

SCHEDULE B

REGULATIONS, STANDARDS, AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF ROADS

Schedule B - Regulations, Standards, and Specifications for the Design and Construction of Roads

This is **Schedule B** of the Corporation of the Village of Valemount Subdivision and Development Servicing Bylaw No. 919, 2026.

Corporate Officer

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SCHEDULE B

REGULATIONS, STANDARDS, AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF ROADS

GENERAL

Where the provisions of **Schedule A** of this Bylaw require the construction of roads, the Owner shall construct such roads in accordance with the regulations, standards and specifications set out in this Schedule, existing laws and where applicable, any design requirements set out by the Ministry of Transportation. Where large developments are proposed, the Approving Officer may require a Traffic Study.

Approval of Engineering Drawings Required Prior to Construction

Engineering drawings showing detailed design of roads shall be submitted to the Approving Officer for approval prior to commencement of construction. These drawings shall show existing groundline and proposed alignment and grade of the roads, horizontal and vertical curve information and all other details as may be required. Grades shall be given at all changes in vertical and horizontal alignments for centreline and gutter lines. Elevations shall be shown on the drawings at all changes in vertical alignments.

Classification of Roads

Prior to design of the road system, the Approving Officer shall classify each road proposed within the subdivision and stipulate the required standards in accordance with the provisions of this Bylaw.

Geotechnical Evaluation

In addition to the geotechnical overview undertaken during the preliminary phase of the project the Owner shall engage the services of a qualified Geotechnical Engineer to investigate surface and sub-surface conditions within the proposed subdivision. The Geotechnical Engineer shall prepare a report outlining their findings and shall provide clear, definitive recommendations on the geometry and placement of fill sections, compaction requirements over and above those stipulated in this Bylaw, cut slope geometry, pavement structures for roads, and any other geotechnical issues affecting road construction within the proposed subdivision. A copy of the sealed Geotechnical evaluation shall be submitted to the Approving Officer at the time the engineering drawings are submitted to the Approving Officer for approval.

At a minimum, the Geotechnical evaluation report shall include:

- Recommendations for acceptable materials for embankment fills and trench backfills
- Permanent cut/fill slope geometry
- Pavement and granular structure for roads
- Granular structure for walkways and trails if required;

- Comments on groundwater and potential dewatering requirements
- Temporary excavation slopes and shoring requirements
- Engineering review requirements during construction and compaction testing requirements
- Discussion on slope stability/retaining walls if required

DESIGN CRITERIA

General Design Requirements

In the preparation of engineering plans for roads the Owner shall consider the following general design considerations:

Continuation of Existing Streets

The design and arrangement of roads within a subdivision shall provide for the continuation or projection of existing streets in the surrounding area. In no case shall the arrangement of roads within a proposed subdivision make impractical the subdivision of adjoining parcels; and

Topography to be Considered

The design and arrangement of roads shall be suited to the topography of the land proposed to be subdivided.

Consistency with Official Community Plan

The location, classification and standard of all roads proposed within a subdivision shall consider the proposed use of the land and shall generally conform to the provisions of the Village of Valemount Official Community Plan.

Local Roads

Local roads within a proposed subdivision shall be arranged so that their use by through traffic will be discouraged.

Cul-de-Sacs

Cul-de-sac streets shall not exceed 300 metres in length measured from the intersection to the centre of the bulb and shall be provided with an area designed to permit safe and adequate space for the turning of motor vehicles. Where 300 m in length is exceeded, and where the Approving Officer deems them to be necessary, an Emergency Access Road must be provided and consideration will be given to provision of increased road width, mid-block turnarounds, or other parameters as required.

Guidelines for emergency access roads at long cul-de-sacs include the following:

- Maximum grade 10%;

- Adjusting the emergency access grade will be considered at the discretion of the Approving Officer;
- Minimum right-of-way and pavement width: 6.0 m;
- Gates to prevent access by non-emergency vehicles;
- Gravel structure equivalent to local road complete with pavement if used for walkway; and
- Shared use as pedestrian walkway and bikeway at the discretion of the Approving Officer.

Lanes

Lanes, meeting the standards set out in this Bylaw, shall be provided where the Approving Officer deems them to be necessary.

Walkways, Trails and Fences

Walkways or trails 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. All pedestrian walkways/trails to be designed with accessibility in mind. Walkway/Trail surface shall be as determined by the Approving Officer being consistent with the neighbourhood and connection to other trails. Trail structure shall be in accordance with the recommendations of the Geotechnical Engineer.

Where the Approving Officer deems them to be necessary, walkways shall be chain link fenced for their full length on both sides. The minimum height shall be 1.5 metres but may vary at the discretion of the Approving Officer according to individual situations and the height requirements of the Municipal Zoning Bylaw.

Driveways

Single Family Residential Driveway:

- minimum driveway width shall be 3.0 metres;
- driveway widths (surfaced) in excess of 8.0 metres must be approved in writing by the Approving Officer;
- maximum driveway grade shall not exceed 12%;
- minimum driveway surface shall be compacted all weather gravel surface;
- surface water from driveway on private property must be contained on-site and managed in accordance with Schedule F unless otherwise approved in writing by the Approving Officer;
- driveway access roads must have a minimum of 9.0 m centre line radius on all curves and corners along the road;
- turn around facilities are to be provided for any dead-end access driveway fronting an arterial roadway;

- the finished elevation of the driveway at the road property line shall not vary more than 150 mm from the elevation of the centreline of the existing road, unless otherwise approved in writing by the Approving Officer ; and
- unless otherwise approved in writing by the Approving Officer only one driveway will be permitted into each lot.

Reciprocal Access Driveway for a Maximum of Three (3) Single Family Residences, Multi-Family Driveways and All Other Driveways not included in Clause 2.07.1 above:

- minimum driveway width shall be 6.0 metres;
- driveway widths (surfaced) in excess of 8.0 metres must be approved in writing by the Approving Officer ;
- maximum driveway grade shall not exceed 12%;
- minimum driveway surface shall be hot mix asphaltic concrete with curb and gutter; and
- surface water from driveways on private property must be contained on-site, unless otherwise approved in writing by the Approving Officer .
- driveway access roads must have a minimum of 10.25m centreline radius on all curves and corners along the road;
- turn around facilities are to be provided for any dead-end access driveway;
- the finished elevation of the driveway at the road property line shall not vary more than 150 mm from the elevation of the centreline of the existing road, unless otherwise approved in writing by the Approving Officer ; and
- unless otherwise approved in writing by the Approving Officer only one reciprocal access driveway will be permitted into clusters of single-family residence.

Road Right-of-Way Requirements

Road rights-of-way widths shall be in accordance with **Table B.1** of Schedule B.

The tops of road cuts and the toes of road fills that are outside the road right-of-way shall be identified and legally protected.

Intersections

Intersections shall be designed as follows:

- intersecting roads shall meet substantially at right angles (between 70 degrees and 110 degrees);
- jogs in road alignment at intersections shall be avoided except where the distance between centrelines is sufficient to ensure traffic safety.
- minimum spacing between intersections shall be in accordance with Transportation Association of Canada (TAC) requirements for the road classifications being serviced;

- intersections having more than four intersecting legs shall not be permitted;
- intersections shall provide adequate crossing sight distances and stopping sight distances, whichever is greater; and
- a property line cutoff of 3.0 metres for local roads and 4.0 metres for collector and arterial roads shall be at all intersections.

Reverse Curves

If reverse curves are required in a road alignment, the Approving Officer may require that they be separated by means of tangents of sufficient length to allow superelevation rotation.

Mail Boxes

Where required by Canada Post, the Owner shall construct a base for mailboxes in the location specified by Canada Post and approved by the Approving Officer. The Owner is referenced to Canada Post for location and design guidelines.

Street Names and Traffic Signs

Street name signs and traffic signs required as a result of constructing or improving streets shall be provided by the Village of Valemount at the expense of the Owner. Street names shall be assigned by the Village of Valemount.

Appurtenances

The Design Engineer shall detail on the design drawings the location of all proposed traffic islands, retaining walls, guardrails, and permanent barricades. These structures shall be designed in keeping with good engineering practices.

The design should show the location of all traffic signs, street signs, and other traffic control devices required to be placed in the road allowance. Posted speed limits shall be determined by the Approving Officer.

Drawings must show all utility poles. The Owner's Engineer shall indicate those poles which require relocating prior to road construction and shall confirm with the utility the feasibility of their relocation prior to design completion. For underground systems, design drawings shall show the location of underground wiring, and appurtenances including the connections to properties.

Vertical Alignment

The vertical alignment of a road shall be set so the grades of the driveway to adjacent properties shall be in accordance with Schedule B. The maximum grade of the driveway as it crosses the road boulevard will be 3 percent.

The minimum longitudinal gradient at the gutter line shall be 0.5% for all classifications of streets.

Design Speeds

The design speeds used for design of Roads shall be as in **Table B.1**.

TABLE B.1 – ROAD CLASSIFICATION, DESIGN PARAMETERS, PAVEMENT STRUCTURES AND K VALUES

Road Classification	Design Parameters ¹						Minimum Pavement Structures ⁴			K Values			
	A ² Minimum Asphalt Surface Width (m)	Design Speed (km/h)	Curb Return Radii (m)	Minimum Grade	Maximum Grade	Design Traffic (EAL'S)	Select Granular Sub-base (mm)	Crushed Granular Base (mm)	Hot Mix Asphalt (mm)	Crest Curve Minimum	Crest Curve Desired	Sag Curve with Lighting Minimum	Sag Curve No Lighting Minimum
Downtown Commercial	7.5	40		0.5%	10%	2.8 x 10 ⁵	450	100	75				
Frontage Commercial	10	40		0.5%	10%	5.6 x 10 ⁵	450	150	75				
Collector (C)	8.5	50	11	0.5%	10%	2.8 x 10 ⁵	400	100	75	15		10	20
Collector Intersection	8.5									7		See note 3 below	See note 3 below
Local (L)	7.5	50	8	0.5%	10%	2.8 x 10 ⁴	300	75	65	7	10	6	11
Local Intersection	7.5									4		See note 3 below	See note 3 below
Cul-de-Sac (entry downhill)			11.5	0.5%	8%		300	75	65				
Cul-de-Sac (entry uphill)			11.5	0.5%	10%		300	75	65				
Cul-de-Sac (bulbs)			11.5	0.5%	6%		300	75	65				
Industrial	7.5	60	11			5.6 x 10 ⁵	450	150	75				
Lane	6.0			0.5%	8%	Not Applicable	300	75	50				
Walkway/Trail				0.5%	15%	Not Applicable	200	75	50				
Access⁽⁵⁾	6				10%		300	50	-				
Emergency Access Road	6				10%		300	75	50	7		6	11

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

***Radius may be reduced at the discretion of the Approving Officer**

⁽¹⁾ As specified by the Approving Officer

⁽²⁾ Refer to supplemental detail drawings for road cross section

⁽³⁾ Approach grades for a sag curve of minor streets at intersections to major streets shall be designed to provide a maximum gradient of 3% at a point 15 metres from the projected curb line of the major street

⁽⁴⁾ To be specifically designed, based on projected equivalent axle loads (EAL's), in accordance with MS-1 of the Asphaltic Institute

⁽⁵⁾ include ditching along both sides to at least 100 mm below subgrade

Road Crossfall

Minimum road crossfall shall be 2%.

Road Grades

Minimum and maximum road centreline grades shall conform to **Table B.1** based on the classification of the road.

Vertical Curves

Vertical curves shall be designed to provide safe stopping sight distances. Minimum stopping sight distance is the least distance required to bring the vehicle to a stop under prevailing vehicle and climatic conditions. Vertical curves shall be provided at all grade changes greater than 1.0%. Vertical curve length is calculated by the equation $L = K \cdot A$ where:

- L is the length of the vertical curve in metres;
- K is a constant related to lines and geometry of a parabolic curve; and
- A is the algebraic difference in grades in percent.
- L shall not be less than the design speed in kilometres per hour.
- Minimum K values (in metres) for vertical curve design shall be as described in **Table B.1**.

Horizontal Alignment

Centre Line Radii

The minimum required centreline radius for various superelevation rates for each classification of roadways are described in **Table B.2**.

TABLE B.2 – MINIMUM CENTRELINE RADIUS

Road Classification	Horizontal Curve Radii (m)		
	Superelevation (m/m)		
	None	0.02	0.04
Collector (60 km/h design speed)	160	140	130
Local* (50 km/h design speed)	95	n/a	n/a

* Radius may be reduced at the discretion of the Approving Officer

Curb Return Radii

Curb return radii shall conform to design parameters provided in **Table B.1** and be based on the lesser classified Road

Intersection Design

Unless indicated elsewhere herein, all intersection design standards shall conform to those outlined in the latest edition of "Geometric Design Standards for Canadian Roads and Streets" as published by TAC.

Intersection Grades

Approach grades for a crest curve of minor streets at intersections to major streets shall not exceed 75% of the maximum grade allowed for that street classification. The minor street shall be designed to intersect the major street with a vertical curve of minimum length required for that street classification. The vertical curve shall terminate at the projected curb line of the major street using K values as described in **Table B.1**.

Pavement Structure

Pavement design shall be based on the following method:

- a) Design method covered in the Ministry of Transportation and Transit – Pavement Structure Design Guidelines – Technical Circular T-01/15 or the latest edition.
- b) Pavement design is to include consideration of the subgrade soil type, frost susceptibility, moisture conditions and subgrade drainage provisions.
- c) Minimum design life for all classifications of roads is 30 years. The Design Engineer is to provide confirmation that the road is designed to meet the criteria taking into consideration soil conditions, existing and future traffic, commercial and industrial traffic etc.
- d) The structural design of pavements for roads shall be performed by a qualified pavement engineer. Structural designs of pavements shall be submitted to the Approving Officer for approval in an acceptable report format.
- e) Other pavement evaluation systems may be considered upon consultation with the Approving Officer.

Railway Grade Crossings

Locations and details of railway grade crossings are subject to requirements included in TAC Geometric Design Guide and references noted therein.

Approvals from all regulatory bodies are required.

Road Cross-Sections

The standard street cross-section for various classifications of roadways shall be as described in **Table B.1**, **Table B.3** and the Supplementary Detail Drawings.

TABLE B.3 – ROAD CROSS-SECTIONS

Road Classification	Typical Cross-Section (Dwg. Number)
URBAN	
Downtown Commercial	B-1
Frontage Commercial	B-2
Other Roads	B-3
Cul-De-Sac	B-4

Notification of Approving Officer Prior to Undertaking Roadworks

Adequate notice shall be given to the Approving Officer by the Owner prior to the commencement of roadworks as described in **Table B.4**. The Owner shall not proceed from one stage as described in **Table B.4** to another stage without the approval of the Approving Officer.

TABLE B.4 – ROADWORKS

Stage	Minimum Notice Required
Prior to construction of fills and subgrade preparation	72 hours
Prior to placement of sub-base gravel	72 hours
Prior to placement of concrete for curbs and sidewalks	72 hours
Prior to placement of base course	72 hours
Prior to paving	96 hours
Prior to top soiling boulevards	72 hours

MATERIALS

Execution – Master Municipal Construction Documents (MMCD)

The Village of Valemount is using the MMCD Specifications for the construction of roads. The specifications shall apply with the amendments outlined in:

- Appendix B – Supplementary Specifications
- Appendix C – Supplementary Detail Drawings
- Appendix D – Approved Products List

RECORD DRAWINGS

Prior to final acceptance, the Owner shall deposit with the Village, in AutoCAD and PDF format, one set of original record drawings showing all the information requested by this schedule and conforming to the criteria set out in **Schedule H**.