

THE CORPORATION OF THE CITY OF ROSSLAND

BYLAW #1999

A BYLAW TO ESTABLISH SUBDIVISION AND DEVELOPMENT SERVICING REQUIREMENTS

WHEREAS Division 11, Part 26 of the *Municipal Act*, (R.S.B.C. 1996, c. 323) authorizes the Council of the City of Rossland to regulate and require the provision of works and services in respect of the subdivision and development of land,

NOW THEREFORE the Council of the City of Rossland in open meeting assembled ENACTS AS FOLLOWS:

SECTION 1 - SHORT TITLE

- 1.0 .1 This Bylaw may be cited as the "SUBDIVISION AND DEVELOPMENT SERVICING BYLAW, 1998".

SECTION 2 - DEFINITIONS

- 2.0 .1 In this Bylaw:

“**Applicant**” means a person applying for the approval of a subdivision, whether as the owner of the property proposed to be subdivided or as agent for the owner.

“**Approval**” means the Approving Officer affixing her signature to the jurisdiction conferred on her by the Land Title Act.

“**Approving Officer**” means the person appointed by Council to exercise the jurisdiction conferred on her by the Land Title Act.

“**Boulevard**” means that portion of a highway between the curb lines or the lateral boundary lines of a highway and the adjoining property or between curbs on median strips or islands, but does not include curbs, sidewalks, ditches or driveways.

“**Certificate of Acceptance**” means a certificate issued by the Superintendent of Works upon completion and acceptance by the Superintendent of Works of any works and services required to be provided by the terms of this Bylaw.

“**City**” means the Corporation of the City of Rossland.

“Community Sewer System” means a system of sewerage or sewage disposal works which is owned by operated by the City.

“Community Water System” means a system of waterworks owned and operated by the City.

“Construction Completion Certificate” means the certificate prescribed in section 2.10 of Schedule “B” to this Bylaw and attached as Schedule “E” to this Bylaw.

“Council” means the duly elected Council of the City.

“Cul-de-sac” means a highway with only one point of intersection with another highway and which terminates in a vehicle turning area, referred to as the “terminus”.

“Development” means affecting a change in the use of land and in the nature of the use of land, including but no limited to the subdivision of land, and the building or placement of structures on land.

“Developer” means the owner of land proposed to be subdivided or his representative.

“Easement” means the authorization by a property owner for the use by another, and for a specified purpose, of any designated part of his property.

“Final Acceptance Certificate” means the certificate prescribed in Section 2.13 of Schedule “B” to this Bylaw and attached as Schedule “F” to this Bylaw

“Frontage” means the width of a parcel measured along a line 6 meters back from the front parcel line and parallel

“Gradient of Grade” expressed as a percentage is determined by dividing the vertical height from the lowest to highest elevations on the lot by the horizontal distance between the lowest and highest points.

“Highway” means a public street, road, walkway, bridge, lane, thoroughfare and any other public way, but does not include a private right-of-way on private property.

“Lot” means the smallest unit into which lane is subdivided as shown on the records of the Land Title Office.

“Lot Line” means a legally defined limit of any lot.

“Lot Line, Front” means the boundary line of the lot and the street on which the lot abuts. In the case of a corner lot where two lot lines abut streets, the lot line of the shortest length shall be the front lot line. In the case of a through lot, the lot line abutting two parallel or approximately parallel streets shall both be considered as front lot lines.

“Lot Line, Side” means a lot line marking the boundary between two lots, or between a lot and a lane, or between a lot and the public street in the case of a corner lot, of which one or both ends intersect a front lot line.

“Maintenance Bond” means a Maintenance Bond or Irrevocable Letter of Credit acceptable to the City the amount of which should be 10% of the total construction value of the works and services as determined by the professional engineer representing the Owner and approved by the Superintendent of Works for a term which shall not be less than 12 months from the date of the Final Acceptance Certificate.

“Medical Health Officer” means the Medical Health Officer appointed under the Health Act for the territorial jurisdiction of the area in which a subdivision is located.

“Owner” means a person registered in the books of the Land Title Office as owner of land, whether entitled to it in his own right or in a representative capacity or otherwise, and includes the registered holder of the last registered Agreement for Sale and Purchase.

“Panhandle Parcel” means any parcel which is serviced and gains highway frontage through the use of narrow strip of land which is an integral part of the parcel (hereinafter called the “Access Strip”).

“Parcel” means any lot, block or other area in which land is held or subdivided but does not include a highway or portion thereof.

“Performance Agreement” means an agreement between the City and the Owner of land being subdivided or developed in substantially the same form as shown in Schedule “C” of this Bylaw to construct and install the required works and services by the date specified in the agreement or forfeit to the City the amount secured by the Performance Bond.

“Performance Bond” means either a cash deposit, a certified cheque to be deposited upon receipt or an Irrevocable Letter of Credit in the form prescribed in Schedule “C” of this Bylaw the amount of which shall be 125% of the total construction value of works and services required under this Bylaw as determined by the professional engineer representing the Owner and approved by the Superintendent of Works.

“Potable Water” means water that is drinkable and usable for culinary purposes, or as a result of being free of pathogenic organisms (or their indicators), toxic substances, objectionable taste, odor and color and other undesirable physical, chemical and biological characteristics.

“Professional Engineer” means a person who is registered or duly licensed as such to practice within the Province of British Columbia, under the provisions of the Engineering Professional Act, R.S.B.C.

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

- a) public rights of passage with or without vehicles, or
- b) constructing, maintaining or operating any railway, or
- c) erecting and maintaining any pole line, or
- d) laying, placing and maintaining drains, ditches, pipes, transmission lines, or wires for the conveyance, transmission or transportation of water, electrical power, communication or for the disposal of sewage, or
- e) the operation and maintenance of vehicular traffic and as registered as a public right-of-way.

“Roadway” means the portion of the highway that is improved, designed or ordinarily used for vehicular traffic.

“Service Report” means the reports prescribed in section 3.3 of Schedule “B” of this Bylaw and attached as Schedule “G” to this Bylaw.

“Site Servicing Plan” means engineered drawings showing the lay out and connection points for all services including: water, sewer, drainage, highway access; as well as all utilities including: cable, telephone and power.

“Street or Road - Arterial” means as a street or road used primarily by fast or heavy traffic of which a significant portion has both its origin and destination outside of the subdivision area.

“Street of Road - Collector” means a street or road which carries traffic from local streets to arterial streets and includes the principal entrance streets for circulation of traffic within a subdivision.

“Street of Road - Local” means a street or road used primarily for travel and access to and from the parcels of land contiguous thereto.

“Subdivision” means any change in the existing size, shape, number or arrangement of a registered lot or lots, whether by plan or metes and bounds description and may include a lot line adjustment, consolidation or highway widening.

“**Superintendent of Works**” means the person or persons designated from time to time by Council or any professional engineer engaged by the City as a consultant, to fulfill the duties assigned by this Bylaw.

“**Watercourse**” means a natural depression with well defined banks and a bed of 0.6 meters or more below the surrounding land serving to give direction to a current of water on the average at least six months of the year, or having a drainage area of two square kilometers or more.

“**Works and Services**” means the works and services to be performed and constructed by the owner as required by this Bylaw.

“**Zone**” means a land use designation established under the Zoning Bylaw of the City of Rossland and all amendments thereto.

SECTION 3 - CONDITIONS OF SUBDIVISION

3.0 .1 **General Regulations**

Subdivision of land in the City of Rossland shall be in compliance with the provisions of this Bylaw.

.2 **Site Suitability**

No subdivision will be approved which:

- a) is not suited to the configuration of the land being subdivided;
- b) is not suited to the use for which it is intended;
- c) will make impractical the future subdivision of the land within the subdivision or of any adjacent land;
- d) would cause any building, structure or used source of potable water to contravene any applicable Bylaw of the City of Rossland;
- e) is unsuitable for subdivision or development due to flooding, slope instability, improper drainage, rock formations, steep topography, utility easements or other potentially hazardous characteristics.

.3 **Area, Shape and Dimensions of Lots**

- a) No lot shall be created by subdivision that has an area in square meters or hectares less than those set out for the zone in which it is located as required in the City of Rossland Zoning Bylaw #1912, and all amendments thereto.
- b) Where a parcel being created by subdivision fronts on a highway, the minimum frontage is the lesser of:
 - i) 1/10 the perimeter of the lot that fronts on the highway; or
 - ii) the minimum frontage specified for the zone in which the parcel is located as required in the City of Rossland Zoning Bylaw #1912, and all amendment thereto.
- c) Notwithstanding Subsection 3.3 (b), the Approving Officer may exempt a person proposing to subdivide land from the prescribed minimum frontage.
- d) The side lines of a parcel to be created by subdivision shall be as close as practicable at right angle or radial to street lines, and the Approving Officer shall ensure that the shape and dimensions of the parcel are logical for the use intended.

.4 **Panhandle Lots**

- a) Panhandle lots shall be avoided except where required due to topography or other site constraints.
- b) Where access to a lot created by subdivision is proposed via a panhandle:
 - i) and the parcel is capable of further subdivision, the panhandle must be at least 20 meters in width;
 - ii) the panhandle shall not be included in the calculation of the minimum parcel area.

.5 **Double Frontage Lots**

Double frontage and reversed frontage lots shall be avoided except where required due to topography or other site constraints.

.6 **Access to Lots**

Each lot created by subdivision shall abut a public street from which safe and ready access to a driveway on each lot can be provided.

.7 **Provision of Park Land at Time of Subdivision**

In the case of residential subdivisions where three or more lots are created and the smallest lot created is less than 2 hectares in size Council may require a public park land dedication or cash-in-lieu payment pursuant to Section 941 of the Municipal Act.

.8 **Access to Public Hiking Trails**

In areas of the City where public hiking trails traverse or adjoin a property proposed for subdivision, the Approving Officer may require that a public walkway be dedicated to preserve access to that hiking trail. Where a park land dedication pursuant to Section 941 Municipal Act applies, the public walkway will be dedicated in that manner. In the event of a proposed subdivision that is not subject to Section 941 of the Municipal Act, the City of Rossland will seek to reach an agreement with the applicant to preserve public access to existing hiking trails.

.9 **Debris and Waste**

No fallen trees or brush, waste building material or any debris shall be left on any parcel created by subdivision or on any adjoining highway.

SECTION 4 - PROVISION OF SERVICES IN SUBDIVISIONS

4.0 .1 **Requirements For All Subdivisions**

- (a) All subdivisions shall be provided with services as prescribed in Schedule “A”.
- (b) All subdivisions shall comply with the requirements prescribed in Schedule “B” of this Bylaw.
- (c) All subdivisions shall comply with the requirements prescribed in Schedule “D” of this Bylaw.

.2 **Subdivisions Where Servicing Requirements May Be Waived**

Notwithstanding Subsection 4(1), the servicing requirements of this Bylaw may be waived where the parcel being created is to be used solely for unattended equipment necessary for the operation of:

- a) a community water system;

- b) a community sewer system;
- c) a community gas distribution system;
- d) a radio or television receiving or broadcasting antenna;
- e) a telecommunication relay station;
- f) an air navigational aid;
- g) an automatic telephone exchange;
- h) an electrical substation or power generating station;
- i) parks and playgrounds; or
- j) any other similar public service facility or utility

.3 Cost of Services

Unless otherwise provided in this Bylaw, all works and services required in the Bylaw shall be constructed and installed at the expense of the owner of the land being subdivided.

.4 Excess or Extended Services

The City may require that the owner of the land that is proposed for subdivision or development provide excess or extended services that will provide access to or serve land other than the land being subdivided or developed pursuant to the provisions of Section 939 of the Municipal Act. The provision of excess or extended services may include upgrading existing or undersized mains.

SECTION 5 - PERFORMANCE AGREEMENT FOR SUBDIVISION OR DEVELOPMENT

- 5.0 .1 All works and services required to be constructed and installed at the expense of the owner of the land being subdivided or developed shall be constructed and installed in accordance with the provisions of this Bylaw before the Approving Officer approves of the subdivision or the Building Inspector issues the building permit, unless the owner of the land:
- (a) deposits with the City a Performance Bond; and
 - (b) enters into an Performance Agreement with the City to construct and install the required works and services by the date specified in the agreement or forfeit to the City the amount secured by the Performance Bond.
- .2 Where the owner of the land being subdivided or developed is required to construct and install works and services in accordance with the provisions of this Bylaw, the owner shall provide the City with a Maintenance Bond.

SECTION 6 - SERVICING REQUIREMENTS FOR SUBDIVISIONS

6. .1 Highways

All highways created by a subdivision plan, including widening of existing highways, shall;

- a) comply with the dimension, location, alignment and gradient requirements set out in Section 1.0 of Schedule “D” of this Bylaw.
- b) be cleared, graded and surfaced in accordance with the standards set out in Schedule “A” and Section 1.0 of Schedule “D” of this Bylaw.

.2 Street Lighting

In subdivisions where highways are created, street lighting shall be installed and constructed in accordance with the standards set out in Schedule “A” and Section 6.0 of Schedule “D” of this Bylaw.

.3 Water System

Each parcel created by a subdivision shall be supplied with a complete water distribution system connected to a community water system or proven source of potable water as specified in Schedule “A”, and all system components shall be installed in accordance with the standards set out in Section 3.0 of Schedule “D” of this Bylaw.

.4 Sewage Disposal

In subdivision where parcels are created, provision for sewage disposal shall be as follows:

- a) Where ground disposal of sewage effluent is proposed, the construction of individual sewage disposal facilities shall be the responsibility of the owner of the parcel and subject to the approval of the Medical Health Officer. As stipulated in Section 5.7 and 5.8 of the City of Rossland Official Community Plan Bylaw #1854, 1995, and amendments there to, all on-site sewage disposal systems installed in the areas designated as the Happy Valley area and Parkdale area shall require the issuance of a Development Permit complying with the guidelines
- b) Where a community sanitary sewer system is proposed, each parcel created by the subdivision shall be provided with a

complete sewage collection system connected to the community sanitary sewer system, and all system components shall be installed in accordance with the standards set out in Section 4.0 of Schedule “D” of his Bylaw.

.5 Drainage System

Where a parcel created by subdivision is required to be served by a drainage system as specified in Schedule “A”, each lot created shall be provided with a drainage connection system constructed in accordance with the standards set out in Section 5.0 of Schedule “D” of this Bylaw.

**SECTION 7 - SERVICING REQUIREMENTS FOR SUBDIVISIONS
UNDER THE CONDOMINIUM ACT OR FOR
DEVELOPMENT WITH NO SUBDIVISION**

7.0 .1 Development Servicing

As a condition of the issuance of a building permit on the site being developed, the City of Rossland may require that the owner of the land being developed shall provide works and services which are directly attributable to the development in accordance with a Site Servicing Plan prepared by the owner and approved by the Superintendent of Works and in accordance with the requirements in Schedules “A”, “B” and “D” of this Bylaw.

.2 Domestic Water

The development shall be provided with domestic water service connected to community water system or a proven source of potable water, based on the servicing level requirements specified in Schedule “A” of this Bylaw, in accordance with the Site Servicing Plan.

.3 Sewage Disposal

For areas identified in Schedule “A” where community sanitary sewer service is required, the development shall be provided with sanitary sewer service connected to the community sanitary sewer system in accordance with the site servicing plan. On parcels outside the area where connection to the community sanitary sewer system is required, the development shall be provided with a sewage disposal system approved by the Medical Health Officer and in accordance with the site servicing plan. As stipulated in Sections 5.7 and 5.8 of the City of Rossland Official Community Plan Bylaw #1854, 1995, and amendments there to, all on-site sewage disposal systems installed in the areas designated as the Happy Valley area and Parkdale area shall require the issuance of a Development Permit

complying with the guidelines set out in the Official Community Plan Bylaw #1854, 1995 and amendments there to.

.4 Access Roads and Parking

- a) For developments where on-site parking and/or on-site loading facilities are to be provided, the development shall be provided with vehicle access from a highway or highways in accordance with the site servicing plan.

For a development site fronting on a controlled Access Highway designated pursuant to the Highway Act, the proposed method of providing access to the site shall also be subject to approval by the Ministry of Transportation and Highways.

- b) All access roads, on-site parking areas and on-site loading areas shall be surfaced by asphaltic concrete paving on parcels designated C-1, C-2 or M-1 in the City of Rossland Zoning Bylaw #1912. A gravel surface may be provided for offstreet parking and loading spaces and access aisles located on parcels not designated C-1, C-2 or M-1.

.5 Site Drainage

The development shall be provided with site drainage collection and disposal facilities in accordance with a site servicing plan complying with the requirements of Section 5.0 of Schedule "D". The drainage component of the site servicing plan shall illustrate the following:

- a) site grading - showing existing and post-development contours;
- b) method of on-site storm water collection;
- c) subject to the approval by the City and, if appropriate, Ministries having jurisdiction such as Highways and Environment, the method of storm water disposal may be by:
- i) connection to a municipal storm system;
 - ii) discharge to a surface drainage course;
 - iii) discharge to a natural watercourse;
 - iv) on-site disposal to dry wells.

- .6 Under no circumstances shall storm water drainage be permitted to be disposed to the community sanitary sewer system.

**SECTION 8 - SERVICING REQUIREMENTS FOR HIGHWAYS
ABUTTING A SITE BEING SUBDIVIDED OR DEVELOPED**

- 8.0 1 As a condition of the approval of a subdivision or the issuance of a building permit, the City of Rossland may require that the owner of the land being developed provide works and services directly attributable to the development on that portion of a highway immediately adjacent to the site being subdivided or developed, up to the center line of the highway, including:
- a) **Highway Improvements** - clearing, grading and surfacing in accordance with the standards set out in Section 1.0 of Schedule “D” of this Bylaw;
 - b) **Sidewalks, curbs and gutters** - construction of sidewalks, curbs and gutters in accordance with the standards set out in section 2.0 of Schedule “D” of this Bylaw;
 - c) **Water System Improvements** - in areas identified in Schedule “A” where connection to a community water system is required, construction of water distribution system components in accordance with the standards set out in Section 3.0 of Schedule “D” of this Bylaw;
 - d) **Sewer System Improvements** - in areas identified in Schedule “A” where connection to the community sanitary sewer system is required, construction of a sewer collection system in accordance with the standards set out in Section 4.0 of Schedule “D” of this Bylaw;
 - e) **Drainage System Improvements** - provision of drainage facilities as required in Schedule “A”, and construction of specific drainage system improvements in accordance with the standards set out in Section 5.0 of Schedule “D” of this Bylaw.

SECTION 9 - ADMINISTRATION

9.0 .1 Application Fee

An applicant for subdivision approval shall submit with the application a non-refundable fee in the following amounts and in addition the inspection fee calculated in accordance with Section 9.7;

- a) Fifty dollars for each single family residential lot which subdivides an existing single family residential lot;
- b) Subject to subparagraph (c) below, \$250.00 per parcel created by subdivision; and

- c) One hundred dollars per parcel when the subdivision contains three or more parcels.

.2 **Authorized to Enter on Lands Being Subdivided or Developed**

The Approving Officer or the Superintendent of Works, are authorized to enter, at all reasonable times, upon the lands for which application to subdivide or develop has been made, in order to ascertain whether the provisions of this Bylaw are being obeyed.

.3 **Penalty**

- a) Any person who violates any of the provisions of this Bylaw shall, on summary conviction, be liable to a penalty not exceeding the maximum fine prescribed in the *Offence Act*.
- b) Each day's continuance of an offense under sub-section 8.(3) (a) constitutes a new and distinct offense.

.4 **Compliance with Other Bylaws**

Subdivision approval or the issuance of a building permit shall not relieve the applicant of compliance with the regulations and provisions of all other Bylaws of the City of Rossland.

.5 **Severability**

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

.6 **Schedules Form Part of Bylaw**

Schedule "A" through "G" are attached to and form part of this Bylaw.

.7 Subdivision and development engineering and inspection fees for On-Site and Off-site Works shall be payable in the case of either subdivision applications or issuance of building permits, in addition to the application fee above, as follows:

- i. The additional engineering and inspection fee is calculated at:
 - a. 3% on the first \$500,000 of the cost of works and services;
 - b. 2% on the second \$500,000 and;

- c. 1% on the balance of over \$1,000,000.00 of the estimated cost of constructing the same.
- d. In no case shall the fee be less than \$300.00
- ii. The estimated costs shall be approved by the City Engineer.
- iii. Such costs are derived as follows:
 - a. Full cost of construction for ‘on-site’ (new roads) and ‘off-site’ (existing fronting roads), including clearing, grubbing, blasting, cuts and fills, gravel, compaction, pavement, concrete work, traffic signals, traffic signage, ditches, pedestrian underpasses, boulevard restoration and landscaping work if applicable.
 - b. All deep utilities such as storm drainage works, sanitary sewer works, water system works and creek culverts.
 - c. Costs of civil works only for shallow utilities such as installation costs of ducting power,, telephone and cable TV.
 - d. Costs of street lights and ducting where street lights will be owned by the City and ducting only if the street lights are not owned by the City.
 - e. Consulting Engineering design fees are not included in the administration fee calculation.
 - f. GST is not included in the administration fee calculation.

ENACTMENT

- 10.0 .1 If any section, subsection, sentence, clause or phrase of this Bylaw is for any reason held to be invalid by the decision of any court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder.
- .2 This Bylaw shall come into full force and effect on the final adoption thereof.

READ A FIRST TIME
 READ A SECOND TIME
 READ A THIRD TIME
 PUBLISHED PURSUANT TO BYLAW #1728
 RECONSIDERED AND FINALLY ADOPTED

this 6th day of April, 1998
 this 6th day of April, 1998
 this 6th day of April, 1998
 this 7th day of April, 1998
 this 25th day of May, 1998

Mayor

City Clerk

THE CITY OF ROSSLAND

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 1999, 1998

SCHEDULE A - SERVICING LEVELS

ESTABLISHMENT OF SERVICE LEVELS

- 1.0 Within the City of Rossland, different service levels are required for new subdivisions or developments in different areas of the municipality. Three service levels have been established, and the area to which each service level is to be applied is delineated on Maps 1 and 2 which form part of this schedule.

SERVICE LEVEL 1

- 2.0 The following level of services shall be provided in all subdivisions or developments in areas delineated in Map 1 as *SERVICE LEVEL 1* and in areas delineated in Maps 1 or 2 as *SERVICE LEVEL 2* or *SERVICE LEVEL 3* being subdivided to create lots measuring less than 2 ha.:
- 2.1 A highway with a right-of-way width as specified in Section 1.0 of Schedule "D", including:
- .1 asphaltic concrete paving on roadways, walkways and lanes;
 - .2 curb and gutter in subdivisions where new highways are created; where a new highway is not created, the requirement of curb and gutter may be waived subject to the issuance of a Development Variance Permit pursuant to Section 922 of the *MUNICIPAL ACT*;
 - .3 sidewalks where required as specified in Table 1, Section 1.0 of Schedule "D";
 - .4 underground power, telephone and cablevision in subdivisions where new highways are created; where a new highway is not created, overhead power, telephone and cablevision services may be provided subject to the issuance of a Development Variance Permit pursuant to Section 922 of the *MUNICIPAL ACT*;
 - .5 street lighting as specified in Section 6.0 of Schedule "D".
- 2.2 Water distribution system and connection to the community water system.
- 2.3 Sewage collection system and connection to the community sewer system.

- 2.4 Storm water drainage in accordance with a drainage plan as required in Section 5.0 of Schedule "D".

SERVICE LEVEL 2

- 3.0 The following level of services shall be provided in all subdivisions or developments in areas delineated in Map 2 as *SERVICE LEVEL 2*:
- 3.1 A highway with a right-of-way width as specified in Section 1.0 of Schedule "D", including:
 - .1 asphaltic concrete paving on roadways, walkways and lanes;
 - .2 curb and gutter in subdivisions where new highways are created; where a new highway is not created, the requirement of curb and gutter may be waived subject to the issuance of a Development Variance Permit pursuant to Section 922 of the *MUNICIPAL ACT*;
 - .3 sidewalks where required as specified in Table 1, Section 1.0 of Schedule "D";
 - .4 underground power, telephone and cablevision in subdivisions where new highways are created; where a new highway is not created, overhead power, telephone and cablevision services may be provided subject to the issuance of a Development Variance Permit pursuant to Section 922 of the *MUNICIPAL ACT*;
 - .5 street lighting as specified in Section 6.0 of Schedule "D".
- 3.2 Water distribution system and connection to the community water system.
- 3.3 Sewage collection system and connection to the community sewer system.
- 3.4 Storm water drainage in accordance with a drainage plan as required in Section 5.0 of Schedule "D".

SERVICE LEVEL 3

- 4.0 The following level of service shall be provided in all subdivisions or developments in areas delineated on Map 1 as Service Level 3 except for areas being subdivided to create lots measuring less than 2 ha.:
- 4.1 A highway with a right-of-way width as specified in Section 1.0 of Schedule "D", including:
 - .1 asphaltic concrete paving on roadways, walkways and lanes;
 - .2 roadside drainage ditches;
 - .3 overhead power, telephone and cablevision;

- .4 street lighting on overhead power poles.
- 4.2 Water distribution system and connection to:
 - .1 the community water system, or
 - .2 in areas where connection to the community water system is deemed impractical by the Approving Officer, connection to a proven source of potable water as specified in Section 3.0 of Schedule "D".
- 4.3 Sanitary sewage collection system and connection to:
 - .1 the community sewer system, or
 - .2 in areas where connection to the community sewer system is deemed impractical by the Approving Officer, connection to an on-site sewage disposal system as specified in Section 4.11 of Schedule "D".
- 4.4 Storm water drainage in accordance with a drainage plan as required in Section 5.0 of Schedule "D".

CITY OF ROSSLAND

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 1999, 1998

**SCHEDULE B - SUBDIVISION DESIGN DRAWINGS AND
CONSTRUCTION PROCEDURES**

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DEFINITIONS

RTAC	Roads and Transportation Association of Canada
ASTM	American Society for Testing and Materials
CSA	Canadian Standards Association
AWWA	American Water Works Association
kPa	Kilopascal
lpd	Litres per day
Usgpd	US Gallons per day
mPa	Megapascal
psi	Pounds per square inch
mm	Millimeters
m	meter
ft	feet
in	inches
m/s	Meters per Second
HPS	High Pressure Sodium
IES	Illuminating Engineering Society

SECTION 1.0 - ENGINEERING DRAWINGS

1.01 Design Drawing Preparation

All required engineering drawings shall be dated and sealed by a Professional Engineer.

1.02 Design Drawing Approval

All required engineering drawings shall be approved by the City before the Owner starts construction of subdivision or development services.

1.03 General and Legal Information

.1 Drawings to be completed in ink on standard A-1 size sheets (841 mm x 594 mm outside dimensions).

.2 In general, plan and profile drawings shall be to the scale:

Horizontal - 1:500

Vertical - 1:50

with the profile above and the plan below on the drawing. Where grades exceed 15%, the vertical scale may be 1:100.

.3 North arrow to face the top or left side.

.4 The City's subdivision reference number shall be shown on the title block.

.5 Consecutive drawings to be joined by matchlines.

.6 Legal dimensions to be shown on lines.

.7 Right-of way and easement numbers to be shown.

.8 All elevations shall be based on geodetic datum. A minimum of one (1) reference bench mark with elevation shall be shown on each design drawing.

1.04 Water Service Information

.1 On plan, show all watermains, hydrants, valves, caps, reducers, standpipes, pressure reducing stations and all other appurtenances.

.2 Show offsets of mains from property line, pipe sizes, material, and class.

- .3 On plan, indicate fitting sizes and joint types.
- .4 On profile, show pipe sizes, material and classes.
- .5 On plan, show water services from main to property line.
- .6 Location of water services to lot corner to be dimensioned.

1.05 Sanitary Sewer and Storm Drainage Information

- .1 On plan, show all pipes, culverts, manholes, catch basins, drainage drywells, clean-outs, leads, inlets and outfalls, pipe sizes, material, class of pipe and offset from property line.
- .2 On profile show manholes, pipe and sizes, length, material, classes, and grades between manholes and pipe invert elevations. Invert elevations of inlets and outfalls must be shown.
- .3 On plan, show all sanitary and storm sewer services from main to property line.
- .4 On plan, dimension location from lot corner to the services and note invert elevation and pipe size.
- .5 Show centerline of drainage ditches with arrows showing direction of flows.
- .6 Sanitary manholes on profile to be shaded with letratone or equivalent on back of mylar.
- .7 All manholes to have numbering circles on both plan and profile. The manhole numbers shown shall be in accordance with the City's numbering system.

1.06 Roadwork Information

- .1 On plan, show all curb lines, sidewalks, sidewalk widths, driveway crossings, edge of asphalt where no curbs exist, offsets to be shown on property line to curb line and centerline.
- .2 On profile, show road centerline profile including vertical curve data and grades, and gutter grades where they exist.
- .3 For development of steeper sites, the Approving Officer may require the Owner to prepare and submit a site grading plan showing lot and lot access grading.

1.07 Public Utilities Information

- .1 On plan, show gas, underground power, cable television and telephone ducts, overhead pole lines. All intermediate and high pressure gas mains are to be noted.

1.08 Street Lighting Information

- .1 On plan, show street lights and duct work, and all appurtenances related to the system.

1.09 Staging

- .1 On plan and profile clearly show subdivision development staging and the order in which each portion of the project will be developed.
- .2 Where deemed necessary by the Superintendent of Works, show future subdivision development plans for properties not being developed but adjacent to or affecting the subject properties.

1.10 Schools

- .1 On plan show school sites within or adjacent to the proposed development, including location, type of school, size and access points.

1.11 Soils

- .1 On plan show location of test holes, test hole logs, porosity of soils, the depth to ground water and bedrock, areas of soil instability and any other information deemed necessary by the Superintendent of Works.

SECTION 2.0 - CONSTRUCTION PROCEDURES

2.01 Construction Requirements: Dust Control and Clean-Up

.1 Dust Control

During construction of works and services within the subdivision or development, the developer shall be responsible for maintaining dust control at all times wherever:

- a) the operation of any equipment causes dust that becomes a nuisance to property owners and residents in the area;
- b) bare solid conditions are created in performing work.

.2 Clean-Up

- a) During construction of works and services within the subdivision or development, the Developer shall be responsible for ensuring that the construction area shall be maintained free of accumulation of excess or waste material and debris.
- b) The disposal of waste materials and rubbish by burning or burial on the site will not be permitted. The disposal of volatile wastes such as mineral sprits, oil, gasoline or paint thinner into storm or sanitary sewer drains will not be permitted.
- c) During and after construction of works and services, the Developer shall be responsible for ensuring that all access streets into subdivision or development are maintained free of accumulation of excess waste material and debris. The city reserves the right to carry out the maintenance of such access streets and charge the cost of such work to the Developer, if the Developer fails to restore the street(s) to normal levels within a 48 hours of being notified in writing by the City.

2.02 Construction Schedule

Before starting construction of subdivision or development services, the Owner shall provide the Superintendent of Works with a construction schedule, setting out the sequence and timing of construction activities, including those set out in Schedule "D" of this Bylaw where approval by the Superintendent of Works is required. If there are delays or variances from the construction schedule, the Owner shall inform the Superintendent of Works of these variances.

2.03 Authorization of Superintendent of Works to Enter on Lands

During construction, the Superintendent of Works is authorized to enter, at all reasonable times, upon the lands where services are being constructed to view the construction of all works.

2.04 Inspection of Works

Construction of the works shall be inspected by the Owner's engineer, at the Owner's expense, to ensure the works generally conform to the plans, specifications and standards approved by the City.

The Owner or his agent shall be responsible for all construction procedures, testing and coordination of the works and to ensure all works will be constructed to the satisfaction of the City.

2.05 Trench Cuts Across Existing Roads

Where utility mains or services have to cross existing roadways, the pavement shall be precut with a cutting wheel or saw.

Upon completion of the utility installation:

- .1 the trench shall be backfilled with competent soils compacted to 95% standard proctor density;
- .2 the crossing shall be patched with at least 300 mm of pitrum gravel subbase and 150mm of 19mm crushed gravel base course placed and compacted to 100% standard proctor density; and
- .3 the crossing patched with at least 75mm of hot mix asphalt.

2.06 Location and Protection of Existing Utilities

The existing underground services shown on City of Rossland drawings are not guaranteed to be accurate or complete. It shall be the responsibility of the Developer to find and locate all existing services such as water, sewers, drains and culverts, hydro, telephone, cablevision and natural gas; and to preserve and protect them from damage during construction.

No claim for damages by the Developer will be entertained by the City for the cost of locating existing utilities, adjusting or redesigning lines and grades or relaying pipe to avoid conflict.

2.07 Connections to Existing Utilities

All connections to existing utilities shall be undertaken by the Developer. The Developer shall design the connections and submit his design to the Superintendent of Works for approval.

2.08 Public Access and Safety

During construction of the work, all streets shall be kept open for public travel, unless prior arrangements have been made by the Developer with the Superintendent of Works.

At no time shall access be cut off completely from any houses or buildings, however private driveways may be cut off temporarily for periods up to twenty-four (24) hours. Before cutting off access to any houses or buildings, the Developer shall give at least twenty-four (24) hours notice to the owner and occupant of the property.

The Developer shall effectively warn and protect the public from any danger as a result of the work being done.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic or in such a manner that it creates a hazard for the public. At the end of each day's work and at other time when work is suspended, the Developer shall remove all equipment and other obstructions from that portion of roadway open for use by traffic.

The Developer shall ensure that fire hydrants, valve boxes, manhole covers, meter boxes, fire or police call boxes, and all other utility controls are accessible at all times.

The Developer shall provide temporary pedestrian bridges across the trench at all street intersections and at access points to houses and buildings unless alternative convenient pedestrian access is available.

2.09 Maintenance and Restoration of Existing Drainage Facilities

All existing drainage facilities disturbed by the Developer in carrying out the work shall be promptly restored to their original condition as the work advances. On completion of the work, drainage facilities shall have at least the same flow capacity as before and left in a stable condition to the satisfaction of the Superintendent of Works.

2.10 Construction Completion Certificate

Upon completion of construction, the Professional Engineer representing the Owner shall provide the City with a Construction Completion Certificate, stating

that the works as constructed generally conform to the plans and specifications set out in the approved engineering drawings.

2.11 Acceptance of Construction Completion Certificate by City

Upon receipt from the Owner's Professional Engineer of the Construction Completion Certificate the Superintendent of Works shall inspect the works and services, and upon determining that all deficiencies have been rectified to conform to the plans and specifications set out in the approved engineering drawings, shall accept the Construction Completion Certificate.

2.12 Maintenance Bond

Upon acceptance of the Construction Completion Certificate by the Superintendent of Works, the Owner shall provide the City with a Maintenance Bond acceptable to the City in the amount of 10% of the total construction value as determined by the Professional Engineer representing the Owner and approved by the Superintendent of Works. The term of the Maintenance Bond shall be from the date of acceptance of the Construction Completion Certificate to the date of acceptance of the Final Acceptance Certificate, but in no case shall the term be less than 12 months.

2.13 Final Acceptance Certificate

Within a period of 12 months after the date of acceptance of the Construction Completion Certificate by the City, the Professional Engineer representing the Owner shall provide the City with a Final Acceptance Certificate.

Upon receipt from the Owner's engineer of the Final Acceptance Certificate, the Superintendent of Works shall inspect the works and services and upon determining that all deficiencies have been rectified to conform to the plans and specifications set out in the approved engineering drawings, shall accept the Final Acceptance Certificate.

SECTION 3.0 - "AS-BUILT" DRAWINGS AND SERVICE REPORTS

Upon completion of the works, original as-built drawings shall be submitted to the City. The drawings shall conform to City standards and shall include all required inverts, locations, offsets and material classes comprising the works. In addition, the drawings shall include:

- .1 All service connections shall be accurately shown on the "as-built" drawings indicating horizontal distance from service location to property corner and an invert elevation at property line for sanitary sewer services. All revisions made during construction shall be included on the "as-built" drawings.
- .2 "As-Built" or "As-Constructed" must be clearly marked on the full sized transparency drawings and the drawings shall be dated and sealed by a Professional Engineer.
- .3 Service Reports for each serviced lot shall be submitted along with the "as-built drawings." The Service Reports, shall include the following information:

Sewer:

- invert of main at connection;
- invert of service at connection;
- invert of service at property line;
- size and type of service pipe;
- size and type of main
- location of service cap from lot corner;
- location of service connection at main from manhole.

Water:

- depth of cover at curb stop at property line;
- size and type of service;
- size and type of main;
- location of curb stop from lot corner;
- location of main from property line;
- location of main stop from nearest mainline valve.

CITY OF ROSSLAND

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 1999, 1998

SCHEDULE C - PERFORMANCE AGREEMENT

Schedule “C” consists of a form for an agreement between the City of Rossland and the owner of the land proposed for subdivision or development. This agreement is to be used where the owner:

- .1 has requested approval of the subdivision plan or issuance of a building permit before complete construction and installation of the works required in the Subdivision and Development Servicing Bylaw; and
- .2 is agreeable to entering into a binding agreement pursuant to Section 940 of the Municipal Act.

Under Section 3 of the Performance Agreement, the security to be provided to the City by the owner shall be in the amount of 125% of the total construction value of works required under this Bylaw as determined by the Professional Engineer representing the owner and approved by the Superintendent of Works. The construction cost estimate shall be submitted to the Superintendent of Works prior to final subdivision approval being granted by the City.

The Performance Agreement will also include as attachments the following:

- .1 Attachment 1 - Plan of Subdivision and Development prepared by the owner and approved by the Approving Officer.
- .2 Attachment 2 - Letter of Credit.

**PERFORMANCE AGREEMENT FOR THE SUBDIVISION
AND DEVELOPMENT OF LAND IN THE CITY OF ROSSLAND**

THIS AGREEMENT made this _____ day of _____, 19_____.

BETWEEN:

THE CITY OF ROSSLAND, a Municipality duly incorporated under the laws of the Province of British Columbia, having its offices at 1899 Columbia Avenue, P.O. Box 1179, in the City of Rossland, in the Province of British Columbia.

(hereinafter called the “City”)

OF THE FIRST PART

AND

(hereinafter called the “Owner”)

OF THE SECOND PART

WHEREAS the Owner desires to subdivide or develop certain lands within the City and more particularly known and described as:

(hereinafter called “the Lands”)

AND WHEREAS the Owner is required to construct certain highways and other works and services within the Lands or in relation to the development on the Lands (and to subdivide the Lands according to a plant of subdivision) or (and to develop the Lands according to a Site Servicing Plan) (hereinafter called the “Development”) a copy of which is hereunto annexed as Attachment 1 of this Agreement;

AND WHEREAS the Owner has requested approval of the Development prior to the construction and installation of the required works and services and is agreeable to entering

into this bonding agreement pursuant to Section 940 of the Municipal Act and to deposit the Performance Bond herein specified;

NOW THIS AGREEMENT WITNESSETH that in consideration of the premises and in consideration of the Agreement by the City to permit the Development, and in consideration of the approval of the subdivision plan or issuance of the building permit prior to completion of the construction of the works, the City and the Owner herein covenant and agree as follows:

.1 In this Agreement unless the context otherwise required:

“Complete” or “Completion” or any variation of these words when used with respect to the Development shall mean completion to the satisfaction of the Superintendent of Works when so certified by him in writing.

“Contract” means this Agreement.

“Development” means the work and services to be performed and constructed by the Owner as required by the Subdivision Servicing and Development Bylaw No. 1999 of the City.

.2 The Owner shall complete the Development herein specified to the satisfaction of the Superintendent of Works by the _____ day of _____, 19_____.

.3 As security for the due and proper performance of all of the covenants and agreements in this Contract contained and the Development contemplated, the Owner has deposited with the City:

a) Cash or a certified cheque to be deposited or receipt in the amount of \$_____ as security within the meaning of Section 940 of the *Municipal Act* (hereinafter called the “Performance Bond”), OR

b) An irrevocable Letter of Credit in the form attached as Attachment 2 in this Agreement in an amount of _____ bearing even date herewith, a copy of which is attached hereto, (hereinafter called the “Performance Bond”) to be valid for a period of twelve (12) months from the date hereof with automatic renewals from year to year, PROVIDED HOWEVER, that the City shall be at liberty to make demand on the said Letter of Credit at any time after the date hereof with the Owner being entitled to renew this Agreement as hereinafter provided if such Letter of Credit shall not have been demanded upon in the manner hereinafter provided and provided also that the amount of such Performance Bond may be reduced at any time with approval of the City in writing over the hand of the Approving Officer or Superintendent of Works of the City.

(NOTE: Clause a) or b) should be deleted if not applicable.)

.4 The Owner agrees that if the Development is not completed pursuant to Paragraph 2 hereof, the City may complete it, in which event the Owner shall forfeit the amount secured by the Performance Bond to cover the cost of such completion, and the City shall return to the Owner such balance of the Performance Bond as shall not be required for completion, less any administration fees or costs required. If there is insufficient money on deposit with the City by reason of the Performance Bond, then the Owner will pay such deficiency to the City immediately upon receipt of the City’s account for completion. It is understood that the City may do such work either by itself or by contractors employed by the City. If the Development is completed as herein provided, then the Performance Bond shall be returned to the Owner.

- .5 It is understood and agreed that the intent of this Agreement is that the Owner shall complete the development, and grant all necessary easements as shown in the plans and specifications attached and as approved by the Superintendent of Works on the _____ day of _____, 19_____. Construction procedures, ensuring that all works and services are fully operative and conform to City standards, as well as certification of construction completion, shall be in accordance with the provisions of the City of Rossland Subdivision and Development Servicing Bylaw No. 1999.

- .6 The Owner covenants and agrees to comply with the provisions of all Municipal Bylaws throughout the construction of the Development. In the event that any material or debris should be left upon any road after the construction of the Development, the owner covenants and agrees that the City may forthwith remove such material or debris at the expense of the Owner, the cost of such removal to be determined by the Approving Officer. In the event that any invoice of the City, for the removal of such material or debris, shall remain unpaid after thirty (30) days of receipt of the same by the Owner, the City is authorized to deduct the amount of such invoice from the Performance Bond referred to in paragraph 3 hereof.

- .7 The Owner shall, at all times in connection with the Development, keep and employ a competent general superintendent with the authority to act on behalf of the Owner and capable of taking orders, instructions, directions and requests given by the City and these communications to the superintendent shall be held to have been given to the Owner.

- .8 The owner covenants and agrees to:
 - (a) Maintain the development and complete repair for a period of one year from the date of completion as certified by the Superintendent of Works.

 - (b) Remedy any defects appearing within a period of one year from the date of such completion of the development and pay for any damage to other work or property resulting therefrom save and except for defects caused by reasonable wear and tear, negligence of the City, its servants or agents, or acts of God or by vandalism proven to have been committed after the date of completion.

 - (c) Leave with the City for a period of one year from the completion of the Development, as certified by the Superintendent of Works, a Maintenance Bond as required by the City of Rossland Subdivision and Development Servicing Bylaw No. 1999. Should the owner fail to maintain the said Development, remedy any defect or pay for any damages resulting therefrom, the Municipality may deduct the cost of completing all works, remedying and defect or paying the damage from the said Maintenance Bond.

- .9 The Owner shall submit to the City final as-built drawings as required in the City of Rossland Subdivision and Development Servicing Bylaw No. 1999, Schedule B, Section 3.0 - "As-Built" Drawings and Service Reports.
- .10 The Owner covenants and agrees to comply with any changes in subdivision requirements or standards established by City of Rossland Bylaws prior to the substantial commencement upon the said lands of the development contemplated by this Agreement.
- .11 With respect to property taxes on the property herein described:
 - a) The Owner agrees to pay all arrears of taxes outstanding against the property herein described before the formal approval of any subdivision plans or the issuance of a building permit.
 - b) The Owner further undertakes to pay all current taxes levied or to be levied on the Lands on the basis and in accordance with the assessment and collector's roll entries.
- .12 The Owner covenants to save harmless and effectually indemnify the City against:
 - a) All actions and proceeding costs, damages, expenses, claims and demands whatsoever and by whomever brought by reason of the Development.
 - b) All expenses and costs which may be incurred by reason of this Agreement resulting in damage to any property owned in whole or in part by the City or which the City, by duty or custom, is obliged directly or indirectly, in any way or to any degree, to construct, repair or maintain.
 - c) All expenses and costs which may be incurred by reason of liens or non-payment of labour or materials, Workers' Compensation assessment, unemployment insurance, Federal or Provincial Tax or check off.
- .13 If in the opinion of the Superintendent of Works, a delay in performance of the Development is caused by reason of labour disputes, fire, acts of God, unusual delay by common carriers or any other act which is effectively beyond the Owner's control, the Superintendent of Works may extend the time for completion of the Development by the Owner for whatever time the Superintendent of Works deems to be reasonable in the circumstances.
- .14 The City hereby covenants and agrees with the Owner to permit the Owner to perform all the said works herein upon the terms and conditions herein contained.
- .15 The City covenants and agrees that upon satisfactory completion by the Owner of all the covenants and conditions of this Agreement, to provide the Owner with a

Final Acceptance Certificate in accordance with the provisions of the City of Rossland Subdivision and Development Servicing Bylaw No.1999.

- .16 It is understood and agreed that the City has made no representations, covenants, warranties, guarantees, promises or agreements with the Owner other than those in this Agreement.
- .17 The works required to be constructed shall, upon acceptance of the City of the Final Acceptance Certificate, become the property of the City free and clear of any claim by the Owner of any person claiming through the Owner, and the Owner shall save harmless the City such claims and agrees that such claims may at the option of the City and from the Performance Bond.
- .18 It is understood and agreed that before any bond or security required under this Agreement is reduced or released, the Owner shall provide the City with a statutory declaration certifying that all labour, material, Workers' Compensation, and other taxes and costs have been paid.
- .19 Wherever the singular or the masculine are used in this Indenture, the same shall be construed as meaning the plural or the feminine or body corporate or politic where the context or the parties hereto so require.
- .20 This Agreement shall ensure to the benefit of and be binding upon the parties hereto, their respective heirs, executors, administrators and assigns.
- .21 Waiver of any default by either party shall not be deemed to be a waiver of any subsequent default by that party.
- .22 The rights, powers remedies of the City provided in this Contract are cumulative and not exclusive of any right, power or remedy that may be available to the City at law or in equity.
- .23 The whole Contract between the parties hereto is set forth in this Agreement and no representations, warranties or conditions, express or implied, have been made other than expressed herein.
- .24 Nothing contained or implied in this Contract shall in any way prejudice or affect the rights and powers of the City in the exercise of its function under any public or private statutes, bylaws, orders or regulations.
- .25 Time is of the essence of this Agreement.
- .26 (1) Whenever it is required or desired that either party deliver or serve a notice on the other, delivery or service shall be deemed to be satisfactory and deemed to have occurred when:

- (a) served personally, on the date of service; or
 - (b) mailed by prepaid registered mail to the address listed for that party on the first page of this Contract or other address of which that party has in writing notified the other, on the earlier of the date received or on the 5th business day following date of mailing at any Canada Post Office, but in the event of interruption of main service, notice shall be deemed to be delivered only when actually received by the party to whom it is addressed.
- (2) The General Superintendent hired by the Owner in control or a person apparently in control of the Owner's activities on the Lands is an agent of the Owner for the purpose of service of notices.

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

THE CORPORATE SEAL OF THE CITY OF ROSSLAND was hereunto affixed in the presence of

The amount and form of this Performance Bond and Agreement is approved by the City of Rossland this _____ day of _____, 19____.

APPROVING OFFICER

THE CORPORATE SEAL OF THE OWNER was hereunto affixed in the presence of:

RENEWAL

The City and the Owner hereby agree that this Agreement and the security herein is hereby renewed for a further period of twelve (12) months in form identical to this agreement which renewal is approved by the Approving Officer.

THE CORPORATE SEAL OF THE CITY OF ROSSLAND was hereunto affixed in the presence of:

APPROVING OFFICER

THE CORPORATE SEAL OF THE OWNER was hereunto affixed in the presence of:

_____)

DATED in _____ this _____ day of _____, 19 _____.

CITY OF ROSSLAND

PERFORMANCE AGREEMENT FOR THE SUBDIVISION OR DEVELOPMENT OF LAND

ATTACHMENT 1 - PLAN OF SUBDIVISION OR SITE SERVICING PLAN

The attached Plan of Subdivision for the Lands meets the requirements of Subdivision Servicing Bylaw 1999, 1998 and has been approved by the Approving Officer.

**CITY OF ROSSLAND
PERFORMANCE AGREEMENT FOR THE SUBDIVISION OR DEVELOPMENT OF LAND
ATTACHMENT 2 - LETTER OF CREDIT**

Date _____

Bank of _____

To: The City of Rossland

Initial Expiry Date _____

Dear Sirs:

At the request of _____,

(Owner)

we hereby establish in your favour our irrevocable credit for a sum not exceeding _____

Dollars (\$ _____ **).** This credit shall be available to you by sight drafts drawn on the

Bank of _____,

(Address)

B.C. when supported by your written demand for payment made upon use. This Letter of Credit is required in connection with an undertaking by the Developer to perform certain works and services required by you. We specifically undertake not to recognize any notice of dishonour of any sight draft that you shall present to us for payment under this Letter of Credit. You may make partial drawings or full drawings at any time. We shall honour your demand without inquiring whether you have a right as between yourself and our Customer.

The amount of this Irrevocable Letter of Credit will continue in force for a period of one year, but shall be subject to the condition of this Irrevocable Letter of Credit that it shall be deemed to be automatically extended without amendment from year to year from the present or any future expiration date, unless at 30 days prior to the present to any future expiration date, we notify you in writing by registered mail that we elect not to consider this Irrevocable Letter of Credit to be renewable for any additional period.

Our reference for this Letter of Credit is Bank of _____

_____, B.C., Letter of Credit No. _____.

(Address)

BANK OF _____

The Owner hereby specifically agrees that it shall not take any action to dispute the validity of this Letter of Credit unless it shall have expired prior to demand. We hereby agree to indemnify the Bank of _____ against any costs of actions relative to the above. We also authorize the Bank of _____ to make such payment as may be necessary and debit our account.

OWNER

CITY OF ROSSLAND

DEVELOPMENT AND DEVELOPMENT SERVICING BYLAW NO. 1701, 1989

**SCHEDULE D - SUBDIVISION AND DEVELOPMENT SERVICING,
DESIGN AND CONSTRUCTION REQUIREMENTS**

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SECTION 7.0 STANDARD DRAWINGS

SECTION 1.0 - HIGHWAYS

Section 1.0 sets out standards for the dimensions, locations, alignment and gradient of highways, and standards and specifications for the design, construction, materials utilized and installation of works related to roadways.

1.01 Highway Classifications

For the purpose of establishing standards, highways are classified into the following categories:

- .1 **Collector Street** - means a street which carries traffic from local streets and includes the principal entrance streets for circulation of traffic within a subdivision.
- .2 **Industrial Street** - means a street in an area zoned for industrial use which is especially designed to carry truck traffic and having the same function as a Collector Street.
- .3 **Local Street** - means a street designed to permit low speed travel within a neighbourhood and direct access to adjacent properties.
- .4 **Cul-de-Sac** - means a highway with only one point of intersection with another highway and which terminates in a vehicle turning area, referred to as the "terminus".
- .5 **Lane** - means a highway more than 3 m but not greater than 10 m in width, intended to provide secondary access to parcels of land. A lane is not a partial highway.
- .6 **Walkway** - means a path located within a public right-of-way to provide for pedestrian movement.

1.02 Highway Standards

- .1 Different highway standards will be required for different classes of highways and for different service level areas as defined and identified in Schedule A of this Bylaw. Based on these servicing level requirements, the required standards for right-of-way widths, pavement widths, curb and gutter, sidewalk and shoulders are set out in Table 1 following.
- .2 Notwithstanding the right-of-way widths specified in Table 1, where due to terrain or soil conditions, the provision of curb and gutter, sidewalks or gravel shoulders along with cut and fill slopes within the required right-of-way is unfeasible, the Approving Officer may require widening of the road right-of-way.

TABLE 1 - ROADWAY STANDARDS BY HIGHWAY CLASSIFICATION

HIGHWAY CLASSIFICATION	RIGHT OF WAY		PAVEMENT WIDTH	CURB & GUTTER	
	SIDEWALKS	SHOULDER TYPE/ WIDTH			
Collector	Major Urban one side not required (with curb and gutter)	20 m	11 m	both sides	2 m
	Major Urban one side gravel/1.5 m (with gravel shoulder)	20 m	7.5 m	not required	1.5 m
	Major Rural required	gravel/1.5 m 20 m	7.5m	not required	not
	Residential one side not required (with gravel shoulder)	20 m	9 m	both sides	2 m
	Residential one side gravel/1.5 m (with gravel shoulder)	20 m	7.5 m	not required	1.5 m
Industrial	Collector required	gravel/3.0 m 20 m	7.5 m	not required	not
	Minor required	gravel/1.5 m 20 m	7.5 m	not required	not
	One Way required	gravel/1.5 m 20 m	7.5 m (gravel)	not required	not
Local Street	Urban required (with curb & gutter)	not required 20 m	7.5 m	both sides	not
	Urban (with gravel shoulder) required	gravel/1.5 m 20 m	7.5m	not required	not
	Rural required	gravel/1.5m 20 m	7.m (gravel)	not required	not
Cul-de-Sac	Curb and Gutter required	not required 20 m	7.5 m	both sides	not
	Gravel Shoulder required	gravel/1.0 m 20 m	7.5 m	not required	not
Lane		6 m	5m		

Walkway

3m

1.5m

1.03 Intersection Standards

Standards for intersections are as follows:

- .1 Intersection Spacing - no intersection shall be less than 40 meters from any other intersection or likely future intersection. Measurement shall be made along the center line of the intersected highway and between the center lines of the intersecting streets.
- .2 The intersection approach angle shall be as near as possible to 90 degrees, with a minimum permissible angle.
- .3 Y-shaped intersections shall be avoided.
- .4 Intersections with more than four lets shall not be approved.
- .5 Intersections shall not be located on or near sharp horizontal curves or near the crest of any vertical curve.

In areas of steeper terrain, the intersection standards listed above may be altered or relaxed subject to approval in writing by the Superintendent of Works.

1.04 Intersection Design Criteria

- .1 Unless otherwise indicated, intersection design standards shall conform to the latest edition of R.T.A.C. Geometric Design Standards. Where due to steep terrain the application of these design criteria would prove impractical or unfeasible, the criteria set out below may be altered or relaxed subject to approval in writing by the Superintendent of Works.
- .2 At street intersections, the minor street shall be constructed with an approach grade of not greater than 3%, for a distance of not less than 15 metres back from the proposed edge of asphalt of the major road.
- .3 Minimum K values of vertical curves at intersections shall not exceed those shown in Table 2 below.

TABLE 2

INTERSECTION STREET	MINIMUM K VALUES (in meters)	
	Crest	Sag Curve
Collector	7	6
Local	4	4

- .4 Grades of major roads through intersections shall not exceed 75% of the maximum allowable grade for the following distances from the intersecting road curb line.
 - Collector 30 metres
 - Local 15 metres

1.05 Clearing

- .1 All roadway rights-of-way and lanes shall be cleared their full width, grubbed and all refuse completely disposed of.
- .2 Where possible, topsoil shall be removed and stored on site for later replacement on lots.
- .3 Leaning or dangerous trees or snags outside the clearing area shall be removed.
- .4 Burning shall be carried out in accordance with the provision of the Forest Act and regulations thereto and the applicable City of Rossland Bylaw.

1.06 Grading

Topsoil shall be removed for the full width of the right-of-way and the roadway, lane and boulevard areas shall be graded to the approved profile and cross-sections. The completed subgrade profile shall be constructed to a tolerance of 30mm and all soft, spongy or unstable areas which may exist or develop shall be excavated to a firm base and backfilled to grade with compacted selected material. All utility trenches within the subgrade section shall be excavated to a firm base and backfilled to grade with compacted select material. Acceptable native subgrade material is to be compacted to 100% Standard Proctor Density.

1.07 Road Cut and Fill Slopes

- .1 Cut and fill slopes shall be accommodated entirely within the road right-of-way. When necessary, the Approving Officer may require additional road dedication to contain the cut and fill slopes within the right-of-way and require that road construction be completed prior to submission of the subdivision plan.
- .2 Unless otherwise approved by the Superintendent of Works, cut and fill slopes shall conform to the following:

1 vertical to 2 horizontal;

The Superintendent of Works may request that for embankments and excavations greater than 2 metres in height, a geotechnical report be submitted to substantiate the recommended design slopes.
- .3 Rock cuts shall be constructed to .75 vertical to 1.0 horizontal.

1.08 Boulevard Grading

- .1 Boulevards shall be smoothly graded from the back of the curb and/or back of the sidewalk to the property line and restored with 100mm of raked topsoil.
- .2 The grade of the boulevard to the property line shall not exceed 3% unless approved in writing by the Superintendent of Works.

1.09 Roadway Design Criteria

.1 Design Speed

Roadway shall be designed to R.T.A.C. Geometric Design Standards unless otherwise specified.

.2 Cross-Section

All roads shall be designed with a 2% crown unless otherwise approved by the Superintendent of Works. Under certain adverse topographical conditions, such as developments on steep side hills, roads shall be crossfalled at 2% towards the high side ditch.

.3 Horizontal Alignment

Table 3 below provides the minimum required center line radius for the two main roadway classifications.

TABLE 3

ROADWAY CLASSIFICATION	DESIGN SPEED	MINIMUM CENTERLINE HORIZONTAL RADIUS (metres)	
		km/hr	SUPERELEVATION (m/m)
		NORMAL CROWN	
			0.02 0.04
Collector	60	120	110 100
Local	50	65	

.4 Curb Returns

Table 4 below details require curb return radii for the various road classifications.

At intersections of roads without curb and gutter, the pavement shall be placed to the same radii as for roads with curb and gutter.

ROAD CLASSIFICATION	CURB RETURN RADII (metres)
INDUSTRIAL	9
COLLECTOR	8

LOCAL

6

.5 Vertical Alignment - Road Grades

- a) Minimum longitudinal road grades with curb and gutter shall not be less than 0.50 percent.
- b) Maximum grades shall not exceed those shown in Table 5 below unless it can be justified to the Superintendent of Works that short pitches exceeding the maximum will improve intersection design.
- c) Where due to steep terrain the application of these road grade standards would prove impractical or unfeasible, the standards set out in Table 5 below may be relaxed subject to approval in writing by the Superintendent of Works.

TABLE 5

ROAD CLASSIFICATION	MAXIMUM GRADE
COLLECTOR	8%
LOCAL	8%
CUL-DE-SAC	
Entrance	uphill 2% downhill 2%
Terminus	uphill 2% downhill 2%
INDUSTRIAL	8%
LANES	8%

Maximum grades are to be reduced by 1% for each (or part of each) 30 metres that the centerline radius is less than 150 metres.

.6 Vertical Curves

Vertical curves are to be designed to provide safe stopping sight distances. Vertical curve lengths are calculated by the following equation $L = KA$

- where L = length of vertical curve
- K = a constant related to lines to geometry of a parabolic curve
- A = algebraic difference in grades in percent

Table 6 below specifies minimum K values to be used for vertical curve design.

TABLE 6
MINIMUM K VALUES (in metres)

ROADWAY CLASSIFICATION	DESIGN SPEED km/hr.	CREST CURVE		SAG CURVE
		MINIMUM	DESIRABLE	
COLLECTOR	60	10	15	9
LOCAL	50	7	10	6

In order to provide proper drainage, a maximum K value of 80 metres for crest curves, and 40 metres for sag curves shall be used.

.7 Cul-de-Sacs

All dead end roads must be provided with a cul-de-sac bulb. Unless otherwise approved by the Superintendent of Works, cul-de-sac roads shall not be greater than 150 metres in length.

1.10 Road Base Design Requirements

- .1 The Superintendent of Works may, in areas where poor soil conditions exist, request a pavement structure design from a Geotechnical Engineer.
- .2 The following minimum road base requirements outlined in Table 7 may be used when the applicant is not requested to submit a pavement structure design.

TABLE 7

ROAD CLASSIFICATION	SUB-BASE THICKNESS	BASE THICKNESS	ASPHALT THICKNESS
COLLECTOR	300 mm	150 mm	75 mm (2 lifts)
LOCAL	300 mm	150 mm	75 mm “ “
CUL-DE-SAC	300 mm	150 mm	75 mm “ “
INDUSTRIAL	300 mm	150 mm	75 mm “ “
CUL-DE-SAC	300 mm	150 mm	75 mm “ “

The Superintendent of Works reserves the right to require that where a total of 75 mm of asphalt is required by this bylaw, that the 75 mm be placed in either one or two lifts depending on weather conditions and other factors.

1.11 Earthwork Compaction

.1 Embankments

Embankments shall be compacted to at least 95% of standard maximum dry density when tested in accordance with the Standard Proctor method, ASTM Standard D698.

.2 Subgrade Compaction

Prior to placement of road sub-base gravel, the subgrade shall be shaped to design cross-section and compacted to at least 100% Standard Proctor density, ASTM Standard D698.

1.12 Roadway Construction Materials

.1 Right to Reject Material

The Superintendent of Works shall have the right to reject any material delivered to the site which has no prior approval. All sampling and testing shall be done in accordance with ASTM or CSA Standards.

.2 Road Sub-Base

The material for the road sub-base course shall be 75 mm minus pitrun gravel composed of inert durable materials, free from soft disintegratable particles.

When tested in accordance with ASTM Standards C136, the material shall meet the gradation requirements and shall be uniformly graded as follows:

Sieve Size	Percent Passing
75 mm (3 inch)	100%
25 mm (1 inch)	50 - 85
0.15mm (#100)	30 - 60
0.075 mm (#200)	2 - 8

(wet sieving conforming to ASTM-C-117)

The granular sub-base shall be placed and compacted to at least 100% Standard Proctor Density, ASTM D698.

.3 Road Base for Paved Roads and Road Surface for Gravel Roads

Granular base course material and the road surface material for gravel roads shall be uniformly graded 19 mm crushed gravel of which not less than 60% of the material retained on the No. 4 sieve is fractured rock. Base course and gravel road surface materials shall have the following gradation limits:

Sieve Size	Percent Passing
-------------------	------------------------

19 mm (3/4 inch)	100 %
9.5 mm (3/8 inch)	60 - 100
4.75 mm (#4)	40 - 80
2.36 mm (#8)	30 - 60
1.18 mm (#16)	20 - 45
0.300 mm (#50)	8 - 20
0.075 mm (#200)	2 - 8
	(wet sieving)

The granular base course shall be placed and compacted at least 100% Standard Proctor Density ASTM D698.

.4 Shoulders

The material for finishing road shoulders shall be as specified for road base. The shoulder material shall be watered and compacted to 100% of Standard Proctor Density, ASTM D698.

1.13 Asphaltic Concrete Pavement and Related Works

All asphaltic concrete pavement for roads and lanes shall be manufactured and placed in accordance with the standards set out in this Schedule and only after all required services are installed.

.1 Construction Schedule

Before commencement of the works, the applicant shall prepare a construction schedule satisfactory to the Approving Officer, based upon completing the various phases or parts of the work. During installation and construction, the Applicant's Engineer shall certify that each phase or part is complete and meets all standards and requirements. The Applicant shall not proceed to a subsequent construction phase prior to the inspection of the preceding phase by the Approving Officer. If the Approving Officer is not given proper notice and has not had ample opportunity to carry out the proper inspections, he may take whatever steps he deems necessary including exposing or removal of the works.

.2 Where restoration work is necessitated by reason of construction through a built up or established area, work shall proceed in such a manner that testing, manhole construction, house service connections, restoration of private easements, boulevards, roads, and general site cleanup are completed no later than thirty (30) days after completion of the works. If the restoration is not completed within this time, the City reserves the right to enter upon the property, carry out or complete the restoration and charge the cost of such work to the Applicant.

1.14 Asphaltic Hot Mix Concrete

.1 Asphalt Cement

Asphalt cement shall conform to ASTM Standard D946 for asphalt cement used in pavement construction. The asphalt cement shall be uniform in character, free of water and shall not foam when heated to 177 degrees C.

.2 Aggregate

All aggregate particles shall be clean, tough, durable, moderately sharp and free from coatings of clay, silt, loam and other deleterious material. Combined aggregates shall be free of clay or silt balls or any other aggregations of fine material.

a) **Course Aggregate**

Coarse aggregate shall be all material retained on a 4.75 mm sieve and shall conform to the soundness and abrasive requirements in ASTM Designation D692-54.

b) **Fine Aggregate**

Fine aggregate shall be all material passing the 4.75 mm sieve and shall conform to ASTM Designation D1073.54.

c) **Mineral Filler**

The mineral filler shall conform to ASTM Designation D242 and shall have the following gradation:

4.75 mm (#4) sieve	100% passing
0.15 mm (#100) sieve	90 - 100% passing
0.075 mm (#200) sieve	70 - 100% passing

d) **Gradation**

The mixed aggregates shall meet the following gradation limitations by wet sieve analysis:

19 mm	100%
12.5 mm	80 - 100%
9.5 mm	70 - 90%
4.75 mm	50 - 70%
2.36 mm	35 - 50%
0.600 mm	18 - 30%
0.300 mm	7 - 15%
0.075 mm	4 - 8%

.3 Asphalt Primer

Asphalt Primer shall be MC-30, or as specified by the Asphalt Institute.

.4 Asphalt Tack Coat

Bituminous tack coat shall be SS-1 or SS-1h asphalt emulsion, or as approved.

1.15 Asphalt Mix Design

The mix design shall meet the following specifications:

Characteristic	Requirement
Asphalt cement viscosity grade	AC8
Asphalt cement content (by total wt. of mix)	4.5 - 7.0%
Compaction blows per end of specimen ⁷⁵	
Stability @ 68 degrees C.	545 kg
Flow Index	8 - 16
% voids total mix (compacted)	3 - 5
% V.M.A.	14 (minimum)
Mixing temperature	143 deg. C - 157 deg. C.
Asphalt cement temperature	135 deg. C - 148 deg. C.
Aggregate temperature	140 deg. C. - 162 deg. C.

1.16 Asphaltic Concrete Surfacing

Asphaltic concrete shall not be placed prior to approval of the base coarse, tack coat or prime coat by the Superintendent of Works. The hot mix placement temperature shall be between 124 degrees C. and 148 degrees C. for a 75 mm mat thickness.

1.17 Compaction of the Mix

After Compaction, the finished pavement shall conform to the following minimum density requirements:

April 15 - August 31 - 97% of Marshall design density - ASTM D1559 - 76

After August 31 - 98% of Marshall design density - ASTM D1559 - 76

1.18 Cold - Mix Asphaltic Concrete

Cold - mix asphaltic concrete shall not be permitted, unless approved by the Superintendent of Works.

1.19 Lanes

.1 Where service lanes for vehicular traffic are provided in commercially zoned subdivisions, the requirements for subgrade preparation and surfacing of lanes shall be as for street surfacing.

- .2 Lanes may be provided where terrain and natural features render vehicular access impracticable and where:
- a) they form an extension of any existing system of lanes; or
 - b) they are necessary to provide secondary access in order that reasonable traffic flow can be assured on the main highway.

1.20 Street and Traffic Control Signs

The Applicant shall deposit with the City funds equal to the cost of providing and installing street name and traffic control signs. Signs will be installed by the City when all works are completed by the Applicant.

1.21 Street Names

Street names shall be assigned by the City.

SECTION 2.0 - CURB, GUTTER AND SIDEWALKS

2.01 General

In areas where curb and gutter are to be provided, non-mountable concrete curbs are required for all collector roads and in commercial zones. Mountable concrete curbs shall be installed in all other areas where curb and gutter are mandatory. Curbs, gutters and sidewalks shall be installed in accordance with the design standards set out in this section. All curb, gutter and sidewalk sections shall be monolithic and to the dimensions described in the Standard Drawings contained in Section 7.0 of this Bylaw.

2.02 Design Standards

.1 Curb Return

Curb return radii shall conform to Table 4 of Section 1.10 of this Schedule.

.2 Concrete

Concrete shall conform to CSA-A23 and the mix design shall conform with the following:

- a) Minimum compressive strength - 30 Mpa at 28 days.
- b) Maximum aggregate size.
- c) Slump - 50 mm +/- 20 mm
- d) Air entertainment - 5% to 7%
- e) Cement shall be Type 1 Normal or Type III High Early.
- f) Other additions may be used only if prior approval is obtained from the Superintendent of Works.

2.03 Construction Standards

.1 Subgrade Preparation

- a) All topsoil, organic soils, frozen materials, roots or other deleterious materials shall be removed. The subgrade shall be compacted to 100% of the Standard Proctor density, ASTM D698.
- b) Granular sub-base and base course materials shall conform to the Road Base Specifications set out in Section 1.12 of this Schedule and shall be placed to a minimum of 0.3m beyond the back edge of the curb or sidewalk.

.2 Construction Joints

Construction joints shall be installed at sidewalk crossings and along the surface of existing structures where the sidewalk butts up to the surface. The material used shall be bituminous fibre, conforming to ASTM-D 545 and shall be installed throughout the entire depth of the sidewalk. The construction joint shall be exposed with a 6 mm radius edge.

.3 Contraction Joints

Contraction joints shall be constructed every 3 m by means of an approved marking tool which has a minimum width of 32 mm and a minimum depth of 6 mm. The edges of the tool shall be rounded off with a 6 mm radius. Contraction joints shall be the full width of and perpendicular to the longitudinal axis of the sidewalk, curb and gutter, invert crossing median section.

.4 Finishing

- a) When the concrete has partially set up, the surface shall be worked with wood and steel trowels. Under no circumstances shall water be sprinkled onto the surface of the concrete in order to provide a more workable surface.
- b) After steel trowelling the surface to a smooth, even finish the sidewalk shall be broomed transversely; curbs, gutters, invert crossings and medians shall be left with a smooth trowel finish. No mortar coat or water shall be used. After brooming, the edges shall be rounded with an edger, having a minimum width of 32 mm and a minimum depth of 13 mm. Invert crossings shall be surface jointed after brooming as shown.

.5 Curing and Protection

Freshly deposited concrete shall be protected from premature drying and extreme temperature. It shall be maintained with minimal moisture loss at a relatively consistent temperature for a period of time necessary for hydration of the cement and proper curing of the concrete.

Curing and protection of concrete shall conform to Section 21 of CSA Standard Can3-A23.1-M77.

.6 Concrete Test Results

All concrete test results shall be submitted to the Superintendent of Works. Three concrete test cylinders shall be taken for each class of concrete poured from each day's construction, or from every 50 cubic metres placed. One cylinder will be tested at 7 days, two cylinders will be tested at 28 days.

SECTION 3.0 - WATER SYSTEM

3.01 General

- .1 The standards and specifications set out in this Section shall apply to all waterworks construction by, for, or in the City of Rossland. All standards not specifically covered in this Section shall be in accordance with the appropriate A.W.W.A. Standards or as directed by the Superintendent of Works.
- .2 In the areas identified in Schedule A where connection to a community water system is not required, each parcel created by a subdivision shall have a proven source of potable water in compliance with Ministry of Health regulations.

3.02 Installation of Watermains

All materials, including pipe fittings, shall be installed to applicable A.W.W.A. Standards for the installation of the particular type or class of material being used and to any additional requirement as set out by the materials manufacturer. All watermains shall be installed to a minimum depth of 1.5 metre clear cover from the crown of the pipe to the finished grade of the street directly above the pipe. All pipe shall be bedded, backfilled and compacted in accordance with this Section.

3.03 Connection to Existing Systems

Connection of a new water distribution system to existing municipal mains, or the turning on of water into new mains must be carried out by the applicant under the direction of the City. Application for connection must be made to the Approving Officer and adequate advance notice for undertaking such work shall be provided.

3.04 Design Standards

.1 Design Pressure

- a) Generally water systems shall be designed for pressures in the range of 210 Kpa(30 psi) to 590 Kpa (85 psi), with 210 Kpa (30 psi) measured under peak hourly demand conditions and the 590 Kpa (85psi) measured under static conditions. The minimum pressure shall be measured or calculated at the main floor of the highest proposed house, and an allowance made for pressure loss in the service line to the house wall. Reservoir level shall be assumed at mid-point for calculation of minimum pressure, and full for calculation of maximum static pressure.
- b) The maximum daily demand condition shall be assumed to be:
 - .1 8800 lpd (2100 US gallons per day) per single family dwelling, mobile home, medium density rowhouses, townhouses or duplex dwelling unit.

- .2 3200 lpd(850 US gallons per day) per high density apartment dwelling unit.
- .3 Water systems shall be designed to ensure that fire flows as required by the Insurers Advisory Organization (IAO) are available for required duration and within acceptable pressure limits.

.2 Minimum Pipe Size

Minimum supply mains in residential areas in all subdivisions shall be a minimum of 150 mm diameter. In high density or commercial areas, the minimum water main size shall be 200 mm diameter. 50 mm blow-off shall be provided on dead ends.

3.05 Materials

All materials and equipment utilized shall conform to the following standards and to the latest edition of the pertinent AWWA Standard Specifications for materials and equipment. All material shall be new non-corrosive and of the best quality available. Alternative materials shall be covered by the latest AWAS specifications. All material must be approved by the Ministry of Health for use in public water supply systems.

.1 Pipe

Pipe sizes 100 mm and larger shall be ductile iron (Ductile), or polyvinyl chloride (P.V.C) as directed by the Superintendent of Works.

a) Ductile Iron Pipe

Ductile Iron pipe shall conform to AWWA Standard C151/A21.51-81.

Class: The pipe wall thickness shall be designed for each application in accordance with AWWA C150/A21.50-81.

Pipe Joints: Pipe joints shall be a rubber gasket type conforming to AWWA C110/A21. 10-82 such as Bell-tite, Tyton or approved equal.

Cast Iron Fitting Hubs: Hub connections shall be Bell-Tite, Tyton, Ter-Mech or approved equal.

Cathodic protection may be required at the discretion of the Superintendent of Works.

b) Polyvinyl Chloride (P.V.C.)

Polyvinyl Chloride pipe shall conform to AWWA Standards C900-81 with the following particular requirements:

Class: All pipe shall be Class 150 or better.

.2 Main Line Valves

Line valves 150 mm and larger shall be Canada Valve or Terminal City or equivalent gate valves conforming to AWWA Standard C500-80. Valves shall be iron-body, bronze-mounted, solid wedge or double disc gate, non-rising stem with flanged or hubbed ends to suit. Flanges shall have Class 125 Standards drilling. Valve stems shall be fitted with a standard AWWA nut and shall turn clockwise to close.

All valves shall have the manufacturer's name and catalogue number molded as an integral part of the valve body.

On distribution mains throughout the subdivision, valves shall be installed to isolate sections of main no greater than 200 m in length.

Valves shall be flanged directly onto mainline fittings.

.3 Cast Iron Fittings

Cast iron fittings such as bends, tees, crosses, adapters, end caps, etc., shall be flanged or hubbed to suit. Flanges shall be standard Class 125 cast iron flanges.

.4 Fire Hydrants

All hydrants shall be equivalent in all respects to Terminal City C71P compression type hydrants and shall be equipped with two 64 mm nominal I.D. outlets, 8 threads per 25.4 mm, conforming to the B.C. Standard hose thread and one 130 mm outside diameter pumper port conforming to American National Fire Hose Coupling Threads.

Fire hydrant spacing shall conform to the latest issue of the Insurers Advisory Organization (IAO) recommendations; however, in any case, fire hydrants shall not be spaced greater than 150 metres apart.

Access paths to hydrants shall be graded to all hydrants separated from the road by a ditch or as otherwise directed by the Superintendent of Works. The access pad shall generally be at the same grade elevation as the road shoulder with a culvert installed in the ditch.

.5 Valve Boxes

Valve boxes shall be telescopic Robar No. 37 - 72, or equivalent.

.6 Service Connections

Service connection pipe up to and including 50 mm diameter shall be Type K soft copper tube conforming to ASTM specification B88.

Corporation cocks shall be Mueller standard brass.

Curb Stops shall be stop and drain type Mueller brass or equivalent with an inverted key and adjustable service box.

All bushings, reducers, union and nipples shall be standard brass.

.7 Coupling Clamps

Upon approval from the Superintendent of Works, joining of two plain end pipes may be by use of Robar Series 306 stainless steel clamps or equivalent.

.8 Air Release

Provisions for air release shall be provided at all critical high points throughout the water system. Should conventional means for air release not be sufficient or non-existent on the designed system, installation of air and vacuum release valves shall be required.

3.06 Pipe Bedding Material

- .1 Pipe bedding shall be undertaken in strict accordance with the manufacturer's bedding requirements for the type of pipe utilized. Sand bedding, where required, shall be clean, well graded sand with a maximum aggregate size of 6 mm with not more than 8% by weight passing the No. 200 sieve.
- .2 Bedding material shall be provided in accordance with the standard drawings contained in Section 7.0 of this Schedule.

3.07 Main Offsets from Centre Line and Depth of Bury

- .1 Water distribution mains shall be installed 3.5 metres from the center line of road on the opposite side as the sanitary sewer.
- .2 The minimum depth of bury from finished ground elevation to the top of the pipe shall be 1.5 metres.
- .3 The minimum clearance between watermain and sewer main crossings shall be 450 mm.
- .4 Where watermains are installed under the roadway or roadway shoulder, a 1.5 metres diameter asphalt apron shall be placed around all valves and appurtenance structures.

3.08 Service Connections

- .1 Service connections are defined as the installation from the connection at the main up to and including curb stop and service box marked "Water".
- .2 Service connections shall be installed in accordance with the standard drawings contained in Section 7.0 of this Schedule. A water connection shall be installed, wherever possible, in a common trench with the sanitary sewer connection, provided that the water service is located a minimum 300 mm above the sewer service. Where this minimum vertical separation cannot be provided, the water and sewer services shall be separated a minimum of 3 metres.
- .3 The minimum depth of bury for services from finished ground to the top of the pipe shall be 1.5 metres.
- .4 Each dwelling to be sighted on a parcel created by a subdivision shall have an individual 20 mm water service connection. For multiple unit residential or larger scale commercial projects, the size of service connection shall be determined by the Superintendent of Works based on available pressure and estimated demand.

3.09 Thaw Wires

The Superintendent of Works may require that thaw wires be installed from the watermain to property line parallel to the copper service connection. Thaw wires shall be 2/0 coated copper wire, seven strand or better.

3.10 Horizontal Reaction Blocks

Horizontal reaction blocks shall be placed between undisturbed soil and all fittings whose deflection is greater than 10 degrees. Reaction blocks for each type and size of fitting shall be sized to conform to the bearing areas specified on the standard details. Reaction block concrete shall not be placed over the joints between the fitting and the pipe.

3.11 Vertical Reaction Blocks

- .1 Vertical reaction blocks shall be placed above or below vertical fitting deflections of greater than 5 degrees (grade change of 9%).

The quantity of concrete required shall be calculated on the basis of the following:

Calculate the total head at the fitting:

H - 71 metres (surge) + elevation difference between reservoir and fitting in metres.

$$\text{Concrete required} = 2 \times 1000 H A \sin 1/2 \angle \times 1.5 = \text{sq.m.}$$

Where H = Calculated head at the fitting
 A = Area of the Pipe in square metres.
 Δ = Deflection angle of fitting.

- .2 Steel restraining bars between the fitting and the concrete shall be shaped to the fitting and be a minimum of 15 mm diameter and shall be galvanized or bituminous coated.

3.12 Cross Trench Bridging

20 Mpa concrete shall be used to backfill pipes installed under existing main crossings to protect against settlement of the upper main. The haunching shall extend one metre clear of each side of the crossing main.

3.13 Pipe Anchors

- .1 Pipe anchors shall be placed around watermains laid at grades of 33-1/3% and steeper, and shall be constructed in accordance with the standard details.
- .2 All pipe anchors shall be constructed with 25 Mpa concrete and shall project a minimum of 200 mm into undisturbed soil at the bottom and sides of the trenches.
- .3 Anchors on all sizes of ductile iron pipe and polyvinyl chloride cast pipe shall be cast on every second joint abutting the downhill portion of the bell.

3.14 Erosion Protection

Trench backfill on steep sideslopes shall be placed in a manner to eliminate erosion due to surface runoff. Design drawings shall identify the means to be used for erosion protection.

3.15 Watermain Disinfection and Flushing

- .1 All watermains, fittings, services and appurtenances shall be disinfected and flushed to the satisfaction of the Superintendent of Works and in compliance with the requirements of the Ministry of Health.
- .2 Providing the inside of the pipe installed is clean, the water system may be chlorinated in accordance with the AWWA Standard C601-81, Section 7, Hypochlorite tablets (with 3-3/4 grams of available chlorine per tablet). The number of tablets required for various sizes of pipe shall conform to the following table.

Length of Pipe Section in metres	Diameter of Pipe (mm)					
	50	100	150	200	250	300
4 metres	1	1	2	2	3	5

5.5 metres	1	1	2	3	5	6
6 metres	1	1	2	3	5	7
9 metres	1	2	3	5	7	10
12 metres	1	2	4	5	9	14

- .3 The tablets shall be attached to the top of the main by using a non-toxic waterproof glue.
- .4 If in the Superintendent of Work’s opinion, the mains were constructed without due cleanliness or should the mains have to be re-chlorinated because of the ineffective chlorinating with tablets, chlorinating shall be undertaken by the continuous feed method (AWWA Standard 601-81) until satisfactory tests have been proved.
- .5 After 24 hour chlorinating retention time, all mains, services and appurtenances shall be completely flushed of sand, silt , dirt, chlorinated water and other foreign material. The Developer shall ensure that flushed water does not create a hazard or nuisance to the public, nor to public and private property. Where practical, watermains shall be flushed into storm sewers or where no storm sewers or reasonable drainage areas exist, the Developer shall flush mains into a tanker truck and dispose of it away from the site. The Developer shall take full responsibility for damage to persons or property caused by his flushing operations.
- .6 After the main has been satisfactorily flushed, the Developer shall collect water samples from sections of the system as prescribed by the local Health Inspector. The samples shall be submitted to the Ministry of Health for testing with test results reported directly to the Superintendent of Works by the Ministry of Health.

3.16 Watermain Testing

- .1 All water mains shall be pressure tested with water to AWWA Standards at a minimum of 1030 Kpa (150 lbs./sq. in.) or 1.5 times the working pressure of the main, whichever is greater, for a minimum duration of two hours. The system shall be tested in sections which shall be defined as the length of watermain between two consecutive mainline valves including services, hydrants, fittings and all other appurtenances. The working pressure of the test section shall be the normal working pressure of the line at the lowest elevation within the section. Leakage pressure tests may be conducted on more than one section at a time; however, the allowable leakage for the total test length may not exceed the allowable leakage of the shortest test section.
- .2 The Superintendent of Works shall calculate the test pressure and shall determine the leakage rate.
- .3 The allowable leakage shall be determined by the following formula:

$$L = \frac{ND P}{65,200}$$

Where:

L = allowable leakage in litres per hour
N = number of joints in test section
D = inside diameter of pipe in millimeters
P = test pressure in kilopascals

Examples of allowable leakage in litres per hour per 50 couplings:

Pipe Diameter	Test Pressure - 1030 Kpa (L/hr per 50 couplings)
100	2.47
150	3.70
200	4.93
250	6.16
300	7.40
350	8.63
400	9.86
450	11.10
500	12.33
600	14.80

- .4 All leaks shall be repaired and all air pockets removed from the watermain test section and the test continued until the leakage is less than the allowable leakage calculated by the Superintendent of Works.

SECTION 4.0 - SANITARY SEWER SYSTEM AND SEWAGE DISPOSAL

4.01 Sanitary Sewer System

The standards set out in this section shall apply to and govern sanitary sewerage systems installed in the City of Rossland. The design of these systems shall comply with the design principles of the Waste Management Branch as defined in a publication entitled “Guidelines for Assessing Sewerage Works”.

4.02 Design Standards for Sanitary Sewer System**.1 Design Flow**

- a) The design flow for sanitary sewers in the City shall be calculated on the basis of the following criteria:

Average Daily Flow	365 litres (80 Igals)/capita/day
Infiltration Allowance	5190 (1140 Igals)/hectare/day

- b) The ratio of Peak Flow divided by the average daily flow shall be known as the Peak Factor. The Peak Factor shall be calculated by using the Harmon Formula as follows:

$$\text{Peak Factor} = \frac{18 + P}{4 + P} \quad \text{where P is the service population in thousands}$$

.2 Pipe Size

- a) Minimum a sanitary sewer main extension in low density residential areas is not conceivable, the final 300 metres of main may be 150 mm diameter.
- c) The pipes shall be designed, using the Manning Formula with roughness coefficient $n=0.13$, to flow full (or less than full) at the design flow with a velocity not less than 0.75 metres per second.

.3 Depth of Mains

Mains shall be designed to connect all possible basements on the assumption that the service pipe leaves the building at the closest point to the sewer at a pipe crown elevation 0.45 metres below the basement floor level and runs at a slope of not less than 2.0% to connect to the crown of the sanitary sewer main.

.4 Sanitary Sewer Manholes

- a) Manholes shall be installed at the end of each line; at all changes in grade, size or alignment; at all intersections; and at distances not greater than 122 metres for sewers 375 mm or less.
- b) Standard manholes shall be 1050 mm inside diameter.
- c) The maximum drop between pipe inverts shall be 200 mm. Where drops greater than 200 mm occur, the pipe inverts shall exceed 600 mm and an outside drop structure installed.

.5 Anchoring

- a) Sanitary sewer mains installed at grades steeper than 20% shall be anchored in accordance with the standard detail drawings.
- b) 25 Mpa Concrete shall be used for anchor construction.

4.03 Minimum Velocity and Grade

Minimum velocity for pipe flowing full or half full shall be 0.75 m per second. Some corresponding minimum grades are as follows assuming n = 0.013. Steeper grades are desirable.

100 mm dia	1.50%	375 mm dia	0.23%
150 mm dia	1.00%	400 mm dia	0.20%
200 mm dia	0.60%	450 mm dia	0.18%
250 mm dia	0.40%	525 mm dia	0.15%
300 mm dia	0.32%	600 mm dia	0.12%
350 mm dia	0.28%		

4.04 Main Offsets from Centre Line and Minimum Depth of Bury

- .1 Sanitary sewer mains shall be offset 3.5 mm from the road center line on the opposite side as the watermain.
- .2 The minimum depth of bury from finished ground elevation to the top of the pipe for mains and services shall be 1.5 metres unless otherwise approved by the Superintendent of Works.

4.05 Sanitary Sewer Service Connections

- .1 100 mm diameter sewer services (or larger if required), shall be installed to be property line in accordance with the standard drawings. The service shall be installed, wherever possible, in a common trench with the water service, provided that the water service is located not less than 300 mm above the sewer service. The sewer service shall generally be offset 3.0 metres from the low corner of the lot. Deviation from the required location for

the sewer service may be permitted in instances where topographic features dictate a more desirable location of the service connection.

- .2 Service connections shall be made with an approved branch wye or wye saddle and be installed in a straight line and at uniform grade from the terminus at the property line to the 45 degree long radius bend at the main.
- .3 The ends of service connections shall be not more than 300 mm short of the property line. The ends of all service connections shall be sealed with watertight plugs or caps and marked with 50 mm x 100 mm stakes placed vertically with one end in the bottom of the trench and in contact with the watertight plug or cap and the other end protruding at least 0.6 metres above ground level. The depth of service pipe invert below the top of the 50 mm x 100 mm marker stake shall be marked on the stake.
- .4 When the sewer main is 3.6 metres or more in depth, service risers may be installed close to the main when the service depth is less than the sewer main.

4.06 Materials

.1 Pipe

The following type of pipe will be acceptable for sanitary sewer mains and services:

Polyvinyl Chloride (PVC) Pipe

For 150 mm to 300 mm sizes, the pipe the fittings shall conform to ASTM D3034-73, and shall have a minimum SDR of 35. for diameters greater than 300 mm, the pipe shall be Perma-Lac 320 and Perma-Loc 70 ribbed gravity sewer pipe conforming to ASTM F794083. 100 mm and 150 mm sanitary sewer services shall have a minimum SDR of 28. The pipe shall be coloured green for in-ground identification as sewer pipe.

.2 Precast Manhole Sections

- a) Precast concrete manhole sections shall be 1050 mm inside diameter with 115 mm wall thickness, reinforced concrete pipe of at least Class II in accordance with ASTM Standard C76 with tongue and groove joints. Manhole sections shall have 19 mm galvanized steel steps cast in the concrete as shown on the standard drawings.
- b) Joints shall be made water tight.
- c) Cover slabs for manholes shall be reinforced to withstand H-20 highway loading conditions.

.3 Cast Iron Manhole Frames and Covers

Covers and frames shall be cast iron of an approved pattern to withstand H-20 loading. The clear opening of the frame shall be 500 mm in diameter. The cover shall have a weight of 66 kg. The frame shall be of the round base pattern have a weight of 84 kg. Bearing faces of the cover to frame shall be machined for a nonrocking fit. Covers shall have two only 22 mm diameter lifting holes with bolt plug assembly as shown on the standard drawings. Frames shall have three only 22 mm diameter leveling holes. Covers and frames shall be Dobney Foundry Pattern C20, or approved equal. The wording "SANITARY SEWER" shall be embossed on each cover.

.4 Concrete

Poured in place concrete shall have a 28 day strength of 25 Mpa.

4.07 Infiltration, Air and Exfiltration Tests

.1 Infiltration Test

Where the surface level of existing groundwater in the backfilled trench is one metre or more above the top of the pipe throughout the entire test section, an infiltration test shall be used to determine leakage into the pipe.

.2 Air Test

Where the groundwater surface level is less than one metre above the top of the pipe at the lowest point in the test section, or where groundwater at the time of testing is not apparent, a low pressure air test shall be carried out. Air pressure tests shall be the minimum time allowed for the pressure within a sewer main section to drop from 24.1 Kpa to 17.2 Kpa. The minimum time-air pressure loss for various diameters of pipe are as follows:

Pipe Diameter	Minimum Time for Air Pressure to Drop from 24.1 Kpa to 17.2 Kpa
100 mm	3 minutes, 46 seconds
150 mm	5 minutes, 40 seconds
200 mm	7 minutes, 34 seconds
250 mm	9 minutes, 26 seconds
300 mm	11 minutes, 20 seconds
350 mm	14 minutes, 10 seconds

Copies of the test results shall be submitted to the Superintendent of Works on the City's standard test forms.

.3 Exfiltration Test

Where the groundwater level is below the pipe invert throughout the section, an exfiltration test may be used. The test section shall be sealed at its lower extremity by means of a watertight plug. The test section shall be filled with water such that a minimum hydrostatic head of 600 mm is placed on the pipe at its upper extremity. The head of water on the pipe shall be taken as the distance from the top of the pipe to water surface at the point of measurement. The test pressure shall be maintained above the 600 mm minimum head for a period of not less than one hour.

The maximum allowable infiltration/exfiltration rate shall be 9.3 litres/mm of pipe diameter/24 hours/kilometer of sewer main. Rates for various pipe sizes are as follows:

Pipe Diameter	Maximum Allowable Infiltration/Exfiltration Rate in Litres per Hour Per Metre of Main
100 mm	.0387
150 mm	.0581
200 mm	.0775
250 mm	.0968
300 mm	.1162
350 mm	.1356

Copies of the test results shall be submitted to the Superintendent of Works on the City's standard test forms.

- .4 Manholes shall be tested with water to prove they are completely water tight.
- .5 If leakage is detected, the leak or leaks shall be found and repaired by approved measures. The testing shall be repeated in these sections until leakage is within acceptable limits.

4.08 Cleaning and Flushing

All sewer mains, manholes and services installed shall be flushed of all deposits of silt, sand, gravel, debris and other objectionable materials. All sewer mains shall be flushed clean and a suitable sized plug passed through each test section to ensure no obstructions exist. The Superintendent of Works shall witness all flushing operations. Mains visibility between manholes.

4.09 Video Inspections

The Superintendent of Works may require a video inspection report be submitted where conventional testing indicates the section may not conform a specifications or for sections which cannot be adequately tested by conventional means.

4.10 Forcemains

.1 Pipe

Pipe sizes 100 mm and larger shall be polyvinyl chloride (PVC) or Ductile Iron (D.I.).

a) Polyvinyl Chloride (P.V.C.)

Polyvinyl Chloride class and series pipe shall conform to AWWA C900 or ASTM D2241.

b) Ductile Iron Pipe (D.I.)

Cathodic protection may be required at the discretion of the Superintendent of Works.

.2 Fittings

Cast iron fittings shall conform to watermain specifications.

.3 Pipe Bedding Material

Pipe bedding material and installation shall be in accordance with the watermain specification.

.4 Reaction Blocks

Reaction blocks shall be placed in accordance with the watermain specifications.

.5 Pipe Anchors

Pipe anchors shall be placed in accordance with the watermain specifications.

.6 Testing

Forcemains shall be tested to AWWA standard at 1.5 time the working pressure for a duration of two hours. The allowable leakage shall be calculated by the AWWA formula noted in the watermain specifications.

Copies of the test results shall be submitted to the Superintendent of Works on the City's standard test forms.

.7 Depth of Bury

The minimum depth of bury from finished ground elevation to the pipe shall be 1.5 metres unless otherwise approved by the Superintendent of Works.

4.11 Land Disposal

In the areas identified in Schedule “A” where on-site sewage disposal is permitted, the design and installation of such a system shall be in compliance with the regulations of the Ministry of Health, Central Kootenay Health Unit or the Ministry of Environment, Waste Management Branch depending on the required capacity of the proposed disposal system. As stipulated in Policy 2, Section 3.5 of the City of Rossland Official Community Plan Bylaw No. 1640, 1988, all on-site sewage disposal systems installed in the Happy Valley area shall require the issuance of a Development Permit complying with the guidelines set out in Section 4.5 of the Plan.

SECTION 5.0 - STORM DRAINAGE

Bylaw 2104 .0
Nov27_00

GENERAL

Where the provisions of Schedule 'A' of the Subdivision & Development Servicing Bylaw #1999, require the construction of a storm drainage system, the Applicant shall provide a storm drainage system including sewer mains, manholes, service connections and all related appurtenances consistent with the standards and specifications contained in this Section.

1.1 Approval of Engineering Drawings Required Prior to Construction

Engineering drawings and design calculations which show detailed design of the necessary works shall be submitted to the Approving Officer, City Engineer, or Public Works Superintendent for approval prior to the commencement of construction. The drawings shall show alignment and size of pipes, proposed grades, distances between manholes, manhole invert elevations, existing ground line, proposed final ground line over the pipe, location of all service connections to the property line, all easements, pipe bedding requirements and all other details as may be required.

1.2 Where Sewage Collection System Not Required

Where storm drainage facilities are not required at the time of development, the City of Rossland may require rights-of-way to be provided by the Applicant to allow for the eventual installation of these facilities. Such rights-of-way shall be registered in favour of the City of Rossland at the Applicant's expense. In this instance, the Applicant will be required to provide for surface drainage as required by the Approving Officer, with all catch basins and other appurtenances designed to facilitate connection to the future storm sewer system.

1.3 Stormwater Management

All drainage systems in the City of Rossland shall be designed considering the overall management of stormwater. The primary purpose will be to limit the effect of peak flows and volumes of runoff on property, receiving streams, and watercourses.

1.4 Minor and Major Drainage Systems

The drainage system shall consist of two components, the minor and the major systems. The minor system will consist of underground conduits, groundwater interceptor drains, open channels and watercourses designed to convey a 10 year return period flow for residential, industrial, commercial, institutional, and high density residential areas. The major system will consist of surface flood paths, roadways and watercourses designed to convey the 100 year return period flow. In special conditions where surface flood paths cannot be established, pipes and culverts of the minor system may be enlarged to accommodate the major system flow.

1.5 Adequate Drainage

All subdivisions shall be adequately drained throughout the year. Where the whole or part of any proposed subdivision is wet or subject to intermittent or periodic flooding, approval of the subdivision will be withheld until the Approving Officer is satisfied that

appropriate steps have been taken to drain the land or otherwise remedy such wet or flooding conditions.

1.6 Existing and Natural Watercourses

Where a subdivision is traversed by a watercourse, drainage way or stream, a right-of-way shall be provided along such watercourse or its planned re-alignment of a width deemed necessary by the Approving Officer for construction, maintenance, conservation, and beautification purposes.

No natural drainage course shall be altered or diverted unless such alteration or diversion has been approved by the City of Rossland and the Provincial Ministry of the Environment Lands and Parks.

Storm water shall only be discharged from a subdivision to a drain, ditch, watercourse, stream or other waterway as may, in the opinion of the Approving Officer, be adequate to receive the discharge therefrom, or which has been declared a part of the City of Rossland drainage system.

1.7 Drainage Systems Through Private Property

Where it is necessary to construct a drainage system through privately-owned land, the Applicant shall obtain or grant a right-of-way in favour of the City of Rossland to guarantee the right of access, in perpetuity, to the drain area facility in perpetuity.

2.0 DESIGN CRITERIA

2.1 Sizing of Systems

The system shall be of sufficient capacity to accommodate all tributary areas as defined by the City. For drainage areas 20 hectares and smaller, the Rational formula shall be used:

$$Q = KCIA$$

- Where:
- Q = Flow in m³/s
 - K = Constant to establish units of compatibility (.00278)
 - C = Dimensionless runoff coefficient
 - I = Rainfall intensity in mm/hr
 - A = Runoff area in hectares

Rainfall intensities shall be as shown on Standard Drawing D-8 or calculated according to the following equation:

$$I = A \times T^B$$

- Where: T = the time of concentration in hours
A and B are coefficients as specified in Table 5.1

**TABLE 5.1
RAINFALL INTERPOLATING EQUATION COEFFICIENTS**

Rainfall Frequency	A	B
10 Year Storm	18.4	-0.711
100 Year Storm	27.3	-0.739

For the minor system, the 10 year frequency curve shall be used. For the major system, and for special structures such as in the design of storm retention basins, underpass drainage or arterial roads, the 100 year rainfall curve shall be used.

The time of concentration, or inlet time, will vary with topography and the nature of the drainage areas, but will generally be fifteen minutes or greater for residential areas. Inlet times shall be determined by the Design Engineer, subject to the approval of the City of Rossland.

Runoff coefficients for storm sewer design shall be assumed to be not less than the values specified in Table 5.2.

**TABLE 5.2
RUNOFF COEFFICIENTS**

Description of Area	Runoff Coefficient
Commercial	
Downtown	0.82
Neighbourhood	0.60
Industrial	
Light area	0.65
Heavy area	0.75
Residential	
Suburban	0.30
Single – family	0.40
Multiunits – detached	0.55
Multiunits – attached	0.65
Apartment dwelling area	0.60
Parks, cemeteries	0.15
Playgrounds	0.25
Unimproved areas	0.15

Runoff coefficients other than those specified in this section shall be used only with the express consent of the City Engineer.

For tributary areas greater than 20 hectares, the method used by the Design Engineer to calculate storm flows shall be approved by the City Engineer.

2.2 Design Grade

The minimum design grade shall be calculated by use of the Manning Formula such that a minimum velocity of 0.6 m/s shall be maintained during the design flow.

Pipes shall be designed to carry the required quantity when flowing $\frac{3}{4}$ full for pipes sized 450 mm and smaller. Pipes sized 525 mm or larger shall be sized to carry the required quantity when flowing full.

2.3 Roughness Coefficients

Roughness coefficients for use with the Manning's Formula shall be as specified in Table 5.3.

**TABLE 5.3
ROUGHNESS COEFFICIENTS**

Pipe or Channel Material	Roughness Coefficient
Concrete Pipe	0.013
PVC Pipe	0.013
Corrugated Metal Pipe	
Unpaved	0.024 – 0.033
25% paved	0.021 – 0.028
100% paved	0.013
Smooth Asphalt	0.012
Asphalt or Concrete Paving	0.014
Packed Clay	0.030
Light Turf	0.200
Dense Turf	0.350
Dense Shrubbery	0.400

There are no maximum allowable velocities except that the designer shall ensure that adequate energy dissipation is provided in the system subject to the approval of the City Engineer.

2.4 Minimum Pipe Size

Minimum pipe size shall be 250 mm for mains, 200 mm for catch basins leads, 100 mm for residential service connections, and 150 mm for non-residential service connections. The minimum pipe size for mains accepting flows from open ditches shall be 400 mm and suitable silt traps and inlet structures shall be provided.

2.5 Culverts

Where an open ditch system is required to cross a road, street or driveway, the ditch shall be enclosed by means of a culvert. All culverts shall be of sufficient size to properly drain all of the area naturally draining into the channel or ditch feeding into the culvert but shall be a minimum 400 mm diameter. Allowance shall be made for future flows as a result of full development of the upstream tributary area.

2.6 Location of Sewer Mains

Storm sewer mains shall, wherever possible, be located in the road right-of-way as shown on the Standard Drawings. Where the location of the sewer main within the road right-of-way is not practical due to topography or other factors, the sewer main shall be located in a utility right-of-way registered in favour of the City of Rossland and having a width of not less than 6.0 metres. The Approving Officer may require a utility right-of-way wider than 6.0 metres in the case where services in addition to storm sewer will be placed in the same right-of-way or where the depth of the sewer main requires a wider easement. There shall be a minimum clear lateral distance between the outside walls of storm sewers and sanitary sewers of 0.75 m.

2.7 Alignment of Sewer Mains

Storm sewer mains shall generally be designed to follow a straight alignment between manholes. Curved alignments within rights-of-way shall be subject to the approval of the City Engineer and provided that the pipe is set at a grade greater than the specified minimum and pipe alignment is at a parallel offset with an established boundary. In these cases, the radius of curvature shall be not less than 65 metres, or twice the minimum radius recommended by the pipe manufacturer, whichever is the greater.

2.8 Depth of Cover

The minimum depth of storm sewer mains shall be sufficient to provide all service connection piping with a minimum cover of 1.5 m to the top of the service, anywhere within the finished right-of-way. In no instance shall the cover over the crown of the main be less than 1.5 m.

2.9 Manholes

Manholes shall be installed at a maximum spacing of 120 metres and in the following locations:

- .1 All changes in grade.
- .2 All changes in alignment, including non-curvilinear sewers.
- .3 All changes in pipe size.
- .4 All pipe junctions.
- .5 All intersections.

Where, in the opinion of the Approving Officer, the grades of sewer pipes are sufficient to provide proper cleaning, the maximum spacing of manholes may be increased to greater than 120 metres.

Manholes shall normally be constructed in accordance with the details as shown on the Standard Drawings. In cases where these details will not suffice, a detailed design drawing must be approved by the City Engineer.

The relative elevations of storm sewers entering and leaving a manhole are to be such as to ensure that the manhole does not substantially reduce the hydraulic capacity of the system. Minimum fall through the manhole shall be 30 mm.

There shall be no change in the grades of pipe between manholes.

2.10 Catchbasins

Catchbasins shall be constructed as shown on the Standard Drawings.

Catchbasins shall be located at a maximum spacing of 100 metres along the drainage path, at all intersections, at all low points, or spaced at intervals such that not more than 10% of the gutter flow reaching each inlet will pass on to the next inlet downstream, provided this carry-over is not objectionable to pedestrian or vehicle traffic and the inlet is not in a sump. Catch basins shall be located at intervals such that surface drainage does not exceed gutter or flow channel capacities, to eliminate overflow to driveways, boulevard, margins, sidewalks, or private property.

2.11 Catchbasin Leads

Catch basin leads shall discharge into a manhole and not directly into the sewer pipe.

Catch basin leads shall have a minimum cover of 0.6 m, except for PVC pipe which shall have a minimum cover of 0.9 m.

Non-side inlet catch basins may be used for curb and gutters with grades less than 2%.

Side inlet catch basins shall be used for curb and gutters with grades greater than 2% and at all road intersections and low points regardless of the road grades

2.12 Service Connections

Storm sewer service connections shall only be used for building foundation perimeter drains unless otherwise approved by the City Engineer.

The diameter of storm sewer service connections shall be determined by the Design Engineer, but shall be 100 mm diameter minimum for a single family residential service and in no case shall a non-residential service connection be less than 150 mm.

Service connections shall be made with an approved branch wye and be installed in a straight line and at a uniform grade from the terminus at the property line to the 45 degree long radius bend at the main. An approved wye saddle may be used to connect a 100 m diameter service to an existing main. The minimum pipe grade for sewer service pipes shall be:

- 2% for 100 mm service pipe

- 1% for 150 mm service pipe

For services 150 mm and larger, a manhole shall be installed at the intersection of the main and service.

Sewer services shall be installed 4.0 metres from the lot corner and shall be installed, wherever possible, in common trench with the water and sanitary sewer services.

2.13 Pipe Class and Bedding Class

The quality of pipe and bedding shall be so selected such that the installation will adequately support the loads to be placed on it during construction and in operation. Pipe class and bedding class must be identified on all engineering drawings. Pipe shall have at least Class B bedding, as defined by the Standard Drawings.

For concrete pipe, the calculations shall follow the method shown in the latest edition of the *Concrete Pipe Design Manual* prepared by the American Concrete Pipe Association.

For PVC pipe, the calculations shall follow the methods outlined in the latest edition of the Uni-Bell Plastic Pipe Association publication *Handbook of PVC Pipe – Design and Construction*.

For CSP pipe, the calculations shall follow the methods outlined in the latest edition of the American Iron and Steel Institute publication *Handbook of Steel Drainage & Road Construction Products*.

2.14 Major Flow Routing

All overland flows in excess of 0.05 cu.m/sec shall have specifically designed flow routes, that are protected and preserved by restrictive covenants or rights-of-way. The major flow routing shall normally be provided along roads and in natural watercourses. In some cases, the major flow may also be carried alongside the road in grassed swales, across country in rights-of-way and along public walkways.

In special circumstances, or where desired to enable lower building elevations, the pipes and culverts, which form a part of the minor system, may be enlarged or supplemented to accommodate the major flow. All habitable areas of buildings shall be above the major flow hydraulic grade line, except where specific flood prevention measures have been taken and which are acceptable to the City Engineer.

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

Where road ditches are permitted by the City Engineer, the ditches and all culverts shall be designed to accommodate the major flow. All ditches shall be adequately protected from erosion.

Where the road is used to accommodate major flow, it shall be formed, graded and sufficiently depressed below the surrounding property lines to provide adequate hydraulic capacity. On arterial roads, the 100 year hydraulic grade shall not be higher than centreline of the pavement with the maximum flow depth not to exceed 300 mm. On collector and local roads, the entire roadway may be used as a major flood path with the maximum flow depth not to exceed 300 mm.

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

In areas where surface major flow routes cannot be provided, a pipe system will be designed to accommodate the required major flow, and sufficient inlet capacity will be provided to accommodate introduction of the major flow into a piped system. The recommended HW/D shall be a maximum of 1.5 but preferably no more than 1.0.

Major flow routing over 0.05 cu.m./s shall be shown on the engineering drawings and sufficient design shall be carried out to provide assurance to the City Engineer that no property damage or endangering of public safety will occur under major flow conditions. The Design Engineer shall provide the City Engineer with the depth of flow along the major flow route and shall show on the Design Drawings the hydraulic grade line above the design curb and gutter or above the finished surface of other drainage courses. The discharge point from the development for the major flow route shall be coordinated with the downstream routing to outfalls as determined by the City of Rossland. Where major flow outfalls to a receiving watercourse, the velocity shall not exceed 1.5m/s, or energy dissipaters shall be provided to minimize erosion.

The use of catchbasin inlet control devices to separate major and minor hydraulic grade lines may be allowed, subject to the satisfaction of the City Engineer regarding the suitability of such control devices. Where catchbasin inlet control devices are used, building elevations may be controlled by the hydraulic grade line occurring in the minor system.

3.0 MATERIALS

3.1 Concrete Pipe

- .1 Non-reinforced circular concrete pipe and fittings: to ASTM C14M maximum diameter 675 mm, strength class as shown on Contract Drawings, designed for flexible rubber gasket joints to ASTM C443M.
- .2 Reinforced circular concrete pipe and fittings: to ASTM C76M for all pipe greater than 675 mm diameter, strength class as shown on Contract Drawings, designed for flexible rubber gasket joints to ASTM C443M.
- .3 Reinforced concrete arch pipe: to ASTM C506M.
- .4 Reinforced concrete elliptical pipe: to ASTM C507M.
- .5 Lifting holes:
 - .1 Pipe 900 mm and less diameter: no lift holes.
 - .2 Pipe greater than 900 mm diameter: lift holes not to exceed two in piece of pipe.
 - .3 Provide pre-fabricated plugs to seal lift holes water tight after installation of pipe.

3.2 Plastic Pipe, Mainline Smooth Profile

- .1 Polyvinyl chloride pipe up to 675 mm in diameter, DR35. Pipe to have minimum pipe stiffness (F/Y) of 320 kPa at 5.0% deflection, ASTM D2412. Pipe to be manufactured to specifications for pipe size ranges as follows:
 - 100 mm dia. – 375 mm dia. To ASTM D3034
 - 450 mm dia. – 675 mm dia. To ASTM F679.

Pipes to be certified by Canadian Standards Association to standards for pipe size ranges below.

100 mm dia. – 675 mm to CSA B182.2

- .2 Joints: Pipe to include integral bell and spigot ends with stiffened wall section and formed groove for a rubber gasket; gaskets to ASTM F477.
- .3 Normal pipe length joint to joint to be 4.0 m.
- .4 Maximum installed deflection not to exceed 5.0% of the base inside diameter.
- .5 All pipe to have green pigmentation.

3.3 Plastic Pipe, Mainline Ribbed Profile

- .1 PVC Ribbed Pipe: PVC ribbed pipes and fittings conforming to ASTM F794 and certified by Canadian Standard Association to CSA B182.4, 200 mm to 900 mm diameters. Fittings may be of PVC pipes certified to CSA B182.2 and ASTM D3034/F679.
- .2 Pipe to have a minimum pipe stiffness of 320 kPa at 5.0% deflection Class V, when tested in accordance with ASTM D2412. Pipe to be marked to clearly indicate class rating as required under ASTM F794.
- .3 Pipe to have factory assembled spigot gaskets and integral bell joint features.
- .4 Gaskets to meet requirements of ASTM F477.
- .5 Normal pipe laying length joint to joint to be 4.0 m.
- .6 Maximum installed deflection not to exceed 5.0% of base inside diameter.

3.4 Corrugated Steel Pipe

- .1 For use for driveway crossings and road crossings in ditched areas only where permitted by the City Engineer.
- .2 Corrugated steel pipe to CAN3-G401 with water tight collars
 - .1 Double Zinc as supplied by Atlantic Industries.
 - .2 Aluminized Steel Type 2 for corrugated pipe or Ultra Flow pipe as supplied by Armtec Construction Products.

3.5 Service Pipe and Connections

- .1 Storm sewer service connections 100 mm and 150 mm diameter to be PVC type PSM DR 28 sewer pipe.
- .2 100 mm and 150 mm DR 28 PVC storm sewer service connection pipe to have a minimum pipe stiffness of 625 kPa. Pipe to be manufactured to ASTM D3034 and certified by Canadian Standards Association to CSA B182.2.
- .3 Storm sewer service connections greater than 150 mm diameter to conform to applicable specifications for mainline pipe.
- .4 Manufactured connections to non-reinforced or reinforced concrete mainline pipe to be made using sanded PVC pipe male end stub with integral bell by either:
 - .1 Stub grouted into neatly chipped hole in pipe wall by concrete pipe manufacturer. Grout to be Portland cement based grout.
 - .2 Stub epoxy resin cemented into neatly cored hole in pipe wall by concrete pipe manufacturer.
- .5 Stub and bell orientation to be 45° to centreline of mainline pipe (wyes) for concrete pipe less than 1050 mm diameter. Orientation may be 90° to centreline of mainline pipe (tees) for concrete pipe 1050 mm diameter or larger. No section of service stubs to protrude past inside of concrete pipe wall.
- .6 Manufactured wye connections to PVC mainline pipe to be made with extrusion moulded PVC or fabricated PVC fittings manufactured to ASTM D3034 and CSA B182.2.
- .7 Connections to ribbed PVC pipe to be made with a performed tee or wye fitting when connection is up to two sizes smaller than mainline pipe. For these pipes, in-situ installation of tees or wyes involving cutting across pipe ribs not permitted. For connections more than two sizes smaller than mainline pipe, an insertable tee for ribbed PVC pipe is permitted. When an insertable tee is used, hole cut into mainline pipe to cut as few ribs as possible.
- .8 PVC service connection pipe and fitting joints: push-on type comprised of integral bell with single elastomeric gasket to ASTM D3212 and ASTM F477. Normal pipe laying length joint to joint to be 4.0 m.
- .9 Pipe and fitting joints for service connection pipe materials other than PVC type PSM sewer pipe to be as specified for applicable mainline pipe.

3.6 Manholes and Catch Basins

- .1 Concrete to be a minimum of 20 Mpa
- .2 Precast manhole sections and precast catch basin sections shall be reinforced concrete to ASTM C478 and suitable for H2O loading. Manhole sections shall be complete with ladder rungs.
- .3 Precast manhole and catch basin lids shall be reinforced concrete designed to withstand H2O loading.
- .4 Minimum manhole barrel inside diameter shall be 1050 mm. Minimum catch basin barrel inside diameter shall be 750 mm for non-side inlet and 900 mm for side inlet.

- .5 Manhole frame and cover, and catch basin frame and grate shall be as shown on the Standard Drawings.
- .6 Ladder rungs to be:
 - .1 20 mm cold rolled steel, hot dipped after bending to CSA G164, welded to reinforcing bars and cast with manhole sections or epoxy grouted into manhole walls.
 - .2 20 mm aluminum alloy #6351-T6 (CSA-S157 and NBC 1977), complete with polyethylene anchor insulating sleeves and installed in 25 mm or 26 mm precast or drilled holes in manhole sections.
 - .3 Distance from top of manhole cover to top rung to be maximum 500 mm where no handhold provided. Maximum distance may be extended to 660 mm where handhold provided.
 - .4 In compliance with all requirements of Workers' Compensation Board.
- .7 Safety platform to be installed in all manholes in excess of 6 m deep.
- .8 Joints: make watertight using cement mortar or gaskets to ASTM C443.
- .9 Mortar:
 - .1 Aggregate: to CSA A82.56.
 - .2 Cement: to CAN/CSA-A8
- .10 Adjusting rings: to ASTM C478
- .11 Concrete Brick: to CAN3-A165 Series.
- .12 Concrete blocks: to be H type concrete construction blocks conforming to latest ASTM specifications.
- .13 Prebenched manhole bases:
 - .1 Where precast manhole sections are incorporated into precast base by bonding to concrete benching, use precast reinforced concrete manhole sections to ASTM C478 complete with ladder rungs above benching.
 - .2 Where base benching is cast monolithically with manhole walls, reinforce wall and joint sections as specified in ASTM C478.
 - .3 Precast concrete base section minimum thickness to be 120 mm, measured from underside of base to lowest point in concrete channeling.

3.7 Inlet and Outlet Structures

Concrete inlet and outlet structures shall be designed by the Design Engineer and subject to the approval of the City Engineer. As a minimum the following is required:

- reinforced concrete to 30 Mpa
- concrete base slab, wing walk and headwall
- galvanized pipe handrail – 38 mm diameter
- hinged, galvanized trash grillage
- rock rip rap
- energy dissipation as required.

4.0 WORKMANSHIP

4.1 All workmanship, installation, flushing and cleaning shall be in accordance with the latest edition of the Master Municipal Construction Documents.

4.2 Testing

.1 Video

Video inspection reports for all storm sewers shall be provided.

.2 Other Tests

At the discretion of the City Engineer, the following tests may be required:

.1 Water Exfiltration Test

.1 Exfiltration test to include testing of sewer main, service connections and manholes in each section.

.2 Seal test section at lower and upper ends by means of removable water tight plugs. Where necessary, provide top of inspection chambers with suitable removable water tight plugs. Fill section with water to minimum height of 1.2 m above crown of pipe at highest point in section or 1.2 m above elevation of ground water, whichever is higher. Allow air to escape from inspection chambers that have been plugged during filling with water.

.3 Pressures in excess of 3 m water head not recommended. Damage resulting from testing to be repaired by Contractor at own expense. Maintain test pressure for minimum for 3 hours.

.4 Allowable leakage from pipe will be calculated using following formula:

$$\text{Allowable Leakage (Litres)} = \frac{H \times D \times L}{k}$$

Where: H = duration of test in hours
D = pipe diameter in millimetres
L = length of test section in metres
k = 840

.5 Where service connections exist along test section, allowable leakage from service connections to be calculated by use of above formula and added to that of main sewer leakage to arrive at total allowable leakage. No additional leakage allowance to be made for manholes in test section.

.6 Above exfiltration limits to constitute maximum total allowable exfiltration from sewer mains, service wyes, service lines, manholes and appurtenant structures existing along test sections of pipe.

.7 If test section has exfiltration amount in excess of allowable, replace or repair section of sewer. Retest such sections until they meet allowable leakage limits.

- .8 Test manholes that have failed exfiltration test for water tightness by filling structure with water to 2 m above invert of pipe (or to 150 mm below ground level, if pipe invert is less than 2 m). No measurable drop in one hour will constitute an acceptance test.
 - .9 Where service connections exist along test section, allowable leakage from service connections to be calculated by use of above formula and added to that of main sewer leakage to arrive at total allowable leakage. No additional leakage allowance to be made for manholes in test section.
 - .10 Above exfiltration limits to constitute maximum total allowable exfiltration from sewer mains, service wyes, service lines, manholes and appurtenant structures existing along test sections of pipe.
 - .11 If test section has exfiltration amount in excess of allowable, replace or repair section of sewer. Retest such sections until they meet allowable leakage limits.
 - .12 Test manholes that have failed exfiltration test for water tightness by filling structure with water to 2 m above invert of pipe (or to 150 mm below ground level, if pipe invert is less than 2 m). No measurable drop in one hour will constitute an acceptance test.
- .2 Low Pressure Air Test
- .1 Low pressure air test to include testing of sewer main and service connections in each section. Test manholes by either exfiltration test utilizing water or by low pressure air as specified.
 - .2 Wet inside perimeter of concrete pipes in test section, then increase pressure in test section prior to conducting air tests. Then increase pressure in test section to 24 kPa above average groundwater pressure and observe rate of pressure drop.
 - .3 Maintain 25 kPa above average ground water pressure for at least 5.0 minutes before commencing internal air pressure test. Regulate air pressure to prevent pressure inside test section from exceeding 35 kPa above average ground water pressure.
 - .4 Commence test period when pressure decreases to 24.0 kPa above groundwater pressure and end when pressure decreased to 20.5 kPa above average groundwater pressure. Do not add air to test section during test period. If test period is less than:
 - 2 minutes and 32 seconds for 100 mm pipe
 - 3 minutes and 50 seconds for 150 mm pipe
 - 5 minutes and 6 seconds for 200 mm pipe
 - 6 minutes and 22 seconds for 250 mm pipe
 - 7 minutes and 39 seconds for 300 mm pipe
 - 8 minutes and 56 seconds for 350 mm pipe

- 9 minutes and 35 seconds for 375 mm pipe
- 10 minutes and 12 seconds for 400 mm pipe
- 11 minutes and 34 seconds for 450 mm pipe
- 12 minutes and 45 seconds for 500 mm pipe
- 13 minutes and 45 seconds for 525 mm pipe

the sewer shall be deemed to have failed test. Retest upon completion of repairs to any leaks.

- .5 Contract Administrator reserves right to withdraw permission to use this test procedure at any time and to require Contractor to carry out exfiltration test utilizing water.
- .3 Infiltration Test
- .1 Infiltration test to include testing of sewer main, service connections and manholes in each section or sections.
 - .2 Seal test section at highest point with removable water tight plug. Measure leakage by means of an approved weir or meter. Duration of test not less than 1 hour.
 - .3 Allowable leakage to be same as that calculated for exfiltration less 10% if external head is 600 mm or less. Above infiltration limits to constitute maximum total allowable infiltration for section.
 - .4 If test section has infiltration amount in excess of allowable, replace or repair section of sewer. Retest such sections until they meet allowable leakage limits.

SECTION 6.0 - POWER, TELEPHONE, CABLEVISION AND STREET LIGHTING

6.01 General

- .1 Where the installation of underground power, telephone and cablevision distribution systems is required, the developer shall be responsible for meeting all the requirements of the utility companies and government agencies concerned. Design drawings prepared by the utility companies shall be submitted for approval together with all other required plans for the subdivision.
- .2 Where overhead electrical power is to be provided, installation of street lights on the poles will be permitted.

6.02 Liaison with Power Company

- .1 It is the responsibility of the developer to carry out liaison and obtain approvals from West Kootenay Power and Light Company for the installation of street lighting. Where underground electrical power is to be installed, the developer shall submit to the Superintendent of Works drawings approved by West Kootenay Power of the street lighting layout together with all other required plans of the subdivision.
- .2 Where overhead power is to be provided, it is the responsibility of the developer to carry out liaison with West Kootenay Power prior to submission of the subdivision drawings to the Superintendent of Works to ensure that pole locations will not conflict with other underground utilities. Further, the developer shall provide written evidence from West Kootenay Power that complete street lighting services can be provided from power poles. Written confirmation of serviceability from power poles shall be submitted complete with design drawings for the subdivision road and services.

6.03 Street Lighting Standards and Luminaries

- .1 Street light standards shall be in areas serviced with underground power and shall be Lincoln Steel or Barber octagonal section, 11 gauge mild steel standards 8 m high for standards not requiring a power base and 7 m high for standards with a power base as shown on Standard Drawing L-1.
- .2 The davit arm length shall be 2.5 metros unless otherwise approved by the District Engineer.
- .3 The power base shall be Barber Cat. No. 1636 complete with padlock hasp at top of door.
- .4 Street luminaries shall be 150 watt 120/240 volt H.P.S. Powerlite LXBC2227S-150 complete with Sylvania LU150/55D lamp, complete with photoelectric controller.

6.04 Conductors

Conductors to street lamp standards shall be sized as required and specified on the design drawings. All underground conductors shall be type TWU-40 or RWU conforming to - 40 degrees C rating unless specified otherwise. Conductors in the standard shall be #12 solid RWU90XL.

6.05 Grounding

Each standard shall be grounded by means of a continuous #8 x-link green conductor installed in the conduit and connected to a grounding plate or a 19 mm diameter grounding rod 3 metres long at each service in accordance with the Provincial Electrical Code.

6.06 Lamp Standard Bases

Bases for davit standards shall be precast or cast in place trapezoidal bases as shown on Standard Drawing L-3. The base shall be 460 mm square at the top, 810 mm square at the bottom and 1.5 metres deep.

6.07 Frangible Bases

The Superintendent of Works may require that frangible bases be used for lamp standards installed on roads not requiring curb and gutter. Frangible bases shall conform to standard drawing L-7.

6.08 Offsets

Lamp standard bases shall be located as shown on the standard drawings.

6.09 Painting

Standard shall be zinc chromate primed at the factory and painted after erection with one coat of Silver Tremclad.

6.10 Refractors

All refractors shall be polycarbonate.

6.11 Recommended Average Horizontal Illumination

(From IES Roadway Lighting Practice)

AREA CLASSIFICATION

Roadway and Walkway Classification	Commercial Areas		Residential Areas	
	Foot Candle	Lux	Foot Candle	Lux
Collector	1.2	13	0.6	6

Local	0.9	10	0.4	4
Lanes	0.6	6	0.4	4
Pedestrian Walkways and Sidewalks	0.9	10	0.2	2

The levels recommended represent average illumination on the roadway when the light source is at its lowest output and when the luminaries is in its dirtiest condition.

Recommended Uniformity Ratio

The maximum average to minimum uniformity ratio of horizontal illumination for roadways shall be as follows:

- 3:1 for arterial roads and commercial areas;
- 6:1 for residential areas

CITY OF ROSSLAND

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 1999, 1998

SCHEDULE E - CONSTRUCTION COMPLETION CERTIFICATE

**SUBSTANTIAL COMPLETION AND
CONSTRUCTION COMPLETION CERTIFICATES**

PROJECT:	JOB #:
LOCATION:	
OWNER:	
CONTRACTOR:	
PROJECT DESCRIPTION:	

SUBSTANTIAL COMPLETION

I, _____ of _____ hereby certify that the project described above has been constructed according to Specifications and is substantially complete as defined by the Contract Documents. I hereby recommend this project be accepted as substantially complete and hereby state that facilities may be used for the purpose for which they were intended.

LIST OF DEFICIENCIES:

Holdbacks for deficiencies will be as specified in _____ of the General Conditions of the Contract Documents.

	Project Engineer:
	Authorized Company Official:
	Date: _____, 199
	Owner or Owner Representative:
	Approved On: _____, 199

CONSTRUCTION COMPLETION

I hereby certify that the items listed as deficiencies have now been corrected and recommend that this project be accepted as complete.

	Date: _____, 199

	Project Engineer:
Approved On: _____, 199	Owner or Owner Representative:
Approved On: _____, 199	Approving Officer:
	Title:
Maintenance Period Expiry Date: _____, 199	

CITY OF ROSSLAND

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 1999, 1998

SCHEDULE F - FINAL ACCEPTANCE CERTIFICATE

FINAL ACCEPTANCE CERTIFICATE

PROJECT:	JOB NO.:
LOCATION:	
OWNER:	
CONTRACTOR:	
PROJECT DESCRIPTION:	
MAINTENANCE PERIOD EXPIRY DATE:	199

This Final Acceptance Certificate is issued in accordance with _____ of the General Conditions and constitutes acceptance of the due performance of the Contract or any part thereof.

Approved on _____, 199 _____
Owner or Owner's Representative

Approved on _____, 199 _____
Title

Approved on _____, 199 _____
Approving Authority

_____ Title

CITY OF ROSSLAND

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 1999, 1998

SCHEDULE G - SERVICE REPORT

ENACTMENT

- (1) If any section, subsection, sentence, clause or phrase of this Bylaw is for any reason held to be invalid by the decision of any court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder.
- (2) This Bylaw shall come into full force and effect on .

READ A FIRST TIME	this day of , 1996
READ A SECOND TIME	this day of , 1996
READ A THIRD TIME	this day of , 1996
PUBLISHED PURSUANT TO BYLAW #1728	this day of , 1996
RECONSIDERED AND FINALLY ADOPTED	this day of , 1996

Mayor Deputy City Clerk