.” (Bylaw No. 1669)

5.14.3 In the case of works to be maintained by private entities, an Operations and Maintenance Manual to be provided.

5.14.4 Delete. (Bylaw No. 1669)

5.14.5 Delete. (Bylaw No. 1669)

5.14.6 Where ever possible, storm water from private commercial/industrial property is to be disposed of on that property and storm water from public road is to be disposed of in the road right-of-way. Storm water run-off from roofs or paved areas shall be passed through a water purification device or pond which in the opinion of the City Engineer removes impurities in the water to the same degree as a StormCeptor™.
SCHEDULE 6 SEWAGE COLLECTION AND DISPOSAL

6.0 SEWAGE COLLECTION AND DISPOSAL

6.1 General

6.1.1 New subdivisions and development may only be created and occur when serviced by the municipal sanitary sewer system.

6.1.1.1 Notwithstanding s.6.1.1., development without being serviced by the municipal sanitary sewer system may occur in areas outside the West Shore Environmental Services contract area for sewer service [defined in the agreement dated September 20\(^{th}\), 2004 (West Shore Utility; Bylaw No. 876)], under one or more of the following circumstances:

a) Each parcel is a minimum of 40ha in area and has a sufficient area for sewage disposal to comply with the Sewerage System Regulation under the Public Health Act, or has the benefit of an easement for access to such an area for sewage disposal on another parcel that is a minimum of 40ha in area.

b) Construction of a building on a lot that has been vacant since September 20\(^{th}\), 2004 (the date of adoption of the West Shore Utility; Bylaw No. 876).

c) Construction of an accessory building.

d) Construction of a building that replaces, alters, or increases the floor area of an existing building.

6.1.2 In areas not served by the municipal sewer, but contained within the West Shore Environmental Services contract area for sewer service [defined in the agreement dated September 20\(^{th}\), 2004 (Westshore Utility; Bylaw No. 876)], development (except for any form of subdivision other than a strata subdivision of a two-family dwelling) may occur without connection to the municipal sanitary sewer system provided the following conditions have been met: (Bylaw 1513)

a) The owner grants to the City a covenant under s.219 of the Land Title Act that requires the owner to connect the building to the municipal sanitary sewer system within 6 months of a sewer main being installed in a highway or City statutory right of way abutting the parcel on which the building is located.

b) Payment of the Sewer Capital Recovery Fee (SCRF) to West Shore Environmental Services or the City of Langford is made prior to the issuance of a building permit authorizing the construction of the building.

c) Installation of all on-site plumbing necessary between the building and a point 1.0 m from the boundary of the highway or statutory right of way that the City designates as the future location of the sewer, to allow the building to be connected to the municipal sanitary sewer system in accordance with the BC Building Code, and the works are installed in accordance with the permit prior to occupancy of the building. The City may require the owner to install works for either a 100mm diameter gravity connection or a 50mm diameter force main connection.
6.1.2.1 Notwithstanding Section 6.1.2, in areas not served by the municipal sewer, but contained within the West Shore Environmental Services contract area for sewer service [identified in the agreement dated September 20th, 2004 (Westshore Utility; Bylaw No. 876)], the following forms of development may occur without connection to the municipal sanitary sewer system: (Bylaw No. 1494)

i. The alteration or repair of a residential building; or
ii. The construction, alteration, or repair of a building that is accessory to a residential building;

Provided that all of the following conditions are met:

a) The construction, alteration or repair is pursuant to a building permit or is exempt from the requirement of a building permit; and
b) The construction, alteration or repair is not for the purpose of creating an additional dwelling unit or units except where the additional dwelling unit is a permitted secondary suite within a principal dwelling; and

c) The construction or alteration does not create more than 70m² (750ft²) of new gross floor area, or a cumulative total of more than 70m² (750ft²) of new gross floor area when considered together with all alterations (Bylaw 1513)

6.1.3 Wherever, in the opinion of the City Engineer, future development or subdivision shown in the Official Community Plan for the City is probable for the lands adjacent to the development or subdivision, sanitary sewers must be extended to the property boundary and terminated with a capped stub or a manhole. Size and location shall be suitable for the future extension to the satisfaction of the City Engineer.

6.1.4 Each parcel in a subdivision which is not connected to the municipal sewer system shall have an area for sewage disposal approved by the Capital Health Region Environmental Health Officer or shall have secure access to such an approved area for sewage disposal on another parcel.

6.1.5 Any existing in-ground disposal system in a development or new subdivision shall be decommissioned and removed to the satisfaction of the City Engineer if it is the intent of the developer to provide a new in ground disposal system or to connect to the Municipal Sewer System. Any existing sewage disposal systems shall be shown on the construction drawings.
6.2 Design Criteria

TABLE 6-1: Sewage Flow Design Criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Flow</td>
<td>250 L/capita/day</td>
</tr>
<tr>
<td>Stormwater inflow/infiltration</td>
<td>14,500 L/ha/day for 10 year</td>
</tr>
<tr>
<td>Storm water Inflow/infiltration</td>
<td>20,000 L/ha/day for 100 year</td>
</tr>
<tr>
<td>Commercial Flow</td>
<td>20,000 L/ha/day</td>
</tr>
<tr>
<td>Industrial Flow</td>
<td>20,000 L/ha/day</td>
</tr>
<tr>
<td>Institutional Flow</td>
<td>20,000 L/ha/day</td>
</tr>
</tbody>
</table>

TABLE 6-2: Population Equivalent Table

<table>
<thead>
<tr>
<th>Housing Unit Type</th>
<th>Persons per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>3.7</td>
</tr>
<tr>
<td>Multi Family – Low Rise</td>
<td>2.7</td>
</tr>
<tr>
<td>Multi Family- High Rise</td>
<td>2.5</td>
</tr>
<tr>
<td>Modular Homes</td>
<td>2.0</td>
</tr>
<tr>
<td>Non-Residential</td>
<td>80 per ha</td>
</tr>
</tbody>
</table>

TABLE 6-3: Main Pipe Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Ø</td>
<td>200mm</td>
</tr>
<tr>
<td>Terminus piping (last 300m)</td>
<td>150mm at 2% grade</td>
</tr>
<tr>
<td>Minimum velocity:</td>
<td>0.61m/sec at full pipe</td>
</tr>
<tr>
<td>Minimum gradient:</td>
<td>1.00% for terminal sections</td>
</tr>
<tr>
<td>Maximum velocity:</td>
<td>6.10m/sec</td>
</tr>
<tr>
<td>Roughness coefficients</td>
<td>0.013</td>
</tr>
<tr>
<td>Acceptance of existing systems</td>
<td>In accordance with the Official Community Plan and the Sewer Master Plan as directed by the City Engineer</td>
</tr>
</tbody>
</table>

TABLE 6-4 Sewer Pipe and Fittings

<table>
<thead>
<tr>
<th>Size Range</th>
<th>Material and Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>100mm to 150mm Ø</td>
<td>SDR 28 PVC to CSA B182.2 &amp; ASTM D3034 (PS=625 kPa)</td>
</tr>
<tr>
<td>200mm to 375mm Ø</td>
<td>SDR 35 PVC to CSA B182.2 &amp; ASTM D3034 (PS=320 kPa)</td>
</tr>
<tr>
<td>Greater than 375mm Ø</td>
<td>SDR 35 PVC to CSA B182.2 &amp; ASTM D3034 or F794 (PS=320 kPa)</td>
</tr>
<tr>
<td></td>
<td>Open profile PVC to CSA BV182.4 and ASTM F794 (PS=320 kPa)</td>
</tr>
<tr>
<td></td>
<td>Dual wall corrugated profile PVC to CSA B182.4 and ASTM 794 (PS=320kPa)</td>
</tr>
</tbody>
</table>

All Fittings shall be compatible with the pipe to which they are attached. Inserta-Tees are not permitted.
6.2.1 Pipes may be laid to the minimum vertical and/or horizontal radius of 60 metres or as recommended by the manufacturer, providing the design velocity (full pipe) is increased to 0.914 m/s for the curved section.

6.2.2 Mains shall have at least 1m cover and be deep enough to provide drainage at 2% minimum gradient from 600mm below basement floor elevation to obvert of pipe crown for new parcels. Cover shall be 0.6m at ditch inverts.

6.2.3 When a sanitary sewer pipe is installed such that it crosses below an existing asbestos cement (alc) watermain, the existing watermain material shall be replaced with ductile iron pipe for a distance of at least two (2) metres beyond each edge of the trench of the service crossing the watermain.

6.3 Manholes

6.3.1 Manhole structures shall be in accordance with MMCD S1 and S2. Manholes 3.0 to 5.0m deep to be 1200mm diameter, manholes deeper than 5.0m to be 1500mm diameter. (Bylaw No. 1817)

6.3.2 Manholes shall be provided at all changes in grade, pipe size, horizontal alignment (for non-curvilinear sewers) and at the upper end of mains not to be extended in the future. Only one curve, horizontal or vertical, is permitted between manholes. In addition to the foregoing, additional manholes shall be constructed so that the maximum distance between manholes is as shown in TABLE 6-5. Services 200mm and larger require a manhole when connecting to a mainline of the same size or larger. The invert of the incoming service shall match the centreline of the mainline pipe. (Bylaw No. 1817)

<table>
<thead>
<tr>
<th>Pipe size (mm Ø)</th>
<th>Maximum Distance (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>375 and smaller</td>
<td>125</td>
</tr>
<tr>
<td>450 and 750</td>
<td>155</td>
</tr>
<tr>
<td>900 and larger</td>
<td>185</td>
</tr>
</tbody>
</table>

6.3.3 Manholes in gravel areas shall have a 1.5m square 50mm thick asphalt or 100mm thick concrete apron.

6.3.4 In cases where the sewer will be extended in the near future and the end of the present construction is within 45m of an existing manhole, the City Engineer may allow the use of a cleanout structure in accordance with drawing SS-S6 in place of a manhole.

6.3.5 Outside-drop manholes will be permitted, if in the opinion of the City Engineer, the circumstances preclude the use of normal manholes. These shall be constructed wherever the change in invert elevations through the manhole is greater than 600mm. Elevation changes greater than 600mm shall be by way of an outside drop only. Allowance shall be made in the design for the effect of the resulting turbulence on the hydraulic capacity of the system.
6.3.6 The relative elevations entering and leaving a manhole must not reduce the hydraulic capacity of the system.

6.3.7 Allowances for energy losses or changes in velocity are to be determined in accordance with sound hydraulic principals.

6.3.8 The City Engineer may approve situations involving a large pipe flowing into a smaller pipe at steeper grade.

6.3.9 Stubs shall be placed in manholes to allow for future connections. The length of the stubs shall be 600mm maximum from the outside of the manhole. The end shall be securely capped to the satisfaction of the City Engineer. Grades shall be suitable for future extension of the system.

6.3.10 Manhole benching shall be a steel trowel finish with a constant grade from the inlet(s) to the outlet. The benching inside radius shall be no less than three times the branch diameter. Pre-benched manholes are permitted.

6.3.11 All channels shall be constructed to permit use of a pan and tilt camera having dimensions of 600mm x 150mm diameter.

6.3.12 The obvert of pipes entering a manhole shall not be lower than 50mm above the obvert of the outlet pipe. The internal channel in the manhole shall have an elevation difference of 5% from the inlet to the outlet.

6.3.13 Manhole and cleanout lids are to be set to match existing or planned grades both longitudinally and transversely. If the highway grade is greater than 6%, manhole castings shall be encased in a concrete surround poured to 150mm below the rim.

   a) 100mm high manhole frame castings are permitted in unpaved areas only.

6.3.14 All manhole barrel and sections shall be installed with rubber gaskets and mastic and shall be grouted inside with rapid set non-shrink grout. If, in the opinion of the City Engineer the water table may be high enough to affect the manhole, fibreglass bases in a concrete liner may be required.

6.3.15 Inlet and outlet pipes shall be grouted inside the manhole with rapid set non-shrink grout.

6.3.16 All manhole and cleanout lids must be cast to include “Langford Sanitary” (Bylaw No. 1817)

6.4 Service Connections

6.4.1 Sanitary sewer service connections of adequate size, but not less than 100mm² shall be provided from a main to the property line of each new or existing parcel, which forms part of the development or which fronts a highway or other right-of-way in which the sewer is to be constructed and shall be constructed in accordance with MMCD S7.
6.4.2 All service connections shall be provided with an inspection chamber at the property line or at service the right-of-way boundary in accordance with drawing SS-S9.

6.4.3 All service connections shall terminate a distance inside the property line equal to the depth at the property line for new parcels unless otherwise approved by the City Engineer and at property line for existing parcels at a location agreed upon by the owner. All stubs must have a 1% minimum gradient from the inspection chamber into private property in accordance with the Building Code and 2% minimum from the sewer main to the inspection chamber, in accordance with the MMCD Documents.

6.4.4 Where deep sewers exist (those installed at greater than 3 meters below finished grade), the service stub shall be terminated within 1.0 vertical meters of the minimum basement floor elevation and marked with a 2x4 stake. The service connection shall have a long radius sweep and be installed at no more than 45 degrees from the vertical.

6.4.5 Duplex lots shall have a 100mmØ service connection to one inspection chamber. Lots with duplex potential shall have a 100mmØ service connection. (Bylaw No. 1555)

6.4.6 Wherever possible, adjoining residential type lots shall be serviced with one 100mmØ service connection with two 100mmØ stub and two inspection chamber (one for each lot) or may terminate at a 100x100x100 duplex inspection chamber.

6.4.7 Service locations shall be marked with a 40mm x 90mm stake painted red complete with a red insulated wire from a nail on the stake to the service connection cap with the depth marked.

6.5 Inspection Chambers

6.5.1 All inspection chamber (IC) lids and collars shall be installed in accordance with drawing SS S9. The lid cams shall be securely tightened to ensure that they are not subject to vandalism or misuse. (Bylaw No. 1494)

6.5.2 All inspection chambers shall have a cast iron chamber cover and concrete surround in accordance with drawing SS S9.

6.5.3 Any inspection chamber set in a slope greater than 3% shall have a cast iron chamber cover and concrete surround in accordance with SS S9.

6.5.4 Wherever an inspection chamber is covered by a cast iron chamber cover, the clearance between the cast iron lid and the plastic lid shall be a minimum of 75mm.

6.5.5 Inspection chambers shall be supplied and installed without plugs.

6.5.6 The inspection chamber lid shall be fastened to the riser pipe with a stainless steel machine bolt as provided by the manufacturer.

6.5.7 Where property line is within 1 meter of the backside of a sidewalk or curb the inspection chamber shall be installed using cast iron inspection chamber cover specified
in drawing SS S9, in a cast in place concrete apron protruding from the sidewalk or curb toward the property. This apron shall be constructed to the same engineering specifications as the sidewalk and shall provide a minimum of 200mm of concrete from the edge of the cast iron lid to the edge of the apron. An expansion joint at the sidewalk or curb to apron interface shall be provided.

6.5.8 Inspection chambers shall be a minimum of one meter apart from centre to centre when installed, unless, in the opinion of the City Engineer the clustering of services would be beneficial to site servicing and layout in which case the sewer and drain connections may be installed on one adjoining property line.

6.6 Force Mains

6.6.1 At the lowest pump delivery rate anticipated to occur at least once per day, a cleansing velocity of at least 0.9m/s shall be maintained. The maximum velocity should not exceed 3.5m/s.

6.6.2 An automatic air/ vacuum relief valve shall be placed at high points in the force main to prevent air locking, in accordance with good engineering practice.

6.6.3 Force mains should enter the gravity sewer system at a point not more than 600mm above the flow line.

6.6.4 The minimum size for mains discharging raw sewage shall be determined for each specific project by a Professional Engineer.

6.6.5 Force main service connections shall be a minimum 50mm Ø, and shall have a check valve and a ball valve at the property line.

6.6.6 Force main service connections shall be within 1 metre of the property line on the municipal right-of-way.

6.6.7 A tracer wire shall be installed for the purpose of locating the force main and a warning tape clearly marked “CAUTION BURIED SEWER LINE” shall be placed a minimum of 300mm and a maximum of 600mm above the obvert of the force main and service connections. The tracer wire shall be installed along the obvert of the force main and service connection.

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

6.6.9 Pipe bedding shall be a minimum depth of 150mm of sand under and 300mm above the pipe.

6.6.10 The minimum depth of a force main shall be 1.0 from finished grade.

6.6.11 Cleanouts shall be provided at all low points in the system and at the system terminus.
6.6.12 All force main ties to gravity feeds shall be designed to avoid confluence turbulence.

6.6.13 All force main gate valves shall be right hand closing and suitable for raw sewage application. Spacing shall be a minimum of 300m.

6.6.14 Check valves shall be provided where required for maintenance.

6.6.15 A gate valve on the force main from the pump station is required.

6.6.16 Force mains shall be hydrostatically tested to a minimum 150 psi for a minimum of 1 hour with zero allowable leakage.

6.7 Testing

6.7.1 All sewer systems must be tested to MMCD standards prior to Construction Acceptance. The contractor must provide the City Engineer with 24 hours notice of the test. (Bylaw No. 1494)

6.7.2 All sanitary sewers must be video inspected and the Professional Engineer must certify that all the videos have been viewed and that the sewer and connections are clean and free of defects prior to submission to the City Engineer for review.

6.7.3 CCTV videos and reports are to be accompanied with half size drawings. Air tests and videotaping are required prior to hot-mix asphalt concrete paving.

6.7.4 The system must be flushed and re-videoed prior to 1 year warranty inspection.

6.7.5 Minimum quality control test frequencies specified are the minimum number required to determine sufficient trench compaction. The contractor shall perform as many tests as are necessary to ensure that the works and services conform to the requirements of the contract regardless of the minimum number required as follows:

6.7.5.1 Trench bedding (mainline) – one test for every 75m of trench. Minimum one between any two manholes.

6.7.5.2 Trench backfill (mainline) – one test for every 75m of trench at each 1.0m fill depth. Minimum one between any two manholes.

6.7.5.3 Trench bedding (service) – one per road crossing.

6.7.5.4 Trench backfill (service) – one per road crossing at each 1.0m fill depth.

6.7.5.5 Roadbase – one per road crossing.

6.7.5.6 Roadbase – one for every 75m of trench with a minimum of one between any two manholes.
7. OBJECTIVES AND DESIGN CRITERIA

7.1. GENERAL: IT IS THE INTENT OF THIS DOCUMENT THAT ANY CONSTRUCTED LIFT STATION WILL BE A “TURN-KEY” PRODUCT.

7.1.1. The use of sewage lift stations is permitted providing all design options that would avoid lift stations have been considered. The City Engineer shall approve the proposed lift station location. Submersible sewage lift stations are preferred however, larger capacity sewage lift stations or lift stations with special design or siting requirements maybe considered.

7.1.2. Any lift station must be constructed fully functional, operational and with City-specified software installed. The SCADA (kiosk software) consultant shall be selected and retained by the City.

7.1.3. A preliminary design report shall be submitted by the Professional Engineer to ensure that the City’s concerns are addressed prior to commencement of detailed design. This report shall include a cost analysis for operation and maintenance. The report shall provide detailed information on the following design criteria in accordance with Sections 7.1.4 through 7.2.6 of this document.

7.1.4. Standby power and/or peakflow storage maybe required. The City Engineer shall determine which options are more economically feasible based on location, environmental concerns, storage capacity required and the availability of an external emergency power source. In the case of standby power, an on-site emergency generator is required. The selection of an appropriately sized generator for lift stations will be based on design criteria in accordance with this bylaw. The generator must be sized so that it will not be required to run at more than 80% of its total capacity while having all pumps running simultaneously. (Bylaw No. 1817)

7.2. LIFT STATION LAYOUT AND DESIGN CRITERIA

7.2.1. The structural, mechanical and electrical components of the lift station shall be designed to the OCP ultimate population build-out, in consultation with the Planning Department staff and in accordance with the City Sewer Master Plan for the designated catchment area(s).

7.2.2. Ideally, the lift station shall be located in an area where receiving sewers, water mains, and provisions for 3-phase power supply are concurrent and shall be located for convenience of operation and maintenance.

7.2.3. A Professional Engineer shall demonstrate that the lift station will have a minimal negative impact on the adjacent neighbourhood. These considerations should include, but not be limited to, lighting, odour, noise levels and maintenance operations.
7.2.4. The access shall be an asphalt driveway or approved alternate, for H2O loading. Adequate area must be provided adjacent to the lift station for maintenance vehicles with trailers to turn around. The maximum centerline grade of an access shall be no greater than 8% and have a cross-fall not exceeding 2%. Any deviation from this specification must be approved by the City Engineer.

7.2.5. Landscaping

7.2.5.1 A landscape plan shall be provided. The following items shall be adhered to:

- All utility boxes, including generators shall be wrapped with anti-graffiti wrap (all sides and top of box). Anti-graffiti wrap images shall be approved by the City Parks Manager.
- 1800mm (6'-0") high cedar wooden fencing along property lines adjacent to residential housing.
- Fully automatic irrigation system to City of Langford specifications.
- Shrub, tree and groundcover planting to City of Langford Parks department approval.

7.2.6. Protection from vehicular damage for the kiosk shall be provided. The siting of the kiosk should be the primary method of protection; however, if suitable siting cannot be achieved, engineered concrete walls, berms, or other alternates may be used, as approved by the City Engineer. Any such protection devices must be compatible with the overall landscaping scheme and be engineered to withstand vehicular impact.

7.2.7. If the lift station is located in an existing or proposed residential area and, in the opinion of the City Engineer security or aesthetics are an issue, the kiosk and any above ground components of the lift station shall be enclosed in a building. The form and character of the building shall be residential in nature with an asphalt shingle gable roof and muted natural colour scheme.

7.2.8. Where the lift station is located in an area of drainage concern or flood plain, the station shall be designed as fully submerged. Electrical components shall be constructed above the 200-year flood elevation.

7.2.9. A Professional Engineer shall approve the ground conditions at the lift station location and shall certify that all geotechnical works carried out in conjunction with the lift station construction have been performed under their supervision.

7.2.10. Lift Stations providing service to more than 5 single-family dwellings shall use 3 phase power. Phase-converters are not permitted.

7.2.11. Functional odour control shall be incorporated into the lift station or, at the discretion of the City Engineer, future odour control shall be provided for.
7.2.12. Provide sufficient access to remove wet well components for repair, include mounting hardware for the City’s davit hoist.

7.2.13. The minimum emergency or peak flow storage above the high level alarm shall be provided by a separate chamber. Storage shall be designed to accommodate a minimum of one hour of peak flow plus one hour of average daily flow, for maximum Official Community Plan build-out for the catchment area(s) or larger if, in the opinion of the City Engineer a larger catchment area shall apply.

7.2.14. Where standby power is required by the City Engineer, fuel degradation shall be addressed in the Design Report.

7.2.15. In the case where the valve chamber is a separate structure the design shall incorporate a flexible joint between it and the wet well structure.

7.2.16. Provide a 20mm diameter threadolet fitting and liquid filled pressure (100φ face) gauges located on each pump header for testing purposes. Location as approved by the City Engineer.

7.3. WET WELL SPECIFICATIONS

7.3.1. Wet well design shall be certified by the Professional Engineer in consultation with the pump manufacturer. A report on hydraulics shall be provided including but not be limited to comment on air entrainment, vortexing and cavitation, and shall reflect the operation of the proposed pumps in the proposed wet-well design.

7.3.2. Provide a minimum 38mm water supply stand pipe with stop drain and Camlock fitting.

7.3.3. A water supply for wash down shall be provided within 10m of the station and be sized for available flow and pressure. A ball shutoff valve shall be provided. A reduced pressure principal backflow preventer shall be installed in accordance with the AWWA Canadian Cross Connection Control Manual (latest edition). Test results for the RP device shall be submitted to the City and CRD.

7.3.4. The piping arrangement shall make a provision for wet-well pump-out from an area near the access hatches. This may be achieved by a camlock fitting and piping sized appropriately for the City’s maintenance contractor’s pumper truck.

7.3.5. Provide a minimum 150 mm diameter aluminum or hot dipped galvanized pipe vent with vandal proof screen on the outlet for the ventilation of the wet well. Such vents shall be fitted with flanged fittings at the station roof to allow for future removal and adaptation for odour control devices. All accessory colours shall be in accordance with approved landscape designs.

7.3.6. The outlet pipe and all other connections to the station shall be brought to within 1.2 m of the expected ground line around the pump station by the use of risers either on the inside of the station or attached to the outside of the station.
7.3.7. The following coating specifications shall apply to the following components:

7.3.7.1. Steel piping shall be powder coated inside and out with 2 coats 3M “Scotch Kote” 206N fusion bonded epoxy coat to AWWA-C213. Surface preparation shall be SSPC-SP10, blasted clean.

7.3.7.2. Exteriors of valves shall be epoxy coated with 1 coat Cloverdale Paint “Prep-Tech” epoxy penetration sealer prime coat #83020 and 2 coats Cloverdale Paint “Clova Mas-Tic” epoxy #83100, minimum dry film thickness 6 mils.

7.3.7.3. Option for stainless steel piping (no coating) Type 316L to ASTM A312 Schedule 10S, Minimum wall thickness: long radius bends. Flanges to be full face 150 #CL slip or weld neck.

7.3.8. All concrete stations must be designed and constructed to prevent sulphide attack. The concrete surface of the wet well shall be treated with the following or as approved:

7.3.8.1. One coat Sherwin Williams “Kem Cat Coat” epoxy filler Dry Film Thickness (DFT) 10 mil and 1 coat Sherwin Williams “High Solids Catalyzed Epoxy Coat” DFT 6 mil, surface preparation in accordance with manufactures recommendations; or

7.3.8.2. One coat Canus Industries (604-552-2375) IMC-XYG UARD Series 4000, colour off white, DFT 4-6 mil, surface preparation shall be pressure wash and degrease; or

7.3.8.3. Two Coats Bar-Rust ICI 236 Devoe Coatings. Surface preparation shall be sweep blast and pre coat in accordance with manufacturers recommendations.

7.3.9. If, in the opinion of the City Engineer, the force main arrangement creates a maintenance issue where a flush valve may not be effective, pig loaders are required.

7.3.10. Any drain line from any chamber to the wet well requires a backflow preventer valve.

7.4. PUMPS

7.4.1. All pumps shall be Flygt three phase, solids handling pumps (one pump is to be complete with a mixing flush valve), or approved alternate.

7.4.2. Actual test results for the proposed pumps shall be provided to the City in order for efficiency to be confirmed.

7.4.3. The pump manufacturers must supply references for parts availability together with details of servicing expertise available.

7.4.4. Pumps are to be assembled complete with lift out slide rail system, cast iron discharge elbow; upper and lower guide rail support, pump rails and galvanized pump lifting chains.
7.4.5. Multiple pump scenarios shall meet maximum flow condition with one pump in failure mode.

7.4.6. Pumps shall have non-clog impellers that will pass a minimum 50 mm spherical solid.

7.4.7. All pump valves shall be located in a separate valve chamber. Alternate designs shall be subject to approval by the City Engineer. A check valve and isolation valve for each pump must be provided.

7.4.8. Locate the isolation valve and, where possible, locate the check valve in a horizontal position.

7.4.9. A water hammer and transient analysis must be performed.

7.5. LEVEL MONITORING SYSTEM

7.5.1. Level Measurement

7.5.1.1. Levels in the wet well shall be transmitted to the PLC by means of a submersible pressure transducer suspended within a stilling well in the wet well. (Bylaw No. 1817)

7.5.1.1.1. Pressure Transmitter to be a Flygt/kpsi US100 or Blue Ribbon Bird Cage Submersible pressure sensor with a 4-20ma output.

7.5.1.1.2. Stilling shall be fabricated from 150\(\phi\) SCH 40 PVC pipe perforated with 12\(\phi\) holes at 50mm c/c for the submerged section.

7.5.1.2. Two Flygt ENF-10 or approved equivalent float switches shall be mounted in the wet well to signal high level and low level alarm.

7.5.1.3. The float switches shall take control of the level measurement system upon failure of the pressure transmitter.

7.6. CHAMBER COVER, OPERATION AND MAINTENANCE PROVISIONS

7.6.1. Chamber covers shall be Flygt Safe-Hatch™ or approved equivalent (size to be approved by the City Engineer). An H-20 load rating shall be required where vehicular loads on the chambers are possible.

7.6.2. All chambers shall conform to Work Safe BC confined entry regulations.

7.6.3. A Work Safe BC approved aluminum ladder for access to wet well shall be provided. The location of the ladder shall not interfere with the removal and installation of the pumps and equipment. The ladder must be designed to extend and lock at a maximum of 600mm above the high water level float to permit wet well access, and at a distance above the roof of the wet well in accordance with current Work Safe BC regulations.
7.6.4. Where required by Work Safe BC regulations, an intermediary safety platform shall be provided. The platform shall be hot dipped galvanized “skid grid”.

7.6.5. A safety zone for maintenance personnel shall be provided.

7.7. CONTROL KIOSK DESIGN REQUIREMENTS

7.7.1. The lift station shall be equipped with a duplex or triplex automatic pump control kiosk in a powder coated aluminum enclosure for outdoor mounting.

7.7.1.1. The kiosk must be located a minimum of 3.0m from the station lid, and the control portion of the kiosk (with indicator lights and switches) shall face north (because of sun reflection concerns).

7.7.1.2. The kiosk shall be constructed so as the operators will be standing on a drained concrete pad at least three inches higher than the adjacent ground and at least one foot larger in dimension than the radius of all the door swings.

7.7.1.3. The internal panels of the control portion of the kiosk shall be hinged for ease of operation. The adjacent control enclosures shall be hinged at opposite sides to allow for both enclosures to be opened simultaneously allowing a service technician visual access to both enclosures simultaneously.

7.7.1.4. The kiosk construction shall meet the requirements outlined in this Schedule.

7.7.2. A luminaire shall be erected in accordance with Bylaw 1000 at the lift station site and shall be situated to provide adequate levels of illumination for the wet well and kiosk during emergency night-time events. The luminaire shall be a maximum of 3 metres from the kiosk.

7.7.3. Provide a Hand / Off / Auto (HOA) switch to operate and/or override photocell on luminaires.

7.7.4. Provide a separate 25mm orange communication conduit complete with a spare pull cord for this luminaire to the control equipment side of the kiosk for the antenna cable.

7.7.5. A variable speed explosion-proof exhaust fan with high and low speed switch (with VFD Program Module) must be used which will be running constantly at low speed and which has sufficient capacity to exchange the total volume of air inside the well at least 6 times an hour with means for detecting failure. At high speed, the fan must purge noxious fumes while maintenance personnel are in the wet well, per Work Safe BC Confined Space regulations. (Bylaw No. 1817)

7.7.6. The control kiosk shall contain the following components in the power distribution compartment:

7.7.6.1. Hydro pull box (as required by B.C. Hydro).
7.7.6.2. Main service disconnect breaker.

7.7.6.3. B.C. Hydro meter base.

7.7.6.4. Automatic transfer switch (rated the same as the main service disconnect) complete with network capability. (Bylaw No. 1817)

7.7.6.5. Crouse-Hinds weatherproof 100A stand-by power receptacle (AR1042S22) when necessary.

7.7.6.6. 125A Splitter (feeding transformer and control enclosure).

7.7.6.7. Minimum 3kVA 600 to 120/240V transformer (protected by a fused switch). (Bylaw No. 1817)

7.7.6.8. Light and light switch (3-way).

7.7.7. The control kiosk shall contain the following components in the control compartment:

7.7.7.1. An orange RPVC communication conduit(s) complete with a spare pull cord shall be provided from the control compartment of the kiosk to either a telephone/cable pole drop or an active underground telecommunication utility pull box. The telecommunication provider shall be approved by the City Engineer. The Contractor shall be responsible for making arrangements for the installation of the telephone or cable connection. (Bylaw No. 1817)

7.7.7.2. 120/240V 24 cct. panel board (Square D).

7.7.7.3. 1500W ceramic heater (on dedicated 15A circuit with receptacle).

7.7.7.4. 120V GFI quadruple utility receptacle on a dedicated 15A circuit.

7.7.7.5. MagMaster remote flow meter transmitter.

7.7.7.6. Control enclosure containing PLC, control/indicator panel, motor disconnects, magnetic starters, overload protection, 24 Vdc control power supply, and all other control equipment.

7.7.7.7. Light and light switch (3-way).

7.7.8. The control kiosk shall contain an operator control panel comprised of IDEC SLC30 series indicators, pushbuttons, and switches arranged in a 3x7 (duplex) or 4x7 (triplex) matrix as shown in Table 7-1.
### TABLE 7-1: Control Kiosk Specifications

<table>
<thead>
<tr>
<th>Pump 1 Run (Green Indicator)</th>
<th>Pump 2 Run (Green Indicator)</th>
<th>Pump 3 Run (Green Indicator)</th>
<th>Vent Fan Off-Low-High (3 Position Maintained)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOA (3 Position Maintained)</td>
<td>HOA (3 Position Maintained)</td>
<td>HOA (3 Position Maintained)</td>
<td>347/600V Main Power (Green Indicator)</td>
</tr>
<tr>
<td>Pump 1 Status (Red Indicator)</td>
<td>Pump 2 Status (Red Indicator)</td>
<td>Pump 3 Status (Red Indicator)</td>
<td>120V Control Power (Green Indicator)</td>
</tr>
<tr>
<td>Pump 1 Over Temp (Red Indicator)</td>
<td>Pump 2 Over Temp (Red Indicator)</td>
<td>Pump 3 Over Temp (Red Indicator)</td>
<td>UPS Low Battery (Red Indicator)</td>
</tr>
<tr>
<td>Pump 1 Leak (Red Indicator)</td>
<td>Pump 2 Leak (Red Indicator)</td>
<td>Pump 3 Leak (Red Indicator)</td>
<td>High Level Float (Red Indicator)</td>
</tr>
<tr>
<td>Pump 1 Overload (Red Indicator)</td>
<td>Pump 2 Overload (Red Indicator)</td>
<td>Pump 3 Overload (Red Indicator)</td>
<td>Low Level Float (Red Indicator)</td>
</tr>
<tr>
<td>Reset (Round Red Pushbutton)</td>
<td>Reset (Round Red Pushbutton)</td>
<td>Reset (Round Red Pushbutton)</td>
<td>Lamp Test (Round Black Pushbutton)</td>
</tr>
</tbody>
</table>

All indicators shall be 24 Vdc LED type. Engraving shall be 4mm high.

7.7.9. Run-time totalizers for each pump shall be installed in the control panel for each pump directly below the column of indicators and controls for each pump as shown above.

7.7.10. The control kiosk shall be equipped with a GE Fanuc VersaMax PLC for control, monitoring, and SCADA functions. The following components shall be supplied, installed, and wired by the Contractor as shown in Table 7-2.
### TABLE 7-2: Wiring Specifications for Control Kiosk

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) IC200PWR002</td>
<td>1</td>
<td>24VDC(in)/3.3VDC(out) Power Supply</td>
</tr>
<tr>
<td>(b) IC200CPUE05</td>
<td>1</td>
<td>CPU Ethernet c/w 128K Memory</td>
</tr>
<tr>
<td>(c) IC200MDL650</td>
<td>1</td>
<td>32 point 24Vdc digital input card</td>
</tr>
<tr>
<td>(d) IC200MDL742</td>
<td>1</td>
<td>32 point 24Vdc digital output card</td>
</tr>
<tr>
<td>(e) IC200ALG260</td>
<td>1</td>
<td>8 point analog input card</td>
</tr>
<tr>
<td>(f) IC200CHS002</td>
<td>3</td>
<td>Carrier</td>
</tr>
<tr>
<td>(g) IC755CSS0RDA-AJ</td>
<td>1</td>
<td>HMI</td>
</tr>
<tr>
<td>(h) Deleted (Bylaw No. 1817)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.7.11. The PLC shall be mounted within the control enclosure and the HMI shall be mounted on the door directly to the right of the indicator/control panel. (Bylaw No. 1817)

7.7.12. The PLC software to operate the pump station must be provided by the City’s software consultant. The Contractor shall demonstrate end-to-end functionality of each PLC point to the field equipment to the City Engineer prior to the software installation by the City’s approved software consultant. The Contractor is responsible for commissioning the software. The Contractor shall supply all necessary equipment and wiring to provide the following points connected to the PLC (in the order shown – note that references to P3 can be deleted in the event of a duplex pump station).

7.7.13. Digital Inputs
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cabinet intrusion on any door</td>
</tr>
<tr>
<td>2</td>
<td>347/600V power/phase loss (from Controlab DSP-1LS)</td>
</tr>
<tr>
<td>3</td>
<td>Communication Loss</td>
</tr>
<tr>
<td>4</td>
<td>Low battery</td>
</tr>
<tr>
<td>5</td>
<td>High wet well level (based on Flygt ENM-10 float switch)</td>
</tr>
<tr>
<td>6</td>
<td>Low wet well level (based on Flygt ENM-10 float switch)</td>
</tr>
<tr>
<td>7</td>
<td>Vent fan status (based on digital CT calibrated on low speed)</td>
</tr>
<tr>
<td>8</td>
<td>Lamp test button</td>
</tr>
<tr>
<td>9</td>
<td>P1 status (from aux. contact on starter)</td>
</tr>
<tr>
<td>10</td>
<td>P1 leak</td>
</tr>
<tr>
<td>11</td>
<td>P1 over temperature</td>
</tr>
<tr>
<td>12</td>
<td>P1 over load (from starter)</td>
</tr>
<tr>
<td>13</td>
<td>P1 reset button</td>
</tr>
<tr>
<td>14</td>
<td>P2 status (from aux. contact on starter)</td>
</tr>
<tr>
<td>15</td>
<td>P2 leak</td>
</tr>
<tr>
<td>16</td>
<td>P2 over temperature</td>
</tr>
<tr>
<td>17</td>
<td>P2 over load (from starter)</td>
</tr>
<tr>
<td>18</td>
<td>P2 reset button</td>
</tr>
<tr>
<td>19</td>
<td>P3 status (from aux. contact on starter)</td>
</tr>
<tr>
<td>20</td>
<td>P3 leak</td>
</tr>
<tr>
<td>21</td>
<td>P3 over temperature</td>
</tr>
<tr>
<td>22</td>
<td>P3 over load (from starter)</td>
</tr>
<tr>
<td>23</td>
<td>P3 reset button</td>
</tr>
</tbody>
</table>
7.7.14. Digital Outputs

**TABLE 7-4: Digital Outputs for Control Kiosk**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High level alarm indicator</td>
</tr>
<tr>
<td>2</td>
<td>Low level alarm indicator</td>
</tr>
<tr>
<td>3</td>
<td>347/600 power indicator</td>
</tr>
<tr>
<td>4</td>
<td>120 control power indicator</td>
</tr>
<tr>
<td>5</td>
<td>24DVC Failure</td>
</tr>
<tr>
<td>6</td>
<td>P1 run indicator</td>
</tr>
<tr>
<td>7</td>
<td>P1 status alarm indicator</td>
</tr>
<tr>
<td>8</td>
<td>P1 leak alarm indicator</td>
</tr>
<tr>
<td>9</td>
<td>P1 over temperature alarm indicator</td>
</tr>
<tr>
<td>10</td>
<td>P1 overload alarm indicator</td>
</tr>
<tr>
<td>11</td>
<td>P1 run (through 24Vdc/120Vac solid state relay and HOA to starter)</td>
</tr>
<tr>
<td>12</td>
<td>P2 run indicator</td>
</tr>
<tr>
<td>13</td>
<td>P2 status alarm indicator</td>
</tr>
<tr>
<td>14</td>
<td>P2 leak alarm indicator</td>
</tr>
<tr>
<td>15</td>
<td>P2 over temperature alarm indicator</td>
</tr>
<tr>
<td>16</td>
<td>P2 overload alarm indicator</td>
</tr>
<tr>
<td>17</td>
<td>P2 run (through 24Vdc/120Vac solid state relay and HOA to starter)</td>
</tr>
<tr>
<td>18</td>
<td>P3 run indicator</td>
</tr>
<tr>
<td>19</td>
<td>P3 status alarm indicator</td>
</tr>
<tr>
<td>20</td>
<td>P3 leak alarm indicator</td>
</tr>
<tr>
<td>21</td>
<td>P3 over temperature alarm indicator</td>
</tr>
<tr>
<td>22</td>
<td>P3 overload alarm indicator</td>
</tr>
<tr>
<td>23</td>
<td>P3 run (through 24Vdc/120Vac solid state relay and HOA to starter)</td>
</tr>
</tbody>
</table>

7.7.15. Analog Inputs (from ABB MagMaster)

**TABLE 7-5: Analog Inputs for Control Kiosk**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discharge Flow (from ABB MagMaster)</td>
</tr>
<tr>
<td>2</td>
<td>Wet Well Level (from Flygt LS100 series pressure transducer)</td>
</tr>
<tr>
<td>3</td>
<td>P1 Amps (from analog CT)</td>
</tr>
<tr>
<td>4</td>
<td>P2 Amps (from analog CT)</td>
</tr>
<tr>
<td>5</td>
<td>P3 Amps (from analog CT)</td>
</tr>
</tbody>
</table>

7.7.16. The pump station shall be equipped with a Shaw cable hard wired service and modem for use with the City’s SCADA system. The modem shall be mounted in a mounting bracket adjacent to the control compartment but not inside so as to permit easy access for viewing the indicator light and setting the reset button. The modem shall be connected through a router firewall to the communications port on the PLC.

7.7.17. Deleted. (Bylaw No. 1817)
7.7.18. The pump station shall be equipped with an uninterruptible power supply (UPS) to optimize signal strength (WPS) which supplies power to the PLC, CDPD modem, Magmeter, level sensor, and all other low voltage control devices and indicator lights. The UPS shall have enough capacity to power these devices for a period of 2 hours after the utility power has failed. The UPS shall provide dry contacts for utility fail and low battery for connection to the PLC. Interposing relays will be required to interface the PLC to UPS. The following UPS shall be supplied, installed, and wired by the Contractor: Powerware Corporation model #PW9125-700 UPS with a PW9125-24EBM extended battery. The Contractor shall provide the City with a ten year manufacturer’s warranty for this UPS unit.

7.7.19. The pump station shall be equipped with an ABB Kent Taylor MagMaster flow meter (Model MFF/G) on the station discharge complete with remote transmitter with 3 line display and keypad, and 4-20ma interface for connection to the PLC. The Contractor shall submit the proposed bill of materials to the City Engineer for approval prior to procurement. The Contractor shall supply the City with a calibration certificate for the above noted meter. The digital readout from this meter shall show the rate of flow in litres per second and total volume pumped in cubic meters.

7.7.20. The Contractor shall submit shop drawings for the Kiosk, electrical and pump control system for approval by the City Engineer prior to fabrication.

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

7.7.22. Provide digital As-Built drawings based on the City’s current “Construction Drawings and Drafting Standards“ with elevations based on NAD 83 coordinates. Provide one laminated weather proof set and two paper sets of acceptably indexed operation and maintenance manuals as set out in this Schedule that contains all information for controls, monitors, pumps, and data collection. These manuals shall be contained within appropriate binders. A laminated wiring schematic shall be provided for all systems and permanently adhered to the inside of the right-hand control panel door.

7.7.23. Electrical Kiosk Design and Fabrication

7.7.23.1. This specification shall apply to the design, testing and supply of pump station kiosks. This specification is intended to establish the minimum quality benchmark for the enclosure, heating, and wiring (Figure 3).

7.7.23.2. For the purpose of this document, the kiosk shall mean a CSA-4 Housing complete with heating designed to contain electrical and electronic components.

7.7.23.3. All kiosks shall bear approval to nationally-recognized standards by organizations accredited by the Standards Council of Canada (e.g. CSA or Warnock Hersey).
7.7.23.4. The electrical / control kiosk shall be shipped and delivered to the site with 100% of the components installed and verified as per section 7.6.35. No after manufacturer assembly shall be permitted other than termination of connections for pump, transducer, floats, flow meter, antenna and luminaire.

7.7.24. Warranty

The Contractor shall warrant that all products are free from defects in material and workmanship. The warranty period shall be one year from the date of acceptance by the City. Any product warranties in excess of one year shall be assigned to the City. During this warranty period, the Contractor shall repair or replace any defective product free of cost to the City. This shall include all shipping costs. All defective products shall be repaired or replaced immediately upon notification. (Bylaw No. 1494)

7.7.25. Materials

7.7.25.1. All materials shall be new.

7.7.25.2. Unless otherwise noted, equipment shall be fabricated from 5052-H32 sheet aluminum of at least 3.2 mm (1/8 ins) thick.

7.7.26. Connecting Hardware

7.7.26.1. Miscellaneous hardware other than screws, nuts, bolts and washers shall be stainless steel. Other hardware coatings must be submitted to the City for approval.

7.7.26.2. Connecting hardware (i.e. screws, nuts, bolts and washers) 9.5mm diameter or smaller and shall conform to the following:

7.7.26.2.1. All hardware shall have unified national thread form (ANSI) and shall be 18-8 or 316 stainless steel.

7.7.26.2.2. All nuts and bolts 1/4-20 and larger shall have UNC (Unified National Course) threads and hexagon heads, and shall bear suitable markings to identify their grade and origin of manufacture.

7.7.26.2.3. All machine screws smaller than 1/4-20 (e.g. 8-32 UNC, 1024 UNC) shall be Robertson pan-head. All screw heads shall be sized so only one screwdriver is required when working on the panels.

7.7.26.2.4. No sheet metal or self tapping screws shall be used.

7.7.26.2.5. No pressure adhesive cable ties shall be used where equipment and/or wiring is to be mounted to the inside of the control enclosure doors, a 3.2mm powder coated aluminum stand-off liner shall be welded to the inside of the door to facilitate the use of fasteners.
7.7.27. Fabrication

7.7.27.1. All welds shall be in accordance with CAN/CSA W59.2 - Welded Aluminum Construction or be certified by a Professional Engineer (in an appropriate field) registered in the Province of BC.

7.7.27.2. All exterior seams shall be of continuously welded construction. All exterior welds shall be ground smooth.

7.7.27.3. All welds shall be free of slag and spatter.

7.7.28. Kiosk Doors, Hinges and Door Gaskets

7.7.28.1. Kiosk doors shall be fabricated from sheet aluminum and have a separate stiffening panel welded to the inside door skin.

7.7.28.2. Kiosk doors shall be hinged to the kiosk using three hinges evenly spaced on each door. The hinges shall be non ferrous metal and equipped with a grease nipple for lubrication such as Marr Weld-On Hinge Limited Model #AFSSP-10GF.

7.7.28.3. Each door shall have a door stop to hold the door open at 90 degrees.

7.7.28.4. The gasket shall be of one continuous piece per side (i.e. four strips per opening) and shall be permanently bonded to the metal.

7.7.28.5. The gasket shall be of an appropriate length so as not to have gaps at gasket joints or to shrink over time. The surface of the gasket shall be covered with a silicon lubricant to prevent sticking to the mating surface.

7.7.29. Cabinet Internal Lighting

The power distribution and control compartment on the kiosk shall be equipped with a 100W equivalent LED rough usage bulb, receptacle, and light switches. The two light switches shall be wired as a three-way circuit. (Bylaw No. 1817)

7.7.30. Kiosk Environmental Requirements

Each kiosk shall be equipped with a 1500W ceramic heater complete with fan. This heater shall be installed on a shelf mounted near the bottom of the kiosk in the control section.

7.7.31. Equipment Mounting Panels

Equipment mounting panels shall be constructed from 5052-H32 sheet aluminum of at least 4.7 mm thick. The equipment mounting panels shall extend horizontally from wall to wall and vertically from the fan/light mounting panel to the bottom of the kiosk base as shown on the “Approved for Construction” drawings for the subject project. Equipment mounting panels may also be constructed of 10 gauge powder coated sheet steel. All equipment mounted to such panels shall be fastened with 8-32 screws.
7.7.32. Kiosk Electrical Equipment

7.7.32.1. The Contractor shall supply all electrical equipment as described in the bylaws and shown on the drawing. Alternative products must be approved by the City prior to start of fabrication.

7.7.32.2. The Contractor shall provide equipment layout details with the shop drawings.

7.7.32.3. An inner mask shall be installed to protect personnel from electrical hazard. The mask shall have cut-outs for circuit breaker toggle mechanisms. Knock outs in the mask shall be provided for all spare breaker spaces.

7.7.32.4. All equipment shall be mounted on to the equipment mounting panels and shall be secured using 8-32 inserts.

7.7.32.5. All equipment shall be labelled using vinyl adhesive equipment labels with 10 mm high black characters on a white background as shown in Figure 7-1.

7.7.32.6. All panels shall be supplied with the breakers installed.

7.7.33. Control Wiring

All wiring shall be completed in accordance with the following requirements:

7.7.33.1. Figures 7-1 and 7-2 illustrate control wiring methods and standards, and are also used to establish the minimum quality benchmark.

7.7.33.2. All conductors shall be stranded RW90 unless otherwise noted. Conductor size and color-coding for control wiring shall be as shown in Table 7-6.

7.7.33.3. The wiring shall be neatly bundled and ty-rapped to the equipment mounting panel at 150 mm intervals as shown in Figure 7-1.

7.7.33.4. All wire bundles shall be formed by using a single ty-wrap.

7.7.33.5. No ty-wraps or any other wire bundling device shall be found inside or partly inside any wire bundles.

7.7.33.6. All wiring shall take the neatest route to its termination point.

7.7.33.7. All wires shall be free of splices or through connections in their entirety.

7.7.33.8. Provide 8-32 inserts and ty-rap mounts for the attachment of wiring as shown in Figure 7-1.

7.7.33.9. Wiring and terminal blocks shall be labelled according to the conventions shown in Table 7-7. All wiring and equipment mounting shall be done in a neat manner as shown in Figures 7-1 and 7-2.
**TABLE 7-6: Conductor Color Code for Control Wiring**

<table>
<thead>
<tr>
<th>Colour</th>
<th>Size</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>Number 16-RW90</td>
<td>Low-voltage control wiring</td>
</tr>
<tr>
<td>Red</td>
<td>Number 14-RW90</td>
<td>120 volt control wiring</td>
</tr>
<tr>
<td>Black</td>
<td>Number 14-RW90</td>
<td>Hot</td>
</tr>
<tr>
<td>White</td>
<td>Number 14-RW90</td>
<td>Neutral</td>
</tr>
<tr>
<td>Green</td>
<td>Number 14-RW90</td>
<td>Ground</td>
</tr>
</tbody>
</table>

**TABLE 7-7: Control Wiring Labelling Conventions**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONDUCTORS</th>
<th>CABLES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Control</td>
<td>LC-001</td>
<td>LCC-01</td>
<td>1</td>
</tr>
<tr>
<td>Remote Control</td>
<td>RC-001</td>
<td>RCC-01</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>N3, N3-1</td>
<td>n/a</td>
<td>2,3</td>
</tr>
<tr>
<td>Hot</td>
<td>H3, H3-1</td>
<td>n/a</td>
<td>2,3</td>
</tr>
<tr>
<td>24 Volts AC</td>
<td>24AC, 24AC-1</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>24 Volts AC (return)</td>
<td>24N, 24N-1</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Terminal Blocks</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
</tbody>
</table>

Notes:
1. Local specifies termination inside the control cabinet and remote indicates termination outside.
2. If there is more than one conductor of the same type within a bundle or cable, the conductors are labelled sequentially starting from one.
3. Hot and neutral circuits are labelled Hx or Nx where x is the circuit number in the panel.
4. Terminal blocks are numbered sequentially, fused terminals are preceded by an ‘F’, and ground terminals are preceded by a ‘G’.

**TABLE 7-8: Terminal Block Part List**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WDU6 Terminal</td>
<td>102020</td>
</tr>
<tr>
<td>WPE6 Ground Terminal</td>
<td>101020</td>
</tr>
<tr>
<td>WAP2.5-10 End Section</td>
<td>105000</td>
</tr>
<tr>
<td>WEW 35/2 End Bracket</td>
<td>106120</td>
</tr>
<tr>
<td>WTW 2.5 - 10 Partition</td>
<td>105010</td>
</tr>
<tr>
<td>WSI 6/2 Fuse Terminal</td>
<td>101400</td>
</tr>
<tr>
<td>WOV6 Jumper Bar</td>
<td>As required</td>
</tr>
<tr>
<td>TS35 Mounting Bar</td>
<td>38340</td>
</tr>
</tbody>
</table>
7.7.33.10. All control wiring shall be labelled using wire markers from Grafoplast as shown on Figure 7-2.

7.7.33.11. Terminal blocks shall be supplied from Wiedmuller or approved alternative.

7.7.34. Kiosk Finish

The kiosk shall be finished as follows:

7.7.34.1. The enclosures shall be powder coated gray. The Contractor may alternatively submit proposed powder coat procedures to the City representative for approval.
7.7.34.2. The final product shall be free of dents, scratches, weld burns and abrasions harmful to its strength and general appearance.

7.7.34.3. All exterior corners shall be rounded to a radius of 3.17 mm (1/8 ins) minimum.

7.7.34.4. All sharp edges shall be de-burred to a radius of 0.4 mm (1/64 ins) minimum in order to reduce hazards to service personnel.

7.7.35. Testing

The Contractor shall perform testing of all control wiring including heating and ventilation within each kiosk. The tests shall be witnessed by the City Engineer and the City SCADA consultant.

7.7.36. Product Review

The City will require the following conditions to be met prior to delivery:

7.7.36.1. The cabinets and wiring have been reviewed and accepted by the City Engineer.

7.7.36.2. The cabinets shall be 100% complete and operational (see 7.6.22.4).

7.7.36.3. All control wiring shall be tested to the satisfaction of the City Representative.

7.7.36.4. Any equipment which has been rejected shall be repaired or replaced within a time period acceptable to the City. All costs associated with these repairs and for the testing of a failed product will be borne exclusively by the Contractor.

7.7.37. Manufacturers Identification

7.7.37.1. The City will allow the manufacturer to externally identify the kiosk as to its origin.

7.7.37.2. The location, size and method must be visually pleasing and approved by the City prior to implementation.

7.7.37.3. All labelling installed by the manufacturer shall be set square on the kiosk.

7.7.37.4. Adhesive stickers shall not be used in labelling the kiosk exterior.

7.7.38. Labelling

7.7.38.1. All products shall be labelled with the Contractor’s company name, model number, panel rating and the date of manufacture. This label shall be located on the inside of the kiosk in an easy to read location.

7.7.38.2. The Contractor shall also provide aluminum engraved labels with black painted lettering on the outside of each kiosk. The wording for the kiosk ID plate will be provided by the City.
7.7.38.3. All ID plates shall have 15 mm high characters and shall be attached to the door using a minimum of 4 stainless steel 8-32 machine screws complete with blind PEM fasteners.

7.7.39. Plan Pouch and Portable Computer Shelf

7.7.39.1. The Contractor shall supply and mount a waterproof plan pouch (400mm high 500mm wide) on the inside of the left door of the control compartment. The pouch shall be secured to the inside.

7.7.39.2. The Contractor shall supply a 400mm deep by 500 mm wide fold down shelf attached to the inside left-hand control panel door. The shelf shall be large enough to hold an open 75mm ring binder and shall have a 6mm restraining lip on the three outer edges.

7.7.40. Shop Drawings

7.7.40.1. Submission

7.7.40.1.1. Detailed dimensioned layout shop drawings (i.e. manufacturing drawings) including plans, elevations, sections, equipment layout and wiring diagrams (if required) for each kiosk.

7.7.40.1.2. Technical brochures for materials and equipment as required.

7.7.40.2. Drawing Format

The drawing format shall be as follows:

7.7.40.2.1. In AutoCAD and PDF format (most current release.)

7.7.40.2.2. Produced on ISO A1 size paper (other sizes shall meet the approval of the City Representative).

7.7.40.2.3. In metric units only.

7.7.40.2.4. Legible when reduced to 1/2 size.

7.7.40.2.5. In accordance with CSA Standard CAN/CSA-B78.2-86 - Dimensioning and Tolerancing of Technical Drawings.

7.7.40.3. City Review

The City Review of the shop drawings will be as follows:

7.7.40.3.1. Drawings will be reviewed by the City Engineer solely to ascertain conformance with the general design concept. Responsibility for approval of detail design inherent in the drawings rests solely with the Contractor. The review by the City Representative shall not constitute approval.
7.7.40.3.2. Review by the City Engineer shall not relieve the Contractor of its responsibility for errors or omissions in the drawings or for proper completion of the work in accordance with the contract documents. The City Engineer may review all design drawings and return any comments to the Contractor seven days after receipt.

7.7.40.3.3. The Contractor is responsible for verification and correlation of field dimensions, fabrication processes, techniques of construction, installation and co-ordination of all parts of the work.

7.7.40.3.4. After the City Review, the drawings will be returned to the Contractor. The Contractor shall revise the drawings to the satisfaction of the City Engineer prior to fabrication.

7.7.41. Packaging

7.7.41.1. Shipping documentation shall include the purchase order number and an itemized bill of materials.

7.7.41.2. Each kiosk shall each be lag bolted to two 10cm x 10cm posts along the shorter sides of the kiosk to be used for support when the kiosk is being lifted or moved.

7.7.41.3. Any product damaged in shipping shall be repaired or replaced at no extra cost to the City. The Contractor will assume all responsibility for getting the product to the City in proper working order.
NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. ALL DIMENSIONS ARE MINIMUM DIMENSIONS. A LARGER KIOSK MUST BE APPROVED BY THE DISTRICT ENGINEER.
3. CABINET DRAWINGS ARE INFORMATIONAL ONLY. THE CONTRACTOR SHALL SUPPLY DETAILED SHOP DRAWINGS.
7.8. GENERATOR CRITERIA

7.8.1. ELECTRICAL

7.8.1.1. The generator should be Manufactured by Kohler/John Deere (diesel type) sized so that it will not be required to run at more than 80% of its total capacity while having all pumps running simultaneously and based on the following information: (Bylaw No. 1817)

7.8.1.1.1 The generator shall be equipped with a 15 Amp - 110 volt receptacle.

7.8.1.2. The generator shall have provisions to reverse the phase rotation through a transfer switch.

7.8.1.3. The generator shall be permanently wired to the control kiosk.

7.8.1.4. The generator will be designed to have minimal impact on adjacent property owners. Therefore, sound attenuation will be extremely important. A maximum sound emission of 65 dba’s at 6 meters will fulfill this requirement.

7.8.1.5. This generator shall be in a suitable weather enclosure to protect it against vandalism and deterioration due to weather.

7.8.1.6. The generator shall be permanently mounted on a suitably sized reinforced concrete pad.

7.8.2. REMOTE MONITORING

7.8.2.1. The generator shall be linked to the lift station PLC thus enabling an operator to remotely monitor the operation of the generator.

7.8.2.2. The generator will have fully electronic monitored features including the following:

7.8.2.2.1. fuel level

7.8.2.2.2. oil pressure indicator

7.8.2.2.3. battery voltage

7.8.2.2.4. coolant temperature

7.8.2.2.5. generator output in volts and Amps

7.8.2.2.6. an external temperature sensor which will activate a circulating 1500 Watt block heater

7.8.2.2.7. The controller for remote start up
7.8.2.2.8. High temperature emergency shut down

7.8.2.2.9. Low oil pressure emergency shut down

7.8.2.3. Weatherproof junction boxes shall be mounted on a rigid steel post adjacent to the Generator location. One junction box will contain the communications connection from the PLC to the generator controller. A minimum 16-pair industrial grade cable will be permanently wired to the controller at the generator with enough cable to comfortably extend to the weatherproof junction box. The second junction box will provide power to the 1500-watt block heater.

7.8.2.4. The contractor shall be responsible for all City consulting electrical engineers costs incurred for PLC and central monitoring station software upgrading, commissioning and testing.

7.8.3. MAINTENANCE MANUALS AND WARRANTY

7.8.3.1. Maintenance manual shall be in accordance with Section 7.9 of this Schedule.

7.8.3.2. The Warranty Period shall, despite any other provision of this Bylaw, be two years from the date of Construction Acceptance. (Bylaw No. 1494)

7.9. OPERATION AND MAINTENANCE MANUAL CRITERIA

The operation and maintenance manual for the lift station shall comply with the following format:

7.9.1. SYSTEM DESCRIPTION AND OPERATION REQUIREMENTS

7.9.1.1. General

7.9.1.2. System description

7.9.1.3. Operator attendance

7.9.1.4. Utilities & maintenance contracts

7.9.1.5. System modifications

7.9.1.6. Operator’s duties & responsibilities

7.9.2. SUPERVISION & MAINTENANCE OF SEWAGE PUMPING STATION

7.9.2.1. Introduction

7.9.2.2. Maintenance of works and site

7.9.2.3. Weekly maintenance
7.9.2.4. Preventive maintenance

7.9.3. OPERATION AND MAINTENANCE OF PIPELINES

7.9.3.1. General requirements
7.9.3.2. Gravity Sewers
7.9.3.3. Forcemain

7.9.4. CONTROL AND INSTRUMENTATION PHILOSOPHY

7.9.4.1. General Description
7.9.4.2. Sewer Effluent
7.9.4.3. Manual Station Isolation
7.9.4.4. Wet well level control
7.9.4.5. Normal pumping sequence
7.9.4.6. Emergency backup level control
7.9.4.7. Surge Protection
7.9.4.8. Station Instrumentation
7.9.4.9. Electrical system
7.9.4.10. Programmable logic control system

7.9.5. CONTROL SYSTEM

7.9.5.1. General
7.9.5.2. Normal level control system
7.9.5.3. Emergency level control system
7.9.5.4. Programmable logic controller
7.9.5.5. Relay backup system
7.9.5.6. Station display panel
7.9.5.7. Station interface panel
7.9.5.8. Low voltage power supply
7.9.5.9. Surge control system
7.9.5.10. Wash down water system

7.9.6. PROCESS SYSTEM
7.9.6.1. Sewage pumping equipment
7.9.6.2. Lifting equipment

7.9.7. ELECTRICAL
7.9.7.1. General
7.9.7.2. Main switchgear
7.9.7.3. Operations Manual for standby generator

7.9.8. MANUAL & EMERGENCY OPERATING PROCEDURE
7.9.8.1. General
7.9.8.2. Gravity sewer blockage
7.9.8.3. Pumping equipment failure
7.9.8.4. Forcemain failure
7.9.8.5. Power failure

7.9.9. OPERATION & PREVENTATIVE MAINTENANCE OF PUMPS
7.9.9.1. General
7.9.9.2. Troubleshooting
7.9.9.3. Startup summary

APPENDICES
A Instrumentation index and specification sheets
B Mechanical equipment specification sheet
C Utility contracts
D Maintenance contracts
E Warranty Certificates
7.10. **POWDER COAT SUPPLY SPECIFICATION**

7.10.1. **POWDER COAT SELECTION CRITERIA**

7.10.1.1. Powder coat shall be of type Polyester-TGIC.

7.10.1.2. Powder coating products used for coating aluminum components shall meet the following requirements:

7.10.2. **POWDER COAT APPLICATION**

7.10.2.1. **Scope**

This specification shall apply to the application of powder coating products on aluminum components.

7.10.2.2. **General requirements**

7.10.2.2.1. The powder coating process, as specified below, shall be tested on at least one piece from a given batch of aluminum components to ensure a high quality coating for that type of component before the complete batch is powder coated. If there is uncertainty about the quality or appearance of the powder coating, City approval shall be acquired.

7.10.2.2.2. Where possible, items to be powder coated shall be free of dents, scratches, weld burns, ripples, pits, and abrasions before powder coating.

7.10.2.2.3. Removable components which may be damaged by the powder coating process shall be removed before powder coating and reassembled after powder coating.

7.10.2.2.4. Mask all threaded hardware and tapped holes as required.

7.10.2.3. **Pre-Treatment**

The powder coating pre-treatment shall include the following steps:

7.10.2.3.1. Alkaline cleaning, (or equivalent) as required, to remove process oil, grease, and dirt.

7.10.2.3.2. Rinsing as required.

7.10.2.3.3. Multi-metal Iron Phosphate coating or Dried in Place pre-treatment to increase corrosion resistance and improve paint adhesion. Follow chemical

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1 If Dried in Place pre-treatment method is used in step 3, steps 4 and 5 are not required.
supplier’s specifications. Chemical concentration, temperature, and timing specifications must be followed precisely.

7.10.2.3.4. Rinsing as required.

7.10.2.3.5. Non-Chrome (or equivalent) sealer coating to provide additional corrosion protection. Follow chemical supplier’s specifications. Chemical concentration, temperature, and timing specifications must be followed precisely.

7.10.2.4. Drying / Pre-heating

All items to be powder coated must be completely dry and pre-heated as required to help prevent out-gassing before powder coat application.

7.10.2.5. Application

7.10.2.5.1. Powder coat shall be of type Polyester-TGIC.

7.10.2.5.2. For porous castings, a powder coat type shall be selected to help prevent out-gassing.

7.10.2.5.3. Powder coat must be applied to meet the powder coat manufacturer’s specifications.

7.10.2.5.4. Powder coat thickness shall be no less than 2.5 mils at any location.

7.10.2.5.5. Full-coverage of interior and exterior surfaces is required, unless otherwise specified in the contract, with no light spots allowed on exterior surfaces.

7.10.2.6. Final Appearance

7.10.2.6.1. All powder coatings shall be smooth, substantially free of contamination, flow lines, light spots, powder build-up, powder washout, streaks, sagging, runs, blisters and other defects that would in any way impair serviceability or detract from the general appearance.

7.10.2.6.2. Orange peel appearance shall be reduced as much as possible, however, where unavoidable, orange peel appearance shall be consistent and visible only at short ranges.
SCHEDULE 8 - WATER SUPPLY

8. Water Supply General

8.1. Each parcel in a subdivision within the City of Langford shall have a water supply provided by the City or Capital Regional District Water Service (CRDWS) as determined by the City Engineer.

8.1.1. All designs for extensions of the City or CRDWS water system shall be reviewed and approved by a drinking water officer in accordance with the Drinking Water Protection Regulations under the Drinking Water Protection Act.

8.1.2. Individual wells may be permitted in areas outside the CRDWS service area provided that each parcel shall have a proven source of potable water of not less than 4000 litres per day.

8.1.3. Individual wells are permitted for non-potable water uses on City owned land.

8.1.4. Where water is to be supplied by the CRDWS, the CRDWS specifications shall have precedence. If CRDWS specifications are silent on any issue, the specifications in this schedule shall apply.

8.1.5. Each parcel in a subdivision or development which is provided with a water supply from the City or CRDWS shall have sufficient pressure in the water supply at the property line to meet the requirements of the BC Building Code and shall be shown to have sufficient pressure to meet the requirements of the BC Building Code for water pressure at the faucet at the highest point at which a plumbing fixture could be installed on the parcel having regard to the restrictions in the City Zoning Bylaw and in any Covenants registered on the property. A Professional Engineer shall approve and certify the required pressures.

8.2. Water Supply Facilities

8.2.1. Where water supply facilities (pump station or PRV station) are located within a road right of way or a statutory right of way in favour of the CRDWS and/or the City of Langford within private property, the facility meet the following landscape requirements:

8.2.1.1. A landscape plan shall be provided.

8.2.1.2. All utility boxes, including generators to be wrapped with anti-graffiti wrap (all sides and top of box). Anti-graffiti warp images shall be approved by the City Parks Manager.

8.2.1.3. 1800mm (6'-0'') high cedar wooden fencing along property lines adjacent to residential housing.

8.2.1.4. Fully automatic irrigation system to City of Langford specifications.
8.2.1.5. Shrub, tree and groundcover planting to City of Langford Parks department approval.

8.3. Delete. (Bylaw No.1669)

8.4. Network Requirements

8.4.1. Where a final road pattern of a subdivision creates a watermain network with excessive dead ends, a supplementary connection of a minimum of 150 mm diameter shall be required to an existing main and may necessitate the provision of a Right-of-Way over private property in favour of the City.

8.5. Delete. (Bylaw No.1669)

8.6. Delete. (Bylaw No.1669)

8.7. Delete. (Bylaw No.1669)

8.8. Delete. (Bylaw No.1669)

8.9. Separation to Other Services

8.9.1. At any location there shall be a minimum horizontal clearance of 3m between a watermain and a sanitary sewer or storm drain. The Consulting Engineer shall first obtain approval of the Regional Public Health Engineer if an alternative is to be proposed.

8.9.2. At any location there shall be a minimum horizontal clearance of 1m between a watermain and any other existing or proposed underground services or open ditches.

8.9.3. Watermains shall not be located within 1 m of any utility pole.

8.9.4. Where it is necessary for a watermain to cross other underground services the crossing shall be made at an angle greater than 20°. The vertical clearance between sanitary sewers or storm drains and the watermain at the crossing point shall be not less than 450mm. For all other services, the vertical clearance shall be not less than 150mm.

8.10. Delete. (Bylaw No.1669)

8.11. The watermain replacement work shall be done by the City or CRDWS at the Applicant’s expense, and this shall be indicated on the Design Drawings.

8.12. Delete. (Bylaw No.1669)

8.13. Delete. (Bylaw No.1669)

8.14. Delete. (Bylaw No.1669)

8.15. Fire Hydrants
8.15.1. For one and two family residential development, the centre of the building envelope as identified in Bylaw 300 for the appropriate zone shall be within 150 metres of a fire hydrant, measured along the access route as defined in Building Bylaw No. 1160 and along the highway to which the access route connects. For all other building types fire protection shall be as prescribed by Building Bylaw 1160.

8.15.2. For Commercial, Industrial, Institutional and Multi Family Zones, as identified in Bylaw 300, fire hydrants are required every 90 metres.

8.15.3. In addition to the requirements of this bylaw, fire hydrants shall be located at 150 metre intervals along all collector and arterial roads regardless of the density of development adjacent. For 4 lane arterial roads with, or designated to be constructed with a raised median, fire hydrants shall be located on both sides of the road at 250 metre spacing per side.

8.15.4. Fire flow demand shall be in accordance with the current “Water Supply for Public Fire Protection”, by the Fire Underwriters Survey (FUS) for the existing or anticipated land use. Residual pressure at the flow rate shall not be less than 140 kPa (20 psi).

8.15.5. For residential applications only, If FUS recommended fire flows are not available, or the subject property is outside the Capital Regional City Water Services service area, a reduction to the prescribed fire flows may be permitted providing the property is charged with a s.219 of the Land Title Act covenant that requires all buildings over 300 square feet in floor area to be provided with residential fire sprinklers in accordance with NFPA 13D. (Bylaw No. 1669)

8.15.6. Fire Hydrants on private property shall be protected by a statutory right-of-way in favour of the City or CRDWS for maintenance.

8.15.7. Hydrants shall be as per MMCD W4.

8.15.8. Hydrants shall be located in the boulevard and should preferably be located at or near a street intersection; otherwise they may be located on the projection of the property line dividing two lots. In selecting the location for a hydrant, the probable route of the fire engine shall be considered.

8.15.9. A hydrant shall not be located within 3 m of a utility pole or light standard, within 1 m horizontally of underground service pipes or open ditches, or within 2.2 m of the curb line.

8.15.10. Whenever practical, hydrants shall be near the highest and/or lowest point of the watermain.

8.15.11. The design drawings shall indicate the final elevation to which the hydrant flange is to be set. Any adjustments required after the system is in service will be made by the City at the Applicant’s expense.

8.16. Air Relief Valves
8.16.1. Air relief valves shall be as per MMCD W6.

8.16.2. Provision shall be made for expelling air by the installation of air relief valves where necessary.

8.16.3. Double acting air valves shall be installed at all high points on watermains 200mm and larger.

8.17. Flush Valves

8.17.1. Flush valves shall be as per Drawing W8SS.

8.17.2. Flush valves shall be installed at all dead ends.

8.17.3. Provision shall also be made for expelling air during filling by the installation of double acting air valves or test points where necessary. The initial flush shall be through a port which shall be a minimum of ½ the diameter of the main.

8.18. Service Connections

8.18.1. Service connections shall be installed to each proposed lot in a development or to each duplex dwelling unit, shall be connected to the main in a road allowance, and shall be installed at right angles to the main, within the boundaries of the lot being served, except in the turning area of a cul-de-sac. No service connection is to be provided to a lot by way of a private easement over another property.

8.18.2. Service connection separation shall meet the CRDWS separation requirements. (Bylaw No. 1494)

8.18.3. Traffic islands with planting areas shall be provided with a 19mm water service.

8.18.4. On a panhandle lot, service connections shall be extended from the meter location along the access strip to the main body of the lot at the time of subdivision development.

8.18.5. If a development requires a private fire line as well as a domestic water service, the fire line shall be completely separate from the domestic service.


8.19.1. There shall be no physical connection between a public and a private potable water supply system, nor between either a water system and a sewer or appurtenance thereto, which would permit the passage of private water or any sewage or polluted water into the potable public supply.

8.19.2. No pipe, valve or fitting which has been exposed to raw sewage shall thereafter be included in a potable water system, either temporarily or permanently.
SCHEDULE 9 ELECTRICITY AND TELECOMMUNICATIONS

9. General

9.1. Deleted (Bylaw No. 1513)

9.2. Every extension of electrical and telecommunications services to a subdivision or development and any such services installed to a building constructed under the City of Langford Building Bylaw, shall be installed underground in ducts except in areas identified in the Street Atlas as Cross Section R17.

9.3. Where a proposed single family residential subdivision creates new lots that front on an existing highway serviced by overhead wires or a building permit is issued for a single family dwelling that fronts on such a highway, electrical and telecommunications services may be overhead on the municipal road and to the dwelling if one or more existing single family residential dwellings exist with overhead or above ground service on the block face for which the subdivision would be approved or the building permit issued. (Bylaw Nos. 1513 and 1555)

9.4. All utility services, junction boxes, transformers and service facilities shall be located within the road right of way or as approved by the Utility owner if not in the road right of way. (Bylaw No. 1494)

9.5. Every attempt shall be made to locate junction boxes, vaults and transformers in boulevard areas and not sidewalks. These should favour one side of the sidewalk and not be located in the middle of the sidewalk. If there are no alternatives, the services shall be installed at the edge of the sidewalk and shall have “non-slip” lids. No junction boxes or vaults are permitted when the road grade exceeds 4%. Utility lids must be surrounded by a 150mm thick by 150mm wide square concrete apron.

9.6. Deleted (Bylaw No. 1513)

9.7. Existing electrical transmission systems may remain overhead in the frontage of a new subdivision or development unless, in the opinion of the transmission service provider, the proximity of the proposed structures will be in conflict. (Bylaw No. 1513)

9.8. All new three phase transmission systems in the City Centre area as identified in the Official Community Plan shall be installed underground, unless otherwise permitted by the City Engineer.

9.9. Delete. (Bylaw No. 1669)
SCHEDULE 10 IRRIGATION STANDARDS

10. GENERAL

Furnish all labour, materials, equipment, permits and services necessary for the complete supply and installation of a properly operating irrigation system as indicated on the drawings and specified herein.

10.1. RELATED WORK

10.1.1. Unit Paving

10.1.2. Concrete Walks, Curbs And Gutters

10.1.3. Topsoil And Finish Grading

10.1.4. Seeding

10.1.5. Hydraulic Seeding

10.1.6. Sodding

10.1.7. Planting Of Trees, Shrubs And Groundcovers

10.2. QUALITY ASSURANCE

10.2.1. All irrigation designs for city approval must be designed by a certified irrigation designer – turf/commercial classification as certified by IIABC or IA.

10.2.2. Installation of low voltage wiring requires contractor to have low voltage electrical ticket as certified by the BC Electrical Safety Branch.

10.2.3. The contractor shall install the irrigation system in accordance with all applicable plumbing regulations.

10.2.4. All irrigation components and installation to comply as a minimum to irrigation industry association of British Columbia (IIABC) – standards for landscape irrigation systems.

10.2.5. The irrigation contractor shall be a member of the irrigation industry association of British Columbia.

10.2.6. A manufacturer’s warranty is required for all irrigation equipment outlined in this specification and on the irrigation drawing(s).
10.3. SUBMITTALS

10.3.1. Design and Record Drawings:

10.3.1.1. Design Drawings: Seven (7) days prior to scheduled work, the contractor will provide the City with a set of professionally designed and drafted irrigation documents at the same scale as the project design plans with a complete list of materials for review. Drawings will indicate all components, models and materials from water supply to irrigation heads. All underground service information is to be clearly shown on design drawings.

10.3.1.2. Record Drawings: Upon completion, the contractor must submit 2 prints of digitally drawn as-built drawings. The prints will indicate the location of connection points, backflow preventers, sleeves, main lines, lateral lines, emitter lines, valves, controllers, and any other component installed. Dimensionally locate pressurized components and pressurized lines from buildings, curb lines or other fixed site features. Main lines, individual zones, and associated components to be drawn on separate layers. Copy of backflow test to be included.

10.3.1.3. Zone Map: Contractor to provide 2 laminated copies, in letter sized format, a zone map indicating type of zone (shrubs, trees, etc..), colour coded, general valve locations and valves keyed to controller station numbering. One copy is to be attached to inside of controller cabinet.

10.4. OPERATING PRESSURE STANDARDS

10.4.1. Irrigation system to have a dynamic operating pressure between 50 and 90psi.

10.5. MATERIALS

10.5.1. Plastic Pipe: Plastic pipe shall be rigid un-plasticized PVC. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign material, blisters, deleterious substances, wrinkles and dents, PVC 1120 conforming to requirements of CSA B137.3.

10.5.1.1. Schedule 40 Polyvinyl–Chloride (PVC), for all pressurized lines and for hard surface sleeving. 150mm SDR 28 pipe may be used for irrigation sleeving. (Bylaw No. 1817)

10.5.1.2. Class 200 Polyvinyl–Chloride (PVC), for all laterals.

10.5.2. Emitter line shall be used for the headers of all emitter lines. Tubing will conform to the requirements of CSA B137.1 and have a maximum pressure rating of 75 psi.

10.5.3. Automatic Control Valves
10.5.3.1. Heavy-duty, 200 psi rated, plastic, commercial grade electric remote-control valve, with flow control. Irritrol 100 Series Century Plus series valves, or Rain Bird PGA valves must be used. (Bylaw No. 1817)

10.5.4. Control Valve Boxes

10.5.4.1. All control valves shall be installed in a rectangular thermoplastic valve access box of proper size as required for EASY ACCESS AND REPAIR to the valves. Access boxes shall be complete with approved thermoplastic cover and stainless steel bolt.

10.5.5. Sprinkler Heads (turf only): All sprinkler heads shall be of the types and sizes with the diameter or radius of throw, pressure, discharge and any other designations necessary for complete, head to head coverage. All critical points including corners, edges and tight contours will receive full coverage by either rectangular, triangular or edge methods of head layout. All areas of turf will be covered by a minimum of two (2) irrigation heads. All heads of a particular type and for a particular function in the system shall be manufactured by Irritrol or Rain Bird and shall be marked with the manufacturer’s name and identification, in such a position that they can be identified without being removed from the system. (Bylaw No. 1817)

10.5.5.1. Rotors: Toro T5P, or Rain Bird 5000, 3500 (Bylaw No. 1817)

10.5.5.2. Rotors (sand based playfields): Toro 640 series or Rain Bird Falcon. Stainless Steel only on playfields. (Bylaw No. 1817)

10.5.5.3. Spray Heads: Rain Bird 1800 or Irritrol i-pro sprays (Bylaw No. 1817)

10.5.6. Class 200 Polyvinyl–Chloride (PVC), for all laterals

10.5.7. Irrigation Controller:

10.5.7.1. Irritrol Total Control or as approved by the Parks Manager. (Bylaw No. 1817)

10.5.7.2. Controller cabinet: to be lockable aluminum, weather proof, hinge and hasped, mounted securely, minimum 600mm above finished grade. On all installations, the cabinet will be powder coated the same colour as the adjacent street light poles. Cabinet size must be sufficient to house the controller and duplex receptacle. Locks are to be supplied by the City.

10.5.7.3. Cabinet mounting: cabinet is to be mounted to 100mm square steel tubing – set in concrete base (min. 600mm depth), powder coated colour to match cabinet. Location of post to be 900mm from sidewalk, 3m min. away from intersections and preferably within shrub beds.

10.5.7.4. If it is the opinion of the City Parks Manager that a controller cabinet is impractical, the controller may be housed in an approved access box.
10.5.8. Wire:

10.5.8.1. Control: single strand copper wire TWU-40 #14 gauge.

10.5.8.2. Common: single strand copper wire TWU-40 #12 gauge.

10.5.9. Subsurface drip emitter line:

10.5.9.1. Drip-in c/w Root Guard, with red stripe. Manufacturer; Toro Ag – 3.8 Lph, 300mm emitter spacing. (Bylaw No. 1817)

10.5.10. Pressure regulating module:

10.5.10.1. Irritrol Omni regulating module or Rain Bird PSR Dial Valve Pressure regulator on all drip emitter line and hanging basket zones. (Bylaw No. 1817)

10.5.11. Primer and Glue

10.5.11.1. WELD-ON P70 primer must be used when gluing pipe. (Bylaw No. 1817)

10.5.11.2. WELD-ON 705 PVC glue must be used after primer. (Bylaw No. 1817)

10.5.12. Miscellaneous:

10.5.12.1. Disc filter: 38mm super 80 mesh, Arkal disc filter. 1 per water source, unless system has greater than 500 lineal meters of drip emitter line, then 2 per water source are required.

10.5.12.2. Hose connections: brass, 19mm male thread.

10.5.12.3. Battery operated timer: Toro DDCWP (2-4-6-8 zones) or as approved by Parks Manager. (Bylaw No. 1817)

10.5.13. Main line shall be Schedule 40 PVC installed a minimum of 450mm below grade to top of pipe in all areas. Mainline shall be 75mm or as specified by the City Parks Manager. All mainlines and lateral lines under hard surface areas shall have Schedule 40 PVC sleeves unless required otherwise by the City Parks Manager.

10.6. GENERAL INSTALLATION

10.6.1. Obtain and pay for all permits, fees and taxes associated with the installation and operation of complete irrigation systems.

10.6.2. Separate zones are required for turf, trees, shrubs, annuals, and hanging baskets.

10.6.3. Valve manifolds are encouraged to be centrally located with as many valves on (1) manifold as possible. Valves are to be attached to piping with kwik fit couplings, are not to touch each other or the valve box sides. Valve boxes are to be supported with 1
layer of bricks. Minimum distance to lid 100mm; clearance under manifold to be 300mm.

10.6.4. The Contractor shall obtain all underground service information and shall be solely responsible to locate all existing services in the vicinity, prior to commencing work.

10.6.5. Primer to be used on all pipe connections.

10.6.6. Wires are to be buried in a common trench strapped/ secured to underside of mainline.

10.6.7. Lateral lines shall be installed a minimum of 300mm below grade to top of pipe in all soft landscape areas.

10.6.8. All piping within sports fields shall be installed a minimum of 450mm below grade to top of pipe.

10.6.9. Subsurface drip emitter line is to be installed 100mm below surface of growing medium.

10.6.10. All piping shall be flushed prior to installation of subsurface drip emitter line.

10.6.11. Installation location of controller as approved by City of Langford.

10.6.12. All mainline piping shall be bedded in sand, sand depth to be 50mm on top and bottom of pipe. Laterals to be bedded in backfill material free from rocks and other unsuitable materials which could damage the pipe or create unusual settling problems.

10.6.13. All sprinklers shall be installed on swing joints using PVC 90-degree street elbows and PVC Schedule 80 nipples, no marlex fittings permitted on charged lines. Rain Bird prefabricated swing arms. (Bylaw No. 1817)

10.6.14. Sprinklers shall be flush mounted at finished grade.

10.6.15. Sprinklers shall be installed a maximum of 25mm away from any retaining wall, sidewalk or solid boundary. Curb locations are preferred.

10.6.16. All trees will have two emitter loops per tree as follows: (1) 1.82m diameter emitter loop and (1) 0.9m diameter emitter loop per tree, annual plantings will have a 350mm spacing for groundcover and a 450mm emitter line spacing for shrubs.

10.6.17. Flow rates through meters, backflow prevention devices and valves shall not exceed manufacturer specifications.

10.6.18. All emitter line ends to terminate into a Polyethylene header or footer to create a looped subsystem. Emitter run lengths not to exceed manufacturers recommended distances.
10.6.19. Each emitter zone to have a drain valve installed. Drain valve to be located at low point of emitter zone (install in a polyethylene tubing header or footer).

10.6.20. Each emitter zone to have a vacuum release valve installed. Vacuum release valve to be located at high point of emitter zone (install 152mm round valve box; 50mm from lid).

10.6.21. Drain valve and air vacuum release valve to be accessible inside a lockable 152mm round valve box.

10.6.22. All annual beds to have drip emitter line and to be separately zoned from shrubs and trees.

10.6.23. Hanging basket irrigation zones will include a separate shut off for each pole located adjacent the pole base in a 150mm round valve box.

10.6.24. Hanging basket irrigation zones will include a minimum 19mm horizontal supply line. The lamp standard will be supplied with a 12.5mm vertical line running inside the pole. 6mm polyethylene tubing is to be installed up to the hanging basket bracket through a nylon grommet. A suitable grommet must be installed to protect the tubing from wear.

10.7. CLEANUP & INSPECTION

10.7.1. Any damage to paving, planting or any other structure due to settlement of improperly compacted trenches shall be promptly repaired at the contractor’s expense to the satisfaction of the City of Langford.

10.7.2. Surplus material shall become property of the contractor and removed from site.

10.7.3. All irrigation systems will require inspections by the City Engineer with 24hrs notice according to the following Table 10-1:

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>1st Inspection</td>
<td>Sleeving</td>
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<tr>
<td>2nd Inspection</td>
<td>Open Trench Main Line &amp; Pressure Test</td>
</tr>
<tr>
<td>3rd Inspection</td>
<td>Open Trench Lateral Line</td>
</tr>
<tr>
<td>4th Inspection</td>
<td>Irrigation System, Controller &amp; Coverage Test</td>
</tr>
</tbody>
</table>

10.7.4. The Contractor shall balance and adjust the various components of the irrigation system to ensure the efficient operation of the system. This includes the adjustment of pressure regulators, part circle sprinklers and individual adjustments of the controllers. Also make minor changes in sprinkler head locations to provide full coverage as part of work.
10.8. GUARANTEE

10.8.1. Provide a written guarantee for all workmanship and materials for one year from the date of Substantial Completion as certified by the Project Administrator.

10.9. Irrigation shall be installed in the following boulevards within the City of Langford:

- Bear Mountain Parkway
- Goldstream Avenue
- Happy Valley Road
- Jacklin Road
- Langford Parkway
- Millstream Road
- Sooke Road
- Veterans Memorial Parkway
- Westshore Parkway
- City Park Frontages
- All areas within the City Center
- All tree locations in new boulevards (Bylaw No. 1817)
## CITY OF LANGFORD
### SUPPLEMENTARY SPECIFICATIONS

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<td>Measurement for Payment</td>
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<td>Seismic Survey and Monitoring</td>
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<td>32 11 23 – Granular Base</td>
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<td>Cleaning and Flushing</td>
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CITY OF LANGFORD
SUPPLEMENTARY SPECIFICATIONS

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<tr>
<td>33 40 01 – Storm Sewers</td>
<td>3.10</td>
<td>Service Connection Installation</td>
<td>Delete the first 2 words of “Where specified,” from Paragraph 3.10.3 to read “Install inspection chambers at, etc.”</td>
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<td>3.11</td>
<td>Cleaning and Flushing</td>
<td>Revise Paragraph 3.11.6 to read: “Remove foreign material from pipe and related appurtenances by power flushing with water.” Delete the remainder of the Paragraph.</td>
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<tr>
<td></td>
<td>3.12</td>
<td>Inspection and Testing</td>
<td>In 3.12.1 replace the phrase “under 900mm in diameter.” with “prior to Acceptance of Works and services and prior to Final Acceptance of works and services.” Add Clause 3.12.4 which reads: “The Contractor shall carry out power flushing and video inspection of all storm sewers. The results of the inspection shall be delivered to the Contract Administrator at least 14 days prior Acceptance of Works and services and prior to Final Acceptance of works and services. Inspection records shall illustrate flow through the pipe for all design grades less than 2%. Add Clause 3.12.5 which reads: “The inspection record shall be in a form acceptable to the City.” Add Clause 3.12.6 which reads: “Inspection video shall be submitted to the City in electronic format.”</td>
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<tr>
<td>33 30 01 - Sanitary Sewers</td>
<td>3.11</td>
<td>Cleaning and Flushing</td>
<td>Revise 3.11.6 to read: “Remove foreign material from pipe and related appurtenances by power flushing with water.” Delete the remainder of the paragraph.</td>
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<td></td>
<td>3.12</td>
<td>Leakage Testing General</td>
<td>The preferred method of leakage testing is the low pressure air test. All other tests will be carried out at the discretion of the Contract Administrator.</td>
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<td>3.18</td>
<td>Video Inspection</td>
<td>Revise Paragraph 3.18.1 replace the phrase “under 900mm in diameter following completion of installation with “prior to Acceptance of Works and services and prior to Final Acceptance of works and services.”</td>
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<tr>
<td>SECTION</td>
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<tr>
<td>33 34 01 - Sewage Force Mains</td>
<td>3.14 Cleaning and Flushing</td>
<td>Revise Paragraph 3.14.4 to read: “Remove foreign material from pipe and related appurtenances by mandrelling or swabbing.”</td>
<td>Add Clause 3.18.3 which reads: “Inspection records shall illustrate flow through the pipe for all design grades less than 2%.” Add Clause 3.18.4 which reads: “The inspection report shall be in a form acceptable to the City.” Add Clause 3.18.5 which reads: “Inspections shall be submitted to the City in electronic format.” Add Clause 3.18.6 which reads: “Prior to the end of the maintenance period, or when directed by the Contract Administrator, the Contractor is to carry out power flushing and video inspection of all mains. The results of the inspection are to be delivered to the Contract Administrator at least 14 days prior to the end of the maintenance period.”</td>
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<td>SUPPLEMENT</td>
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<td>B1</td>
<td>Banner Sizes</td>
<td>Add this drawing (Bylaw 1669)</td>
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<tr>
<td>C1</td>
<td>Concrete Sidewalk, Infill and Barrier Curb</td>
<td>Delete this drawing (Bylaw 1000)</td>
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<tr>
<td>C2</td>
<td>Concrete Sidewalk and Barrier Curb</td>
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<tr>
<td>C3</td>
<td>Concrete Sidewalk and Rollover Curb</td>
<td>Delete this drawing (Bylaw 1000)</td>
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<tr>
<td>C6</td>
<td>Concrete Median Curb and Interim Curbs</td>
<td>Delete this drawing and refer to Drawing No. SS C6 “Curb and Gutter Detail”, (Bylaw 1000)</td>
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<tr>
<td>C8</td>
<td>Wheelchair Ramp for Sidewalk, Infill and Barrier Curb</td>
<td>Delete this drawing and refer to Drawing No. SSC8, titled “Sidewalk Ramp (Boulevard Adjacent to Curb)”. (Bylaw 1000)</td>
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<td>C9</td>
<td>Wheelchair Ramp for Sidewalk and Barrier Curbs</td>
<td>Delete this drawing and refer to Drawing No. SSC9, titled “Sidewalk Ramp (Sidewalk Adjacent to Curb)”. (Bylaw 1000)</td>
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<td>C15</td>
<td>Driveway Configurations</td>
<td>Replace drawing C15 with new C15 (Bylaw 1574)</td>
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<td>E1</td>
<td>Double Headed Streetlight</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>E2</td>
<td>Single Head Streetlight</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>E3</td>
<td>Cyclone Streetlight</td>
<td>Replaced with drawing E8 (Bylaw 1618)</td>
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<td>E4</td>
<td>Cyclone Streetlight Base</td>
<td>Replaced with drawing E9 (Bylaw 1618)</td>
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<td>E5</td>
<td>Landscaping Outlet Post</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>E6</td>
<td>Waste Receptacle Kiosk</td>
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<td>E7</td>
<td>Cobra Street Light</td>
<td>Replaced with drawing E10 (Bylaw 1618)</td>
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<tr>
<td>E8</td>
<td>Langford Post Top Luminaire</td>
<td>Amend this drawing (Bylaw 1669)</td>
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<td>E9</td>
<td>Langford Post Top Luminaire Service Base</td>
<td>Added Bylaw 1618</td>
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<td>E10</td>
<td>Cobra Street Lighting</td>
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<td>G1</td>
<td>General Legend for Contract Drawings</td>
<td>Delete this drawing and refer to Contract Drawing Legends. (Bylaw 1000)</td>
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<td>G2</td>
<td>Legends for Materials</td>
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<td>G3</td>
<td>Legend for Streetlight and Traffic Signal Drawings</td>
<td>Delete this drawing and refer to Contract Drawing Legends. (Bylaw 1000)</td>
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<td>G4</td>
<td>Utility Trench</td>
<td>Amend this drawing (Bylaw 1817)</td>
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<td>G5</td>
<td>Pavement Restoration</td>
<td>Amend this drawing (Bylaw 1817)</td>
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<td>L1</td>
<td>Street Tree Planting Detail</td>
<td>Amend this drawing (Bylaw 1817)</td>
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<td>L2(a)</td>
<td>Tree Planting Detail</td>
<td>Amend this drawing (Bylaw 1817)</td>
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<td>L2(b)</td>
<td>Tree Planting Detail</td>
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<td>L2(c)</td>
<td>Tree Grate Installation Detail</td>
<td>Amend this drawing (Bylaw 1817)</td>
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<td>L2(d)</td>
<td>Tree Grate Installation Detail</td>
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<td>L2(e)</td>
<td>Tree Grate Detail</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>L2(fa)</td>
<td>Artificial Turf Installation at Boulevard Tree</td>
<td>Replace drawing L2(f) with L2(fa)</td>
<td>1817</td>
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<td>L2(fb)</td>
<td>Artificial Turf Installation at Boulevard Tree</td>
<td>Add this drawing</td>
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<td>L2(g)</td>
<td>Artificial Turf at Concrete</td>
<td>Amend this drawing</td>
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<td>L3</td>
<td>Grass Area – Seeded</td>
<td>Add this drawing</td>
<td>1494</td>
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<tr>
<td>L4</td>
<td>Median Planting Section</td>
<td>Amend this drawing</td>
<td>1817</td>
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<tr>
<td>L5</td>
<td>Tree Protection Barrier</td>
<td>Add this drawing</td>
<td>1494</td>
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<td>L6</td>
<td>Split Rail Fence at Grade Trails</td>
<td>Add this drawing</td>
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<tr>
<td>P1</td>
<td>Typical Sleev ing – Mainline and Boulevard</td>
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<td>P2</td>
<td>Typical Sleev ing - Roadways</td>
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<td>P3</td>
<td>Typical Frontage-Boulevard Water supply by private property</td>
<td>Add this drawing</td>
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<td>P4</td>
<td>Typical Frontage – Sidewalk along road edge</td>
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<td>P5</td>
<td>Water Connection</td>
<td>Replaced with new P5</td>
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<td>P6</td>
<td>Valve Manifold</td>
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<td>P7</td>
<td>Drip Line</td>
<td>Replace with new P7</td>
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<td>RS1</td>
<td>Turn Around Details</td>
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<td>Turn Arounds</td>
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<td>RS3</td>
<td>Temporary Turn Around s</td>
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<td>RS4</td>
<td>Pedestrian Activated Crosswalk Signals</td>
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<td>RS5</td>
<td>Canada Post Mailbox Pull Out</td>
<td>Add this drawing</td>
<td>1513</td>
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<td>S4</td>
<td>Inside Drop Manhole</td>
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<td>S6</td>
<td>Sewer Cleanout</td>
<td>Delete this Drawing and refer to Drawing No. SSS6 “Sewer Cleanout”. (Bylaw 1000)</td>
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<td>S9</td>
<td>Inspection Chamber for 100 to 200 Sanitary Sewer Connection</td>
<td>Amend this drawing</td>
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<td>S10</td>
<td>Double Catch Basin</td>
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<td>S11</td>
<td>Top Inlet Catch Basin</td>
<td>Amend This Drawing</td>
<td>1669</td>
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<td>S15</td>
<td>Driveway Culvert with Concrete Block Endwalls</td>
<td>Delete this drawing</td>
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<td>S16</td>
<td>Ditch Inlet</td>
<td>Add this Drawing to Standard Detail Drawings under “Storm and Sanitary Sewers” (Bylaw 1000)</td>
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<td>S17</td>
<td>Sanitary Force Main Connection</td>
<td>Add this drawing</td>
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<td>Stormwater Control and Treatment Areas</td>
<td>Add this drawing</td>
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<td>SD2</td>
<td>Drainage Calculation Sheet</td>
<td>Add this drawing</td>
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<td>SD3</td>
<td>Langford Rainfall Intensity-Duration Frequency Curve</td>
<td>Add this drawing</td>
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<td>SD4</td>
<td>Lot Development Erosion and Sediment Control</td>
<td>Add this drawing</td>
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<td>SD5</td>
<td>Silt Fence</td>
<td>Add this drawing</td>
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<td>SD6</td>
<td>Sediment Basin</td>
<td>Add this drawing</td>
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<td>SD7</td>
<td>Vertical Seepage Pit Detail</td>
<td>Amend this Drawing (Bylaw 1669)</td>
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<td>SD8</td>
<td>Combined Constructed Wetland and Detention Facility</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>SD9</td>
<td>Grass Swale</td>
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<td>SD10</td>
<td>Filter Strip</td>
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<td>SD11</td>
<td>Oil/Grit Separator Chamber with External High Flow Bypass</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>SD12</td>
<td>Oil/Grit Separator Type 1</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>SD13</td>
<td>Oil/Grit Separator Type 2</td>
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<td>SD14</td>
<td>Flow Control Manhole</td>
<td>Add this drawing (Bylaw 1000)</td>
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<td>SD15</td>
<td>Combined Detention for 2 Year Control &amp; Oil/Grit Separator</td>
<td>Add this drawing (Bylaw 1000)</td>
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<tr>
<td>SD16</td>
<td>Storage and Outlet Sizing</td>
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<tr>
<td>W1</td>
<td>Fire Hydrant Clearance Specifications</td>
<td>Add this drawing (Bylaw 1513)</td>
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</tbody>
</table>
LARGE BANNER

0.75m
(30"

4" Sleeve

0.46m
(18"

0.33m
(13"

NOTE:
1. BANNER AND TAIL MATERIAL - DUO-FLEX BLOCK-OUT, WEIGHT 18oz.
2. REINFORCE ALL EDGES WITH NYLON WEBBING.
3. EXTRA MESH FABRIC REINFORCED POCKETS.
4. MAY REQUIRE BLOCKOUT DEPENDING ON GRAPHICS.

SMALL BANNER

0.45m
(18"

3" Sleeve

0.33m
(13"

NOTE:
1. BANNER AND TAIL MATERIAL - CLOTH.
2. DOUBLE STITCH ALL EDGES.
3. WILL REQUIRE BLOCKOUT DEPENDING ON GRAPHICS.

BANNER SIZES

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 30-Jan-17
DRAWN: MB
DWG No. B1

SCALE: NTS
APPROVED: GH

Last Revised: By av 1669, February 2017
1. ALL CONSTRUCTION TO CONFORM TO MMCD SPECIFICATIONS AND CITY OF LANGFORD SUPPLEMENTS.

BARRIER CURB

INVERTED GUTTER

EXTRUDED CONCRETE CURB (ISLANDS)

CURB AND GUTTER DETAIL
**NOTES:**

1. ALL PAVERS TO COLOR RED. SEE CHART FOR PAVER PATTERN AND STYLE.
2. INSTALL EDGE PAVERS AS SOLDIER COURSE.
3. NON-RESIDENTIAL DRIVEWAY ACCESS TO BE REVIEWED & APPROVED ON AN INDIVIDUAL BASIS.
4. WARNING STRIP ALSO REQUIRED AT ALL DRIVEWAY DROPS

---

**BRICK STANDARDS**

<table>
<thead>
<tr>
<th>SURFACE TYPE</th>
<th>PAVER SHAPE</th>
<th>PAVER PATTERN</th>
<th>PAVER THICKNESS</th>
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<tr>
<td>SIDEWALK BEHIND</td>
<td>COBBLE</td>
<td>RUNNER</td>
<td>50mm</td>
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<tr>
<td>NON-MOUNTABLE</td>
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<td></td>
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<tr>
<td>Curb</td>
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<tr>
<td>DRIVeways &amp;</td>
<td>LOCOPIVE OR</td>
<td>HERRINGBONE</td>
<td>60mm</td>
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<td>SIDEWALKS BEHIND</td>
<td>LEGEND</td>
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<td>MOUNTABLE CURB</td>
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<tr>
<td>NON-RESIDENTIAL</td>
<td>LOCKPAVE OR</td>
<td>HERRINGBONE</td>
<td>80mm</td>
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<td>DRIVEWAYS</td>
<td>STANDARD</td>
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<tr>
<td>CROSSWALKS</td>
<td>LOCKPAVE OR</td>
<td>HERRINGBONE</td>
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<td>STANDARD</td>
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**CITY OF LANGFORD**

**ENGINEERING DEPARTMENT**

**DATE:** 98/04/08  
**DRAWN:** GRH  
**SCALE:** NTS  
**APPROVED:**

**MMCD SS C8**

Lost Revised: Nov 4, 2009
SUPPLEMENTS TO MMCD Schedule 11 - 14
NOTES:
1. ALL HARDWARE SHALL BE POWDER COATED

LANDSCAPING OUTLET
ALUMINUM POST
DUPLEX GFI OUTLET

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 01-Apr-09
DRAWN: JS
SCALE: NTS
APPROVED:

SUPPLEMENTS TO MMCD

Schedule 11 - 15
NOTES:
1. ALL HARDWARE SHALL BE POWDER COATED
2. BASE SHALL BE 900mm (36") SONOTUBE

Waste Receptacle
Service Kiosk

City of Langford
Engineering Department

Date: 25-Sep-07  Drawn: SS
Scale: NTS  Approved: E6

Last Revised: Oct 22, 2009
ANCHOR BASE PLATE:

Bolt circle
10” (254mm) to 11” (280mm)

Access door

NOTE:

1. All concrete bases shall be in accordance with MMCD, poured in place. Bases must be certified by a professional engineer.

2. Lighting designer to confirm wattage, distribution and spacing.

3. All poles & hardware must be powder coated PAI 503.

4. Product Code: Lumac LPTC-615

LANGFORD
POST TOP LUMINAIRE

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 15-Mar-16
DRAWN: E8
SCALE: NTS
APPROVED: MM

Last Revised: Sylvex 1559, February 2017

SUPPLEMENTS TO MMCD
Schedule 11 - 17
NOTES:
1. ALL CONCRETE BASES SHALL BE IN ACCORDANCE WITH SPECIFICATIONS. PLACE BASES MUST BE CERTIFIED BY A PROFESSIONAL ENGINEER.
2. ALL POLES & LUMINAIRES MUST BE PIGEON COATED S/N 5015.
3. PRODUCT CODE NORA POLE STD 36.
NOTES:
1. ALL CONCRETE BASES SHALL BE IN ACCORDANCE WITH MMCD. POURED IN PLACE BASES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER.
2. ALL POLES & HARDWARE SHALL BE POWDER COATED MURGOLY WOOLCO (RAL 3007 OR CURACOAT P#-6196-7), COBALT BLUE (RAL 9013) OR JET BLACK (RAL 9005).
3. ENGINEER SHOULD CONFIRM POLE CAPACITY AND SELECT APPROPRIATE BANNER ARM.
4. ALL BANNER HARDWARE TO BE POWDER COATED TO MATCH POLE COLOUR.
5. LOWER BANNER ARM TO BE PLACED 4.5M FROM GROUND.

SUPPLEMENTS TO MMCD  Schedule 11 - 19
NOTES:
1. ALL LANDSCAPE CONSTRUCTION AND PLANT MATERIAL TO CONFORM TO MMCD (CURRENT EDITION) AND CITY OF LANGFORD STANDARDS.
2. REQUIRED AREAS OF GROWING MEDIUM IS 10 SQUARE METRES, TO A DEPTH OF 800mm FOR EACH TREE.
3. FINAL TREE LOCATIONS MAY BE VARIED IF CERTIFIED BY A LANDSCAPE ARCHITECT AND BY THE CITY OF LANGFORD PARKS DEPARTMENT.
4. IF POOR DRAINAGE CONDITIONS EXIST, PROVIDE POSITIVE SUB-SURFACE DRAINAGE AWAY FROM PLANT EXCAVATION.
5. IRRIGATION REQUIRED TO CITY OF LANGFORD STANDARDS.

STAKES: PRESSURE TREATED WOOD, 75mm DIAMETER x 2.43m
- PLACE STAKES PARALLEL TO PREVAILING WIND DIRECTION.
- DO NOT DRIVE STAKES THROUGH ROOTBALL.
- STAKES TO REMAIN FOR ONE GROWING SEASON, THEN REMOVE.

SET TREE AT ORIGINAL GRADE OF NURSERY. ENSURE THERE IS NO MORE THAN 50mm FROM THE FINISHED GRADE TO THE ROOT FLAIR.
50mm THICK MULCH SAUCER, SIZE TO ENCOMPASS TREE STAKES (MIN).

ADJACENT WALKWAY
- IF REQUIRED) STRUCTURAL GROWING MEDIUM TRENCH UNDER WALK AS PER LANDSCAPE ARCHITECT'S RECOMMENDATIONS.
- REMOVE BURLAP AND ROPE OR WIRE BASKET FROM TOP 1/2 OF ROOTBALL.
- SLOPE OF EXCAVATION AT 1:1:1
- TAMPER GROWING MEDIUM TO PREVENT ANY SETTLEMENT.

SURFACE TREATMENT AS PER PROJECT REQUIREMENTS. MINIMUM OF 2½ (CROSSFALL) SLOPE TO THE TOP OF THE CURB IS REQUIRED.

GROWING MEDIUM TO CONFORM TO BCCLA/BCLA LANDSCAPE STANDARD (CURRENT EDITION) AND THE CANADIAN SYSTEM OF SOIL CLASSIFICATION.

STREET TREE PLANTING DETAIL
Standard Street Tree Offset from Roadway Curb

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 08-APR-09
DRAWN: DE
SCALE: NTS
APPROVED: MM

Last Revised: Draft 1017, February 2019
NOTES:
1. ALL LANDSCAPE CONSTRUCTION AND PLANT MATERIAL TO CONFORM TO MMCD (CURRENT EDITION) AND CITY OF LANGFORD STANDARDS.
2. REQUIRED AREAS OF GROWING MEDIUM IS 10 SQUARE METRES, TO A DEPTH OF 800mm FOR EACH TREE.
3. FINAL TREE LOCATIONS MAY BE VARIED IF CERTIFIED BY A LANDSCAPE ARCHITECT AND BY THE CITY OF LANGFORD PARKS DEPT.
4. IF POOR DRAINAGE CONDITIONS EXIST, PROVIDE POSITIVE SUB-SURFACE DRAINAGE AWAY FROM PLANTING EXCAVATION.
5. IRRIGATION REQUIRED TO CITY OF LANGFORD STANDARDS.
6. SEE DRAWING L3(a, b, c, d, and e) FOR REQUIRED DETAILS AND WORKS.

COMPACTED BASE
GROWING MEDIUM TO CONFORM TO BCSLABC CLA LANDSCAPE STANDARD (CURRENT EDITION) AND THE CANADIAN SYSTEM OF SOIL CLASSIFICATION.
REMOVE BURLAP AND ROPE OR WIRE BASKET FROM TOP 3/4 OF ROOTBALL.
STRUCTURAL SOIL TO 95% M.P.D. DENSITY (SEE PLAN).

DATE: 08-APR-09
DRAWN: DE
SCALE: NTS
APPROVED: MM

CITY OF LANGFORD
PARKS DEPARTMENT

L2(a)
1. All landscape construction and plant material to conform to MMCD (current edition) and City of Langford Standards.

2. Required areas of growing medium is 10 square metres, to a depth of 800mm for each tree.

3. Final tree locations may be varied if certified by a landscape architect and by the City of Langford Parks Dept.

4. If poor drainage conditions exist, provide positive sub-surface drainage away from planting excavation.

5. Irrigation required to City of Langford Standards.

NOTES:

LONGITUDINAL STRUCTURAL GROWING MEDIUM TRENCH TO CONNECT TO ADJACENT TREES WITHIN 10m.

PAVING SURFACE AS PER PROJECT REQUIREMENTS.

LIMIT OF STRUCTURAL SOIL PIT (3m x 4m)

DOBNEY SP45 SERIES CAST IRON TREE GRATE TO CITY OF LANGFORD STANDARDS (SEE INSTALLATION DETAILS L2(a, c and e) FOR REQUIRED WORKS.

100mm (4") PVC AIR VENT w/ VENTED CAP, LATERAL LINE OPTIONAL.

TREE PLANTING DETAIL
Structural Growing Medium Pit

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 08-APR-09
DRAWN: DE

SCALE: NTS
APPROVED: MM

MMCD SS
L2(b)

Last Revised: Bylaw 1017, February 2019

SUPPLEMENTS TO MMCD

Schedule 11 - 24
NOTES:
1. ALL LANDSCAPE CONSTRUCTION AND PLANT MATERIAL TO CONFORM TO MMCD (CURRENT EDITION) AND CITY OF
LANGFORD STANDARDS.
2. REQUIRED AREAS OF GROWING MEDIUM IS 10 SQUARE
METRES, TO A DEPTH OF 800mm FOR EACH TREE.
3. FINAL TREE LOCATIONS MAY BE VARIED IF CERTIFIED BY A
LANDSCAPE ARCHITECT AND BY THE CITY OF LANGFORD
PARKS DEPT.
4. IF POOR DRAINAGE CONDITIONS EXIST, PROVIDE POSITIVE
SUB-SURFACE DRAINAGE AWAY FROM PLANTING EXCAVATION.
5. IRRIGATION REQUIRED TO CITY OF LANGFORD STANDARDS.
SUPPLEMENTS TO MMCD  
Schedule 11 - 26

NOTES:
1. ALL LANDSCAPE CONSTRUCTION AND PLANT MATERIAL TO CONFORM TO MMCD (CURRENT EDITION) AND CITY OF LANGFORD STANDARDS.
2. REQUIRED AREAS OF GROWING MEDIUM IS 10 SQUARE METRES, TO A DEPTH OF 800mm FOR EACH TREE.
3. FINAL TREE LOCATIONS MAY BE VARIED IF CERTIFIED BY A LANDSCAPE ARCHITECT AND BY THE CITY OF LANGFORD PARKS DEPT.
4. IF POOR DRAINAGE CONDITIONS EXIST, PROVIDE POSITIVE SUB-SURFACE DRAINAGE AWAY FROM PLANTING EXCAVATION.
5. IRRIGATION REQUIRED TO CITY OF LANGFORD STANDARDS.

TREE GRATE
INSTALLATION DETAIL
In Paver Sidewalks and Plazas

CITY OF LANGFORD
PARKS DEPARTMENT

DATE:  08-APR-09     DRAWN:  DE     MMCD SS
SCALE:  NTS       APPROVED:  MM

L2(d)

Last Revised: Drawn 1017, February 2019
The Standard City of Langford Tree Grate

SP-48 TREE GRATE
DOONEY FOUNDRY LTD.
SURREY, B.C.

TREE GRATE DETAIL

CITY OF LANGFORD
PARKS DEPARTMENT.

DATE: 05/APR/09
DRAWN: DE
SCALE: N.T.S.
L2(e)
SUPPLEMENTS TO MMCD

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 08-Jan-18
DRAWN: tmm
SCALE: NTS
MMCD SS L2(fa)

Last Revised: Bylaw 1817, February 2019

ARTIFICIAL TURF INSTALLATION AT BOULEVARD TREE

3.5m TREE PLANTING WELL LENGTH

BOULEVARD TREE

ADJACENT ROADWAY

CONCRETE CURB AND GUTTER

33x86mm RIPPED IN HALF (33x43mm) PLASTIC WOOD NAILER BOARD ALONG CURB, ARTIFICIAL TURF

33x86mm PLASTIC WOOD NAILER BOARD

EDGE OF TREE WELL AND FILTER FABRIC

33x86mm RIPPED IN HALF (33x43mm) PLASTIC WOOD NAILER BOARD ALONG ADJACENT CONCRETE SIDEWALK, ADJACENT SEPARATED CONCRETE SIDEWALK

REFER TO DRAWING L1 FOR TREE INSTALLATION DETAILS 0.6m 700mm DEPTH OF TOPSOIL AND 50mm BARK MULCH.

TREE RING DRIP IRRIGATION AS PER CITY OF LANGFORD BYLAW 1000.

33x86mm PLASTIC WOOD NAILER BOARD ALONG ALL TREE WELL EDGES, SECURED WITH 300mm LENGTH REBAR STAKES LOCATED ON ARTIFICIAL TURF SIDE @ 600mm O.C. ARTIFICIAL TURF TO WRAP OVER EDGE OF WOOD NAILER BOARD (43mm) AND TO BE SECURED TO TREE WELL SIDE OF NAILER BOARD.

SYNTHETIC TURF SURFACE (CONTACT PARKS FOR ARTIFICIAL TURF SPECIFICATIONS) TO BE LOCATED 15mm FROM TOP OF TREE PLANTING AREA 0.6m 100mm DEPTH OF 10mm MINUS GRANULAR BASE.

700mm DEPTH OF TAMPEDD/TILLED GROWING MEDIUM

NON-WOVEN GEOTEXTILE BASE LAYER (NILEX 4545 OR APPROVED EQUAL).

TAMP GROWING MEDIUM UNDER ROOTBALL TO PREVENT ANY SETTLEMENT.

1.0m (TYP.)

3.5m TREE PLANTING WELL LENGTH

CROSS SECTION "A"
ARTIFICIAL TURF GRASS INSTALLATION PROCEDURE FOR STREET TREES

1. Excavate material for tree pit to depth of 700mm, length of 3.5m and the width of the boulevard (varies). This is referred to as the tree planting well.
2. Install and tamp growing medium in 200mm lifts to a depth of 700mm settled depth. This may have to be adjusted based on depth of underground utilities within the boulevard within the tree planting area.
3. Install 33x60mm ripped in half (33x42mm) plastic wood nailer board along sidewalk and curb and secure turf to top of nailer board.
4. Install 33x60mm plastic wood nailer board along the outside of the tree well and secure turf to tree well side of nailer board.
5. Plant tree in centre of 1.5m tree well opening prior to artificial turf installation, to prevent settlement of artificial turf base.
6. Install layer of non-woven geotextile fabric over tamped growing medium within artificial turf area at a width of 1m on either side of the tree well.
7. Install 100mm of 19mm minus crush (road base) over the fabric and compact by tamping. Install growing medium within the tree well to bring level to 50mm below final grade.
8. Apply water to the growing medium and road base to reduce settlement and bring growing medium within the tree well up to final grade. Add required road base outside the tree pit to bring to final grade and tamp. The intent is to prevent settlement of the growing medium and artificial turf base within the tree well area.
9. Install artificial turf as per manufacturer’s specifications.
SUPPLEMENTS TO MMCD Schedule 11 - 30

ARTIFICIAL TURF INSTALLATION BETWEEN CONCRETE SIDEWALK AND CONCRETE CURB

SYNTHETIC TURF Surface (contact Col. for Artificial Turf Specifications) to be located 18mm from top of concrete sidewalk, 100mm depth of 19mm minus granular base.

CONCRETE CURB

33x86mm ripped in half (33x43mm) plastic wood nailer board fastened to concrete sidewalk.

SECURE TURF TO TOP OF NAILER BOARD.

33x86mm ripped in half (33x43mm) plastic wood nailer board fastened to concrete curb.

SECURE TURF TO TOP OF NAILER BOARD.

ARTIFICIAL TURF INSTALLATION BETWEEN PAVING STONE SIDEWALK AND CONCRETE CURB

SYNTHETIC TURF Surface (contact Col. for Artificial Turf Specifications) to be located 18mm from top of paving stone sidewalk, 100mm depth of 19mm minus granular base.

CONCRETE CURB

33x86mm ripped in half (33x43mm) plastic wood nailer board fastened to concrete curb.

SECURE TURF TO TOP OF NAILER BOARD.

FINISH GRADE PAVEMENT

ARTIFICIAL TURF INSTALLATION ALONG BOULEVARD

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 11-Sep-17
DRAWN: tmm

SCALE: NTS

MMCD SS
L2(g)

Last Revised: Bylaw 1817, February 2019
NOTES:
- ALL METHODS AND MATERIALS TO CONFORM TO THE CITY OF LANGFORD BYLAWS 1000 & 1689 (CURRENT EDITIONS).
- PROTECT PLANT MATERIAL FROM DAMAGE DURING TRANSPORTATION AND PLANTING.
- LOCATE AND FLAG ALL BURIED UTILITIES IN "BC-1 CALL" PLANTING BEDS PRIOR TO DIGGING AND ENSURE THAT UTILITIES ARE PROTECTED DURING CONSTRUCTION.
- PLANT MATERIAL DENSITY / SPACING TBD BY PARKS MANAGER.
- PLACE ROOT BALL AT SAME FINISH ELEVATION AS ORIGINAL NURSERY PLANTING.
- THIS DETAIL REFLECTS MIN 3.5m WIDTH BOULEVARDS.

SYNTHETIC TURF SURFACE (CONTACT CO. FOR ARTIFICIAL TURF SPECIFICATIONS) TO BE LOCATED 16mm FROM TOP OF CURB OR 100mm DEPTH OF 10mm MINUS GRANULAR BASE

PREPARED SUBGRADE

TAMP GROWING MEDIUM UNDER ROOTTAIL TO PREVENT ANY SETTLEMENT.

WIDTH VARIES

100mm

1000mm

DRAIN LINE REQUIRED ON IMPERMEABLE SUB SOILS TO TIE TO ROADWAY DRAINAGE.

ARTIFICIAL TURF INSTALLATION FOR MIN 3.5m CENTER MEDIAN

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 11-Sep-17
DRAWN: TMM
SCALE: NTS
APPROVED: MM

Last Revised: Sylow 1/17, February 2015

SUPPLEMENTS TO MMCD
Schedule 11 - 31
MINIMUM PROTECTION REQUIRED AROUND TREE

<table>
<thead>
<tr>
<th>Trunk Diameter (DBH)</th>
<th>Distance From Trunk</th>
<th>Total Diameter</th>
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<tbody>
<tr>
<td>20cm/8in</td>
<td>1.2m</td>
<td>2.6m</td>
</tr>
<tr>
<td>26cm/10in</td>
<td>1.6m</td>
<td>3.25m</td>
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<tr>
<td>30cm/12in</td>
<td>1.8m</td>
<td>3.9m</td>
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<td>4.66m</td>
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<td>40cm/16in</td>
<td>2.4m</td>
<td>5.2m</td>
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<tr>
<td>45cm/18in</td>
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<td>5.65m</td>
</tr>
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<td>50cm/20in</td>
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<td>56cm/22in</td>
<td>3.3m</td>
<td>7.16m</td>
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<td>60cm/24in</td>
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<td>90cm/36in</td>
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</tr>
<tr>
<td>100cm/40in</td>
<td>5.0m</td>
<td>13.0m</td>
</tr>
</tbody>
</table>

NO DUMPING OR STOCKPILING WITHIN TREE PROTECTION BARRIER.
INSPECT BARRIER WEEKLY AND REPAIR AS NEEDED.
CUT BACK ROOTS OUTSIDE THE TREE PROTECTION BARRIER CLEANLY WITH SHARP LOPPERS OR PRUNING SAW.
NOTES:
• ALL METHODS AND MATERIALS TO CONFORM TO THE CITY OF LANGFORD BYLAWS 1000 & 1669 (CURRENT EDITIONS).
• PROTECT PLANT MATERIAL FROM DAMAGE DURING TRANSPORTATION AND PLANTING.
• LOCATE AND FLAG ALL BURIED UTILITIES IN "BC-1 CALL" PLANTING BEDS PRIOR TO DIGGING AND ENSURE THAT UTILITIES ARE PROTECTED DURING CONSTRUCTION.
• PLANT MATERIAL DENSITY / SPACING TBD BY PARKS MANAGER.
• PLACE ROOT BALL AT SAME FINISH ELEVATION AS ORIGINAL NURSERY PLANTING.

150mm AGGREGATE BASE
COMPACTED TO 95% SFD*
10mm EXPANSION JOINT
C/W SEALANT
MIN 15mm DEEP**

450mm WIDTH VARIES

TAMP GROWING MEDIUM UNDER ROOTBALL TO PREVENT ANY SETTLEMENT.

MINIMUM 50mm BARK MULCH
(SETTLED DEPTH) PLACED IN SHRUB BED

MINIMUM 700mm (SETTLED DEPTH)
GROWING MEDIUM

GROUND COVER PLANTING

CONCRETE CURB

FINISH GRADE PAVEMENT

FINISH GRADE PLANTING BED

2% SLOPE

2% SLOPE

SHRUB PLANTING

DRAIN LINE REQUIRED ON IMPERVIOUS SUBSOILS TO TIE TO ROADWAY DRAINAGE * TO CONNECT TO MUNICIPAL DRAIN SYSTEM

SUPPLEMENTS TO MMCD

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 11-Sep-17
DRAWN: mm
SCALE: NTS
APPROVED: MM

LAST REVISED SYLVE 1817, FEBRUARY 2019

MEDIAN PLANTING

Schedule 11 - 33
NOTES:

ALL LAWN AREAS TO BE GRADED TO AN EVEN FALL TO NEAREST DRAIN OR SWALE.

PREPARE SEED BED BY ROLLING TO A SMOOTH EVEN SURFACE
BROADCAST APPROVED GRASS SEED. MIX MECHANICALLY FROM TWO DIRECTIONS AT A RATE OF 2.5kg PER 100m² SURFACE AREA.

BROADCAST APPROVED NITROGEN FERTILIZER MECHANICALLY FROM TWO DIRECTIONS TO MANUFACTURERS RECOMMENDATIONS.

ROLL SEED AND FERTILIZER WITH A 100kg ROLLER, RAKE LIGHTLY FROM TWO DIRECTIONS AND ROLL AGAIN.

SPRINKLE LIGHTLY WITH WATER UNTIL SATURATED.
NOTES:
• ALL METHODS AND MATERIALS TO CONFORM TO THE CITY OF LANGFORD BYLAWS 1980 & 1989 (CURRENT EDITIONS).
• MAXIMUM ANGLE OF RAILS NOT TO EXCEED 130°
• DRILL RAILS 300mm FROM EITHER END. HAMMER REBAR THROUGH RAILS. REBAR TO BE FLUSH WITH TOP RAIL.
• FENCE PANELS TO BE THREE (3) RAILS TALL.
• EACH RAIL TO BE MINIMUM 200mm.
• REBAR ANCHORS TO BE DRIVEN 300mm INTO GROUND.
• REBAR NOT TO STICK OUT ABOVE TOP OF RAIL.
NOTES:
1. TERMINATE SLEEving 600mm POST HARDsURFACE.
2. SLEEves AND MAINLINE TO BE BEDDED IN SAND (SEE SPECS).

TYPICAL SLEEving MAINLINE AND BOULEVARD

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 17-AUG-09
DRAWN: DE
SCALE: NTS
APPROVED: MM

P1

Last Revised: Bylaw 1817, February 2019
SUPPLEMENTS TO MMCD  Schedule 11 - 37

TYPICAL SLEEVING ROADWAYS

NOTES:
1. TERMINATE SLEEVE 600mm POST HARD SURFACE.
2. SLEEVES AND MAINLINE TO BE BEDDED IN SAND (SEE SPECS)

SLEEVE SCHEDULE
LOCAL ROADS - SINGLE 150mm SLEEVE
ARTERIAL AND CONNECTOR ROADS - DOUBLE 150mm SLEEVE

CITY OF LANGFORD
PARKS DEPARTMENT

DATE: 17-AUG-09  DRAWN: DE  MMCD SS
SCALE: NTS  APPROVED: MM

Last Revised: Bylaw 1817, February 2019

1-150mm SLEEVE SCHEDULE 40
OR SDR 26 (TYPICAL)

DISTANCE BETWEEN FULL ROADWAY SLEEVES
NOT GREATER THAN 100m.

MEDIAN SLEEVE CONNECTING BOTH SIDES
OF THE ROADWAY.

SLEEVE ALL INTERSECTIONS 4 WAYS, CONNECT MEDIAN.
NOTES:
1) Terminate sleeving 800mm post hard surface.
2) Sleeves and mainline to be bedded in sand [see specs].
NOTES:
1) Terminate sleeving 600mm post hard surface.
2) Sleeves and mainline to be bedded in sand [see specs].
SUPPLEMENTS TO MMCD

Schedule 11 - 40
PLAN VIEW

NOTES:
1) City encourages centrally located, larger boxes of valves.
2) Valves and piping not touching each other or valve box sides.
3) Valve chambers to be min. 3 metres from driveways, adjacent to sidewalks and ideally placed in planting beds.

SECTION

Continuous layer of brick to support Valve box.
PLAN VIEW

High point. Install vacuum release in 150mm dia. round.

300-450mm spacing [typical]

Low point. Install flush valve - 3/4" male threaded.

SECTION

Finished Grade - Growing medium

100 mm depth

Drip line to be buried 100mm below finished grade of growing medium.

DRIP LINE
Typical Installation

CITY OF LANGFORD
PARKS DEPARTMENT.

DATE 25AUGUST09 DRAWN DE
SCALE N.T.S.

SUPPLEMENTS TO MMCD Schedule 11 - 42
Turn Around Island Details
NOTES:

1. THESE STANDARDS APPLY TO TURN AROUND ON RESIDENTIAL ROADS FOR SINGLE FAMILY DWELLINGS

2. CHAINAGE FOR PROFILES SHALL BE ALONG THE CENTERLINE, SHOW SPOT ELEVATIONS ON GUTTER LINE AS WELL AS THE CENTERLINE PROFILE

3. FOR ISLAND DETAILS, REFER TO DRAWING RS1

---

**Turn Aroun**

**CITY OF LANGFORD**

**ENGINEERING DEPARTMENT**

<table>
<thead>
<tr>
<th>DATE:</th>
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<th>MMCD SS</th>
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<td>19-Jan-10</td>
<td>TWB</td>
<td>RS2</td>
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**SCALE:** NTS

**APPROVED:** MM

LAST REVISED: BY LAW 1817, FEBRUARY 2019
NOTE:
1. ALL TURN AROUNDS TO HAVE FULL WATER CONTROL FOR DRAINAGE.
SUPPLEMENTS TO MMCD

PEDESTRIAN ACTIVATED CROSSWALK SIGNAL

NOTES:
1. ALL POLES & HARDWARE SHALL BE POWDER COATED TO MATCH STREET LIGHT COLOR
2. ALL CONCRETE BASES SHALL BE IN ACCORDANCE WITH MMCD

CITY OF LANGFORD ENGINEERING DEPARTMENT

DATE: 22-Jan-10 DRAWN: TWB MMCD S5
SCALE: NTS APPROVED: MM

Last Revised: Bylaw 1817, February 2019
NOTES:
1. PULL OUTS TO BE PAVED ASPHALT
2. ALL DISTANCES IN METERS
3. SHOULDERING REQUIRED TO MATCH GRADE
4. PREFERENCE TO HAVE PULL OUT LOCATED ADJACENT THE LANE
   WHERE MAJORITY OF RESIDENTS MIGHT BE TRAVELING ON WHEN RETURNING FROM WORK
5. SAFE SITE LINES AT INTERSECTIONS MUST BE ACCOMMODATED WITH PULL OUT LOCATION
6. LOCATE CLOSE TO EXISTING STREETLIGHT

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: 10-Mar-14
DRAWN: TWB
DWG No. RS5

SCALE: NTS
APPROVED: MM

Last Revised: March 10, 2014
NOTES:
1. MANHOLE FRAME & COVER TO BE VICTORIA FOUNDRIES No.1D-28 OR APPROVED EQUAL AND MARKED LANGFORD SANITARY OR LANGFORD DRAIN.
2. TOP OF COVER TO BE 75mm ABOVE EXISTING GROUND ON EASEMENTS OR BOULEVARDS WITH SOIL SLOPING AWAY FROM COVER.
3. TOP OF COVER TO BE FLUSH WITH SURFACE WHEN INSTALLED WITHIN TRAVELED PORTION OF ROAD.
4. EXCAVATION TO BE BACKFILLED WITH CLEAN GRAVEL AND COMPACTED UNDER CLEANOUT.
5. CAP TO BE INSTALLED WITHOUT CASKET.

SEWER CLEANOUT

CITY OF LANGFORD ENGINEERING DEPARTMENT

DATE: 09/04/01
DRAWN: GRH
SCALE: NTS
APPROVED: MMCD SS S6

Last Revised: Oct. 23, 2009
SUPPLEMENTS TO MMCD Schedule 11 - 49
GENERAL NOTES:
1. CATCH BASIN CRATE AND FRAME (TYP.)
2. TRENCHES AND CATCH BASINS UNDER TRAVELLED PORTION
   OF THE ROAD TO BE BACKFILLED WITH GRAVEL AND
   COMPACTED AS PER SPECIFICATIONS.
3. BASE TO BE COMPACTED GRANULAR MATERIAL
   (98% STANDARD PROCTOR) OR CONCRETE SLURRY.
4. ALL DIMENSIONS ARE IN MILLIMETERS (mm).

DOUBLE CATCH BASIN
SUPPLEMENTS TO MMCD  
Schedule 11 - 51
NOTICE:
A 1.2m VERTICAL LENGTH OF 600mm CLASS 3 R.C. AS PER CURRENT ASTM C 78 SPECIFICATIONS SET ON END IS ACCEPTABLE IN LIEU OF MIN.
100mm THICKNESS OF Poured CONCRETE AS SHOWN.
SUPPLEMENTS TO MMCD

LANGFORD RAINFALL
INTENSITY-DURATION
FREQUENCY CURVE

BASED ON ENVIRONMENT CANADA DATA FOR VICTORIA INTERNATIONAL AIRPORT AND VICTORIA MARINE STATIONS

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: OCT 2002
DRAWN: MTK
SCALE: NTS
APPROVED: SD-3

Last Revised: Oct 23, 2009

Schedule 11 - 56
LOT DEVELOPMENT
EROSION AND
SEDIMENT CONTROL

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: OCT 2002
DRAWN: MTK
SCALE: NTS
APPROVED: SD-4

Last Revised: Oct 23, 2009

SILT FENCE AROUND SOIL STOCKPILE
LOT BOUNDARY
FOUNDATION EXCAVATION
DEWATERING PUMP
ALTERNATIVE POLY COVERED SOIL PILE
SITE ACCESS ROAD 4.5m WIDE MINIMUM
TEMPORARY SEDIMENT TRAP
TRAP AREA=1% TOTAL CATCHMENT AREA

PERIMETER DITCH TO INTERCEPT ONSITE RUNOFF AND DIRECT TO SEDIMENT TRAP
SLOPE

STORM DRAIN

0.5m SEDIMENT STORAGE DEPTH
ARMOUR OR POLY EDGE TO PREVENT EROSION

STORM DRAIN

PVC RISER PACKED IN DRAIN ROCK
SERVICE CONNECTION

DITCH

200mm THICK PAD
25mm CRUSH GRAVEL

EFFECTIVE WIDTH

GEO TEXTILE FOR POOR SUBGRADE

TEMPORARY SEDIMENT TRAP SECTION DETAIL
ACCESS ROAD SECTION DETAIL

SOURCE: LAND DEVELOPMENT GUIDELINES FOR THE PROTECTION OF AQUATIC HABITAT.
STEEL T-BAR POST
1.5m LONG

ARMTEC S910 WOVEN FILTER FABRIC OR APPROVED EQUAL.

NATIVE BACKFILL

OVERLAND FLOW

EXISTING GROUND

NOTES:
1. WOVEN FILTER FABRIC TO BE SECURED TO T-BAR AT TOP AND MIDPOINT WITH NYLON ZIP TIES.

2. FABRIC ROLL TO ROLL CONNECTIONS TO BE AS PER MANUFACTURER'S SPECIFICATIONS.

3. TOP TENSION WIRE TO BE 3mm GALVANIZED WIRE SECURED TO POSTS. FABRIC TO BE SECURED TO TENSION WIRE AT MIDPOINT.

4. T-BAR POSTS TO BE SPACED NOT MORE THAN 2.4m APART, CENTER TO CENTER.
SUPPLEMENTS TO MMCD

Sediment Basin

Emergency spillway with sump or filter cloth lining

Surface area equal to 100 m² per ha of catchment

Silt fence or snow fence surround (0.9 m high) to act as trash rack for outlet

Min. 1.5

Inlet

Compacted embankment

Bottom slope 0.5% minimum

Outlet at 1% min.

Min. practical projection into basin

To erosion-resistant channel or storm drain

Note:

Remove sediment when pond is one-third full

City of Langford
Engineering Department

Date: Oct 2002

Scale: NTS

Drawn: MTK

Approved:

Last Revised: Oct 23, 2009

Schedule 11 - 59
NOTES:
1. VERTICAL SEEPAGE PITS SHALL BE LOMBARD 1050 / 1200mm BARREL.
2. LADDER RUNGS SHALL BE TO WCB STANDARDS.
3. THE DEPTH AND QUANTITY OF DRAIN ROCK SHALL BE SPECIFIED BY THE PROFESSIONAL ENGINEER AND APPROVED BY THE MUNICIPAL ENGINEER.
4. ALL VERTICAL SEEPAGE PITS MUST BE PROTECTED BY A CITY OF LANGFORD APPROVED CATCH BASIN. REFER TO S-11.
COMBINED CONSTRUCTED
WETLAND AND
DETENTION FACILITY

CITY OF LANGFORD
ENGINEERING DEPARTMENT

DATE: OCT 2002
DRAWN: MTK
SCALE: NTS
APPROVED:

SD-8

NOTES:
1. SUITABLE FOR CATCHMENTS UP TO 2 HECTARES.
   FOR LARGER CATCHMENTS THE OUTLET PIPE AND
   SPILLWAY CONCEPTS MAY VARY.
2. FOR ALTERNATIVE OUTLET STRUCTURE SEE FLOW
   CONTROL MANHOLE.
NOTES:
1. GRASS MUST STAND UP TO FLOW AND NOT BE PRESSED FLAT BY FLOW.
   MAXIMUM FLOW DEPTH = 100mm OR 50mm FOR FREQUENTLY MOWED AREAS.
2. CHANNEL BASE AREA IS A FUNCTION OF CATCHMENT AREA. CHANNEL
   AREA (WIDTH x LENGTH) = 1% OF CATCHMENT AREA. MINIMUM LENGTH = 30m.
3. USE FLOW SPREADER AT INLET TO ENSURE ENTIRE WIDTH OF SWALE IS WETTED.
4. LONGITUDINAL SLOPE = 1% TO 6%
5. ON GRADIENTS GREATER THAN 6%, GEOTECHNICAL ENGINEERING CERTIFICATION
   SHALL BE REQUIRED TO ENSURE SLOPE STABILITY.
NOTE: THE BASIC FILTER STRIP IS TYPICALLY ADJACENT AND PARALLEL TO A PAVED AREA SUCH AS PARKING LOTS, DRIVEWAYS AND ROADWAYS.
1. SIZE CHAMBER FOR 0.25m² OF WATER SURFACE AREA PER 1 L/s OF 6-MONTH DESIGN FLOW. HIGHER FLOWS TO BE BYPASSED.
2. ILLUSTRATED CHAMBER SUITABLE FOR 6-MONTH DESIGN FLOW OF 30 L/s.
3. HIGH FLOW BYPASS NOT REQUIRED IF WATER SURFACE AREA IN CHAMBER EXCEEDS 0.70m² PER 1 L/s (10 YEAR).

OIL/GRIT SEPARATOR CHAMBER WITH EXTERNAL HIGH FLOW BYPASS

CITY OF LANGFORD ENGINEERING DEPARTMENT

DATE: OCT 2002 DRAWN: MTK
SCALE: NTS APPROVED:

SUPPLEMENTS TO MMCD Schedule 11 - 64
NOTES:
1. USE FOR PAVEMENT AREAS UP TO 1000m² WITH HIGH FLOW BYPASS. BYPASS ALL FLOW GREATER THAN 4 L/s.
2. USE FOR PAVEMENT AREAS UP TO 380m² WITHOUT A HIGH FLOW BYPASS.
3. CORE CHAMBER AS REQUIRED FOR OPTIONAL INLET AND OUTLET LOCATIONS. CORE LOCATIONS TO BE BETWEEN THE CHAMBER INLET WALL AND BAFFLE.

OIL/GRIT SEPARATOR TYPE 1

CITY OF LANGFORD ENGINEERING DEPARTMENT

DATE: OCT 2002  DRAWN: MTK
SCALE: NTS  APPROVED: SD-12

Last Revised: Oct 23, 2009
NOTES:
1. USE FOR PAVEMENT AREAS UP TO 2400 m² WITH HIGH FLOW BYPASS. BYPASS ALL FLOW GREATER THAN 9 L/s.
2. USE FOR PAVEMENT AREAS UP TO 900 m² WITHOUT A HIGH FLOW BYPASS.
3. CORE CHAMBER AS REQUIRED FOR OPTIONAL INLET AND OUTLET LOCATIONS. CORE LOCATIONS TO BE BETWEEN THE CHAMBER INLET WALL AND BAFFLE.
NOTES:
1. TO BE USED WITH STANDARD DETENTION POND WHERE OUTLET IS TO STORM DRAIN SYSTEM OR WHERE SECURITY OF CONTROL STRUCTURE IS REQUIRED.
2. THIS DESIGN FOR 2 YEAR PEAK FLOW CONTROL ONLY.
STORAGE AND OUTLET SIZING

CITY OF LANGFORD ENGINEERING DEPARTMENT

DATE: OCT 2002  DRAWN: MTK
SCALE: NTS  APPROVED: SD-16

Last Revised: Oct 23, 2009
Fire Hydrant Clearance Specifications

NOTES:
1. All distances in meters
2. No red blooming plants near hydrant for visibility

SUPPLEMENTS TO MMCD Schedule 11 - 69
SCHEDULE 12 – DRAFTING STANDARDS

12. General Procedures

12.1. Introduction

The City of Langford’s Contract Drawing and Drafting Standards are to be applied to all drawing submissions made to the City. These standards are necessary to ensure that the City receives consistent drawings compatible with the City’s corporate GIS system.

The City of Langford’s Contract Drawing and Drafting Standards are based on current versions of the industry standard software by Autodesk and ESRI. AutoCAD Map 3D and ESRI ArcGIS are the preferred drafting, design and GIS programs to be utilized by all contractors to the City. The only file formats that the City of Langford will accept are AutoCAD .dwg files or ESRI .shp file sets.

12.1.2. General

12.1.2.1. All submitted digital drawings must reference the UTM Nad83 coordinate system. All X-Ref drawings must be included with submissions, preferably incorporated into the drawing itself.

All drawings submitted using Autodesk software must be designed in Model Space and plotted using Layouts. Each drawing layout is to include and is limited to one drawing sheet.

The drawing sheets will include single or multiple view ports depending on the amount of design detail required to be shown. Each view port will include a scale that best reflects the amount of detail required to be shown in the view port. The User Coordinate System (UCS) can be rotated to allow better viewing of the design works, but a north arrow must always be shown and the amount of rotation must be recorded in the title block.

All drawings submitted will comply with the City of Langford’s Detailed Mapping Specifications available from the City’s website or the City’s GIS staff.

12.1.3. Drawing Review

12.1.3.1. All street names and street types shown on submitted drawings must be spelled and represented correctly. This information is available from the current street map on the City’s website.
12.1.4. Minimum Standards

12.1.4.1. Submission package is complete.

12.1.4.2. NAD83 Coordinate system.

12.1.4.3. All works must be tied to current City of Langford parcel data.

12.1.4.4. All new parcels must be tied to a minimum of two control monuments.

12.1.4.5. Data structure to adhere to the City’s Detailed Mapping Specifications.

12.1.4.6. Xref files to be included if applicable.

12.1.4.7. Must be .dwg or .shp file series format.

12.1.4.8. Drawing must note scaling factor, north arrow and rotation angle if UCS is applied.

12.1.4.9. Correct street names displayed.

12.1.5. Submission Package

12.1.5.1. Drawing Submission packages must be complete and clearly labelled and include the City’s file reference. Final packages will include 1 sealed colour hard copy drawing at an appropriate scale for quality review as well as a colour .pdf representation of the hard copy drawing. To accompany the hard copy drawings and .pdf file is the digital file used to compile the hard copy drawings in either .dwg or .shp.

12.2. Langford Reference Data

12.2.1. Introduction

The City of Langford’s cadastral fabric is updated on a regular basis with new plans and additional control points to ensure the most accurate parcel information is available.

12.2.2. Additional Files Provided

Prior to preparing drawing submissions for the City, contractors must obtain the current relative data sets from the City’s website or from the City’s GIS staff. The files listed below will be available on the City’s website and must be referenced in all new drawings submitted.

12.2.2.1. City of Langford Cadastral

12.2.2.2. City of Langford contours
12.2.2.3. City of Langford Street Map (reference)

12.2.2.4. City of Langford Address Map (reference)

12.2.2.5. City of Langford Control Monuments

12.2.2.6. City of Langford Title Block

12.2.2.7. City of Langford Detailed Mapping Specifications

12.2.2.8. Standard AutoCad blocks

12.2.2.9. Langford.ctb

12.2.2.10. Images and other support files may be requested from the GIS department as required.

Note: The City of Langford cadastral will be provided to the contractor as reference in the area of works. Although the cadastral information will be available, any property lines, iron pins, or control monuments adjacent to the works, within the limit of construction must be surveyed.

12.2.3. All contractors will be required to download the most current/appropriate Title Block from the City’s Website. The drawing contractor is to fill out and update the attributes upon each submission of drawings.
13.1 Trail Construction.

The purpose of these standards is to establish a set of trail types and design guidelines for new trail construction and trail upgrading within the City of Langford. (Bylaw 1817)

13.1.1 Any unique trail situations other than those presented below are to be approved by the Parks Manager. (Bylaw 1817)

13.1.2 Construction of stairs and railings shall meet the BC Building Code requirements.

13.1.3 Trail signage is required for all trails. Requirements for trail signage will be determined by the Parks Manager and may include, but are not limited to:

13.1.3.1 Design Standard for the Langford Trail Marker;

13.1.3.2 The standard for signage that identifies those parks and trails developed and maintained by the City of Langford;

13.1.3.3 Trail Signage Standards – Approved Symbols for Facilities (from Park Facility Standards, BC Parks 1993);

13.1.3.4 Trail Signage Standards – Approved Symbols for Pedestrian and Bicycle Traffic (from Uniform Traffic Control Devices for Canada, Roads and Transportation Association of Canada) N.B. Pedestrian and Bicycle traffic signs should be reduced by one-half or one-third the size normally required for vehicular traffic. See the UTCDC manual for vehicular standard.

13.1.4 Bollards shall be constructed per drawing T1.

### Table 13-1: Design Criteria and Standards for Trail Width and Surfacing

<table>
<thead>
<tr>
<th>Trail Type</th>
<th>Design Criteria</th>
<th>Tread Width</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking Trail</td>
<td>Pedestrian/hiking only; single file</td>
<td>Min: 0.45m</td>
<td>Gravel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max: 0.6m</td>
<td></td>
</tr>
<tr>
<td>Nature Trail</td>
<td>Natural Areas/Corridors of minor creeks; low level use; multiple simultaneous users (e.g. walking, jogging, hiking, mountain biking - pedestrians and cyclists); trail infrastructure (occasional benches, viewpoints, bollards, stairs, occasional waste/recycling receptacles, signs - directional, instructional, interpretive)</td>
<td>Min: 0.3m</td>
<td>Compacted native soil and aggregate or mulch where needed. Base to be native material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max: 1.0m; complete with 0.5m min. on each side of trail (unobstructed clear width) and 2.4m clear height Preferred widths to be provided where there are no constraints.</td>
<td></td>
</tr>
</tbody>
</table>
Pedestrian Walkways and Trails  | Generally for short urban connectors; primarily for pedestrian use  | 1.8 m  | Gravel, except beside side yards – surfacing to be concrete

Multi-Use Trail  | Longer connector trails; multiple simultaneous users (pedestrians and cyclists)  | Min. 3m Max: 4m  | Asphalt

Table 13-2: Trail Gradient Standards

<table>
<thead>
<tr>
<th>Trail Type</th>
<th>Optimum Grade</th>
<th>Maximum Sustained Grade</th>
<th>Maximum Short Distance Grade – Length not greater than 6m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking Trail</td>
<td>0-5%</td>
<td>10%</td>
<td>20-25%</td>
</tr>
<tr>
<td>Nature Trails</td>
<td>0-10%</td>
<td>20%</td>
<td>20-25%</td>
</tr>
<tr>
<td>Pedestrian Walkways and Trails</td>
<td>0-3%</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>Multi-Use Trail</td>
<td>0-3%</td>
<td>5%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Table 13-3: Trail Construction Standards

<table>
<thead>
<tr>
<th>Tread Type</th>
<th>Sub Grade</th>
<th>Tread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hogfuel</td>
<td>Not recommended</td>
<td>To be determined by Parks Manager on a case by case basis</td>
</tr>
<tr>
<td>Gravel</td>
<td>75-150mm thickness of pit run gravel compacted; where required place 75mm clear rock for drainage in low areas</td>
<td>75mm of 6mm thickness minus crushed gravel</td>
</tr>
<tr>
<td>Native Soil</td>
<td>Native material</td>
<td>Compacted native material</td>
</tr>
<tr>
<td>Asphalt</td>
<td>100mm thickness of pit run. Gravel compacted</td>
<td>50mm thickness of hot mix asphalt</td>
</tr>
<tr>
<td>Concrete</td>
<td>Please refer to MMCD Specifications for concrete thickness and strength.</td>
<td></td>
</tr>
</tbody>
</table>

13.2 Irrigation

Irrigation shall be undertaken in accordance with specifications and locations set forth in Schedule 10.

13.3 Boulevard Trees

All boulevard trees complete with municipal irrigation shall be installed in accordance with the specifications set forth in Schedule 10, Schedule 14 and drawings L1 through L2(f) – as applicable. (Bylaw 1817)
**NOTE:**
REFER TO APPROVED PRODUCT LIST FOR BOLLARD AND IN GROUND SLEEVE SPECIFICATION

---

**CITY OF LANGFORD**
ENGINEERING DEPARTMENT

**LANGFORD TRAIL MARKER**

<table>
<thead>
<tr>
<th>MMCD SS</th>
<th>T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>99/05/14</td>
</tr>
<tr>
<td>DRAWN:</td>
<td>GRH</td>
</tr>
<tr>
<td>SCALE:</td>
<td>1:10</td>
</tr>
<tr>
<td>APPROVED:</td>
<td>MM</td>
</tr>
</tbody>
</table>

Leaf Revised: Bylaw 1817, February 2019

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PARKS AND TRAIL CONSTRUCTION
SCHEDULE 14
BOULEVARD LANDSCAPE STANDARDS

14.1. Submission Approval Requirements

14.1.1. Landscape plans, Irrigation plans and detailed landscape cost estimates must be submitted to Parks and approved prior to commencing landscape work on any park, boulevard or public land within the development boundary. (Bylaw 1817)

14.1.2. Landscape plans must be drawn by a Landscape Architect, Landscape Designer or other qualified person approved by the Parks Manger for:

14.1.2.1. Developments in the Downtown Pedestrian Commercial Development Permit Area identified in the Official Community Plan or

14.1.2.2. Off-site landscape works on internal roadways and boulevards where the Subdivision creates more than 3 new lots. (Bylaw 1817)

14.1.2.3. Boulevard areas on existing roadways for developments and/or Subdivisions which create more than 3 new lots.

14.1.3. Landscape plans should be drawn by or coordinated by a Civil Engineer who has been engaged to provide Landscape details and supervise the works on install for:

14.1.3.1. Subdivisions less than 3 lots or

14.1.3.2. Boulevard areas on existing roadways for subdivisions which create less than 3 new lots.

14.1.4. Irrigation plans must be designed by a certified irrigation designer – turf/commercial classification as certified by IIABC or IA. (Bylaw 1817)

14.1.5. The developer must submit a detailed landscape cost estimate for the supply and installation of frontage (off-site) landscape works prepared by a landscape architect of other qualified person. Cost estimates should include supply and installation, and are not limited to: (Bylaw 1817)

14.1.5.1. Site Preparation and Grading

14.1.5.2. Topsoil/Growing medium (Bylaw 1817)

14.1.5.3. Plant Material (Bylaw 1817)

14.1.5.4. Irrigation

14.1.5.5. Mulch (Bylaw 1817)
14.1.5.6. Artificial Turf (Bylaw No. 1669)
14.1.5.7. Sod/Hydroseeding (Bylaw 1817)
14.1.5.8. Granular trails, and any other hard surfaces (Bylaw 1817)
14.1.5.9. Fencing (eg. Chain link fence, split rail fence, etc.) (Bylaw 1817)
14.1.5.10. Site furniture (eg. Trail bollards, lighting bollards, benches, wastereceptacles, bike racks, etc.) (Bylaw 1817)
14.1.5.11. Stairs and bridges and boardwalks (Bylaw 1817)
14.1.5.12. Record landscape drawings and Record irrigation drawings for both production and submission (Bylaw 1817)
14.1.5.13. Deleted (Bylaw 1817)
14.1.5.14. Deleted (Bylaw 1817)

14.1.6. Ensure all minimum utility offsets, driveway offsets and sightlines are met and therefore all boulevard tree locations show on the drawing are confirmed viable. If there is inadequate space within the road right of way, the Director of Engineering and Parks Manager may require a 2 metre wide statutory right of way on either side of the dedicated road for the purposes of planting and maintaining trees, irrigation and ancillary fittings. (Bylaw Nos. 1669, 1817)

14.1.6.1. Listed below are the preferred minimum tree planting setbacks guidelines:

<table>
<thead>
<tr>
<th>Utility</th>
<th>Setback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Poles</td>
<td>2.0m</td>
</tr>
<tr>
<td>BC Hydro Kiosks and Vaults</td>
<td>2.0m</td>
</tr>
<tr>
<td>BC Hydro Underground Lines</td>
<td>1.5m</td>
</tr>
<tr>
<td>Fire Hydrants</td>
<td>1.8m</td>
</tr>
<tr>
<td>Water Main/Water Services</td>
<td>1.8m</td>
</tr>
<tr>
<td>Catch Basins/Valve Boxes</td>
<td>1.5m</td>
</tr>
<tr>
<td>Utility Box Lids</td>
<td>2.0m</td>
</tr>
<tr>
<td>Gas Services</td>
<td>1.0m</td>
</tr>
<tr>
<td>Sanitary &amp; Storm Sewer Service</td>
<td>1.8m</td>
</tr>
<tr>
<td>Sanitary &amp; Storm Sewer Mains &amp; Manholes</td>
<td>2.0m</td>
</tr>
<tr>
<td>Curb or Sidewalk</td>
<td>1.0m</td>
</tr>
<tr>
<td>Driveways/Crossings</td>
<td>1.8m</td>
</tr>
</tbody>
</table>

(Bylaw 1817)

14.1.7. Boulevard trees should be installed when their survival is most likely, usually after construction on abutting lots has been completed. The developer is responsible for replacing any tree that dies or does not thrive during the Warranty Period. (Bylaw Nos. 1669, 1817)
14.1.8. If in the assessment of the Parks Manager, the density of one tree per 15 metres of frontage cannot be accomplished without compromising sound arboricultural practices, due to the size or other characteristics of the frontage, the developer shall pay cash-in-lieu to the City in the amount of $1100.00 for each required boulevard tree that cannot be accommodated, to be used by the City to provide boulevard trees in other locations. (Bylaw Nos. 1669, 1817)

14.1.9. Landscape plans, civil drawings and Irrigation plans submitted for approval must include the following information: (Bylaw 1817)

14.1.9.1. Subdivision name and file number; (Bylaw 1817)
14.1.9.2. Key Plan, north arrow, date, scale and bar scale; (Bylaw 1817)
14.1.9.3. Proposed property lines and right-of-ways; (Bylaw 1817)
14.1.9.4. All Streets, road and walkway alignments; (Bylaw 1817)
14.1.9.5. All existing and proposed above and below grade utility services, alignments and fixtures, such as utility pedestals, fixtures, art installations, monuments, statues, street lights, walkway lights, signage, amenities, catch basins, manholes, high, intermediate and low pressure lines, overhead power lines, sewers, sanitary, water lines, gas lines, etc.; (Bylaw 1817)
14.1.9.6. The surveyed location and size of all existing trees of 15cm caliper within the municipal right-of-way; (Bylaw 1817)
14.1.9.7. All proposed landscaping including but not limited, to boulevard trees, shrubs, shrub beds, sodded or seeded turf grass areas, playgrounds, walkways, artificial turf, etc (Bylaw 1817)
14.1.9.8. Plant List including plant material botanical and common names, cultivar / variety, minimum caliper or height, root treatment (eg. Balled and Burlaped, wire basket specification, tree spade or potted), total quantities of each plant and remarks including special comments or unique installation criteria; (Bylaw 1817)
14.1.9.9. Irrigation design drawing to reflect either extending existing municipal irrigation from the adjacent development or a new CRD dedicated City water meter connection for the development offsite landscaping. (Bylaw 1817)
14.1.9.10. CRD dedicated water meter connection, dedicated live line power, double check valve assembly, controller, valves, mainlines, lateral lines, Irrigation Schedule, Valve Schedule, Critical Analysis and Reference Notes Schedule are required as a minimum, to be included on the irrigation drawings. Refer to Schedule 10 for further irrigation design and record drawing submission requirements. The dedicated water meter connection and live line power for the irrigation system
must be included on the Civil Engineer’s drawing of water supply services. (Bylaw 1817)

14.2. Boulevards and Medians (Bylaw 1817)

14.2.1. Plant materials to be nursery grown stock and comply with British Columbia standard for container grown plants and Landscape Canada Standard guide specification for nursery stock. All nursery stock must be viable, free from pests and disease/invasive species and undamaged. (Bylaw 1817)

14.2.2. Plant material is to be true to name, type and form and be representative of their species and variety. Plant material to be compact and properly proportioned, not weak or thin, or injured by being planted too closely in nursery rows; plant material shall have healthy tops to a size proportionate to root requirements typical of the species or variety. (Bylaw 1817)

14.2.3. Rootballs and growing medium in containers must be free of invasive and noxious plants. (Bylaw 1817)

14.2.4. Boulevard Trees (Bylaw 1817)

14.2.4.1. Are to be provided in the road allowance at a density of one tree per 15 linear metres of frontage. (Bylaw 1817)

14.2.4.2. Are to be a minimum of 5cm caliper for deciduous or broadleaf evergreen trees, and 3.0m height for coniferous trees measured 15cm from ground level or as approved by the Parks Manager. (Bylaw Nos. 1669, 1817)

14.2.4.3. Shall be planted in accordance with drawings L1, L2a, L2b, L2c, L2d, L2e, L2f.

14.2.4.4. For recommended boulevard tree species, refer to Approved Product List. (Bylaw 1817)

14.2.5. Boulevard Shrub Planting (Bylaw 1817)

14.2.5.1. Minimum spacing shall be based on spread at maturity. With the exception of naturalized areas, shrub size at planting shall be a minimum of 300mm height for deciduous shrubs and a spread of 450mm for coniferous shrubs or as approved by the Parks Manager. (Bylaw 1817)

14.2.6. Existing Trees

14.2.6.1. Existing or significant trees on existing or future boulevards, shall be evaluated prior to site work commencing, and shall be retained at the discretion of the Parks Manager.
14.2.6.2. An arborist report or tree survey may be required as part of the landscape plan, at the discretion of the Parks Manager. Existing trees to be retained must be protected with a tree protection barrier, prior to commencement of any site works. Tree Protection barrier as per drawing L3 or as per directed by a Certified Arborist or the Parks Manager, is to be installed and maintained for the duration of the development. (Bylaw 1817)

14.2.6.3. A tree that has been noted to be and is damaged to the point that replacement is necessary, must be replaced in accordance with Table 14-1. (Bylaw 1817)

<table>
<thead>
<tr>
<th>Type of Removal</th>
<th>Tree Replacement Ratio (Removed:Replaced)</th>
<th>Minimum height of new tree</th>
<th>Shrub planting ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of top of tree (max 1/3 of total tree height)</td>
<td>1:1</td>
<td>1.5m</td>
<td></td>
</tr>
<tr>
<td>0-15 cm (6&quot;) cal</td>
<td>1:2</td>
<td>1.5m</td>
<td></td>
</tr>
<tr>
<td>15 – 30 cm (12&quot;) cal</td>
<td>1:2</td>
<td>2.0m</td>
<td>1:4</td>
</tr>
<tr>
<td>30 – 45 (18&quot;) cal</td>
<td>1:3</td>
<td>2.0m</td>
<td>1:4</td>
</tr>
<tr>
<td>45 - 90 (24&quot;) cal</td>
<td>1:4</td>
<td>2.0m</td>
<td>1:8</td>
</tr>
<tr>
<td>&gt;90 cm (36&quot;) cal</td>
<td>Biologist or Landscape Architect replanting plan may be required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14.2.7. Irrigation

Irrigation design drawing to reflect either extending existing municipal irrigation from the adjacent development or a new dedicated City water meter connection for the development offsite landscaping. (Bylaw 1817)

14.2.7.1. If the irrigation design does not reflect extending existing municipal irrigation, the Developer must supply a municipal irrigation system complete with a new dedicated water meter connection and dedicated live line power to all City boulevard trees in accordance with Schedule 10 and details within Schedule 11 (P1-P7). At the discretion of the Parks Manager, Parks will accept battery powered controllers, or a sub-meter may be supplied from a private property water source. A covenant may be required for trees in the SRW. (Bylaw 1817)

14.2.7.2. Dedicated metered power for the municipal irrigation system must be provided. The dedicated City water meter must service all water requirements the City may have within separated boulevards and the road allowance/frontage (i.e. municipal drip irrigation, shrub beds, etc.). Sod within the road allowance/frontage (from back of sidewalk to property line) is not to be watered by the dedicated City water meter. (Bylaw 1817)

14.2.7.3. The Developer must extend the municipal irrigation system (eg, mainline stub off, lateral stub off and wiring, etc.) to the development boundary limits for future development irrigation connections. (Bylaw 1817)
14.2.8. Median Planting

14.2.8.1. Plantings for medians and at driveways, intersections, and pedestrian crossing locations and other locations specified by the City Engineer where sight lines are critical must not exceed height of one meter. Density and spacing of plants to be determined by the Parks Manager.

14.2.9. Turf Grass Seeding/Sodding and Artificial Turf. (Bylaw No. 1669)

Proposed turf grass within the roadway allowance / frontage is to be considered Class 1 (lawn) as per the Canadian Landscape Standard and recommended to be No.1 Premium sod or No. 2 Standard. This is the minimum standard for residential and commercial. (Bylaw 1817)

14.2.9.1. Proposed seed, and hydroseed application methods, to be as per Canadian Landscape Standard. (Bylaw 1817)

14.2.9.2. New turf grass whether seeded or sodded shall be inspected by Parks Department staff for acceptance after three mows for seed, and two mows for sod. Refer to L5. (Bylaw Nos. 1669, 1817)

14.2.9.3. All Separated boulevards or centre medians under three (3) metres in width require the installation of artificial turf. Refer to Schedule 11, details L2(fa), L2(fb), L2(g) and L2(h) for artificial turf installation specifications. (Bylaw Nos. 1669, 1817)

14.2.9.3.1 Artificial turf product specifications shall comply with Table 14-2.

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Physical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile Fiber Type</td>
<td>Polyethylene “U” Shape Cross Section</td>
</tr>
<tr>
<td>Thatch Fiber Type</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>Fabric Width</td>
<td>15 feet</td>
</tr>
<tr>
<td>Pile Fiber Height</td>
<td>1 1/2” – 1 5/8”</td>
</tr>
<tr>
<td>Thatch Fiber height</td>
<td>1’ +/- 15%</td>
</tr>
<tr>
<td>Pile Fiber Colour</td>
<td>Field Green / Olive Green or similar</td>
</tr>
<tr>
<td>Thatch Colour</td>
<td>Tan / Brown or similar</td>
</tr>
<tr>
<td>Tuft Gauge</td>
<td>3/8” – 3/4”</td>
</tr>
<tr>
<td>Tuft Bind</td>
<td>&gt;7 lbs</td>
</tr>
<tr>
<td>Stitch Rate</td>
<td>Compliant with ASTM D5893</td>
</tr>
<tr>
<td>Grab Tear Strength</td>
<td>Compliant with ASTM 5034</td>
</tr>
<tr>
<td>Yarn Breaking Strength</td>
<td>Compliant with ASTM D2256</td>
</tr>
<tr>
<td>Backing Weight</td>
<td>Minimum 24 oz</td>
</tr>
<tr>
<td>Pile Fiber Weight</td>
<td>Minimum 45 oz</td>
</tr>
<tr>
<td>Water Permeability</td>
<td>Minimum 28” of rainfall per hour / sq yd</td>
</tr>
<tr>
<td>Recommended Infill</td>
<td>1.5 – 2 lbs per sq foot 20/40 Tan Silica Sand (Target Products)</td>
</tr>
<tr>
<td>Warranty Period</td>
<td>Minimum 10 years</td>
</tr>
</tbody>
</table>
14.2.9.3.2  All glued turf to turf connections is to be by Nordod or X-GF.  
(Bylaw 1817)

14.2.9.3.3  All glued turf to concrete abutment connections is to be by PL 
Premium Adhesive. (Bylaw 1817)

14.2.9.3.4  For artificial turf plastic wood nailer board see Approved 
Product List and drawings L2(a) and L2(b). (Bylaw 1817)

14.2.10.  Topsoil / Growing Medium (Bylaw 1817)

14.2.10.1.  All areas designated for topsoil and blending of restored areas shall conform to 
the current BCCLA/BCNLA Landscape Standard and the Canadian System of Soil 
Classification.

14.2.10.2.  Topsoil / growing medium shall be free of building materials, invasive or noxious 
plant and their reproductive parts, non composted wood, wood waste, insect 
pests, plant pathogenic organisms, ice, chemical pollutants or substances at 
levels toxic to plants, and other extraneous materials that detract from the 
desirable physical and chemical properties required for landscaping purposes.  
(Bylaw 1817)

14.2.10.3.  The Parks Manager may request a topsoil/growing medium analysis be 
submitted, completed by an accredited commercial laboratory: 
CSA/ASTM/CALA (The Canadian Association for Laboratory Accreditation), prior 
to the delivery and installation of the topsoil. (Bylaw 1817)

14.2.10.3.1.  The analysis will include measurement of percent sand, fines, (silt and 
clay), and organic matter to total 100%, pH, lime required to achieve 
pH6.5, water soluble salts, total carbon to soil nitrogen ratio, total 
nitrogen and available levels of phosphorus, potassium, calcium and 
magnesium. (Bylaw 1817)

14.2.10.3.2.  The analysis shall outline the testing laboratory’s recommendations for 
amendment, fertilizer and other required modifications to make the 
proposed growing medium meet Canadian Landscape Standard 
requirements. (Bylaw 1817)

14.2.10.3.3.  Failure to test and provide appropriate documentation of test results 
may be considered grounds for rejection of a proposed growing 
medium and may result in the removal of rejected material at the 
contractor’s expense. (Bylaw 1817)

14.2.10.3.4.  The contractor shall ensure that the soil submitted for laboratory 
testing, as recommended by the lab, is a representative sample taken 
from the soil that will be delivered to the site. (Bylaw 1817)
14.2.10.4. Structural soil composite shall be composed of growing medium and clear crush granular components in accordance with the following recommended base ration of materials: (Bylaw 1817)

14.2.10.4.1 Ensure sufficient moisture (25% to 75% of field capacity) to provide a homogeneous mixture with consistent properties through the composite soil.

14.2.10.4.2 Peatmoss shall not be used in the preparation of structural soil (Bylaw 1817)

14.2.10.4.3 Soil component proportion by weight: (Bylaw 1817)

<table>
<thead>
<tr>
<th>Component</th>
<th>Proportion by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing medium</td>
<td>15% to 20% dry weight</td>
</tr>
<tr>
<td>Clear crush (25mm to 75mm clear crush)</td>
<td>80% to 85% dry weight</td>
</tr>
<tr>
<td>Hydrogel/Stabilizer*</td>
<td>0.01% to 0.02%</td>
</tr>
</tbody>
</table>

*Hydrogel/Stabilizer is applied as a soil tackifier to ensure even distribution and blending of the composnet materials. Refer to manufacturer specifications for appropriate mixing proportions. (Bylaw 1817)

14.2.10.4.4 Growing medium properties for use as a component in structural soil shall conform to Aggregate and Granular Materials (31 05 17 MMCD 2009) specifications. Gravel graduation shall consist of 25mm to 75mm clear crush washed rock free of any foreign elements or materials.

14.2.10.4.5 Structural soil installation shall conform to Excavation, Trenching and Backfilling (31 23 01 MMCD 2009) specifications. (Bylaw 1817)

14.2.10.5. Minimum topsoil depths shall comply with Table 14-3 (Bylaw 1817)

**Table 14-3 Soil depth requirements**

<table>
<thead>
<tr>
<th>Component</th>
<th>Depth Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>700 mm (27.5”) on all sides of root ball (bylaw 1817)</td>
</tr>
<tr>
<td>Large Shrubs</td>
<td>450 mm (18”) depth</td>
</tr>
<tr>
<td>Small Shrubs</td>
<td>300 mm (12”) depth</td>
</tr>
<tr>
<td>Groundcover</td>
<td>150 mm (6”) depth</td>
</tr>
<tr>
<td>Grass</td>
<td>150 mm (6”) depth</td>
</tr>
</tbody>
</table>

14.2.11. Mulch

14.2.11.1. All planting beds should be top-dressed after planting to a settled depth of 50mm with high organic low wood content mulch. (Bylaw 1817)

14.2.12. Common Fill

14.2.12.1. All common fill shall consist of granular material free of rubble or debris greater than 2mm and shall not be toxic to plant or animal life.
14.3. Construction Acceptance - Landscaping (Bylaw No. 1817)

14.3.1. Construction Acceptance – Landscaping will be issued by the Parks Manager once all the following conditions have been met: (Bylaw Nos. 1669, 1817)

14.3.1.1. All landscaping has been installed, inspected and approved by the Parks Manager and there are no outstanding deficiencies.

14.3.1.2. The required irrigation inspections as noted in Schedule 10, Section 10.7, have been completed through the installation process. The irrigation system has been confirmed fully operational with complete head to head coverage during the Construction Acceptance - Landscaping inspection and there are no outstanding deficiencies. (Bylaw 1817)

14.3.1.3. Record landscape and Record irrigation drawings have been submitted to the Parks Manager in “.dwg” and “.pdf” format and approved. (Bylaw 1817)

14.3.1.4. A signed and sealed As Constructed Information Sheet - Landscaping has been completed and submitted to Parks and approved by the Parks Manager. As Constructed Information Sheets must be submitted separately for all roadways within the development. (Bylaw 1817)

14.3.1.5. A “New Installation Backflow Preventer Test Report” confirming the double check valve assembly has passed CRD inspection has been submitted to Parks. (Bylaw 1817)

14.3.1.6. All new turf grass seeding is fully germinated/well established and has been mowed to 200 mm height three times. (Bylaw 1817)

14.3.1.7. All new turf grass sod is fully knit/well established and has been mowed to 200mm height twice. (Bylaw 1817)

14.4. Warranty

14.4.1. Upon Construction Acceptance - Landscaping of the offsite landscaping to be owned and maintained by the City, the Developer shall warranty the materials, workmanship and services for a period of one year. A warranty bond in the amount of 10% of the offsite landscaping will be retained until completion of the warranty period. (Bylaw 1817)

14.4.2. The City may draw upon the warranty bond/security in whole or in part at any time prior to the expiration of the Warranty Period for repairs pertaining to landscape deficiencies if the developer fails to perform the repairs within a time period as stipulated by the Parks Manager. After acceptance of the repair, the City may elect to extend the Warranty Period for the repaired item for up to one year. (Bylaw 1817)

14.4.3. Deleted (Bylaw 1817)

14.5. Final Acceptance - Landscaping (Bylaw No. 1817)
14.5.1. Final Acceptance-Landscaping will be issued by the Parks Manager once a Final Acceptance-Landscaping Inspection has occurred at the end of the applicable Warranty Period and there are no outstanding deficiencies to be rectified or repaired. The Parks Manager may extend the Warranty Period on items that require replacement or repair at the final inspection, and defer Final Acceptance-Landscaping of those items until the end of the Warranty Period as extended. (Bylaw Nos. 1669, 1817)