



Village of Telkwa Subdivision and Development Servicing Bylaw No.642, 2014

INDEX OF AMENDING BYLAWS


This document has been reproduced for convenience only and is a consolidation of the "Village of Telkwa Subdivision and Development Servicing Bylaw No. 642" with the following amending bylaws:

Amendment Bylaw	Effective Date
No. 726	November 12, 2020
No. 656	September 14, 2015

NOTE TO USER

WHEREAS each bylaw consolidation shall be proof, in the absence of evidence to the contrary, of the original bylaw, of all bylaws amending it and of the fact of adoption of the original and all amending bylaws, pursuant to the "Village of Telkwa Consolidation of Bylaws Authorization Bylaw No. 711, 2020", which was adopted on the 10th day of November, 2020;

This consolidation is hereby certified to be a true and correct copy, this 12th day of November, 2020.



Corporate Officer
Village of Telkwa

**THE CORPORATION OF THE VILLAGE OF TELKWA
SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 642, 2014**

A bylaw to regulate and require the provision of works and services in respect to the subdivision and development of land within the Village of Telkwa.

WHEREAS the Village of Telkwa wishes to revise the provisions of the present Subdivision and Development Servicing Bylaw No. 380, 1996

AND WHEREAS it is deemed desirable to regulate the subdivision and development of land in order to promote the orderly development of the Village.

THEREFORE, the Council of the Village of Telkwa, in open meeting assembled, **ENACTS AS FOLLOWS:**

PART 1 - TITLE

This Bylaw may be cited for all purposes as the "Village of Telkwa Subdivision and Development Servicing Bylaw No. 642, 2014."

PART 2 - INTERPRETATION

2.1 Definitions:

"Access" means a way or means of approach from a road allowance onto private property

"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 his/her signature to the subdivision plan pursuant to the Land Title Act.

"Approving Officer" means the person appointed by Council to exercise the jurisdiction conferred on him/her by the Land Title Act.

"Building code" means the British Columbia Building Code, latest edition.

"Community water system" means a system of waterworks which is owned, operated, and maintained by the by the municipality.

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

“Construction Value” means the estimated cost of construction for developments, as stated on the application for building permit and as accepted by the Building Inspector.

“Construction Completion Certificate” means a certificate issued by the Consulting Engineer, certifying that completion of all of the Works and Services has been achieved.

“Consulting Engineer” means a B.C. registered professional engineer retained by the owner.

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

“Council” means the elected Council of the Village of Telkwa.

“Community sewerage system” means a system of sanitary sewer collection and treatment works which is owned, operated, and maintained by the Village.

“Design Standards” means the current Village of Telkwa standards and specifications for design and construction of subdivision services. This Manual comprises “Schedule C” of this Bylaw.

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

“Development” means affecting a change in the use of land and in the nature of the use of land, including but not limited to the subdivision of land, and the building or placement of structures on land.

“Final Acceptance Certificate” means a certificate issued by the Village verifying that all conditions of this bylaw have been met by the Owner.

“Frontage” means that length of a parcel boundary which immediately abuts a highway other than a lane or a walkway.

“Highway” means a public lane, street, cul-de-sac, walkway, and any other public right-of-way providing for access to parcels of land and/or traffic flow and distribution, but does not include a right-of-way on private property, other than an access route in a bare land strata plan that, in the opinion of the Village Engineer must be designed to Village standards in the interest of public safety and emergency access.

“Landscape Architect” means a member of the British Columbia Society of Landscape Architects or other qualified landscape designer.

“Landscaping” means work that is generally designed by and constructed under the supervision of a landscape professional.

"Latecomer Agreement" means an agreement between the Owner and the Village, in the form prescribed by the Village, as referred to in Section 939 of the Local Government Act.

"Latecomer Charges" means those charges determined and imposed by the Village and as defined by the Latecomer Agreement.

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

“Lot line” means the legally defined limits of any lot;

"Maintenance Bond" means:

- a) a deposit in the form of cash or a certified cheque provided for the Maintenance Period, or
- b) an unconditional irrevocable standby letter of credit in a form satisfactory to the Village, expiring no earlier than one year from the date of issuance and providing for a right of renewal unless the bond or letter of credit is perpetual, issued to the Village by a branch of a chartered bank, credit union or trust company.

"Maintenance Period" means:

- a) the period of one year from the date on which all obligations of the Owner and its Consulting Engineer(s) have been performed.
- b) with respect to Works and Services that appear to be incomplete, defective or deficient during the Maintenance Period referred to in (a) above, the period of one year from the date on which such Works and Services are completed or corrected.

“MMCD” means the most recent edition of the Master Municipal Construction Documents.

"OCP" means the Village of Telkwa Official Community Plan Bylaw No. 613, 2011

“Owner” means a person registered in the Land Titles 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.

“Overhead Wiring” means the installation of overhead electrical and/or communications wiring.

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

“Right of Way (ROW)” means land or any interest in land, including a statutory right of way under section 218 of the Land Title Act, acquired for the purpose of:

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

"Security" means cash, a certified cheque, or an unconditional and irrevocable stand-by letter of-credit that provides for automatic renewals, drawn in favour of the Village on a Canadian chartered bank or other acceptable institution, and in the form acceptable to the Village.

“Sidewalk” means an area of highway improved for the use of pedestrian traffic.

“Street” or **“lane”** means a highway which affords the principal means of vehicular access to abutting lots, and includes a road or road allowance

“Subdivision” means:

- a) a subdivision as defined in the Land Title Act;
- b) a subdivision as defined in the Strata Property Act.

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

“Works and Services” means construction such as highways, lanes, drainage, water and sewer systems, sidewalks, walkways, boulevards, landscaping, street lighting and underground wiring or any other works to be provided for in connection with the subdivision or development of land under this bylaw.

"Works and Services Agreement" means an agreement between the Owner and the District for the construction and installation of Works and Services pursuant to section 940 of the Local Government Act.

“Village Engineer” means the person or persons designated from time to time by the Village Council to fulfil the duties assigned by this Bylaw.

“Zone” means a zone created by the Zoning Bylaw.

Unless otherwise defined herein, all words or expressions in this Bylaw shall have the same meaning as any similar words or expressions contained in the Land Title Act, the Community Charter, the Local Government Act and the Strata Property Act.

PART 3 – FEES AND CHARGES

3.1 Every person who commits an offence against this bylaw is liable upon summary conviction to a fine, as outlined in the Village of Telkwa Fees and Charges Bylaw.

PART 4 – GENERAL PROVISIONS

4.1 Subdivision of land in the Village of Telkwa shall be in compliance with the provisions of this bylaw.

4.2 The provisions of this Bylaw shall apply to the whole of the Village of Telkwa.

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

- a) Promote orderly, efficient, economical and aesthetically pleasing development.
- b) Ensure that subdivisions and developments are developed in harmony with the environment and suited to the use for which they are intended.

4.4 This Bylaw should be used in conjunction with the Schedules to this bylaw, Village of Telkwa Zoning Bylaw and the Village of Telkwa Official Community Plan Bylaw.

4.5 Metric units are used for all measurements in this Bylaw.

- 4.6 This bylaw sets out the minimum acceptable standards for the design and construction of municipal infrastructure within the Village of Telkwa. This bylaw is not a design manual or a construction specifications manual. It is the responsibility of the Owner to employ the services of a Consulting Engineer to ensure that the standards stipulated herein are adhered to.

PART 5 - ADMINISTRATION

- 5.1 The Approving Officer appointed by Council pursuant to the provisions of the Land Title Act shall be responsible for administration of this Bylaw.
- 5.2 The Village Engineer or designated representatives are hereby authorized to enter at all reasonable times upon any property to ascertain whether the regulations or directions of this Bylaw are being observed.
- 5.3 Pursuant to the provisions of the Community Charter and the Strata Property Act, Council delegates to the Approving Officer its authority to approve the conversion of previously occupied residential, commercial and industrial buildings to strata ownership.
- 5.4 Pursuant to the provisions of the Community Charter and the Local Government Act, Council delegates to the Approving Officer its authority to exempt a Parcel from the statutory minimum highway frontage of ten percent of the perimeter of the parcel.

PART 6 – APPLICATION

- 6.1 Applications for subdivision plan approval or building permit shall be accompanied by the fee specified in the Village of Telkwa Fees and Charges Bylaw.
- 6.2 Owners are required, as a condition of subdivision plan approval or building permit issuance, to provide works and services in accordance with this Bylaw.
- 6.3 All works required pursuant to Section 3.1 shall be constructed and installed at the expense of the Owner prior to the granting of subdivision plan approval or prior to the issuance of a building permit.
- 6.4 Prior to the issuance of any building permit the Owner shall provide a refundable security deposit for damage to public facilities. The value of the security deposit shall be determined from Schedule “D.”

PART 7 - APPROVALS

- 7.1 A letter requesting subdivision plan approval shall be accompanied by the appropriate fee as specified in the Village of Telkwa Fees and Charges Bylaw.

7.2 Applications for subdivision plan approval and building permits will be reviewed for compliance with the requirements of this Bylaw and other relevant municipal and provincial legislation. Approval of a subdivision plan or the issuance of a building permit does not imply that the Village will expend Village funds on works in support of the subdivision or development.

PART 8 - SEVERABILITY

8.1 If any section, subsection, 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.

PART 9 - OFFENSE AND PENALTY

9.1 Any person who violates any of the provisions of this Bylaw shall, on summary conviction, be liable to a penalty not exceeding ONE THOUSAND DOLLARS (\$1,000.00), plus the cost of prosecution.

PART 10 - BYLAW SCHEDULES

10.1 The following list of schedules attached hereto and which form a part of this bylaw:
Schedule "A" Conditions of Subdivision and Development Servicing

Schedule "B" Required Levels of Service

Schedule "C" Design Criteria, Supplementary Specifications, and Standard Drawings

Schedule "D" Fees and Deposits

Schedule "E" Performance Agreement

PART 11 - REPEAL

11.1 "Village of Telkwa Subdivision and Development Servicing Bylaw No. 380, 1996" and all amendments thereto are hereby repealed.

SCHEDULE “A”

CONDITIONS OF SUBDIVISION AND DEVELOPMENT SERVICING

SECTION 1 – GENERAL CONDITIONS

1.1 An Applicant or Owner who intends to subdivide land or undertake development within the Village of Telkwa is required to provide works and services in accordance with Schedule “C.”

1.2 Area, Shape and Dimension of Lots

1.2.1 No lot shall be created by subdivision in any zone that has an area in square metres or hectares less than those set out for the zone in which it is located as required in the Village of Telkwa Zoning Bylaw No. 633, 2011 as amended or replaced from time to time.

1.2.2 Where a parcel created by subdivision fronts on a highway, the minimum frontage shall be 1/10 of the perimeter of the lot.

1.2.3 Notwithstanding subsection 1.2.2, a person proposing to subdivide land may be exempted from the prescribed minimum frontage by the Approving Officer.

1.3 No subdivision will be approved which:

- a) Is not suited to the configuration of the land being subdivided; or
- b) Is not suited to the use to which it is intended; or
- c) Will make impracticable the future subdivision of the land within the proposed subdivision or of any adjacent land.

SECTION 2 – PROVISION OF SERVICES

2.1 The Works and Services required by the bylaw shall:

- a) Be connected to all Parcels created through subdivision.
- b) Be fully completed on all highways within the Subdivision or Development, and to the centerline of the Highway where the Works and Services are required within a Highway adjacent to the Subdivision or Development, to the standards prescribed in Schedule C.
- c) Be connected to any Village or private utility works.

2.2 The Approving Officer and Authorized Person are delegated by Council as follows:

To execute all forms of agreement including restrictive covenants, works and services agreements, latecomer agreements, parkland provision agreements, easement agreements to which the Village is a party or statutory right-of-way agreements.

2.3 Exemptions:

The servicing requirements of this Bylaw may be waived by the Approving Officer where the parcel being created is to be used solely for unattended equipment necessary for the operation of:

- A community water system;
- A community sewer system;
- A community gas distribution system;
- A radio or television receiving or broadcasting antenna;
- A telecommunication relay station;
- An air navigational aid;
- An automatic telephone exchange;
- An electrical substation or power generating station;
- Parks and playgrounds; or
- Any other similar public service facility or utility.

2.4 The Owner's Consulting Engineer shall certify actual costs for the excess or extended Services being provided, and may provide a recommendation on the term of a latecomer Agreement.

2.5 Latecomer payments assessed under Section 939 of the *Local Government Act* shall bear interest at a rate prescribed by the Lieutenant Governor in Council under Section 11(3) of the *Taxation (Rural) Act*.

2.6 Rights-Of-Way, Covenants and Easements:

The Owner shall pay for the cost of legal surveys, legal fees and registration of all Rights-of-Way, Covenants, and Easements required by the Authorized Person for subdivision or development.

2.7 Parks Servicing Requirements:

Notwithstanding anything in Appendix A to the contrary, the Owner shall provide to a park land parcel or area dedicated as park on a subdivision plan connections to the property line for water, sanitary sewer, storm sewer and a single phase electrical service.

SECTION 3 – COST OF SERVICES

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

- 3.2 The Village may require that the owner of land that is being subdivided or developed provide excess or extended services to provide access to or serve land other than the land being subdivided or developed pursuant to the provisions of Section 990 of the *Municipal Act*.

SECTION 4 – SECURITY AGREEMENT FOR SUBDIVISION APPROVAL BEFORE COMPLETION OF WORKS AND SERVICES

- 4.1 All works and services required to be constructed and installed at the expense of the owner of the land being subdivided shall be constructed and installed in accordance with the provisions of this Bylaw before the Approving Officer approves the subdivision, unless the owner of the land:
- a) Deposits with the Village a security in the form and amount prescribed in the Village of Telkwa Fees and Charges Bylaw; and enters into an agreement with the Village as provided in Schedule “E” of this Bylaw to construct and install the required works and services by the date specified in the agreement or forfeit to the Village the amount secured.

SCHEDULE “B”

REQUIRED LEVEL OF SERVICE

SECTION 1 – GENERAL SERVICING REQUIREMENT

1.1 Highways:

All highways created by a subdivision plan, including widening of exiting highways, shall:

- a) Comply with the dimension, location, alignment, and gradient requirements set out in Schedule “C” of this Bylaw.
- b) Be cleared, graded, and surfaced in accordance with the standards set out in Schedule “C” of this Bylaw.

1.2 Street Lighting:

In subdivisions where a street lighting system is required, street lighting shall be installed and constructed in accordance with the standards set out in Schedule “C” of this Bylaw.

1.3 Water System:

Each parcel created by a subdivision shall be supplied with a complete water distribution system connected to the community water system, and all system components shall be installed in accordance with the standards set out in Schedule “C” of this Bylaw.

1.4 Sewer System:

Each parcel created by a subdivision shall be supplied with a complete sewer collection system connected to the community sewer system, and all system components shall be installed in accordance with the standards set out in Schedule “C” of this Bylaw.

1.5 Drainage System:

- a) Each parcel created by a subdivision shall be provided with a complete drainage collection system constructed in accordance with the standards set out in Schedule “C” of this Bylaw.
- b) Where greater than four (4) lots are created through subdivision, Telkwa Target Standards set out in Schedule “C” of this Bylaw apply.

1.6 Power, Cablevision, and Telephone:

All subdivisions and developments are to be serviced with electrical power, cablevision, and telephone services.

1.7 Overhead Wiring and Natural Gas:

- a) In all subdivisions and developments where overhead wiring is required, each shall be located, constructed, and otherwise meet the standards found in Schedule “C” and the requirements laid out by the appropriate utility service provider.
- b) Natural gas services may, at the owner’s option, be provided for some subdivisions; and, where such natural gas services are to be provided, they shall be located, constructed, and otherwise meet the standards found in Schedule “C” and the requirements laid out by the appropriate utility service provider.

1.8 Underground Wiring:

Underground wiring may be considered at the discretion of the Approving Officer for some subdivisions; and, where such underground wiring is required, each shall be located, constructed, and otherwise meet the standards found in Schedule “C” and the requirements laid out by the appropriate utility service provider.

1.9 District Heating:

District heating may, at the owner’s option, be provided for some subdivisions; and where such services are to be provided, shall be located, construction, and otherwise meet the standards found in Schedule “C” and the requirements laid out by the appropriate service provider.

SECTION 2 – SERVICING REQUIREMENTS FOR SUBDIVISIONS UNDER THE CONDOMINIUM ACT OR FOR DEVELOPMENTS WITH NO SUBDIVISION

As a condition of the issuance of a building permit on the site being developed, the Village of Telkwa 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 Village Engineer.

This section does not constitute a part of the Village of Telkwa Subdivision and Development Servicing Bylaw No 642, 2014; but is provided for information purposes and to indicate the servicing requirements for proposed developments of this type (i.e. subdivision under the *Condominium Act* or for development not involving subdivision).

2.1 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 Highways 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 with asphalt.
- c) The Approving Officer may, in their sole discretion, approve the use of alternative development standards such as engineered crush rock in order to maintain pervious conditions.

2.2 Site Drainage:

The development shall be provided with site drainage collection and disposal facilities in accordance with the standards of this Bylaw. 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 collection; and
- c) Methods of disposal subject to approval by the Village of Telkwa and, if appropriate, Ministries having jurisdiction such as Highways and Environment may be by:
 - i. Connection to municipal storm sewer system, or
 - ii. Discharge to surface drainage course, or
 - iii. Discharge to natural water course, or
 - iv. On-site disposal to dry-wells.

SECTION 3 – SERVICING REQUIREMENTS FOR CONVENTIONAL SUBDIVISION WITH PARTY WALL

- 3.1 Subdivision servicing for conventional subdivision with party wall agreement shall conform to the requirements of Section 1 of this Schedule and the provisions of Schedule “C” of this Bylaw.

SECTION 4 – SERVICING REQUIREMENTS FOR HIGHWAYS ABUTTING A SITE BEING SUBDIVIDED OR DEVELOPED

- 4.1 As a condition of the approval of a subdivision or the issuance of a building permit, the Village of Telkwa may require that the owner of the land being developed, provide all works and services directly attributable to the development which are or would be located on that portion of a highway immediately adjacent to the site being subdivided or developed, up to the centre line of the highway, including;
- a) Highway Improvements – clearing, grading, and surfacing in accordance with the standards set out in Schedule “C” of this Bylaw;

- b) Water System Improvements – construction of water distribution system components in accordance with the standards set out in Schedule “C” of this Bylaw;
- c) Drainage System Improvements – provision of drainage facilities as required in Schedule “C” of this Bylaw.

SCHEDULE “C”
DESIGN STANDARDS

FORWARD

- 1.1 The Village of Telkwa Design Standards 2014 shall apply to the design and installation of services in new subdivisions and the servicing of and within existing lots within the boundaries of the Village of Telkwa. The standards apply to the design and installation of storm drains, sanitary sewers, waterworks, roadways, curbs, gutters, sidewalks, underground power, telephone, gas, cable television, street lighting, irrigation, landscape and other services or structures required to be installed.
- 2.1 If any conflict occurs between the written specifications and standard detail drawings and/or another code or regulation enforceable in the Village of Telkwa, the Village shall determine the standard to be used.
- 3.1 Throughout this document the words “shall” and “must” and “is required” indicate the imperative. The word “should” indicates the desired or intended result without being mandatory. The word “may”, and like expressions, indicate a choice, an election, or a permitted procedure according to the context.

INTRODUCTION

Schedule C forms part of the Subdivision and Development Servicing Bylaw and identifies the Design Criteria, Specifications and Standard Drawings acceptable to the Village of Telkwa. This document comprises of the following sections;

Design Standards

- | | |
|------------|----------------------------------|
| Section 1 | Street Systems |
| Section 2 | Waterworks |
| Section 3 | Sanitary Sewer Systems |
| Section 4 | Stormwater Systems & Management |
| Section 5 | Overhead & Underground Wiring |
| Section 6 | Street Lighting |
| Section 7 | District Heating |
| Section 8 | Landscape |
| Section 9 | Irrigation |
| Section 10 | Site Furnishing |
| Section 11 | General Procedures |
| Section 12 | Engineering Drawing Requirements |

Section 13 Supplementary Specifications

The onus is on the Developer to ensure that their designs meet accepted engineering principles and are adequate for the site conditions and their accepted uses. For each design standard, applicants may choose between one of the two approaches: a 'Telkwa Target Standard' or a 'Baseline Standard':

Telkwa Target Standard

Intended for large (greater than 4 lots or greater than 1 ha), complex, unusual and innovative developments, the Telkwa Target Standards set out general guidelines that designs must meet, but allow qualified professionals to determine the methods to meet the guidelines, subject to the written approval of the Village. Design criteria and standard drawings, which are considered higher than baseline standards, are provided in this Bylaw and are preapproved by the Village.

Baseline Standard

Intended for small or simple developments (less than 4 lots or infill development, or less than 1 ha), Baseline Standards set out both specific rules and design details that if used with good professional practice are pre-approved by the Village.

- i. References are made throughout to Drawings, these can be found in the Village of Telkwa Supplementary Standard Detail Drawings. References to MMCD Standard Detail Drawings can be found within the Master Municipal Construction Documents.
- ii. No departure from these standards shall be permitted without prior written approval of the Approving Officer.

SECTION 1 STREET SYSTEMS

General

- 1.1 Streets within the Village of Telkwa shall be designated as Lane, Collector, Arterial, or Local, in accordance with the Official Community Plan.
- 1.2 Street design shall meet the following minimum standards in accordance with the zone for which development is to occur:
 - 1.2.1 Rural Standards: paved, ditch or infiltration swale drainage, public water system or proven water source, sanitary sewer or approved septic disposal (where municipal sanitary sewer is deemed unfeasible by the Village); with wiring and other street lighting to rural standards.
 - 1.2.2 Urban Standards: roadway pavement, curb, sidewalk or multi-use pathway, storm conveyance system and stormwater source controls, urban lighting, street trees, landscape, and public art.
- 1.3 Street functional requirements and related widths shall vary based on the zoning of the parcels adjacent to the road.
- 1.4 Street systems shall be integrated with surrounding land uses and consider opportunities for connectivity to areas of activity and interest.

Design Criteria

- 1.5 Table 1-1 identifies the preferred Telkwa Target Standards for street systems and the baseline standards for simple developments. The following design criteria are baseline standards that are preapproved by the Village.

Table 1-1: Target and Baseline Standards for Street Systems

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none"> • Accommodate motor vehicle traffic in a manner compatible in which the street is located. • Employ traffic calming measures as appropriate to maximize road safety. • Avoid excessive road widths, which can otherwise create speeding problems and increase stormwater runoff. • Minimize impervious area. • Allow for stormwater infiltration and treatment. • Provide access for emergency vehicles. • Minimize crossing distances and maximize pedestrian safety at intersections. • Provide for safe and efficient bicycle use. • Provide sidewalks on at least one side of local streets, and both sides of arterial and collector streets. • Include street trees and street landscape as part of the street design. • Provide wayfinding signage and linkages to local heritage, arts, and culture. • Locate utilities in common trench where possible. • Avoid slopes that exceed 3:1 and provide landscape treatment. • Minimize the right of way width commensurate with meeting the above guidelines. • Use materials and services local to the Village of Telkwa and immediate surrounding areas that are appropriate for local climate and environment. 	<ul style="list-style-type: none"> • Baseline design standards are provided in the following sections.

Road Classification

Arterial/Highway: means a highway providing a continuous route for through traffic, with land access a secondary consideration.

Collector Street: means a highway performing a dual function of land access and distribution of traffic between local and arterial streets.

Local Street: means a highway providing land access with little or no provision for through traffic. Direct access is allowed to all abutting properties.

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

Lane: means a highway that provides a secondary means of accessing land.

Walkway: means a pedestrian path which does not generally lie adjacent and parallel to a highway or roadway.

Geometric Design

1.6 Unless otherwise specified in these standards, the geometric design of roadways should be in accordance with the most recent version of the “Manual of Geometric Design Standards for Canadian Roads, TAC” and amendments thereto, the geometric requirements for roadway design within and adjacent to the subdivision may differ according to the predominant adjacent land use and topography, but should generally be those set out in Table 1-2.

1.7 The preferred minimum longitudinal grade is 0.5%.

1.8 The minimum cross fall (crown) grade is 2.0% to a maximum of 4.0%. Under certain adverse topographical conditions, offset crowns may be permitted on collector and local roads. The location of the offset crown shall be approximately 2.5 metres from the high edge of pavement.

1.9 Lanes shall be designed with an inverted 2.0% crown and no less than 0.5% grade.

1.10 Curb return grades shall be a minimum of 1.0%

Table 1-2: Geometric Design Limits

Road Classification	Minimum Design Speed (km/h)	Maximum Gradient (%)	Minimum 'K' Value			Shoulder Return Radii (m)	Minimum CL Horizontal Radius (m)			
			Crest Curve		Sag Curve		Normal Crown	Superelevation (m/m)		
			Minimum	Desirable				0.02	0.04	0.06
Arterial/ Highway	70	8	15	25	15	9	250	225	200	180
Collector	60	8	10	15	8	8	120	110	100	---
Local	50	6 – 10	8	10	6	7	65	---	---	---
Cul-de-sac	50		---	---	---	Entrance 7, Terminus 12	---	---	---	---
Lanes	30	10	---	---	---	---	---	---	---	---

1.11 Maximum gradient for roads servicing industrial zones is 10%

a) In order to provide proper drainage, a maximum K value of 80 metres for crest curves, and 40 metres for sag curves shall not be exceeded.

b) Vertical curves are to be designed to provide safe stopping sight distances. Vertical curves are calculated by the following equation:

$$L = KA; \text{ Where } L = \text{length of vertical curve}$$

K = a constant related to lines of geometry of a parabolic curve

A = algebraic differences in grades in percent

1.12 Minimum design standards for urban and rural streets shall conform to the appropriate street classification in Table 1-3.

Table 1-3: Minimum Design Standards for Urban and Rural Streets

Classification	ROW Width (m)	Pavement Width (m)	Configuration	Sidewalk	Parking

Urban Streets					
Local	15	6.4	Refer to Std. Dwgs. R1 to R3	2 sides	2 sides
Collector	20	7.0	Refer to Std. Dwg. R5	2 sides	-
Rural Streets					
Local	15	6.4 + 0.8m-1.0m gravel shoulder	Refer to Std. Dwg. R4	1 side	-
Rural Collector	20	7.0 + 1.5m gravel shoulder	Refer to Std. Dwg. R6	1 side	-
Arterial	27	12.0 + 2.0m gravel shoulder	Refer to Std. Dwg. R7	1 side	-

* Arterial (Highway 16) to TAC and Provincial Standards for Highway where ROW space is suitable.

Intersection Design

- 1.13 Unless otherwise indicated, intersection design standards shall conform to the latest edition of R.T.A.C. Geometric Design Standards.
- 1.14 Intersection grades shall not exceed 75% of the allowable maximum grade of the intersecting street.
- 1.15 Minimum K values of vertical curves at intersections shall not exceed those shown in Table 1-4.

Table 1-4: Minimum K Values of Vertical Curves at Intersections

Intersecting Street	Minimum K Values (metres)
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	Crest	Sag
Collector	7	6
Local	4	4

1.16 Grades of major roads through intersections shall not exceed 75% of the maximum allowable grade for the following distances from the edge of the intersecting road.

- Arterial 60 m
- Collector 30 m
- Local 15 m

1.17 Intersection approach angles shall be as near as possible to 90 degrees, with a minimum permissible angle of 70 degrees and a maximum angle of 110 degrees.

Curb and Gutter

1.18 General

- a) Curb, gutter, and sidewalks may be required by the Village.
- b) If curb, gutter, and sidewalks are required by the Approving Officer, then they shall be constructed in accordance with this standard and a piped storm drainage system will be provided.
- c) Wheel chair ramps shall be provided at intersections and where requested by the Village Engineer.

1.19 Curb Type

- a) Non-mountable curbs are required for all arterial and collector streets. Refer to Standard Drawing R9.
- b) Mountable curbs are required in all other areas. Refer to Standard Drawing R9.
- c) At infiltration swales or similar facilities, water from pavement shall be passed into the swale across concrete curbs – either Flush Curb or Side Inlet Curb. Refer to standard drawing R9.

Cul-de-Sacs

1.20 Cul-de-sacs shall be no longer than 150 metres to the centre of the bulb.

1.21 Refer to Standard Drawing R8

1.22 Cul-de-sacs shall be designed to have positive drainage. The grade of a downhill cul-de-sac shall not exceed 8%. The grade around the gutter line of the bulb of a cul-de-sac shall not be less than 0.5% nor greater than 5%.

1.23 Refer to Section 10 for vegetation and public art within public right of ways.

Lanes

1.24 Where lanes are to be provided they should run straight from roadway to roadway without corners or intersections.

1.25 Where lanes have a cross-fall, a curb or infiltration swale is required along the low side.

1.26 On lanes and in areas with other similar uses, drainage may be accomplished by a centre line valley or a cross-fall at 2%.

Driveways

1.27 The minimum driveway width shall be 4.5 metres.

1.28 No more than 50% of any lot frontage greater than 9.0 metres will be permitted for driveway access.

1.29 Driveways shall be minimum 3.0m from any street tree, streetlight, fire hydrant, utility kiosk or any above ground structure within the right of way, unless the utility can be protected by a bollard or curb to the satisfaction of the Village Engineer. Water meters are not permitted within the driveway.

1.30 The maximum design grades for driveways shall be:

Land Use	2014 Bylaw Grade
Industrial, Commercial, Institutional	8%
Multiple Residential	15%
Single Family and Duplex	15%

Walkways, Greenways, Trails & Bikeways

1.31 Walkways shall be provided where the Approving Officer deems them to be necessary to provide access through a subdivision to schools, parks, playgrounds, commercial areas or other community facilities, or for the safe and efficient circulation of pedestrian traffic.

1.32 Walkways, greenways, trails and bikeways shall comply with the standards set out in Table 1-5 below.

1.33 Where required, walkways, greenways, trail and bikeways shall be dedicated to the Village with a minimum width of 3.0 metres.

Table 1-5: Walkways, Greenways, Trail & Bikeway Requirements

Trail Type	Users	Width	Surface	Grades		
				Optimum Grade	Max Sustained Grade	Max Short Distance Grade
Sidewalk	All	Min 2.0m	Concrete	0-5%	8%	10%
Walkways and Easements – Multi-use	Generally, for short urban connections; barrier free design, for pedestrians, cyclists and wheelchair access	Min 3.0m	Gravel or Asphalt	0-5%	8%	15%
Walkways and Easements – Pedestrian Use Only	Generally, for short urban connections; primarily pedestrian use	2.0m	Gravel	0-5%	8%	10%
Multi-use Trail	Longer connector trails; multiple users (cyclists and pedestrians)	Min 2.0m Max 3.0m	Gravel (not barrier-free), Asphalt (Barrier free)	0-5%	8%	15%
Hiking Trail	Pedestrian/Hiking only; single file	Min 0.45m Max 0.6m	Natural terrain, grubbed out but not surfaced	0-8%	15%	20-25%

1.34 Concrete public walkways shall be constructed of interlocking brick.

- 1.35 Sidewalks should be continuous grade and not drop through the driveways.
- 1.36 Sidewalks shall be located in accordance with the appropriate road cross section classification.
- 1.37 The lateral sidewalk grade shall be no less than 2.0% and no more than 5.0%.
- 1.38 A minimum of 100mm of 19mm crushed granular gravel and 50mm of asphaltic concrete shall then be placed for the full length and width of the walkway right-of-way. All materials used in sub-grade construction and surfacing shall conform to the specifications outlined for street systems in Section 10.
- 1.39 Walkways shall be fenced for their full length on both sides and the height may vary according to individual situations and the height requirements of the Village Zoning Bylaw. Fence materials shall be 9-gauge 50mm diameter galvanized posts, in accordance with CSA standards.
- 1.40 Walkway grades shall not be flatter than 1.0% or steeper than 15%. Stairs shall be constructed where walkway grades are steeper than 15%. Detailed drawings for stairways shall be submitted to the Village Engineer for approval.
- 1.41 Handrails are necessary for walkways that are 0.6 metres above the ground, and shall be in accordance with Section 11, Site Furnishing.

On-street Parking

- 1.42 Parking lanes shall be delineated with curb extensions at intersections plus optional midblock curb extensions, except where increased clearance or larger curb radii are needed to accommodate buses and large trucks. In 6.0m wide pavement sections, where curb extensions are not used – the pavement width remains 6.0m throughout including at intersections.

Signage

- 1.43 All signage installed is to conform to Ministry of Transportation or TAC Standards.
- 1.44 All signs are to be installed with knock off bases.
- 1.45 Signage to be in accordance with this section and Section 10.

Lighting

1.46 Street lighting to be in accordance with Section 6.

Street Trees

1.47 All street trees shall be installed and irrigated in accordance with Standard Drawing L2 as applicable. Irrigation shall be installed for all street trees as per Section 8.

Public Art

1.48 Public art may be displayed within the public right of way, as per Section 10.

Earthworks

1.49 All earthworks, materials, and structural design for street systems shall conform to Section 11, Earthworks and Materials, and MMCD, latest edition; and to supplemental specifications.

SECTION 2 WATERWORKS

General

- 2.1 The waterworks section applies to design of public potable water systems by, for, or in the Village of Telkwa.
- 2.2 All standards not specifically covered in these Standards shall be in accordance with appropriate AWWA Standards or as directed by the Village Engineer.

Design Criteria

- 2.3 Table 2-1 identifies the preferred Telkwa Target Standards and the baseline standards (minimum) for waterworks. The following design criteria are baseline standards that are preapproved by the Village.

Table 2-1: Target and Baseline Standards for Waterworks

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none">• Demand management provisions (water metering, efficient irrigation, etc.)	<ul style="list-style-type: none">• Shall conform to the standards and associated standard drawings listed in this section.

Demand

- 2.4 The distribution system shall be sized to supply the greater of the peak hourly demand or the maximum daily demand plus fire flow.
- 2.5 The water system shall be designed for the following demands:
- a) Average day demand of 570 litres (125 gallons) per capita per day;
 - b) Maximum day demand of 1590 litres (350 gallons) per capita per day;
 - c) Peak hourly demand of 2730 litres (600 gallons) per capita per day.

Supply

- 2.6 The water supply system shall be designed to satisfy the peak demand and meet the following pressures:
- a) The maximum allowable static pressure in the water mains shall be 1035 kPa (150 psi). This shall be the static pressure measured with the reservoir full;
 - b) The minimum allowable static pressure shall be 210 kPa (30 psi) measured or calculated at the main floor of the highest existing or proposed house. The reservoir water level shall be assumed to be at the mid-point for this calculation.

Configuration and Capacity

2.7 The minimum sizes of water mains shall be as follows:

a) Commercial and industrial areas 200 mm

b) Elsewhere 150 mm*

*except in dead end sections (i.e. Cul-de-sac) where no hydrant is required which may be 100 mm

2.8 All water mains and services shall have a minimum cover of 2.4 metres.

2.9 Water distribution mains shall be offset by a minimum of 3 metres from the property line.

2.10 Water mains shall be located at minimum 3.0 metres from a storm drain or sanitary sewer.

2.11 At any location there shall be a minimum horizontal clearance of 1.0 metre between a water main and any other existing or proposed underground services or open ditches.

2.12 The spacing of fire hydrants shall not exceed the following maximum recommended spacing:

Downtown Commercial Area	105 m
Suburban Commercial	120 m
Residential	150 m

2.13 The minimum vertical clearance between a water main crossing ABOVE a sanitary sewer shall be 450 mm unless the water main is adequately encased with concrete. The minimum vertical clearance between a water main UNDER a sanitary sewer, shall be 1.0 metres unless the water main is adequately encased with concrete. The minimum vertical clearance to piping other than sanitary sewer shall be 300 mm unless the water main is adequately encased in concrete.

Service Connections

2.14 Services shall be installed to all parcels of land which ultimately will require service. The sizes of such connections should take into consideration the ultimate use of the parcel, but shall in no case be smaller than 19 mm diameter.

2.15 Service connections are defined as the installation from the connection at the main up to and including curb stop and service box marked "WATER".

2.16 Service connections shall be installed in accordance with W1 and W2.

2.17 The minimum depth of bury for services from finished ground elevation to the top of the pipe shall be 2.4 metres or equivalent insulated value

Cross Connections

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

2.19 No pipe, valve or fitting which has been exposed to raw sewage shall thereafter be included in a potable water system, either temporarily or permanently.

Water Meters

2.20 Water meters shall be supplied on all building service connections and public irrigation systems.

2.21 Water meters for building service connections up to 50mm in diameter shall be supplied in accordance with standard drawings.

Thrust Blocks

2.22 Horizontal thrust blocks shall be placed between undisturbed soil and all fittings whose deflection is greater than 10 degrees.

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

Materials

2.24 All materials and equipment to conform to the following standards, supplementary specifications, 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 AWWA specifications. All material must be approved by the Provincial Ministry of Health for use in public water supply systems.

Pipes:

2.25 Pipe sizes 100 mm and larger shall be ductile iron (Ductile), or polyvinyl chloride (PVC) or HDPE

Valves:

2.26 Valves shall be located so as to direct the flow of water to the required areas and keep to a minimum the portion of the distribution system affected by a single water main break or shut down due to unserviceability.

2.27 Except as in 2.28, all valves shall be gate valves of the same size as the main. There should be at least two valves at a tee and three valves at a cross. Valves should be attached directly to such fittings on the downstream sides.

2.28 For supply mains with diameter greater than 375 mm butterfly valves may be used, and these will be approved by the Village Engineer on a case by case basis.

2.29 The spacing of valves shall not exceed the following maximum recommended spacing:

Commercial 150 m

Residential 245 m

But in no case shall more than two hydrants be deprived of water due to a single water main break or unserviceability.

2.30 Additional valves may be required for satisfactory system operation or testing purposes:

a) On a new water line near the point of connection to the existing system.

b) Adjacent to a pressure reduction station or a connection to a supply main.

c) At the boundary between pressure zones.

d) In a high-density residential area where more than 50 dwelling units would otherwise be without water supply in the event of a single water main break or unserviceability.

Fittings and Appurtenances:

2.31 A 50mm standpipe or blow-off shall be installed at the end of any main which does not have a hydrant within 10m of the termination point. Location and installation shall be in accordance with Standard Drawing W1.

2.32 Where a main line pressure reduction device is required, it shall comprise:

- a) 2 pilot activated PRVs installed in parallel c/w strainers, isolating valves and pressure gauges with the smaller valve providing normal domestic flows, and the larger responding only to fire flows.
- b) The complete PRV assembly to be installed in a buried reinforced concrete chamber, manufactured to accommodate H₂O loading, providing minimum 2 metres head room, insulated, heated, drainage to a storm sewer or other approved location, aluminum access ladder, and lockable Bilco type access hatch.

Disinfection, Flushing, and Testing

2.33 All water main disinfection, flushing, and testing shall conform to AWWA Standard Manual for disinfecting water mains and supplemental specifications.

SECTION 3 SANITARY SEWER SYSTEMS

General

- 3.1 Sanitary sewer systems shall be designed and installed in accordance with the requirements of the Ministry of Environment, Waste Management Branch, “Guidelines for Assessing Sewage Collection Facilities.”
- 3.2 Wherever, in the opinion of the Village Engineer, future development or subdivision shown in the Official Community Plan for the Village is probable for the lands adjacent to the development or subdivision, sanitary sewers must be extended to the property boundary and terminated with a capped stub or manhole. Size and location shall be suitable for the future extension to the satisfaction of the Village Engineer.

Design Criteria

- 3.3 Table 3-1 identifies the preferred Telkwa Target Standards and the baseline standards (minimum) for sanitary sewer systems. The following design criteria are baseline standards that are preapproved by the Village.

Table 3-1: Target and Baseline Standards for Sanitary Sewer Systems

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none">• Demand management provisions (inflow and infiltration reduction program, water metering, etc.)	<ul style="list-style-type: none">• Shall conform to the standards and associated standard drawings listed in this section.

Design Flow

- 3.4 Sewage flow design shall conform to the following criteria:

Average Daily Flow	450 litres/per person/per day
Infiltration Allowance	5620 res/hectare/day Min. 0.06 litres/s/ha

3.5 Other daily sewage quantities:

School, pupils and staff	45 litres/capita/day
Hotel, full service	1,000 litres/room
Motel	350 litres/unit
Restaurant and pub	150 litres/seat
Other retail and office	120 litres/employee
Industrial	11,000 litres/hectare

3.6 The Peak Factor shall be calculated using the Harmon Formula as follows:

$$\text{Peak Factor} = 1 + \frac{14}{4 + P^{0.05}}$$

P = service population in thousands

Note: Design populations used in calculating average daily flows shall be computed in accordance with the Municipality's population predictions or with the planned development in the area to be served, whichever is larger.

3.7 Sanitary sewers shall be designed to accommodate (per capita flow) x (population) x (peaking factor) + (infiltration). As a maximum design flow, the depth of sewage in each main shall not exceed 0.5 of full depth.

3.8 Flows shall be determined by the Manning Formula, using the velocity determined by:

$$V = \frac{r^{2/3} s^{1/2}}{n}$$

Where: V = Velocity of flow, m/s
r = Hydraulic radius, m
s = slope, m/m
n = roughness coefficient

3.9 Pipe capacity shall be determined by the Manning Formula using the following roughness coefficients (n):

Concrete pipe	0.013
PVC pipe	0.011
HDPE	
Ductile Iron	

Capacity

- 3.10 The minimum pipe diameters for mains shall be not less than 200 mm.
- 3.11 Where sanitary sewer main extension in low density residential areas is not conceivable, the final 300m of main may be 150 mm diameter.
- 3.12 Service connections shall not be less than 100 mm.

Minimum Velocities and Grades

- 3.13 The minimum velocity for sanitary sewer mains flowing full or half full shall be 0.75 m/s.
- 3.14 The minimum grade of service connections shall be 2.0%. Where this grade cannot be met, a 150 mm diameter service connection at a minimum grade of 1.0% may be installed.

Main offsets

- 3.15 Sanitary sewer mains shall be installed on the opposite side of the road from the water main at an offset distance specified on Standard Drawings R1 to R9 for each road classification.

Minimum Cover

- 3.16 The minimum depth of bury from finished ground to the top of pipe for mains shall be 2.4 metres or equivalent insulation.
- 3.17 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.

Manholes and Cleanouts

- 3.18 Manholes shall be installed at:
- a) All changes in grade
 - b) All changes in direction
 - c) All changes in pipe sizes
 - d) All intersecting sewers
 - e) All terminal sections
 - f) Downstream end of curvilinear sewers

- 3.19 Manholes shall be spaced at no greater than 150 metres apart and where future extensions are anticipated.
- 3.20 Manhole Sizes:
- a) Standard manholes shall be 1050 mm inside diameter.
 - b) For pipes greater than 400 mm diameter, minimum inside manhole diameter shall be 1200 mm.
 - c) Where four pipes connect to the manhole, then the manhole shall be 1500 mm inside diameter.
- 3.21 The maximum drop between pipe inverts shall be 200 mm. Where drops greater than 200 mm occur, exterior or interior drop structures shall be installed.
- 3.22 Pipe intersections in manholes shall utilize smooth hand formed concrete channels to maintain uniform flows.
- 3.23 Stub pipes, where provided, shall extend at least 1.5m from the outside face of the manhole.
- 3.24 Inspection Chambers shall be installed a.

Anchoring

- 3.25 Where sanitary sewers are installed at grades greater than 20%, they shall be anchored with 20MPa concrete anchor blocks in accordance with good engineering practice.

Sanitary Sewer Connections

- 3.26 In addition to the municipal requirements, service connections shall be subject to the requirements of the BC and National Plumbing Code.
- 3.27 The service shall be installed, wherever possible, in a common trench with the water service. The sewer service shall be offset 0.5 metres to the left of the water service when facing the lot.
- 3.28 Service connections shall be made with an approved branch wye and be installed in a straight line and at uniform grade from the terminus at property line to the 45° long radius bend at the main.
- 3.29 When the sewer main is 3.6 metres or more in depth, service risers may be installed at the main when service depth is not critical.

Testing

- 3.30 Sanitary mains shall be tested in accordance with the groundwater levels throughout the test section as determined in Table 3-3.

Table 3-3: Parameters for Testing Sanitary Sewer Systems

Test Type	Water level
Infiltration Test (to test leakage into the pipe)	Water level is one metre or more above the top of the pipe.
Air Test	Water level is less than one metre above the top of the pipe.
Exfiltration Test	Water level is below the pipe invert

- 3.31 Copies of test results shall be submitted to the Village Engineer on the Village's Standard Test Forms.
- 3.32 Manholes shall be tested with water to prove they are completely water tight.
- 3.33 If leaks are detected, the leak(s) shall be found and repaired by approved measures. The testing shall be repeated on these sections until leakage is within acceptable limits.
- 3.34 All sewer mains, manholes, and services installed shall be flushed and cleaned with a suitably sized sewer cleaning nozzle. The Village shall witness all flushing operations.
- 3.35 Video inspections and reports shall be submitted to the Village.

Force Mains

- 3.36 Pipes: Pipe sizes 100 mm and larger shall be polyvinyl chloride (PVC) conforming to AWWA C900 or ASTM C2241. or HDPE
- 3.37 All fittings, pipe bedding materials, thrust blocks, and pipe anchors shall be in accordance with the waste main specification.
- 3.38 Force mains shall be tested to AWWA standard at 1.5 times the working pressure for duration of 1 hour. Allowable leakage to conform to AWWA formula in the waste main specification.
- 3.39 Pumping stations shall be discouraged. Where avoidance is not possible, Village approval is required prior to design. Pump stations must be located within a right-

of-way outside of the road dedication. The size, capacity, and type of these stations will be dependent on the development and catchment area involved.

SECTION 4 STORMWATER SYSTEMS AND MANAGEMENT

General

- 4.1 The Village requires that all developments provide drainage structures that will:
 - a) Reduce the rate of post development site runoff to predevelopment levels;
 - b) Improve the quality of site drainage water; and
 - c) Minimize erosion and retain sediments.
- 4.2 Drainage infrastructure for development will conform to the minimum standards in the following sections; however, where development larger than four (4) lots is to occur, the Village requires more stringent controls as identified in Table 4-1 for Telkwa Target Standards.
- 4.3 The developer shall be responsible for improving the existing drainage system downstream of new development to handle any increased flow. Where existing downstream facilities are inadequate to handle the increased flow from the proposed subdivision, an alternate design is required. At no time, will direct discharge be permitted without adequately addressing stormwater quality and detention.
- 4.4 The storm drainage system shall be designed, with sufficient capacity to collect and convey anticipated storm runoff from the total catchment area to be served when fully developed.
- 4.5 The drainage system shall have two components, the “minor” and the “major.”
 - a) The minor system shall be capable of conveying runoff from the 10-year return storm.
 - b) The major system shall consist of surface flow paths within roadways and walkways, and other open channels, capable of conveying that portion of the runoff from the 100-year return storm over and above the capacity of the minor system.

Design Criteria

- 4.6 Table 4-1 identifies the preferred Telkwa Target Standards and the baseline standards (minimum) for stormwater systems and management.

Table 4-1: Target and Baseline Standards for Stormwater Systems and Management

Stormwater Criteria	Telkwa Target Standards	Baseline Standards
Site Runoff / Imperviousness	<ul style="list-style-type: none"> Proposed site impervious to be equal or less than existing site imperviousness. Post development flow to not exceed predevelopment flow for the 2-year 24-hour peak storm. Implement stormwater management controls listed in Section 4.12. 	<ul style="list-style-type: none"> Convey stormwater runoff overland or through piped storm system to design criteria in this section. Where receiving environments are considered sensitive habitat, streams, rivers, lakes, etc. appropriate measures to adhere to Federal and Provincial regulations and guidelines.
Retention/Detention	<ul style="list-style-type: none"> Detain the “minor” event (2 years) to 200 m³/ha of impervious surface area for the proposed development, regardless of the existing condition. Corresponding maximum release rate to be 5 L/sec per hectare of total catchment area. Facility shall have an overflow for the peak 10-year design flow and the 200-year design flow with appropriate conveyance. 	<ul style="list-style-type: none"> Provide for infiltration measures.
Runoff Quality	<ul style="list-style-type: none"> Remove 80% average annual post-development TSS, 40% average annual post development phosphorous. For larger developments consider a “treatment train” (e.g. oil/grit separator followed by a swale). 	<ul style="list-style-type: none"> Remove 80% average annual post-development TSS, 40% average annual post development phosphorous.

Erosion and Sediment Control	<ul style="list-style-type: none"> • Provide an ESCP to the Village prior to construction. • Submit construction checklists for ESC measures utilized on construction site to the Village. • Required for sites greater than 2000m² • Required where receiving environment is sensitive • Required where development is to occur in phases 	<ul style="list-style-type: none"> • Shall conform to the standards and associated standard drawings listed in this section.
Flood Area Management	<ul style="list-style-type: none"> • Provide minimum floor grades above 200-year flood level. • Development in flood plain must consider conveyance of the 200-year peak hour storm. 	<ul style="list-style-type: none"> • Lot grading to slope away from buildings. • Storm conveyance system to be designed to handle 100-year peak hour storm. • Shall conform to the standards and associated standard drawings listed in this section.

Design Flow

4.7 The design flow at any point in a storm water collection system shall be calculated by the Rational Formula:

$$Q = \frac{C \times I \times A}{360}$$

Where: Q = Design flow in cubic metres/second

C = Runoff Coefficient

I = Rainfall Intensity in millimetres/hour

A = Area drained in hectares (ha)

4.8 Drainage systems shall be designed for a recurrence interval of 30 years. The rainfall intensity shall be derived from the intensity curves included in the Standard Drawings.

4.9 Time of concentration shall be the time required for rain falling on the farthest point in the drainage area to reach a point in the drainage system under design, and shall be assumed 10 minutes.

4.10 Runoff coefficients shall not be less than the values given in the table below.

Land Use	Runoff Coefficient
Industrial	0.90
Commercial	0.80
Residential – Single Family	0.35
Residential – Multi-family	0.60
Apartment Areas	0.70
Parks and Playgrounds	0.25
Unimproved Areas including hillsides	0.30

Stormwater Capacity

4.11 Stormwater flows shall be calculated using Manning's equation:

$$V = \frac{r^{2/3} S^{1/2}}{n}$$

V = velocity of flow, metres per second

r = hydraulic radius, metres

s = slope, metre per metre

n = Manning's roughness coefficient

4.12 Pipe Main Parameters

Manning's Formula Roughness Coefficient (n)	PVC 0.011 Concrete 0.013 Ductile Iron 0.013 CMP 0.025
Minimum Diameter	Storm Main 300 mm Catch Basin Leads 150 mm Service Connection 100 mm
Driveway Culverts	Minimum 300 mm diameter 1.6 gauge CMP to CSP1 Specification No. 501
Minimum Velocity	0.75 m/sec (flowing full or half full)
Maximum Velocity	6.1 m/sec
Minimum Service Grades	2.0%
Minimum Cover	3.40 m or equivalent insolation

Manholes

4.13 Manholes shall be provided at the following locations:

- a) All changes of grade
- b) All changes of pipe size
- c) All pipe junctions other than normal service connections
- d) Where a service connection is the same size as the main

4.14 Manhole spacing shall be:

Pipes up to 375mm diameter = 122m

All other pipe = 155m

4.15 Manhole size shall be 1050 mm inside diameter or to the following specification:

1200 mm diameter for pipe sizes 400 to 600mm

1500mm diameter for pipes greater than 600mm

4.16 A drop manhole shall be provided for a 375mm or small drain entering a manhole at an elevation of 0.6 m or more above the manhole invert. A vertical drop of 0.25m or less should be accomplished by benching.

Catch Basins

4.17 Catch basins shall to be installed on all roads having a curb and gutter.

4.18 Catch basins shall be installed at locations best suited to collect runoff water and where overland flow is not feasible. The maximum distance between catch basins shall be:

- 155m on road grades up to 2%
- 90m on road grades steeper than 2%

4.19 Each catch basin shall be connected to a storm drain by an individual lead.

4.20 Details of construction and spacing of catch basins are provided in Standard Detail D1.

Overland Flow

4.21 Where a piped system is provided, in no case shall the overland flow distance for stormwater within the subdivision exceed 150 metres. All ditches shall be constructed either on roadways or on land whose title is conveyed to the Village.

- 4.22 Ditches shall be designed to prevent erosion and be in accordance with Standard Drawing D5 and D6.
- 4.23 Outfalls shall be located and designed such that the outfalled storm water will not cause or present the potential of erosion of Crown, private, or municipal property. Energy dissipation measures shall be implemented if deemed necessary by the Village Engineer.

Stormwater Management

- 4.24 Stormwater Source Control shall be incorporated into subdivision and lot development with regard to topography, water table, soil or rock infiltration capacity, and downstream slope hazards.
- 4.25 Infiltration-based stormwater source controls shall not be used in the following conditions:
- a) Areas within 30 metres of a slope that is steeper than 3H:1V and higher than 5 metres, or other unstable slopes.
 - b) Areas where the post-development wet season groundwater table is less than 0.5 metres below the base of infiltration trenches.
 - c) Areas where existing dwellings do not have foundation drains.
- 4.26 In all developments other than those listed in section 4.25 above, infiltration-based stormwater source controls with an overflow to the Village storm conveyance system are required. Required practices can include and require the following design parameters to be considered, at minimum, effective stormwater management controls:
- a) Infiltration Swales and/or Rain Gardens with reservoir and underdrains. Refer to Standard Drawing D7.
 - b) Permeable pavers shall be allowed with the Village's approval in appropriate areas.
 - c) Infiltration trenches and vertical seepage pits.
- 4.27 Oil/grit separators (At the discretion of the Approving Officer):
- a) Treat approximately 90% of the annual volume of the catchment area and be capable of conveying high flows (10% of the annual runoff volume) directly to the outlet.
 - b) Removing 50% - 80% of total suspended solids (TSS, including fine and clay particles) and 60% - 95% of the floatable free oil.

- c) Maintenance access both to the structure and within the structure shall be provided so that accumulated oils and sediments can be readily removed with a vacuum truck.
- d) The oil/grit separator shall be enclosed in a concrete manhole or vault structure. The structure and lid shall be H2O loading and concrete joints shall be oil resistant and water tight.

Erosion and Sediment Control

- 4.28 All developments within the Village of Telkwa that create a disturbance that could be susceptible to erosion shall undertake erosion and sediment control (ESC) in accordance with this section. Erosion controls (source controls) must be the primary control implemented on a construction site. Sediment control shall be implemented only to manage the residual sediment that occurs after effective erosion controls have been applied.
- 4.29 At the point of discharge from the development site, stormwater runoff shall not exceed turbidity levels of 25 Nephelometric Turbidity Units (NTU) during dry conditions and 100 NTU during wet weather conditions.
- 4.30 All developments shall have an erosion and sediment control plan in place that indicates the following:
 - a) Phased construction plan with site location map that distinguishes between primary erosion control techniques and sediment control measures.
 - b) Indicates access to development and treatment provisions to maintain clear roadways (e.g. wheel wash station).
 - c) Shows direction of runoff on site, complete with runoff capture facility and treatment works prior to discharge of runoff from the site.
 - d) Gravel access pad (3.6m wide, 15m long, composed of 50-75mm clean course aggregate, minimum depth 150mm) for each entry to proposed site.
 - e) Temporary fencing around construction areas, watercourse protection areas, and other areas of environmentally sensitive features.
 - f) Perimeter ditches, swales, or interceptor ditches to divert runoff away from cleared areas.

4.31 Acceptable Erosion Control Best Management Practices can include one or a combination of the following:

- a) Scheduling and staging
- b) Temporary diversion ditches and berms
- c) Slope texturing or mulching
- d) Rolled erosion control products
- e) Straw wattles
- f) Ditch check dams
- g) Rock channel lining
- h) Rolled erosion control products in ditches
- i) Temporary slope drain
- j) Energy dissipater
- k) Seeding or hydroseeding
- l) Polyethylene sheeting

4.32 Acceptable Sediment Control Best Management Practices include:

- a) Sediment fencing
- b) Sediment retention berm, continuous berm, earth dykes
- c) Stabilized worksite entrance
- d) Drop and curb inlet sediment barriers
- e) Sediment retention pond

SECTION 5 OVERHEAD & UNDERGROUND WIRING

General

- 5.1 This section applies to the installation of electrical, telephone and communications wiring, either overhead or underground.
- 5.2 The developer shall be responsible for meeting all the requirements of the utility companies and government agencies concerned with the installation of electric power services. Design drawings prepared by the utility companies shall be submitted together with all other required plans for subdivision.
- 5.3 The Village will ensure that all materials meet or exceed Canadian Electrical Code requirements and CSA standards; and to supplemental specifications.
- 5.4 All utility services, junction boxes, transformers, and service facilities shall be located within the road right of way unless in the opinion of the City Engineer and as permitted by the utility, the right of way on private property affords the same level of accessibility. Where overhead power is to be provided, it is the responsibility of the developer to conduct liaison with the Power Authority prior to the submission of the subdivision drawings to the Village Engineer to ensure that pole locations will not conflict with other utilities. Further, the developer shall provide written evidence from the Power Authority 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 roads and services.

SECTION 6 STREET LIGHTING

General

- 6.1 The primary purpose of this Standard is to serve as a basis for design for fixed lighting systems for street system lighting. These standards are guidelines and not intended to be a substitute for sound engineering knowledge and experience.
- 6.2 Street lighting shall be provided on all streets within the subdivision, perimeter roads, and pedestrian pathways through parks or in instances where total separation between vehicular and pedestrian traffic has been provided. Installation of street lights on overhead electrical power poles will be permitted subject to approval from the Power Authority.
- 6.3 Required Roadway Illuminance and uniformity ratios are based on the current edition of the ANSI/IES RP-8 National Standards Practice for Roadway lighting and the MMCD Green Design Guideline Manual Section 6.0.

Design Criteria

- 6.4 Table 6-1 identifies the preferred Telkwa Target Standards and the baseline standards for simple developments for street lighting. The following design criteria are baseline standards that are preapproved by the Village.

Table 6-1: Target and Baseline Standards for Street Lighting

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none"> • Lighting calculations are based on the illuminance methods described in IES RP-8 and shall be done using appropriate software (e.g. AGI32, LumanMicro, or Visual). • Certified calculation drawings shall be submitted for review by the Village. • Illuminance levels and uniformity ratios to be in accordance with Table 6-1. • Luminaire types, pole heights, spacing criteria and wattages shall be in accordance with Table 6-2. • Preference will be given to Dark Sky approved lighting. • Spacing and location of poles is governed by road width, configuration, intersecting properties, luminaire photometrics, mounting heights and required illumination levels. • Pole spacing is also governed by clearances to BC Hydro powerlines in accordance to the Canadian Electric Code, WorkSafe BC and the BC Electrical Safety Act. • Where possible, locate poles on property lines to avoid driveway conflicts. • Luminaire wattages, distribution and voltage shall be noted on the Design Drawings. 	<ul style="list-style-type: none"> • Documentation indicating compliance with prescriptive criteria (e.g. drawing indicating location, fixture type, wattage, and mounting height) shall be submitted to the Village for review. • Fixtures shall be spaced as indicated in Table 6-2.

6.5 Table 6-1 – Illuminance Values and Uniformity Ratios

Road Classification	Maintained average horizontal Illuminance (lux)		Average to minimum uniformity ratio not to exceed
	Commercial	Residential	
Local	10	4	3:1 average to minimum and 6:1 acceptable for residential areas
Collector	13	6	
Arterial	22	11	
Lanes	6	4	
Walkways and Greenways	10	2	

6.6 Table 6-2 – Luminaire Types, Pole Heights, Spacing Criteria and Wattages

Road Classification	9.0 m high davit pole with Flat Glass Luminaire	Post Top with Post Top Luminaire or
Local	One Sided 100W; distance 50m	Staggered 100W
Collector	One Sided 150W; distance 60m	
Arterial	Both Sides 150W; distance 60m	
Industrial/Commercial	One Sided 150W; distance 60m	Staggered 100W

6.7 General:

- Davit fixtures shall be on 9.0 m davit poles with hot dipped galvanized finish.
- Post top fixtures shall consider banners, hanging basket brackets, electrical outlets and information and street identification signage in selected locations. For post top fixtures, lighting fixtures, poles and brackets shall be powder coated aluminum.
- Pedestrian level lighting is encouraged in commercial areas.
- Lighting fixtures, poles and brackets shall be powder coated aluminum.
- Lighting fixture and colour choice shall be coordinated to create a unified appearance within a given block or district, to the satisfaction of the Village.
- For post top fixtures, lighting fixture and colour choice shall be coordinated to create a unified appearance within a given block or district.

Design of Street Lighting

- 6.8 In underground wiring areas with ornamental street lights, davit poles shall be used on subdivision roadways at or near their intersections with arterial and collector roadways. Elsewhere within the subdivision post-top lights may be used.
- 6.9 Street lights shall be installed at every roadway intersection (two) and bend (one).
- 6.10 A mid-block street light shall not be located at the same lot line as a hydrant on the same side of the roadway. The restrictions on location of street lights apply equally to utility poles.
- 6.11 Additional street lights shall be installed on walkways where there is not inter-visibility of the street lights at each end.
- 6.12 Street lighting ducts shall be installed behind the street lights where possible.

SECTION 7 DISTRICT ENERGY (GROUND HEAT EXCHANGE SERVICE)

General

- 7.1 The intent of this section is to communicate the site servicing provisions that shall be met for district energy utility.
- 7.2 In addition to this section, District Energy shall be in accordance with the requirements of the local District Energy Bylaw for the Village of Telkwa, and as amended from time to time.
- 7.3 Professional services related to District Energy Service or municipally appointed professional shall ensure accreditation or certification with the Canadian Geothermal Coalition prior to approval of works by the Village.
- 7.4 The owner and occupier of each parcel within the service area must connect to and use the District Energy Service as the primary source of energy for the space heating.

SECTION 8 LANDSCAPE

General

- 8.1 These landscape standards and specifications shall apply to all landscape areas within the Village Rights-of-way. This can include, but is not limited to medians, boulevards, soft landscape areas between the curbs and the property lines, and plantings in urban plaza and sidewalk areas. The general design and construction of the landscape shall be in accordance with the standards set out in this section.
- 8.2 Landscaping standards shall be in accordance with the British Columbia Landscape Standard, Latest Edition by the British Columbia Society of Landscape Architects.
- 8.3 Street tree plantings shall be required in all subdivisions where new roads (including cul-de-sacs) or road extensions are required.
- 8.4 Boulevard trees are not required under the following conditions:
 - 8.4.1 Where healthy boulevard street trees are growing at not less than the density or spacing required in this section.
 - 8.4.2 Where there are rock barriers or soil conditions which will not sustain a healthy tree.
 - 8.4.3 Where due to the size of the boulevard area fronting the lot and the presence of driveways or other site services, there is insufficient room to plant a tree.
- 8.5 Boulevard areas lying between the curb and property line of the road right-of-way shall be graded to drain to the curb and fill sections shall be compacted. The topsoil shall be raked free of roots and other debris.
- 8.6 All boulevard and median areas within the road right of way shall be vegetated and shall be provided have establishment maintenance including watering, mowing, weeding, supplemental fertilization, and litter pickup until acceptance by the Village.
- 8.7 All landscape development shall be guaranteed for 1 year from the date of acceptance by the Village. Plants or other materials that fail in the guarantee period shall be replaced at no cost to the Village. Replacement plants and materials shall be guaranteed for a further one year after replacement.

Design Criteria

8.8 Table 8-1 identifies the preferred Telkwa Target Standards and the baseline standards for simple developments for landscape. The following design criteria are baseline standards that are preapproved by the Village.

Table 8-1: Target and Baseline Standards for Landscape

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none">• Landscaping plantings and material shall consider stormwater management control and treatment (e.g. treatment train approach).• Consider landscaping in areas other than the public right-of-way for developments, with appropriate undertaking and maintenance by the property owner.• Alternatives to standard tree planting details shall include project-specific tree planting details, plan and cross section including:<ul style="list-style-type: none">• Typical views of surrounding pavements, curbs, above and below ground utilities, light standards, and adjacent buildings and structures.• Typical details of proposed rooting environment including tree pit dimensions, sub-grade scarification, soil structure and materials, surface treatment, and type of irrigation.• Typical above ground details such as staking, special appurtenances, etc.	<ul style="list-style-type: none">• Shall conform to the standards listed in this section.

Planting Details and Procedures

8.9 Standard Drawing L1 shall specify the appropriate planting detail structure.

8.10 The minimum width for grass boulevards shall be 1.5 m, 2.0 m or greater is preferable. The maximum slope for lawns from back of sidewalk to property line shall be 3:1.

8.11 The minimum width for shrub and ground cover beds shall be 0.6 m, 1.0 m or greater is preferred. Maximum slope for shrub and ground cover beds to be 2:1.

- 8.12 Street trees are to be planted in boulevards that are 2.0 metres, or greater, in width. Trees planted 1.0 metres or less from curbs or sidewalks are to have root barriers to protect civil infrastructure.
- 8.13 Typical street tree spacing shall be:
- a) Small scale trees minimum 6.0m – 8.0 metres apart
 - b) Small – medium scale trees minimum 8.0m – 10.0m apart
 - c) Medium – large trees minimum 10.0m – 12.0m apart
 - d) Large trees 12.0m – 14.0m apart
- 8.14 Street tree placement shall be placed in a manner not to pose significant impacts to underground and overhead servicing. Recommended minimum distances for planting street trees:
- a) 3.0 m from underground BC Hydro, natural gas and communication utilities
 - b) 5.0 m from street lights and BC Hydro poles
 - c) 5.0 m from a driveway crossing
 - d) 7.0 m from an intersection
 - e) 2.0 m from a fire hydrant, water service lateral, catch basin, Kiosk, vault
 - f) 3.0 m from sanitary sewer or storm drain laterals
- 8.15 Street trees in hardscape are to have a minimum of 8 m³ of structural soil as growing medium. Multiple trees on the same frontage are to have a continuous trench of structural soil. Structural soil is to extend from curb to property line, at minimum depth of 400 mm.
- 8.16 Trees shall be balled and burlapped or container grown stock. Bare root trees will not be used.
- 8.17 Sod or hydro seeding shall be used on all lawn/fine grass areas.
- 8.18 Rough grass and wildflowers areas shall be seeded.
- 8.19 Areas to be seeded with grades greater than 3:1 and/or highly erodible soils shall be hydroseeded complete with erosion control (i.e. hydraulically applied erosion control mulch, erosion control blanket, etc.).

Plant Material Selection

8.20 All plant material shall be of good health and vigor with no visible signs of disease, insect pests, damage, or other disfigurements, and shall comply with the latest version of the "BC Landscape Standards."

8.21 All plant materials shall meet the following criteria:

- a) Plants shall have the ability to withstand adverse conditions such as airborne pollutants, maximum sun exposure and reflected heat from pavements, high winds, and abrasive forces, snow loading and exposure to salt from road clearing operations, and limited root zone soil volumes.
- b) Plants shall be hardy to Zone 4b or colder.
- c) Plants shall be capable of reduced water demand following a one-year establishment period.
- d) Plants shall have relatively low maintenance attributes.

SECTION 9 IRRIGATION

General

9.1 Provisions for watering of planted trees, shrubs, groundcover and fine grass areas shall be made by the developer on all lands to be dedicated as road right of way to the Village of Telkwa.

9.2 All Irrigation Design shall follow these guidelines:

- a) Irrigation of the Village ROW, per block or other applicable spacing, shall be from a single service off the water main.
- b) After the maintenance period (one year) the irrigation will be owned and operated by the Village.
- c) Boulevard trees, shrubs and ground covers shall be watered from an automatic irrigation system.
- d) Urban trees in pavement shall be irrigated with an automatic irrigation system that shall include bubblers or drip elements.
- e) Irrigation systems shall be designed to provide water conservation by employing a soil moisture probe, weather station, or other devices to override the controller during periods of adequate soil moisture or rainfall.
- f) Sleeves shall be provided under sidewalks and driveways, and to medians / islands, as required for installation and maintenance of the irrigation system without removing surface paving.

Design Criteria

9.3 Table 9-1 identifies the preferred Telkwa Target Standards and the baseline standards for simple developments for irrigation. The following design criteria are baseline standards that are preapproved by the Village.

Table 9-1: Target and Baseline Standards for Irrigation

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none">Target irrigation designs shall include a complete, professionally drafted package showing a landscape plan and permanent structures, an irrigation plan with typical details complete with specifications coordinated with the site plan, calculation of precipitation rate and watering times per circuit type and by season, and maintenance guidelines.	<ul style="list-style-type: none">Shall conform to the standards listed in this section and associated standard drawings.

Irrigation System Parameters

- 9.4 Maximum design flow velocity to be 1.5m/sec.
- 9.5 Size pipes and values for minimum friction loss.
- 9.6 Pipe materials to be:
 - a) Schedule 40 Polyvinyl Chloride (PVC), for all pressurized lines and for hard surface sleeving.
 - b) Class 200 Polyvinyl-Chloride (PVC), for all laterals.
- 9.7 Irrigation systems should be programmed to irrigate early in the morning or late at night and should be programmed with minimum 4 season schedule for both plant establishment and established landscape.
- 9.8 Provide an isolation gate valve upstream of all automatic sprinkler valves and at regular intervals along the main line.
- 9.9 Valve boxes should be installed on four bricks with 150mm of pea gravel set 50mm below the remote-control valve.
- 9.10 Design head-to-head coverage for turf and shrub areas.
- 9.11 Design to water plant materials with different watering requirements on different valve circuits.
- 9.12 Design sprinkler circuits with matched precipitation heads. Do not mix heads with varied precipitation rates on the same circuit.
- 9.13 Design zones such that rotors have matched rates, patterns and spacing. Rotors spacing shall be 75-80% of the design radius recommended by the manufacturer.
- 9.14 Specify low flow heads for sloping areas.
- 9.15 Every drip circuit shall be designed with a filter, pressure regulator, flush valve and air release valve. The drip component manufacturer's instructions for installation and maintenance shall be included in the project specifications.
- 9.16 Spray heads and nozzles should be installed no more than 150mm from the edge of any paving, fence line or planter edging.

Irrigation Service Connections

- 9.17 Design service connections from Village of Telkwa water main to, and including, water meter chamber, to be in accordance with Part 2 – Waterworks.
- 9.18 Install automatic shut-off devices on every system.
- 9.19 Irrigation to be fitted with backflow prevention devices.
- 9.20 Install flow sensors and master valves after the backflow preventer on every site.
- 9.21 Measure static water pressure at or near the point of connection and include with irrigation system design.
- 9.22 Install pressure regulating devices in high pressure situations.

SECTION 10 SITE FURNISHING

General

10.1 All appurtenances shall be in accordance with MMCD documents, latest edition.

10.2 Selection of style, colour, and other aesthetic values for site furnishing to be determined by the Village.

Design Criteria

10.3 Table 10-1 identifies the preferred Telkwa Target Standards and the baseline standards for simple developments for site furnishing. The following design criteria are baseline standards that are preapproved by the Village.

Table 10-1: Target and Baseline Standards for Site Furnishing

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none">• Materials shall be UV resistant, resistant to erosion, weather, and vandalism, and wood materials shall be above both grade and the 'splash zone' for resistance to rot.• Materials shall be local, readily repaired/replaced if vandalized.• Design of signage shall be approved by the Village and where possible shall be part of a coordinated signage system and unified visual appearance.• All site furnishings shall be in accordance with appropriate safety authorities.	<ul style="list-style-type: none">• Shall conform to the standards and associated standard drawings listed in this section.

Fencing

10.4 Fencing shall be in accordance to individual situations and the height requirements of the Village Zoning Bylaw.

10.5 Fences may be one of two types:

- a) Basic Fence, that is designed primarily for function and low maintenance; where fencing is to be chain link type, material shall be 9 gauge 50 mm mesh, galvanized chain link type with 50 mm diameter galvanized posts, in accordance to CSA standards.
- b) Appearance Fence, which is designed to add aesthetic and character appeal to its function, but also with low maintenance.

- 10.6 When a fence is warranted on public property, Appearance Fence design standards are required under the following circumstances:
- a) When fence is necessary within the foreground (e.g. within 5m) of the view from a public road, trail or sidewalk.
 - b) In other highly visible locations as determined by the Village.
- 10.7 Appearance Fence shall be custom designed to meet the following guidelines:
- a) Above-grade materials shall be wood, brick or stone masonry.
 - b) Foundation of materials shall be concrete, with suitable structural connections to the posts or fence materials.
 - c) Finish shall be to a high standard of colour and texture, e.g. stained wood or natural masonry.
 - d) Design shall be customized in plan and elevation to fit the site and context; height requirements and additional features shall conform to the Village Zoning Bylaw.
- 10.8 When a fence is warranted on public property other than the circumstances identified above, a Basic Fence shall be used, unless the use of Appearance Fence is proposed by the Applicant and approved by the Village. Basic Fence may also be used at public parks where play structures or playing fields require separation from adjacent roadways.

Signage

- 10.9 Design of information and way finding signage on public land shall create a coordinated signage system on a given development or neighbourhood – such that the materials, scale, colour, and graphics of the signs creates a unified visual appearance or variation around a theme. If such signage systems are being dedicated by the developer to the Village, the signage system design and installation is subject to the Village approval of detailed signage system proposal.
- 10.10 Design of signage within Parks shall be to the Village's satisfaction.
- 10.11 Use of neon, large areas of metal, and interior lit signs are discouraged.

Handrails

- 10.12 All handrails shall be designed and installed in accordance with the BC Building Code.
- 10.13 Handrails shall be one of two types:

- a) Basic Safety Handrail, that is designed primarily for function and low maintenance;
- b) Appearance Safety Handrail, which is designed to add aesthetic and character appeal to its safety function, but also with low maintenance.

10.14 Appearance Safety Handrail shall be custom designed to meet the following guidelines:

- a) Materials shall be highly durable, e.g. metals and composites, with preference for aluminum.
- b) Finish shall be to a high standard of colour and texture, e.g. hot dipped galvanized.
- c) Design shall be customized in plan and elevation to fit the site and context, regarding height, number of bars, graphic elements, post spacing, stepping of the top rail, etc.
- d) Designs which graphically or creatively reflect the natural or cultural environment of the Village of Telkwa are encouraged.

Public Art

10.15 Public art shall be displayed in the public right-of-way.

10.16 Acceptable forms of public art can include, but is not limited to: banners, signage, sculpture, fountain, etc.

10.17 Preference will be given to displays that reflect the history and culture of the Village of Telkwa, which are deemed of interest to the community as a whole.

10.18 Preference will be given to displays that use local materials and are created locally.

Bollards

10.19 Bollards may be used to restrict access to areas or protect utility infrastructure (e.g. hydrant, kiosk, etc.).

10.20 Bollards may be used to mark walkways and trails within the Village.

SECTION 11 EARTHWORKS

General

- 11.1 All earthworks, trenching, and materials shall be in accordance with this section, supplementary specifications, and the latest editions of MMCD.
- 11.2 During construction of works and services dust control measures must be provided for at all times wherever:
- The operation of any equipment causes dust that becomes a nuisance to property owners and residents in the area; and
 - Bare soil conditions are created in performing work.
- 11.3 During construction of works and services ensure construction area is maintained free of accumulation of excess waste material and debris and disposed of offsite in approved facilities.
- 11.4 In accordance with Section 9, Erosion and sediment control measures shall be utilized as appropriate on the development site.
- 11.5 A geotechnical study shall be completed where loose or consolidated soils and areas of steep slopes may require special structural design.

Design Criteria

- 11.6 Table 11-1 identifies the preferred Telkwa Target Standards and the baseline standards for simple developments for earthworks. The following design criteria are baseline standards that are preapproved by the Village; target standards can be met through exceptional design and with approval from the Village.

Table 11-1: Target and Baseline Standards for Earthworks

Telkwa Target Standards	Baseline Standards
<ul style="list-style-type: none">Utilize local materials (e.g. local gravel, water from river to control dust, etc.).Use construction practices which ensure ecological integrity.Design to reduce cut and fill volumes.Design to reduce material quantities required for street systems and servicing.	<ul style="list-style-type: none">Shall conform to the standards and associated standard drawings listed in this section.

Structural Design for Street Systems

11.7 Roadways shall be designed in accordance with this standard, and with MMCD Platinum Edition, Sections 32 01 11 through 32 01 17.7, Sections 32 12 13.1 through 32 12 33 and Sections 32 13 16.1 through 32 17 23.

11.8 Pavement design shall include the consideration of the subgrade soil type, moisture conditions and subgrade drainage provisions.

11.9 Regardless of the method used for pavement structure design, pavement structures shall be at least equal to or better than the minimum pavement structures in Table 11-2.

11.10 Pavement structure requirements shall be confirmed by the Developer's Engineer following completion of a geotechnical investigation.

Table 11-2: Roadway Base Design Road Classification	Sub-base Thickness (mm)	Base Thickness (mm)	Asphalt Thickness (mm)
Arterial	450	100	100
Collector	400	100	75
Local	300	100	75
Cul-de-Sac	300	100	75
Industrial*	400	100	75 (2 lifts)
Lane	300	100	50
Walkway	300	100	50

*Where roads subject to industrial traffic, industrial standards for road structure prevail.

Road Sub-base

11.11 The material for the road sub-base course shall be 75mm minus pit run gravel to MMCD.

Road Base and Shoulders

11.12 Granular base course material shall be uniformly graded 25mm crushed gravel to MMCD.

Asphaltic Hot-Mix Concrete

11.13 Asphalt shall conform to Supplementary Specifications in Section 13 of this bylaw.

11.14 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.

11.15 Cold-mix asphalt shall not be permitted, unless approved by the Village Engineer.

Pipe Bedding

11.16 Pipe bedding shall be undertaken in strict accordance with the manufacturer's bedding requirements for the type of pipe utilized.

11.17 Sand bedding, where required, shall be clean well graded sand to MMCD.

Curb and Gutter

11.18 Curb and Gutter to be in accordance with MMCD and Supplementary Specification 1 in Section 13.

SECTION 12 ENGINEERING DRAWINGS & CONSTRUCTION PROCEDURES

General

- 12.1 All applicants for approval under the Village of Telkwa Subdivision and Development Servicing Bylaw No. 642, 2014 shall be accompanied by engineering drawings as specified in this Schedule. The drawings shall be submitted to the Approving Officer and shall be prepared at no cost to the Village.
- 12.2 All required engineering drawings shall be prepared under the direction of, dated, sealed and signed by a Professional Engineer.
- 12.3 Where works or services are provided, located, or constructed as a condition of subdivision approval under this bylaw, as-built engineering drawings of those works and services shall accompany the application for subdivision approval as evidence of the completion of those works as services unless an arrangement pursuant to Section 911 of the *Municipal Act* exists. Such drawings shall be prepared and provided at no cost to the Village.

Approval

- 12.4 Three paper copies of the engineering drawings shall be submitted to the Village Engineer for approval before the owner starts construction of subdivision services.

Drawing Requirements

- 12.5 Drawings to be submitted to the Village in accordance with Table 12-1 below

Table 12-1: Drawing Submission Requirements for Works and Services during Subdivision

Submission Category	Submission Criteria
General and Legal Information	<ul style="list-style-type: none">• Drawings to be submitted in ink on standard A-1 size sheets• In general, plan and profile drawings shall be to the scale: Horizontal 1:500 Vertical 1:50 With the profile below and plan above• North arrow to face the top or left side• Village's Subdivision reference number shall be shown on the title block• Consecutive drawings to be joined by match lines• Legal dimensions to be shown on lot lines• Lot and registered plan numbers to be shown

	<ul style="list-style-type: none"> • Right-of-way and easement numbers to be shown • All elevations shall be referenced to geodetic datum
Waterworks Information	<ul style="list-style-type: none"> • On plan, show all watermains, hydrants, valves, caps, reducers, standpipes, pressure reducing stations, and all other appurtenances • Show offsets of mains from property line, pipe sizes, slopes, materials, and class • On plan indicate fitting sizes and joint types • On profile show pipe sizes, slopes, materials and class • On plan show water services from main to property line • Location of water services to lot corner to be dimensioned
Sanitary Sewer and Storm Drainage Information	<ul style="list-style-type: none"> • On plan, show all pipes, manholes, catch basins, drainage drywells, clean-outs, leads, inlets and outfalls, pipe sizes and slopes, material, class of pipe and offset from property line • On profile, show all pipes and sizes, length, material classes and grades between manholes and pipe invert elevations. Invert elevations of inlets and outfall must be shown • On plan and profile, designate manholes DMH-# for storm sewer manholes and SMH-# for sanitary sewer manholes • On plan show sewer services from main to property line • Location of sewer services to lot corner to be dimensioned
Stormwater Management	<ul style="list-style-type: none"> • Provide stormwater management report indicating, but not limited to the following: overall catchment area, drainage sub-catchments, slopes, land use, soils, minor and major flows, environmentally sensitive areas, erosion concerns, watercourses, water quality issues, existing storm system and capacity, proposed storm system infrastructure and capacity.
Street Systems Information	<ul style="list-style-type: none"> • On plan, show all centreline horizontal curve data, roadway edges and ditches, offsets from property line to roadway edges and centreline • On profile show centreline profile including vertical curve data and grades
Staging Plan	<ul style="list-style-type: none"> • Where a subdivision is to be constructed in stages, show subdivision development staging and the

	<p>order in which each portion of the project will be developed on plan and profile</p> <ul style="list-style-type: none"> • Prepare and submit a report outlining proposed staging • An erosion and sediment control plan shall accompany the staging plan, showing erosion and sediment controls to be used during the construction and phasing of the project • An erosion and sediment control report and checklist to be used for monitoring shall be submitted to the Village for approval prior to commencement of construction
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Construction Procedures

12.6 Before starting construction of subdivision services, the Developer shall provide the Village Engineer with a construction schedule in writing setting out the sequence and timing of construction activities, including those set out in Design Standards where approval by the Village Engineer is required.

If there are delays or variances from the construction schedule, the Developer shall inform the Village Engineer of these variances. The Developer shall provide the Village Engineer with the names and addresses and telephone numbers of the On-site Representative(s), the Contractor, and the Contractor's Superintendent.

12.7 During construction, the Village Engineer is authorized to enter upon the lands where services are being constructed to view the construction of services.

12.8 The construction of required works and services shall be inspected by a Professional Engineer or his designated representative at the expense of the Developer of the land being subdivided.

12.9 Where utility mains and services have to cross existing paved roadways, the pavement shall be pre-cut with a cutting wheel or jack hammer. Upon completion of the utility installation, the trench shall be backfilled and compacted, and a roadway structure similar to the existing roadway placed and compacted. The road shall be patched with hot mix asphalt.

12.10 All connections to existing municipal utilities and associated materials shall be undertaken by the Village. The Developer shall design the connections and submit it to the Village for approval. The Developer shall pay all connection costs and coordinate timing of the connection with the Village, as well as advise affected consumers of a utility system disruption.

12.11 As-builts of existing underground services shown on Village of Telkwa drawings are not guaranteed to be accurate or complete. It shall be the responsibility of the Developer to find and locate in the field all existing services such as water, sewer, drains and culverts, hydro, telephone and natural gas, prior to construction, and to preserve and protect them from damage during construction.

Public Access and Safety

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

12.13 Traffic control and management shall be the responsibility of the Developer to the standards of the Village. Where access to buildings is to be cut off, for no more than 24 hours at one time, the Developer shall provide eight hours' notice to the property owner.

12.14 Appropriate public safety signage shall be provided for the work to be undertaken.

Certificates and Bonds

12.15 Upon completion of construction and submission of as-built drawings to the Village, the Professional Engineer representing the Developer shall provide the Village with a Construction Completion Certificate on a standard form provided by the Village of Telkwa, stating that the works as constructed conform to the plans and specifications set out in the approved design drawings.

12.16 Upon receipt from the Developer's Engineer of the Construction Completion Certificate, the Village Engineer shall inspect the works and services. Upon determining that all deficiencies have been rectified and that the subdivision conforms to the plans and specifications set out in the approved design drawings, the Village shall accept the Construction Completion Certificate. Only the standard certificate form provided in this manual shall be used. Property pins and survey monuments destroyed or damaged by construction operations shall be replaced prior to accepting the Construction Completion Certificate.

- 12.17 Upon acceptance of the Construction Completion Certificate by the Village, the Developer shall provide the Village with maintenance bond or letter of credit acceptable to the Village in the amount of 10% of the total construction value as determined by the Professional Engineer representing the Developer and approved by the Village Engineer. The term of maintenance bond shall be from the date of acceptance of the Construction Completion Certificate to the date of issuance by the Village of the Final Acceptance Certificate, but in no case shall the term be less than twelve months.
- 12.18 No less than 12 months after the date of acceptance of the Construction Completion Certificate by the Village, the Developer shall apply to the Village for Final Acceptance on a standard form provided by the Village of Telkwa.
- 12.19 Upon receipt from the Developer's application for Final Acceptance, the Village Engineer 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 design drawings, the Village shall issue the Final Acceptance Certificate as provided for in on the standard Final Acceptance Application form.

As-Built Drawing Submission

- 12.20 Upon completion of the works, one (1) set of reproducible and two (2) sets of paper as-built drawings, and an electronic submission in the latest version of AutoCAD shall be submitted to the Village. The drawings shall conform to the Village standards and shall include all required inverts, locations, offsets and material types and classes comprising the works. In addition, the drawings shall include:
- a) All service connections shall be accurately shown on the "as-built" drawings indicating horizontal distance from service locations to property corner and an invert elevation at property line. All changes made during construction shall be made on the "as-built" drawings.
 - b) "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.

SECTION 13 SUPPLEMENTAL SPECIFICATIONS

Introduction

13.1 The Village of Telkwa Supplemental Specifications shall apply to the design and installation of services in new subdivisions and the servicing of and within existing lots within the municipal boundaries of the Village of Telkwa. They apply to the design and installation of storm drains, sanitary sewers, waterworks, roadways, curbs, gutters, sidewalks, power, telephone, gas, cable television, street lighting, street trees, and other services of structures required to be installed by the Owner. References are made throughout to Standard Detail Drawings; these can either be found in the Master Municipal Specifications (MMS) or these Supplemental Specifications.

13.2 The Master Municipal Specifications and Standard Detail Drawings are available from:

Master Municipal Construction Documents Association

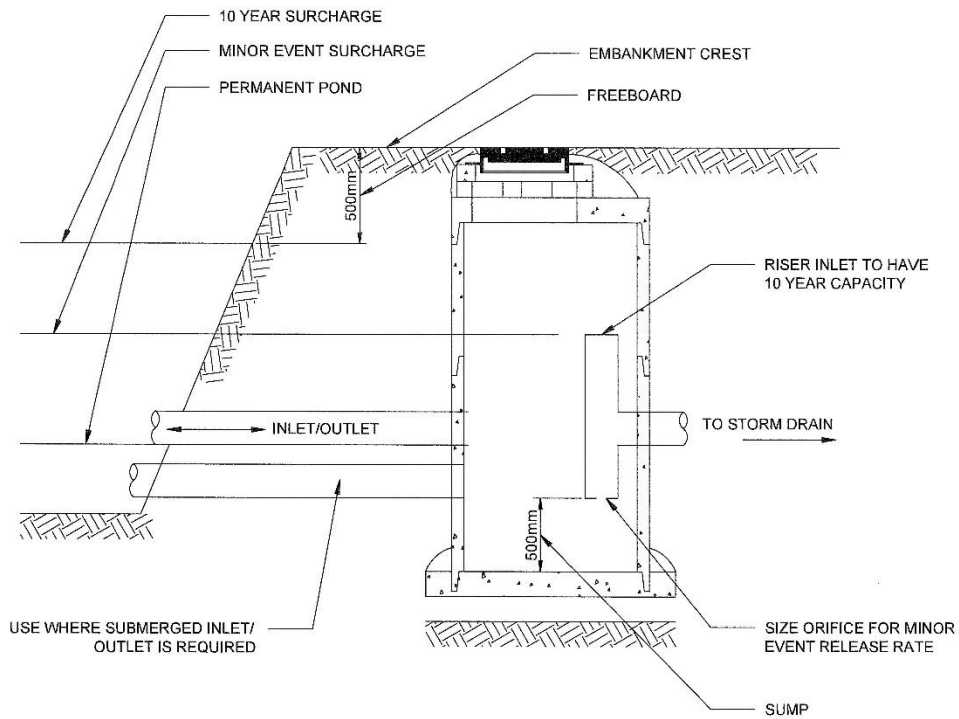
Telephone: (604) 681-029

Email: admin@mmcd.net

Online: www.mmcd.net

13.3 If any conflict occurs between the written specifications and standard detail drawings and/or another code or regulation also enforceable in the Village of Telkwa, the stricter standard shall be used.

13.4 The following supplemental specifications and amendments should be read in conjunction with the Master Municipal Specifications and Standard Detail Drawings.



NOTE:

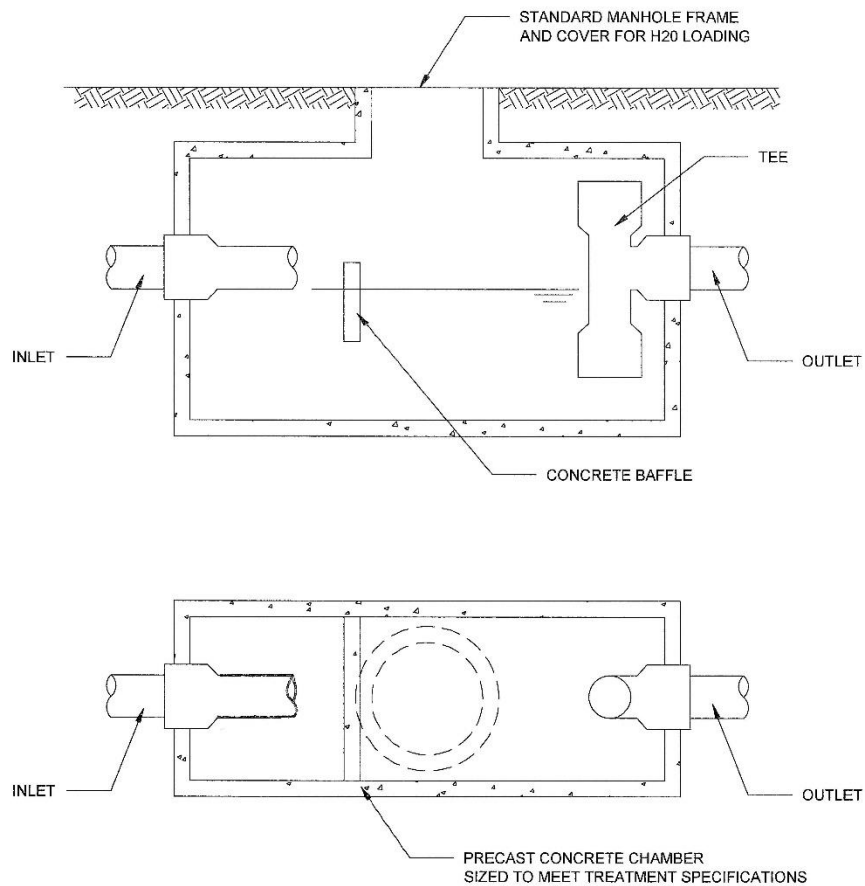
1. TO BE USED WITH DETENTION FACILITY WHERE OUTLET IS TO STORM DRAIN SYSTEM OR WHERE SECURITY OF CONTROL STRUCTURE IS REQUIRED.
2. MANHOLE TO MMCD STANDARD DETAIL S1.

FLOW CONTROL MANHOLE

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

D1



NOTES:

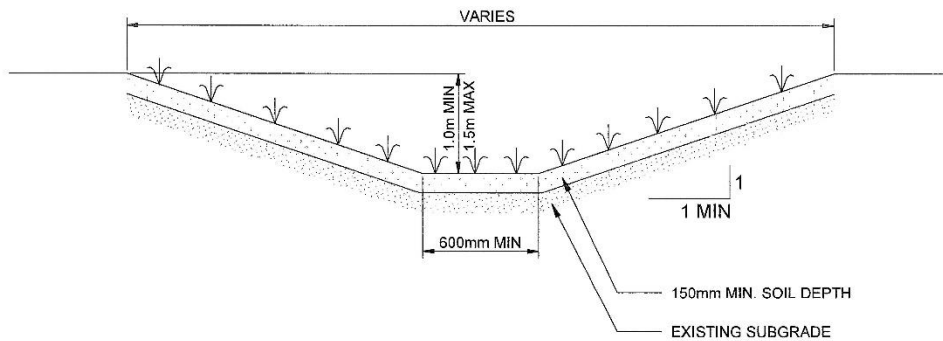
1. OIL/GRIT SEPARATOR TO BE INSTALLED ON COMPACTED GRAVEL OR UNDISTURBED SUBSOIL.
2. CHAMBER TO BE WATER TIGHT.
3. CHAMBER SIZE TO MEET TECHNICAL CRITERIA IN ENGINEERING STANDARDS.

OIL/GRIT SEPARATOR

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

D2



NOTES:

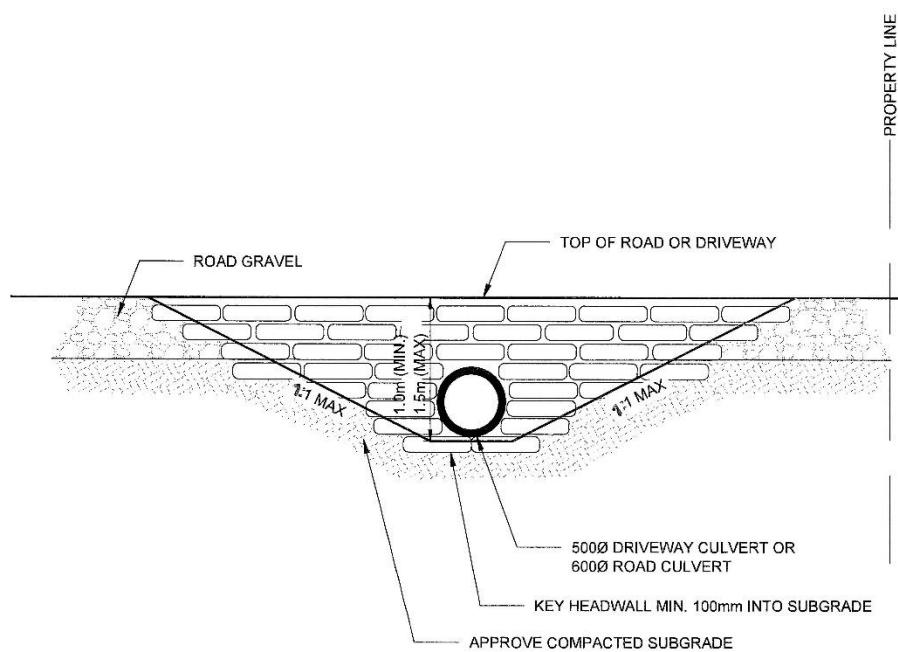
1. MAXIMUM FLOW DEPTH = 100mm OR 50mm FOR FREQUENTLY WETTED AREAS.
2. CHANNEL BASE AREA IS A FUNCTION OF CATCHMENT AREA. CHANNEL AREA (WIDTH x LENGTH) = 1% OF CATCHMENT AREA.
3. LONGITUDINAL SLOPE = 1% TO 6%
4. ON GRADES GREATER THAN 6% ROCK CHECK DAM SHALL BE INSTALLED ACCORDING TO STANDARD DRAWING ES1.

GRASS SWALE

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

D4



NOTES:

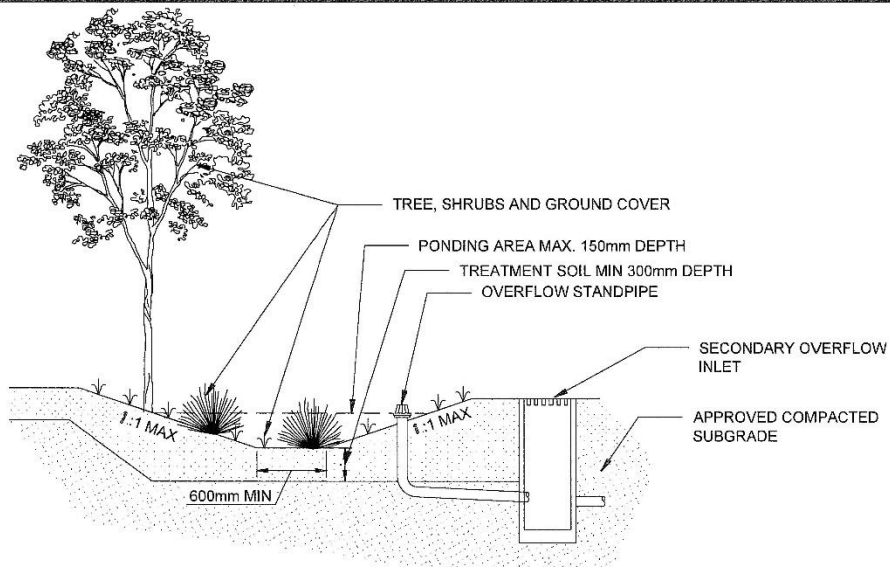
1. HEADWALL MATERIAL TO BE APPROVED BY THE MUNICIPAL ENGINEER.

TYPICAL HEADWALL DETAIL

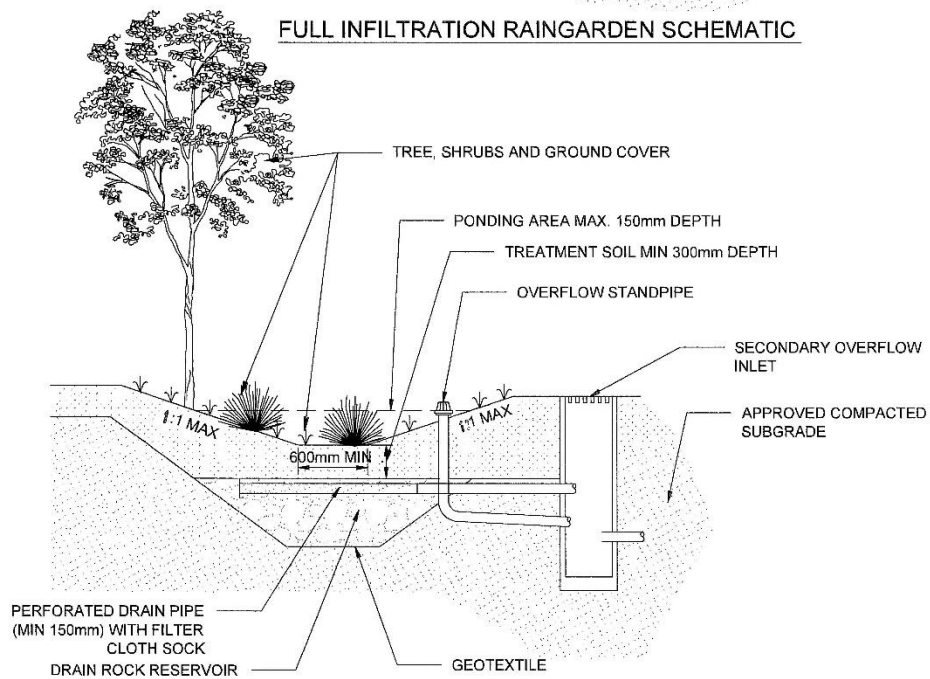
DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

D5



FULL INFILTRATION RAINGARDEN SCHEMATIC



PARTIAL INFILTRATION RAINGARDEN SCHEMATIC

TYPICAL RAINGARDEN DETAILS

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

D6

APR 10 '96 13:26 PACIFIC REGION SSD

P.6

ATMOSPHERIC ENVIRONMENT SERVICE - ENVIRONNEMENT CANADA
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE - ENVIRONNEMENT CANADA

PREPARED BY - PREPARE PAR LE

BC

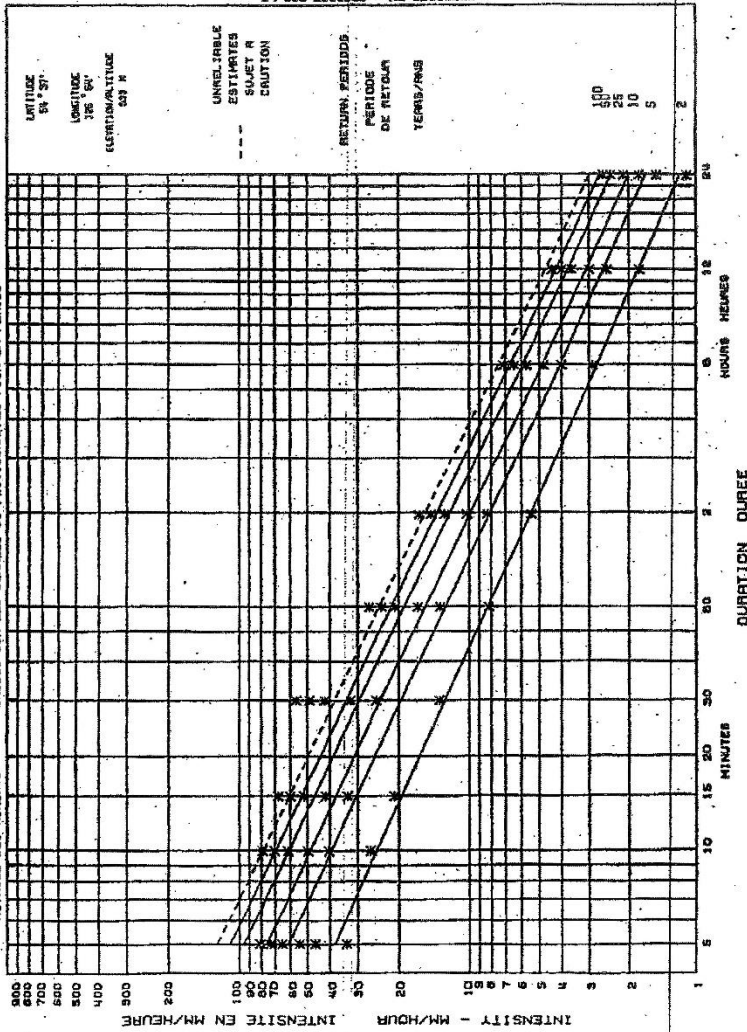
25 YEARS/AN

1983 - 1990

QUICK

SHORT DURATION RAINFALL INTENS. - DURATION FREQUENCY DATA FOR QUICK
BASED ON RECORDING MAIN DRAIN DATA FOR THE PERIOD
BASED SUR LES DONNEES DE PLUVIOMETRIES POUR LA PERIODE

CUNSEL-METHOD OF MOMENTS
METHODE DES MOMENTS



IDF CURVE

DATE: JANUARY 2014

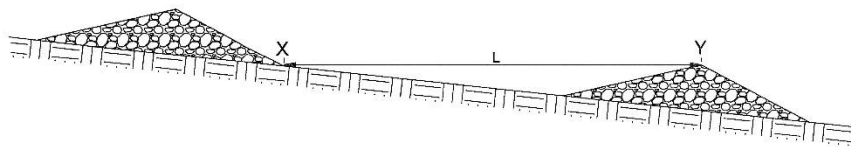
DRAWN: KLT

SCALE: NTS

APPROVED:

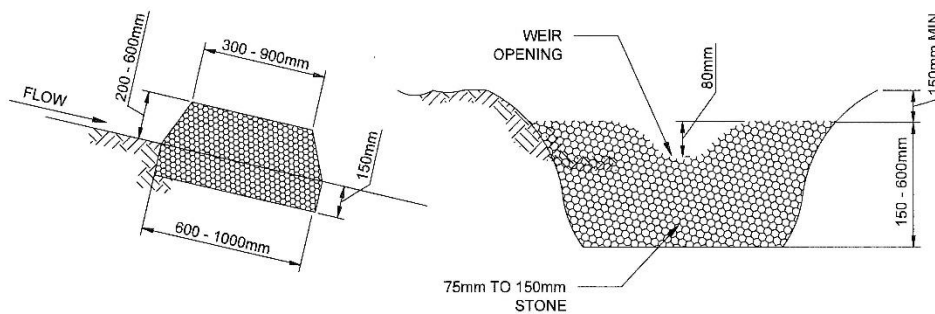
Telkwa
VILLAGE OF TELKWA

D7



L = THE DISTANCE SUCH THAT POINTS X AND Y ARE OF EQUAL ELEVATION

SPACING BETWEEN CHECK DAMS



SECTION A-A

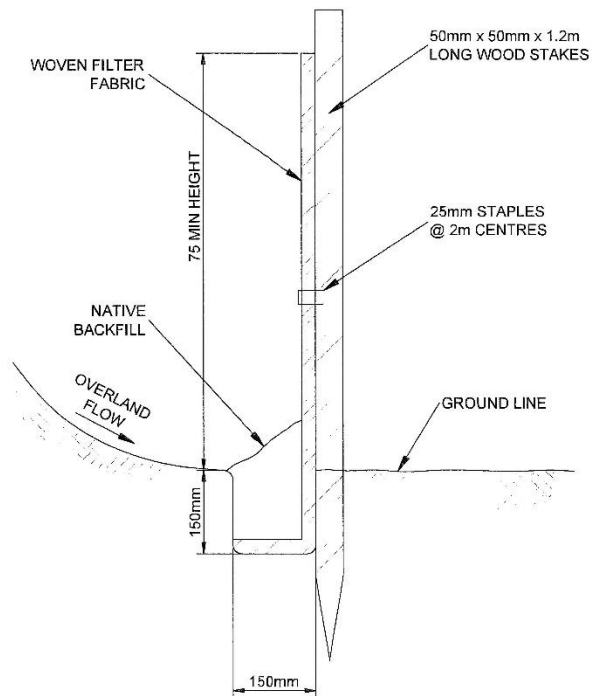
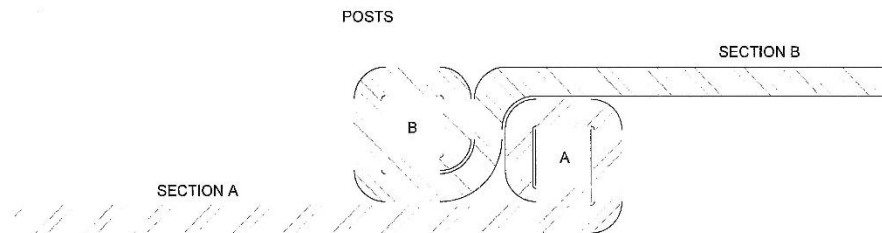
SECTION B-B

TYPICAL ROCK CHECK DAM DETAIL

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

ES1



TYPICAL SILT FENCE DETAIL

DATE: JANUARY 2014

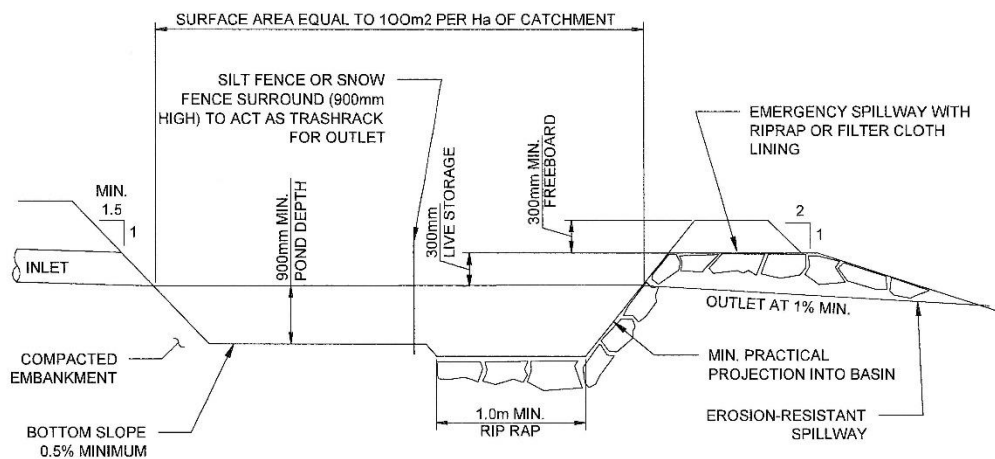
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

ES2



NOTE:

1. REMOVE SEDIMENT WHEN BASIN 1/3 FULL.

TEMPORARY SEDIMENT BASIN

DATE: JANUARY 2014

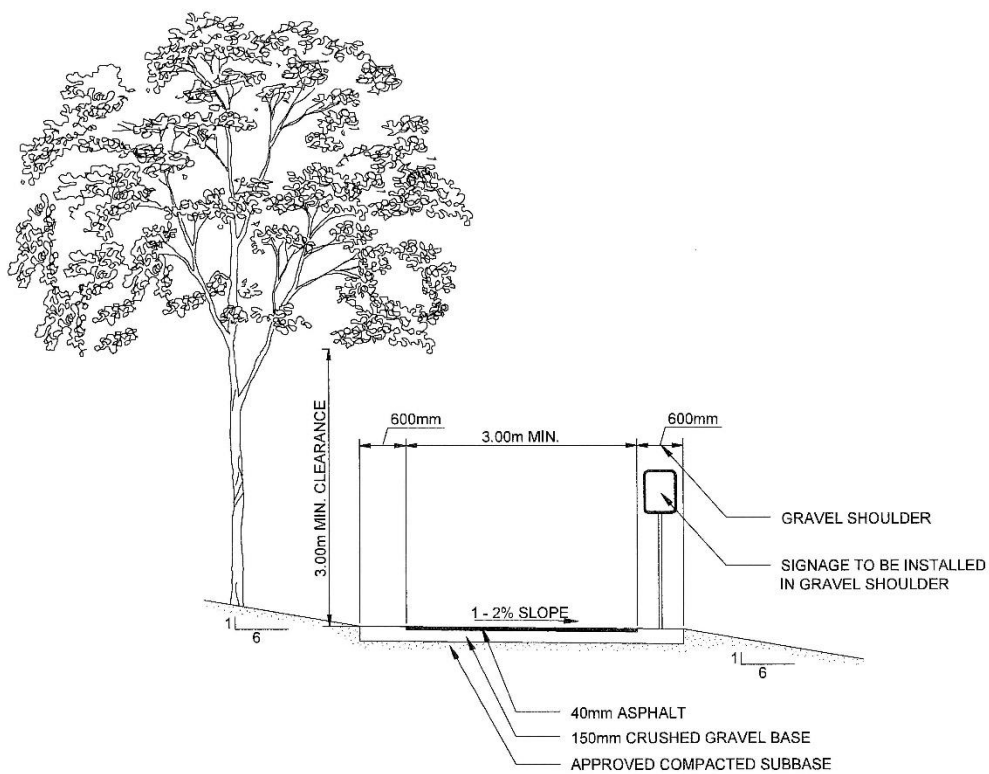
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

ES3

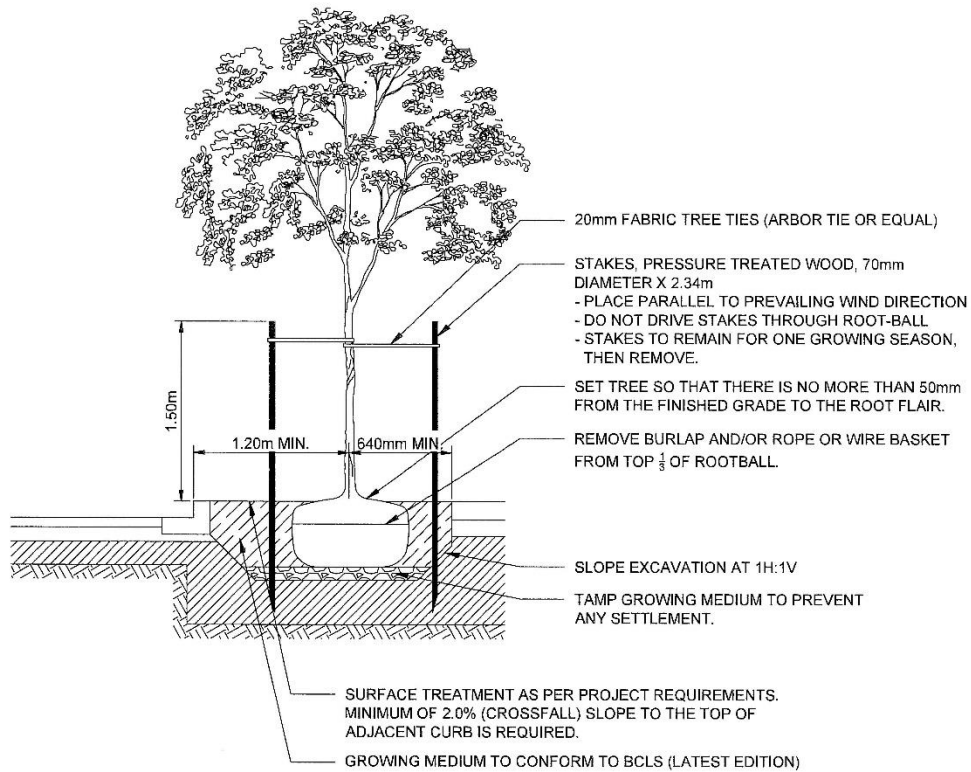


TYPICAL MULTI-USE PATHWAY DETAIL

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

L1



NOTES:

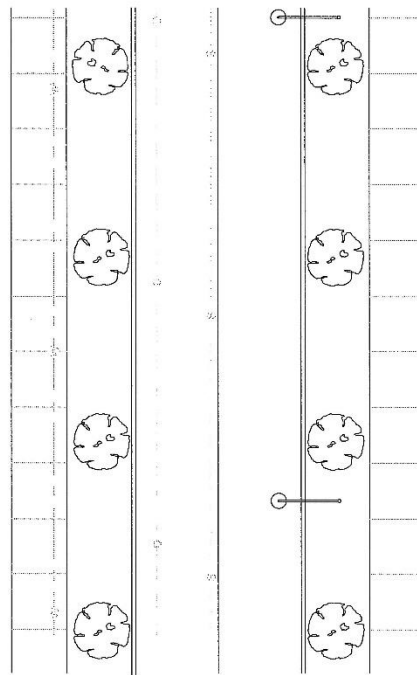
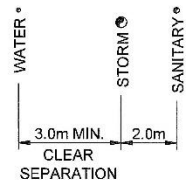
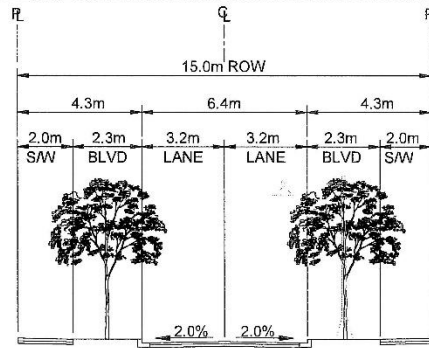
1. ALL LANDSCAPE CONSTRUCTION AND PLANT MATERIAL TO CONFORM TO THE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS (LATEST EDITION) AND THE VILLAGE OF TELKWA STANDARDS.
2. IF POOR DRAINAGE CONDITIONS EXIST, PROVIDE POSITIVE SUB-SURFACE DRAINAGE AWAY FROM PLANTING EXCAVATION.
3. IRRIGATION REQUIRED TO VILLAGE OF TELKWA STANDARDS.

TYPICAL STREET/BOULEVARD TREE PLANTING DETAIL

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

L2

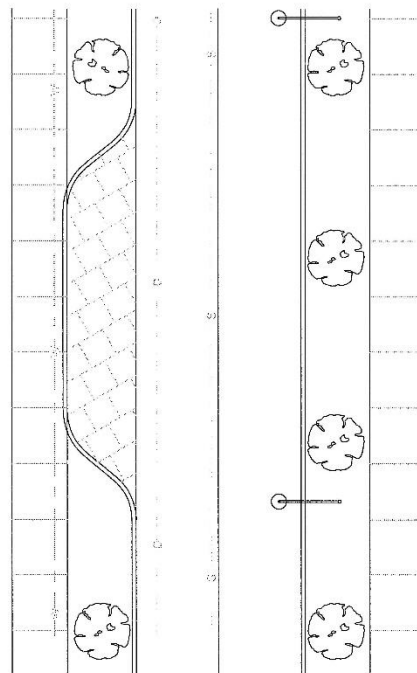
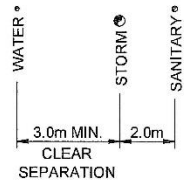
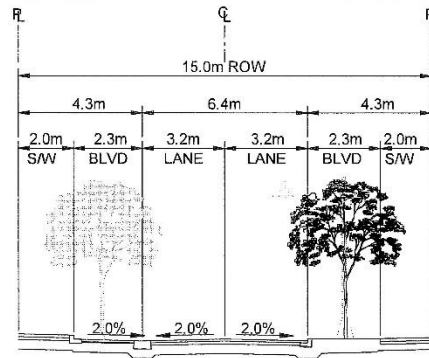


ROW 15 - URBAN LOCAL

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

R1

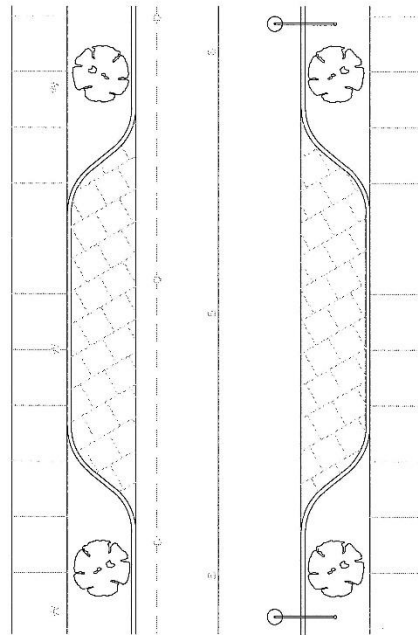
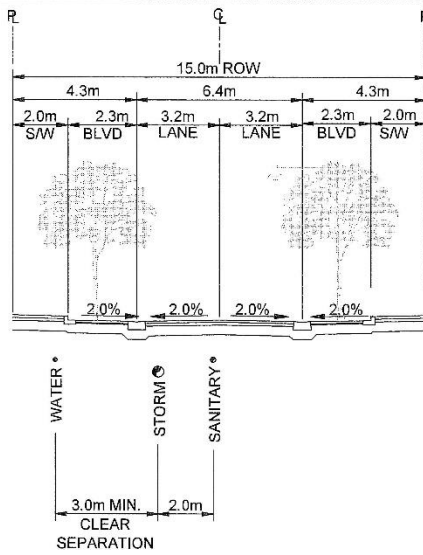


**ROW 15 - URBAN LOCAL
PARKING ONE SIDE**

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

R2



**ROW 15 - URBAN LOCAL
PARKING BOTH SIDES**

DATE: JANUARY 2014

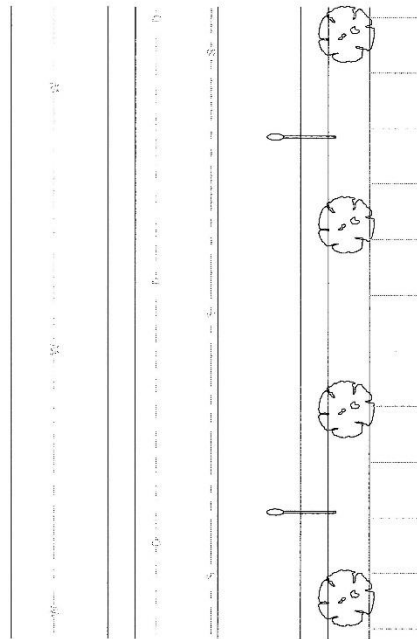
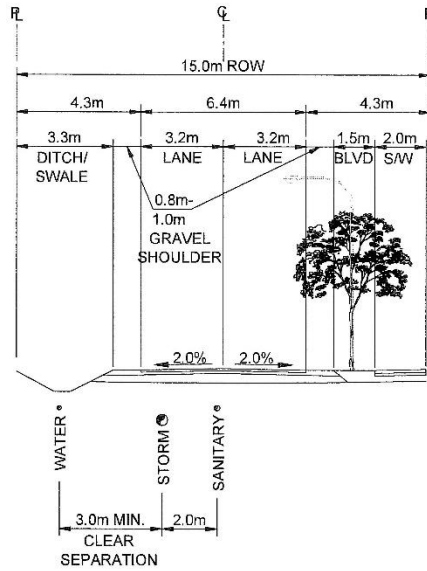
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

R3



ROW 15 - RURAL LOCAL

DATE: JANUARY 2014

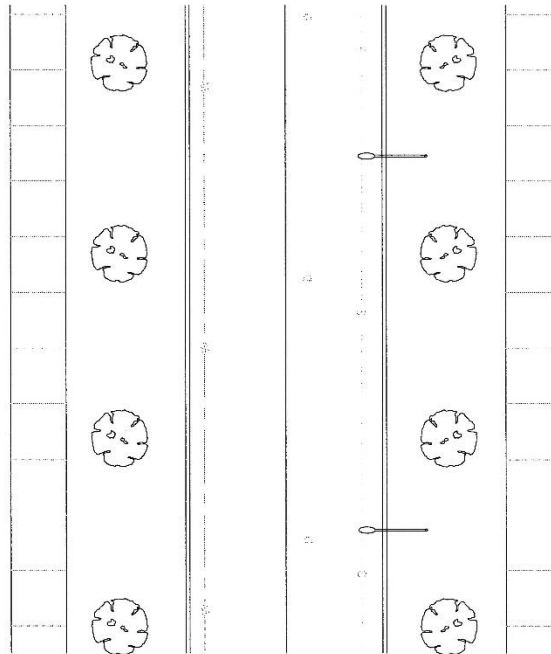
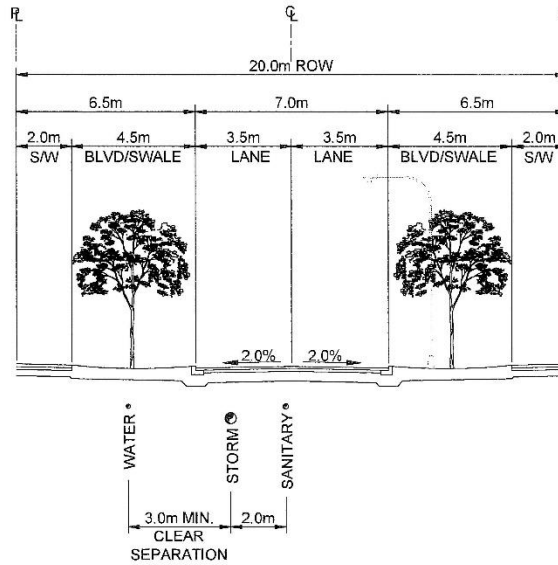
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

R4

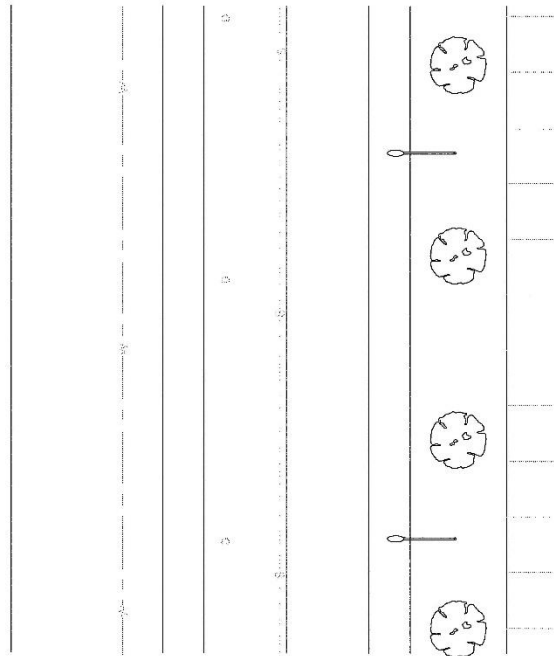
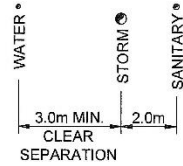
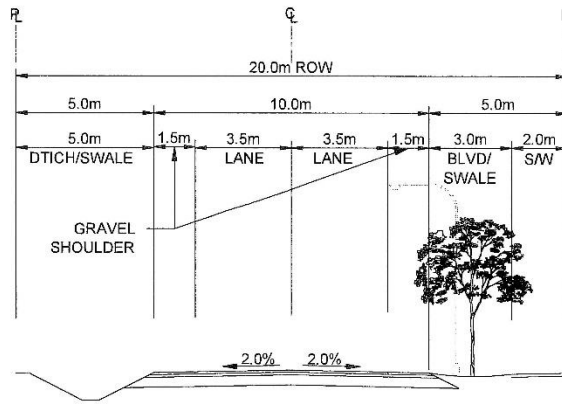


ROW 20 - URBAN COLLECTOR

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

R5



ROW 20 - RURAL COLLECTOR

DATE: JANUARY 2014

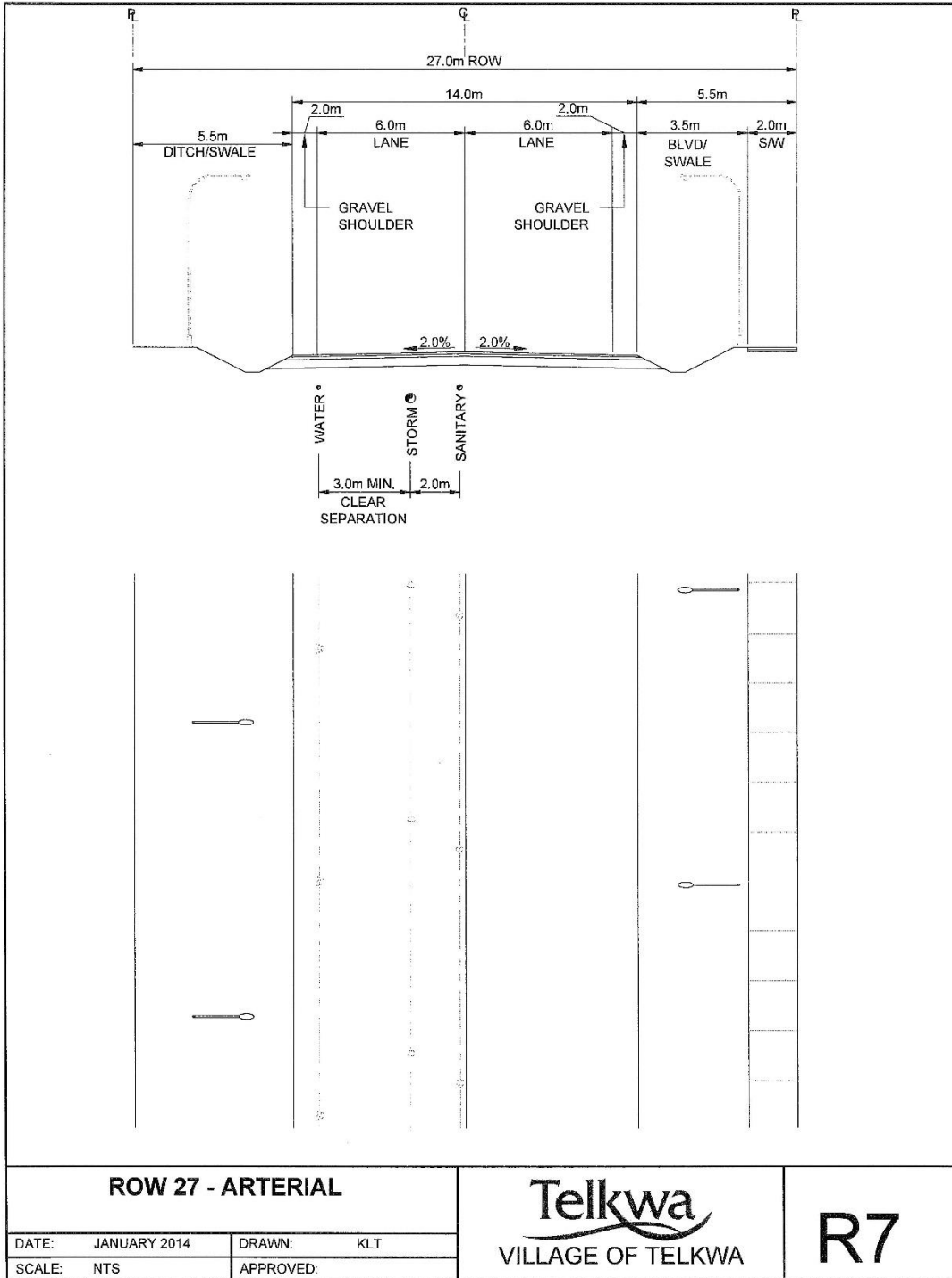
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

R6



ROW 27 - ARTERIAL

DATE: JANUARY 2014

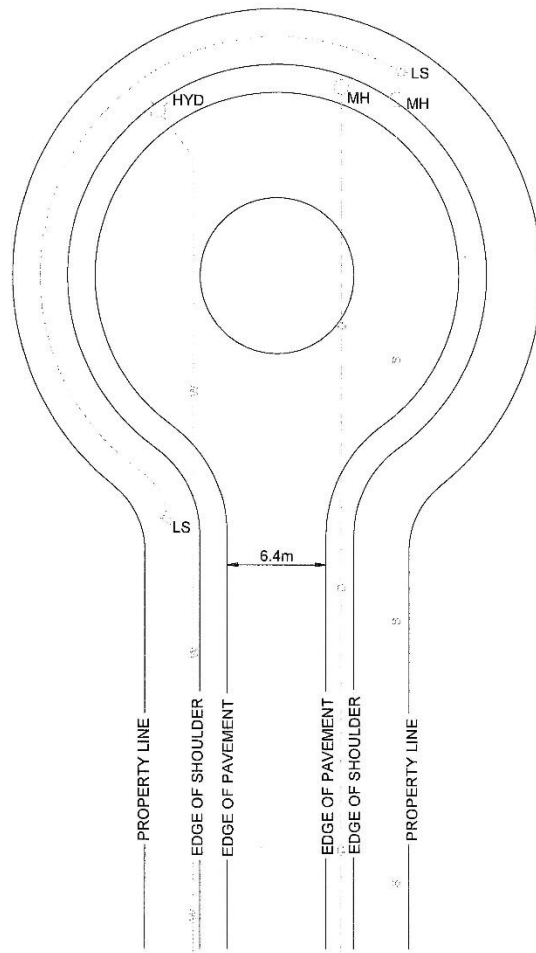
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

R7

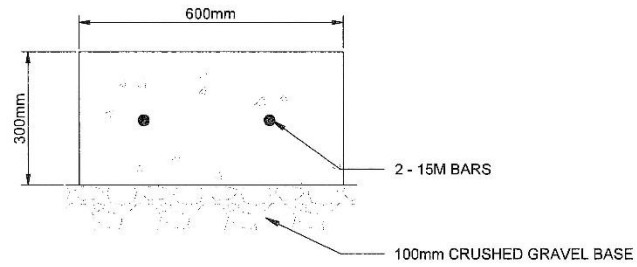


TYPICAL CUL-DE-SAC

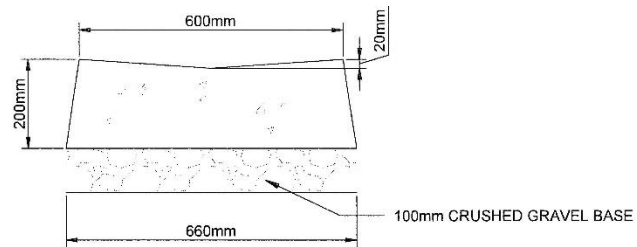
DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

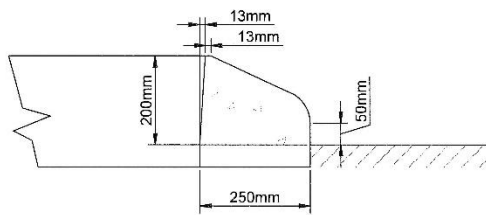
R8



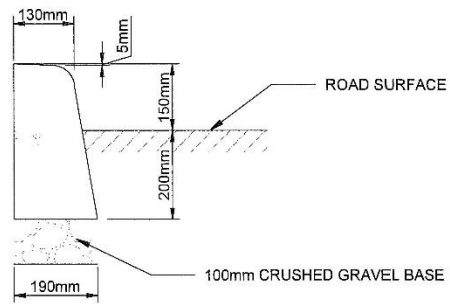
FLUSH CURB



INVERTED GUTTER



EXTRUDED CONCRETE CURB



BARRIER CURB

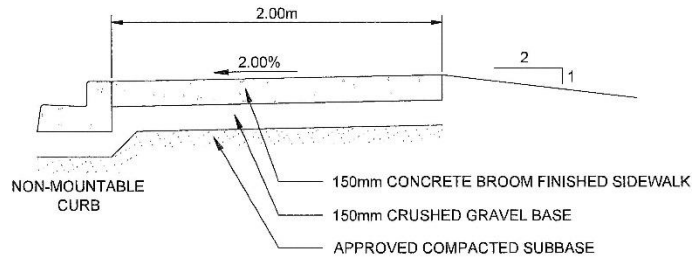
CURB AND GUTTER

DATE: MARCH 2013
SCALE: NTS

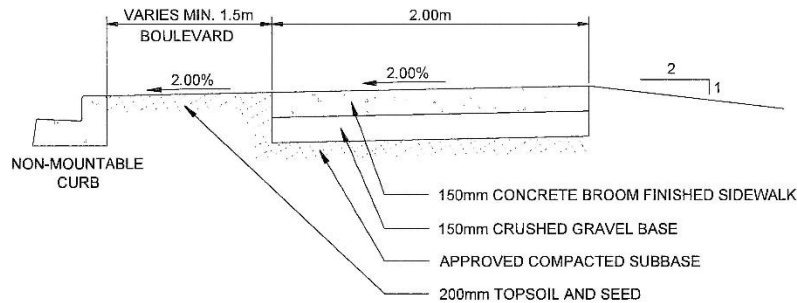
DRAWN: KLT
APPROVED:

Telkwa
VILLAGE OF TELKWA

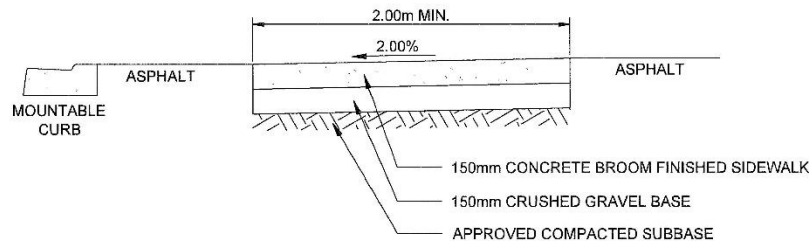
R9



SIDEWALK ABUTTING CURB



SEPARATED SIDEWALK



DRIVEWAY CROSSING

NOTES:

1. REMOVE ALL SOD AND ORGANIC MATERIALS FROM PROPOSED SIDEWALK LOCATION.
2. IN HEAVY TRAFFIC AND INDUSTRIAL AREAS ADD 150mm X 150mm 10/10 GAUGE WIRE MESH REINFORCING.

CONCRETE SIDEWALK

DATE: JANUARY 2014

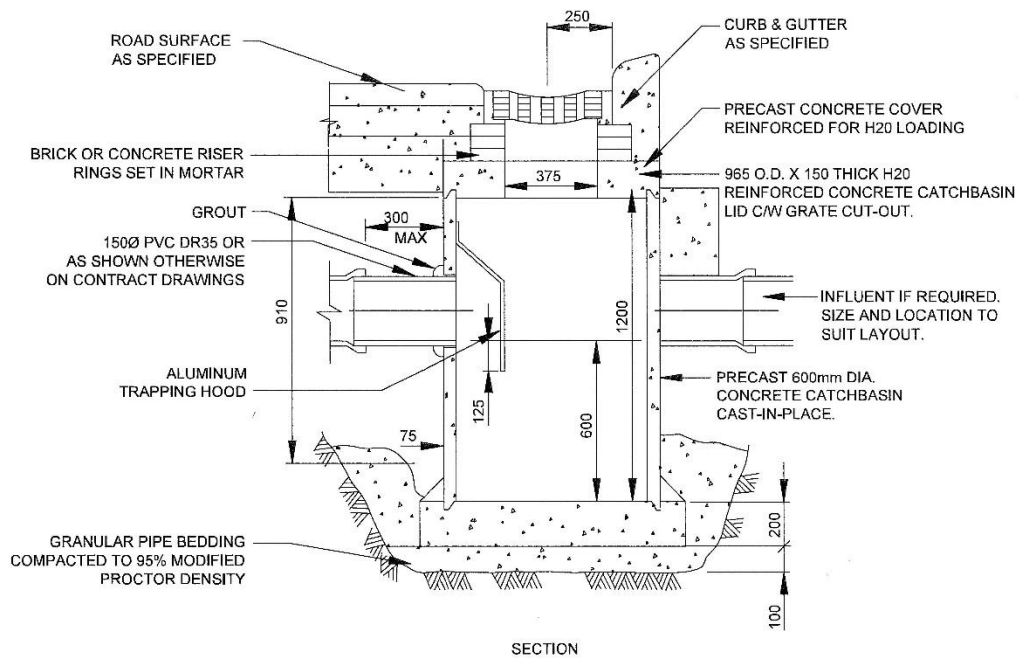
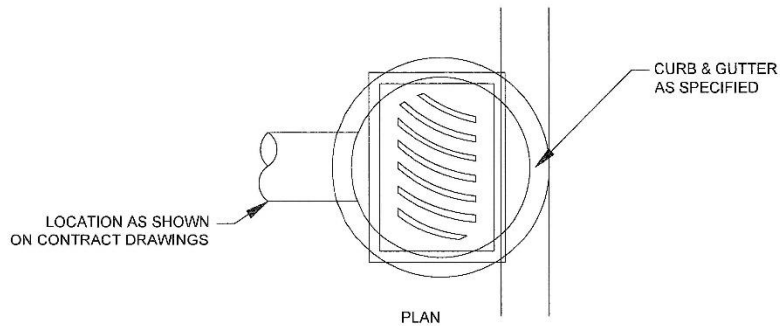
DRAWN: KLT

SCALE: NTS

APPROVED:

Telkwa
VILLAGE OF TELKWA

R10



NOTE:

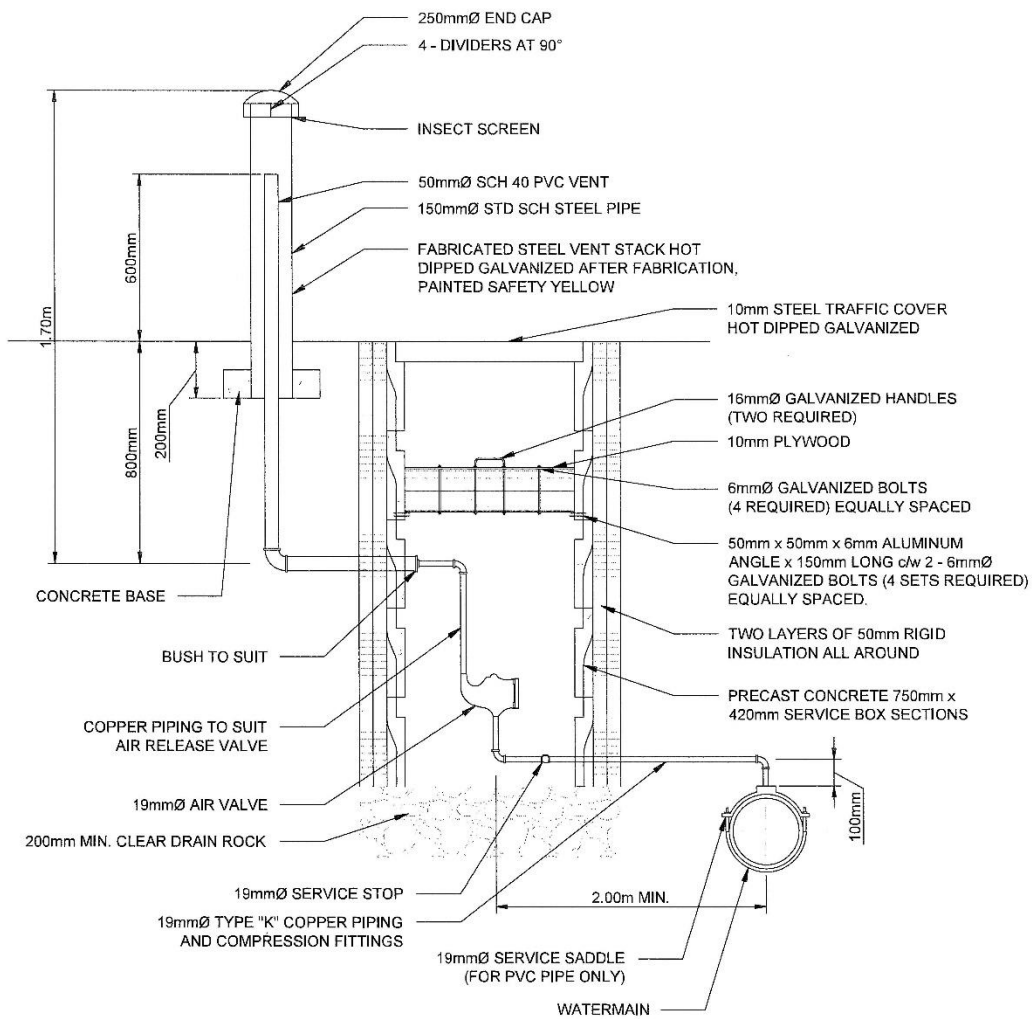
1. DETAILS ARE DRAWN FOR PRECAST RISERS ON CAST-IN-PLACE BASES. PRECAST UNITS C/W BASE APPROVED BY ENGINEER ARE ACCEPTABLE.
2. REFER TO CONTRACT DRAWINGS AND SECTION SUPPLEMENTARY SPECIFICATIONS.
3. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

STANDARD CATCHBASIN

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

S11

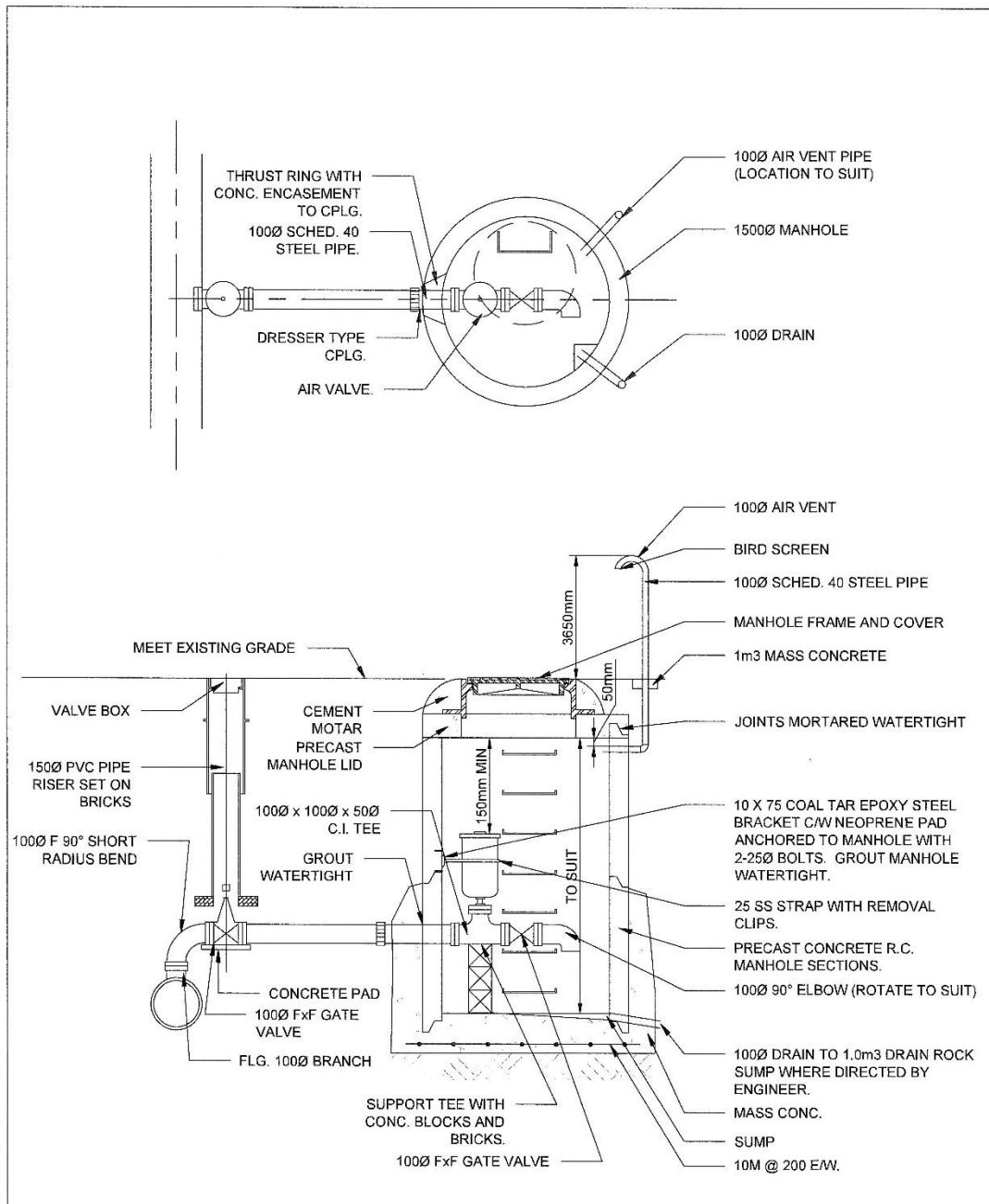


**AIR VALVE ASSEMBLY
 25mm AND 50mm Ø VALVES**

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
 VILLAGE OF TELKWA

W1



AIR VALVE ASSEMBLY **100mm Ø VALVES**

DATE: JANUARY 2014	DRAWN: KLT
SCALE: NTS	APPROVED:

Telkwa
VILLAGE OF TELKWA

W2

(Add) Supplemental Specification 1
Municipal Utilities

Gas and Other Non-

1.0 GENERAL

- .1 This section refers to works not installed by the Village and shall be referenced with all other sections pertinent to the works described herein.
- .2 Works including:
 - .1 Telephone
 - .2 Hydro
 - .3 Cable
 - .4 Natural Gas

1.1 Related Work

- | | | |
|----|---------------------------------------|------------------|
| .1 | Excavating, Trenching and Backfilling | Section 31 23 01 |
| .2 | Controlled Density Fill | Section 31 23 23 |
| .3 | Concrete Reinforcement | Section 03 20 01 |
| .4 | Cast-in-Place Concrete | Section 03 30 53 |
| .5 | Roadway Lighting | Section 25 56 01 |
| .6 | Traffic Signals | Section 34 41 13 |
| .7 | Aggregates and Granular Materials | Section 31 05 17 |

2.0 PRODUCTS

2.1 Materials

- .1 Materials for conduit if applicable to above items shall be as outlined in those above sections, if not they shall be as required by the utility company.

2.2 Granular Pipe Bedding Surround Material

- .1 Refer to Section 31 05 17 – Aggregates and Granular Materials for materials specifications. Where native materials are used without granular bedding, marker tape is to be placed 300-450 mm above the pipe along the length of the trench line.

2.3 Backfill Material

- .1 Refer to Section 31 05 17 – Aggregates and Granular Materials for materials specifications.

3.0 EXECUTION

3.1 General

- .1 Pipe bedding details, including granular surround (pipe cushion) and material specifications are to be as shown in Standard Detail Drawings.

3.2 Trenching

- .1 Do trenching in accordance with Section 31 23 01 – Excavating, Trenching and Backfilling.
- .2 Trench depth to provide cover over pipe or conduit as per Standard Detail Drawings E3.1, E3.2, and G4.

3.3 Installation

- .1 Work to be carried out as per utility standard procedures.

3.4 Surface Restoration

- .1 Shall be done in accordance with Section 31 23 01

AMENDMENTS TO MASTER MUNICIPAL SPECIFICATIONS

			Environmental Protection	Section 01 57 01
1.4	Site Clearing and Plant Protection (add):	.5	Work around watercourses shall be done in accordance with "Develop with Care 2012", published by the Ministry of Environment, and complementary documents.	
			Concrete Walks, Curbs and Gutters	Section 03 30
<u>20</u>				
2.0	PRODUCTS (add):	.1	Use wide base curbs as shown in Standard Detail Drawing C5.	
3.19	Testing (add):	.1	Portland Cement concrete shall be tested for slump, compressive strength and air content.	
		.2	The first set of tests each day or each project shall be made on samples from the first load of concrete delivered to the site. Thereafter for every 300 metres of curb or sidewalk the Consultant shall take at least one set of tests. Each set of tests shall consist of a slump test, an air test and casting of at least one cylinder for a compressive strength test. There shall be at least two such tests with a minimum, of three cylinders cast for each day's pour of a specified strength. Samples shall be obtained, handled and tested in accordance with CSA-CAN3-A23.2.	
		.3	For extruded curbing installed by a slip-form curbing machine using a no-slump mix design, the slump test is not required.	
		.4	Should a measured slump or air content test fall outside the specified limits, the test shall be repeated immediately. In the event of a second failure, the concrete shall be considered to have failed to meet the requirements of this Bylaw, and to be unacceptable.	
		.5	A compression test is the average of at least two cylinders from the same or adjacent samples of concrete.	
		.1	The average of all concrete cylinder compression tests for the particular phase of a subdivision under construction shall equal or exceed the specified strength.	
		.2	Not more than 15% of all cylinders tested shall fall below the specified strength.	
		.3	No single test shall fall below 80% of the specified strength.	
		.4	No three consecutive tests (based on time of pouring) shall fall below the specified strength.	
		If concrete fails to meet the minimum requirements of sub-paragraphs .1 and .2 the entire project shall be deemed unacceptable. Should it fail to meet .3 or .4, the portion of the project represented by those tests shall be unacceptable. Additional testing of unacceptable portions of curb and/or gutter may be ordered by the Consultant. Should such additional tests also prove unsatisfactory, the unacceptable concrete shall be removed and replaced.		
		.6	Unacceptable concrete and frozen concrete shall be promptly removed from the work site.	

<u>Aggregates and Granular Materials</u>			<u>Section 31 05 17</u>
1.1 Related Work (add):	.1.13	Roadway Lighting	Section 25 56 01
	.1.14	Traffic Signals	Section 34 41 13
	.1.15	Gas and Other Non Municipal Utilities	Supplemental Section 1

<u>Excavating, Trenching and Backfilling</u>			<u>Section 31 23 01</u>
1.2 Related Work (add):	.12	Roadway Lighting	Section 25 56 01
	.13	Traffic Signals	Section 34 41 13
	.14	Gas and Other Non Municipal Utilities	Supplemental Section 1

2.2 Use of Specified Materials (add):	.2.7	Gas and Other Non Municipal Utilities	Supplemental Section 1
3.5 3.4 (amend to read): (add):	.1.7	Pipe and Conduit Installation Gas and Other Non Municipal Utilities	Supplemental Section 1 Supplemental Section 1

<u>Controlled Density Fill</u>			<u>Section 31 23 23</u>
1.1 Related Work (add):	.12	Traffic Signals	Section 34 41 13
	.13	Gas and Other Non Municipal Utilities	Supplemental Section 1
3.4 Placing (amend to read):	.3	Do not place controlled density fill around pipe. Fill may be placed from 300mm above crown of pipe, on top of approved pipe bedding, to the full remaining depth.	

<u>Hot-Mix Asphalt Concrete Paving</u>			<u>Section 32 12 16</u>
2.1 Materials (amend to read): (amend table to read):	.1	Asphalt cement: to CGSB-16.3, Grade 150-200	
	.3.2	The mixing of aggregates shall meet the following gradation limitations:	

Sieve Size	Percent Passing (by weight) Asphaltic Hot-Mix Maximum Aggregate Size	
	12.5 mm	19 mm
25 mm	-	-
19 mm	-	100 %
12.5 mm	100 %	80 – 100 %
9.5 mm	78 – 94 %	68 – 86 %
4.75 mm	58 – 80 %	46 – 68 %
2.36 mm	52 – 74 %	30 – 60 %
0.420 mm	10 – 30 %	7 – 22 %
0.150 mm	4 - 12 %	4 – 12 %
0.075 mm	2 - 8 %	2 – 8 %

Note: Selection of asphalt mix-type:

19mm: lower course for all roads; surface course for arterial and industrial streets.

12.5mm: surface course for local, collector streets, and walkways.

2.2 Mix Design

(amend table to read):

.3.2 Asphalt Mix Design: The mix design shall meet the following specifications:

Property	Pavement Course
Marshall Stability at 60°C (kN min.)	6.4 lower course 5.5 upper course
Flow Value (mm)	2 – 4.5
Air Voids in Mixture (%)	2 – 6 lower course 3 – 5 upper course
Voids in Mineral Aggregate (% min.)	14 lower and upper course
Index of Retained Stability (% min.)	75
Asphalt Content (%)	5.8 to 6.4

3.5 Placing **(add):**

.3.4 All rolling for compaction must be done prior to the mix temperature reaching 85°C. Despite varying mix temperatures, air temperatures, and mat thicknesses, in general all vibratory rolling for compaction must be completed within 10-15 minutes of placing by the screed.

3.6 Compaction **(amend to read)**

.1 Roll asphalt continuously to average density not less than 98% of 75 blow Marshall density in accordance with ASTM D1559 with no individual test less than 95%.

3.13 Testing **(add):**

- .1 At least one set of tests to determine the properties of the mix produced during construction shall be performed and compared to the properties of the Marshall Design mix.
- .2 Field density tests using a non-destructive testing device should be taken frequently during the beginning of each project to verify that the rolling procedure is providing the required compaction. There should not be less than one test for each 150 lane metres thereafter.
- .3 Core tests shall be performed on every full width paving Project at the rate of not less than one core for every 500m² of mat. At least two core tests shall be performed for each project. For every core test a timely report shall be made to the Village Engineer of the mat thickness and density. For specific locations, additional tests shall be made as required by the Village Engineer and reports to be submitted. Should the average of a mat thickness or densities fail to meet the requirements, the entire project shall be deemed to be unacceptable. Should any two or more consecutive thicknesses or densities fail to meet the requirements, the mat represented by those tests shall be deemed to be unacceptable. Should any other pavement properties fail to meet required standards, the project or any part of it may be deemed by the Village Engineer as unacceptable.
- .4 Additional testing of unacceptable portions of mat may be ordered by the Village Engineer. Should such additional tests also prove unsatisfactory, the Village Engineer shall require remedial measures be taken which may require remedial construction or removal and replacement of the portions of mat which have not met specifications.

2.3 Valves and Valve Boxes (add):	.5	For pipe under 450mm diameter use gate valves. For pipe 450mm and larger use butterfly valves, unless specified Otherwise in Contract Drawings.
(amend to read)	.2.7	Acceptable manufacturer is Canada Valve/Mueller.
2.5 Service Connections, Pipe, Joints and Fittings (delete):	.5	Delete all
3.13 Thrust Blocks (amend to read):	.3	Where thrust blocks are not practical or possible, approved restraining devices may be used in place of thrust blocks subject to approval of the Village Engineer.
3.19 Testing Procedure (add):	.4	The following tests shall be required for new water mains: proving of valves and leakage test. The leakage test shall be performed in accordance with the respective standards and manufacturer's recommendations. Care shall be taken not to exceed the allowable pressure on any main or appurtenance, especially if some parts of the system are much lower than others. In particular, resilient-seat gate valves and all butterfly valves shall not be subjected to pressures in excess of their rated pressures. Subject to those precautions, the hydrostatic pressure for testing shall be as required by the respective standard of manufacturer's recommendation for the pipe under test.
	.1	The proving of valves shall commence with the new mains isolated from the existing system, full of water, with an independent source of water and pump available to raise and maintain pressure in the new mains. All valves not required to be closed shall be open. Hydrant isolating valves shall be open. Pressure shall be raised to the design operating pressure. Each line valve shall be closed, one valve at a time, the downstream main depressurized and the valve proved. (Hydrant isolating valves will be proved later.) The Owner may manipulate any valve under test to obtain a tight seal. Any valve which fails to hold pressure shall be repaired or preplaced and be retested until a successful test is achieved.
	.2	The maximum length of pipe for each leakage test shall not exceed 300m. The leakage test shall be carried out in accordance with the standard for the pipe being tested, the test duration shall be at least one hour. The allowable leakage rates are: $\text{PVC/Ductile } L = \frac{ND\sqrt{P}}{130,000}$ Where: L = Allowable leakage in L/hr N = Number of joints D = Pipe inside diameter P = Average test pressure in KPa
	.3	The number of joints shall be one joint per length of pipe plus one joint per valve, two per tee and three per cross, based on the design drawings. Any additional joints introduced by the Owner for purpose of convenience of construction or repair shall not be included in the count.

3.21	Disinfection and Flushing Procedures (add):	.10	Those mains previously flushed, disinfected and approved shall remain isolated from other new mains not yet so approved.
		.11	The Owner shall notify the Health Inspector of the Provincial Health Department of any intended chlorination test. Copies of test results shall be submitted to the Village Engineer.

Sanitary Sewers

Section 33 30 01

2.3	Service Connection Installation (amend to read):	.8.2	For connections that are more than two sizes smaller than mainline pipe, use protrusion saddles. Wyes shall be used on all new lines and wherever possible. "Inserta-Tees" are not permitted.
3.6	Pipe Installation (add):	.9.9	Connections shall be made as outlined in the Uni-Bell handbook using hand assistance only. (No machinery buckets)
3.8	Connections to Existing Mainline Pipes (amend to read):	.3	For new connections to existing PVC mainline sewer, drill hole in mainline to exact dimension of new connection. No "Inserta-Tees" permitted.
3.10	Service Connection Installation (amend to read): (add):	.1	Install service connection to 3.6 and as shown on Standard Detail Drawing S8.
		.2	Marker to be set so that top protrudes between 300 mm to 600 mm above existing grade.

Sewage Force Mains

Section 33 34 01

2.2	Pipe, Joints and Fittings (delete):	.1	delete all.
2.3	Valves and Valve Boxes (add):	.6	Acceptable manufacturer is Canada Valve/Mueller.
3.5	Granular Bedding (delete):	.6	delete all.
3.6	Pipe Installation (delete):	.2	delete all.
3.9	Thrust Blocks (amend to read):	.3	Where thrust blocks are not practical or possible, approved restraining devices may be used in place of thrust blocks subject to approval of the Village Engineer.
3.13	General Procedure Testing and Flushing (delete):	.4	delete all.
		.6	delete all.

Storm Sewers

Section 33 40 01

3.8	Connections to Existing Mainline Pipe (delete):	.4	[For connections more than two sizes smaller...as few ribs as possible]
3.10	Service Connection Installation (add): (delete): (delete):	.2	Install 40 x 90 mm marker stake as service terminus so that the top protrudes between 300 – 600 mm above existing grade.
		.3	delete all.
		.4	delete all.
3.12	Inspection and Testing (amend to read):	.4	Water exfiltration and infiltration testing is required in accordance with Section 33 30 01, 3.13 and 3.15.

Pipe Culverts

Section 33 42 13

- | | | |
|-----|------------------------------------------------------------|-------------|
| 2.1 | Plastic Pipe, Smooth Profile
(delete): | delete all. |
| 2.4 | Plastic Pipe, Main Line Ribbed Profile
(delete): | delete all. |
| 2.5 | High Density Polyethylene
(delete): | delete all. |

Manholes and Catch Basins

Section 33 44 01

- | | | | |
|-----|-----------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1 | Materials
(add): | .24 | Minimum pipe size to be 200 mm. |
| 3.3 | Manhole Installation
(delete):
(add): | .15

.19 | delete [...and S4.]

No pipe sections to be left in the manhole channel. |
| 3.6 | Lawn Drain Installation
(add): | .2 | Minimum pipe size to be 200 mm. |
| 3.7 | Endwall Installation
(add): | .4 | Endwalls as required for culverts may also be utilized. The most recent guidelines and regulations from MOE and DFO shall be adhered to during installation. |

SUPPLEMENTAL DRAWINGS

Drawing No. Description

- D2 Flow Control Manhole
- D3 Oil/Grit Separator
- D4 Exfiltration Unit
- D5 Grass Swale
- D6 Typical Headwall Detail
- D7 Typical Raingarden Detail
- D8 IDF Curve
- ES1 Typical Rock Check Dam Detail
- ES2 Typical Silt Fence Detail
- ES3 Temporary Sediment Basin
- L1 Typical Multi-use Pathway Detail
- L2 Typical Street/Boulevard Tree Detail
- R1 ROW 15 – Urban Local
- R2 ROW 15 – Urban Local Parking One Side
- R3 ROW 15 – Urban Local Parking Both Sides
- R4 ROW 15 – Rural Local
- R5 ROW 20 – Urban Collector
- R6 ROW 20 – Rural Collector
- R7 ROW 27 – Arterial
- R8 Typical Cul-de-Sac
- R9 Curb and Gutter
- R10 Concrete Sidewalk

S1 Sanitary Service Connection

Revised Drawings (Included in Supplemental Specifications)

W1 Air Valve Assembly – 25 and 50 mm Valves (MMCD Standard Drawing W6)

W2 Air Valve Assembly – 100 mm Valves (MMCD Standard Drawing W7)

D1 Typical Catch Basin Assembly (MMCD Standard Drawing S11)

Written Amendments (not redrawn)

S8 Amend: delete drawing of Inserta-Tee fitting.

SCHEDULE “E”

PERFORMANCE AGREEMENT