

# Floodplain Exemption Application

Referral Form – RDCK File F2603Hn

Date: June 15, 2026

**You are requested to comment on the attached FLOODPLAIN EXEMPTION for potential effect on your agency's interests. We would appreciate your response WITHIN 30 DAYS (PRIOR TO JULY 16, 2026). If no response is received within that time, it will be assumed that your agency's interests are unaffected.**

**LEGAL DESCRIPTION & GENERAL LOCATION:**

260 East Wilson Creek Road, Rosebery, Electoral Area 'H'  
LOT B DISTRICT LOT 4877 KOOTENAY DISTRICT PLAN EPP30385 (PID: 029-139-716)

**PRESENT USE AND PURPOSE OF PERMIT REQUESTED:**

The subject property is in Rosebery in Electoral Area 'H' just east of Rosebery Provincial Park. The property is primarily used for residential purposes and has been developed with the following buildings:

- a principal residence
- a secondary residence
- a semi-permanent residential structure
- a temporary residential structure (on wheels) and;
- a shop

Wilson Creek abuts the western portion of the property. The [RDCK Floodplain Management Bylaw no. 2080](#) (FMB) specifies that no building can be constructed within 30 meters from Wilson Creek due to the flood hazard that exists there. Floodplain considerations such as this are flagged when an applicant submits a building permit application, however, the applicant did not apply for a building permit for the construction of the principal residence. The applicant chose to build the principal residence without a building permit in the floodplain.

Given that the residence has already been constructed, the property owner is now retroactively seeking a Site-Specific Floodplain Exemption (SSFE) application to authorize a floodplain setback of 11 metres from the creek rather than the 30 meter floodplain setback required by the Bylaw.

There is also a Section 219 covenant on title (KT16479) which requires that no building or structure be constructed within 30 meters of Wilson Creek. This restrictive covenant was registered in 2002 between:

- The First Grantee: The Ministry of Water Land and Air Protection (now the Ministry of Environment and Climate Change Strategy)
- The Second Grantee: The RDCK and;
- The Grantor: The property owners at that time

In addition to this application, the owner will need to address the non-compliance with the covenant with the Ministry and the RDCK. In addition to this, because of the development that has already occurred in contravention of RDCK bylaws, the applicant will also need to complete a Watercourse Development Permit (WDP) application to address impact to the riparian area and a Building Permit application to confirm that the construction is in accordance with the RDCK Building Bylaw.

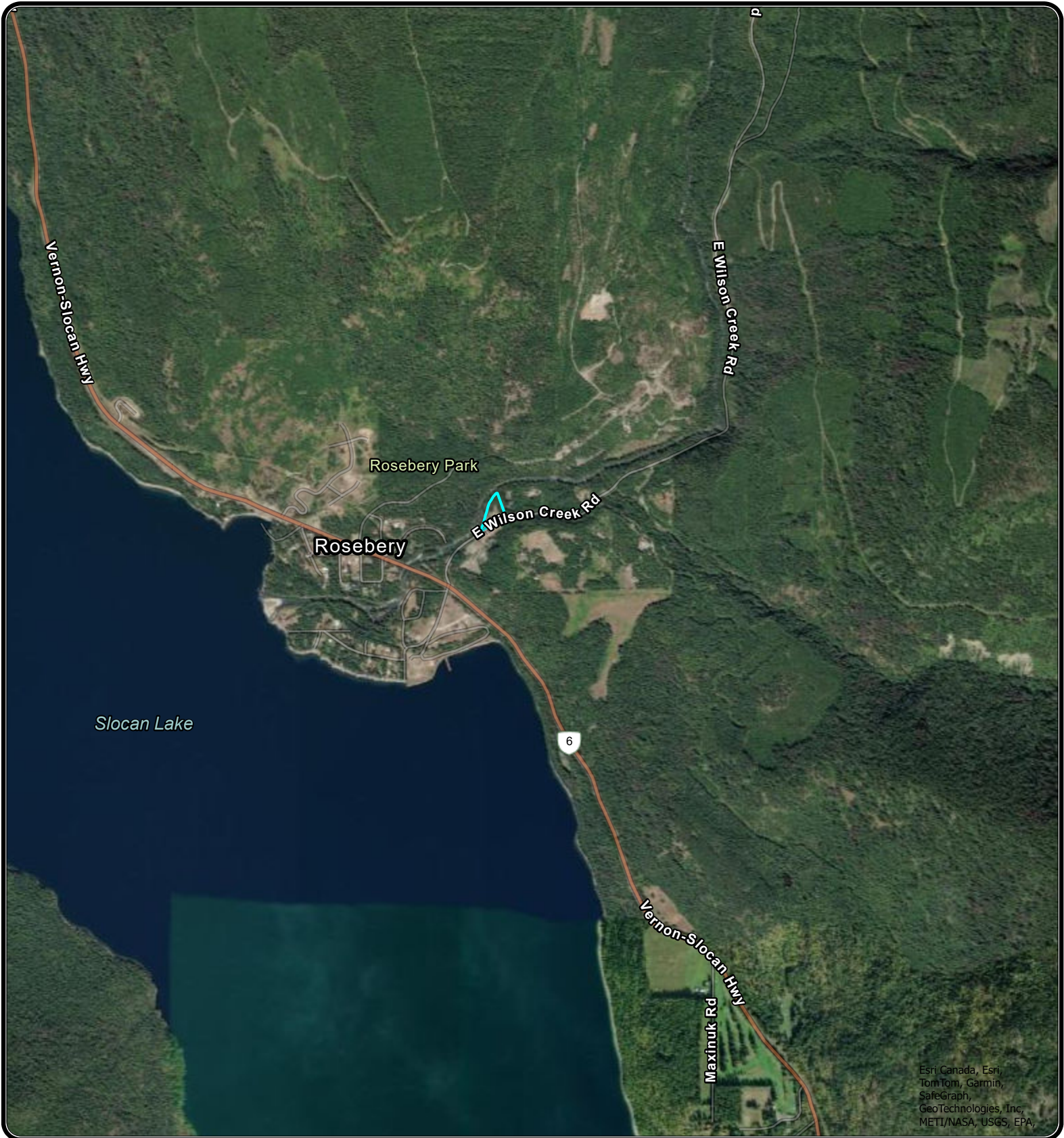
A Site Specific Floodplain Exemption application (F2501Hn) was previously submitted and refused by the Board of Directors in January 2026. The property owner has submitted this present application complete with a new Flood Hazard Assessment report.

<b>AREA OF PROPERTY AFFECTED</b> 0.9 ha (2.25 acres)	<b>ALR STATUS</b> N/A	<b>ZONING</b> N/A	<b>OCP</b> Rural Residential (R3) in Area 'H' Official Community Plan Bylaw No. 1967, 2009
<b>APPLICANT:</b> Darrel Steenhoff			
Please provide your response via email.			
If your agency's interests are 'Unaffected' no further information is necessary. In all other cases, we would appreciate receiving additional information to substantiate your position and, if necessary, outline any conditions related to your position. Please note any legislation or official government policy which would affect our consideration of this permit.			
If you are an RDCK commission member, do not respond via email. Your response is the commission's recommendation which staff will collect from the meeting minutes.			
<b>ZACHARI GIACOMAZZO, PLANNER</b> <b>REGIONAL DISTRICT OF CENTRAL KOOTENAY</b>			
<input checked="" type="checkbox"/> TRANSPORTATION West Kootenay <input checked="" type="checkbox"/> HABITAT BRANCH <input checked="" type="checkbox"/> FRONT COUNTER BC (FLNRORD) <input type="checkbox"/> AGRICULTURAL LAND COMMISSION <input type="checkbox"/> REGIONAL AGROLOGIST <input type="checkbox"/> ENERGY & MINES <input type="checkbox"/> MUNICIPAL AFFAIRS & HOUSING <input checked="" type="checkbox"/> INTERIOR HEALTH HBE Team, Nelson <input type="checkbox"/> WATER SYSTEM OR IRRIGATION DISTRICT <input checked="" type="checkbox"/> UTILITIES (FORTIS, BC HYDRO, NELSON HYDRO, COLUMBIA POWER) <input checked="" type="checkbox"/> MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE STRATEGY		REGIONAL DISTRICT OF CENTRAL KOOTENAY DIRECTORS FOR: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G <input checked="" type="checkbox"/> H <input type="checkbox"/> I <input type="checkbox"/> J <input type="checkbox"/> K ALTERNATIVE DIRECTORS FOR: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G <input type="checkbox"/> H <input type="checkbox"/> I <input type="checkbox"/> J <input type="checkbox"/> K <input type="checkbox"/> APC AREA <input checked="" type="checkbox"/> RDCK FIRE SERVICES – DISTRICT CHIEF (BY AREA) <input checked="" type="checkbox"/> RDCK EMERGENCY SERVICES <input checked="" type="checkbox"/> RDCK BUILDING SERVICES <input type="checkbox"/> RDCK UTILITY SERVICES <input checked="" type="checkbox"/> RDCK REGIONAL PARKS	

The personal information on this form is being collected pursuant to *Regional District of Central Kootenay Planning Procedures and Fees Bylaw No. 2457, 2015* for the purpose of determining whether the application will affect the interests of other agencies or adjacent property owners. The collection, use and disclosure of personal information are subject to the provisions of FIPPA. Any submissions made are considered a public record for the purposes of this application. Only personal contact information will be removed. If you have any questions about the collection of your personal information, contact the Regional District Privacy Officer at 250.352.6665 (toll free 1.800.268.7325), [info@rdck.bc.ca](mailto:info@rdck.bc.ca), or RDCK Privacy Officer, Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4.

RETURN TO: ZACHARI GIACOMAZZO, PLANNER  
DEVELOPMENT AND COMMUNITY SUSTAINABILITY SERVICES  
REGIONAL DISTRICT OF CENTRAL KOOTENAY  
BOX 590, 202 LAKESIDE DRIVE  
NELSON, BC V1L 5R4  
Ph. 250-352-8190  
Email: [plandept@rdck.bc.ca](mailto:plandept@rdck.bc.ca)

# RDCK Map



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## Legend

 Electoral Areas

## Map Scale:

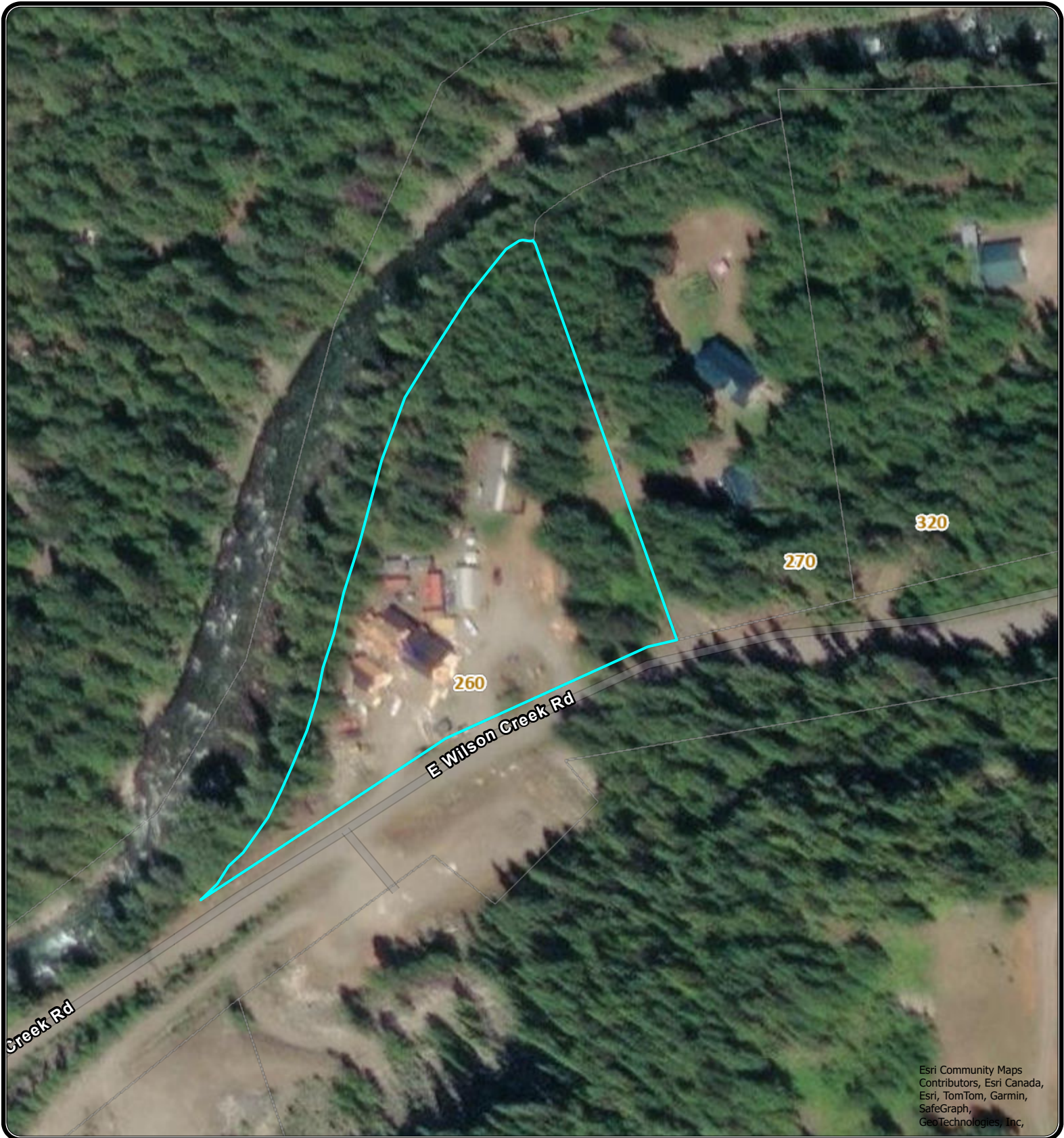
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## Legend

-  Electoral Areas
-  Cadastre - Property Lines
-  Address Points

## Map Scale:

1:2,257

Date: October 14, 2025



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### Legend

- Streams and Shorelines
- Lakes and Rivers
- 100 meter
- RDCK Streets
- Cadastre - Property Lines
- Address Points
- 20 meter
- Electoral Areas

## 20 Meter Contours

### Map Scale:

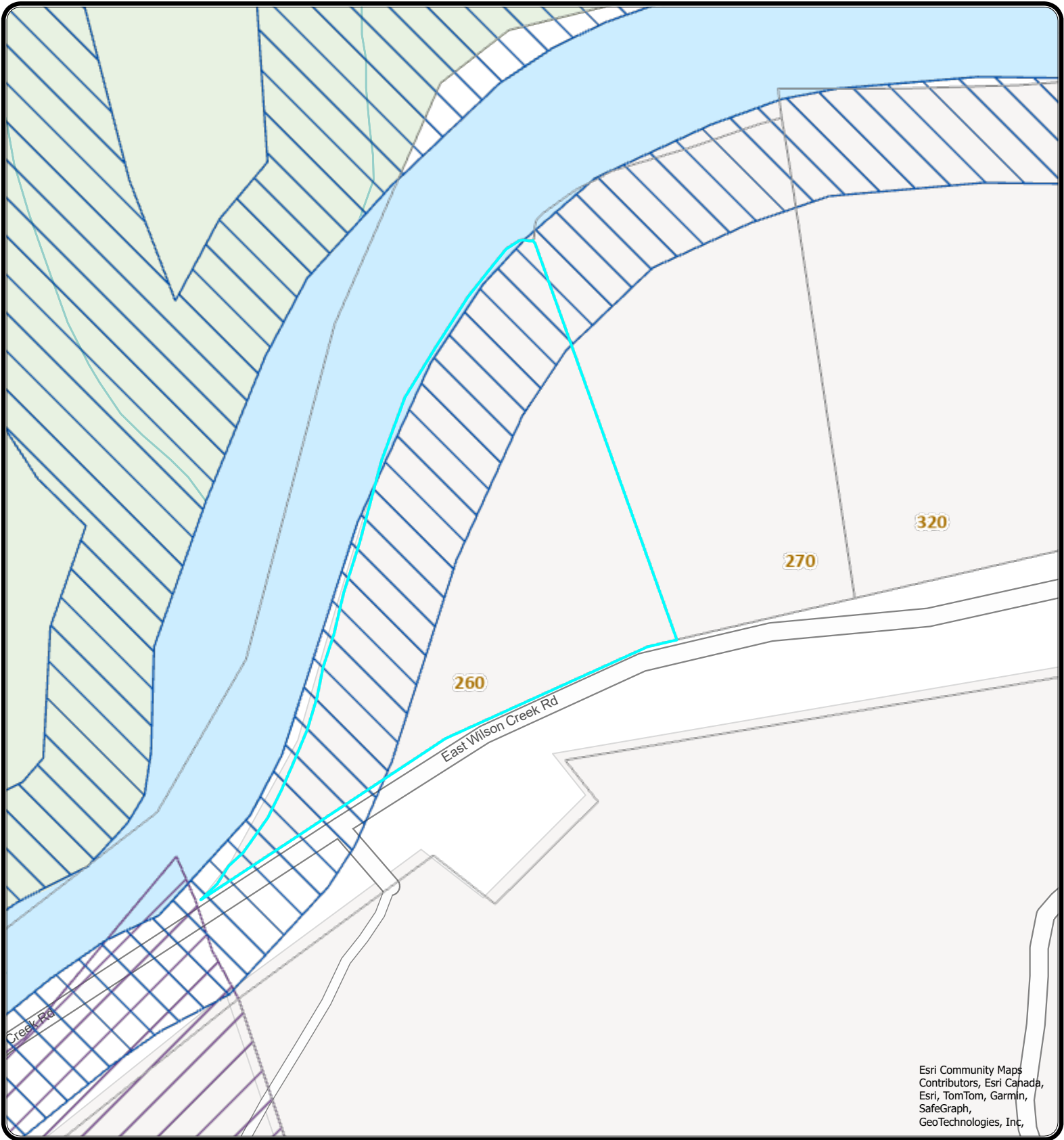
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## Development Permit Areas

-  Industrial
-  Watercourse

## Legend

-  Electoral Areas
-  Cadastre - Property Lines
-  Address Points

## Map Scale:

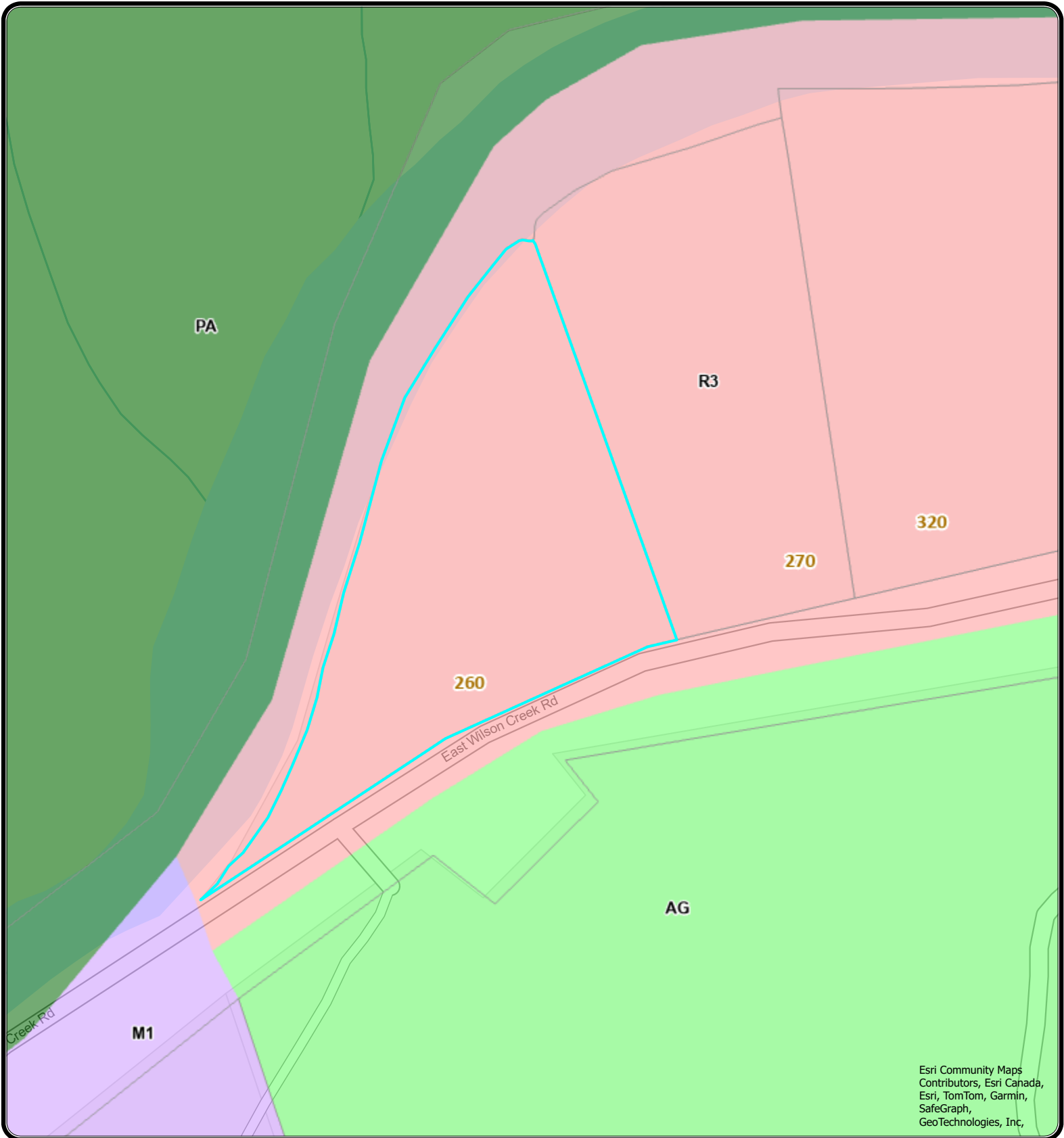
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## Official Community Plan

- Agriculture
- Industrial
- Parks and Recreation

### Legend

- Rural Residential
- Electoral Areas
- Cadastre - Property Lines
- Address Points

### Map Scale:

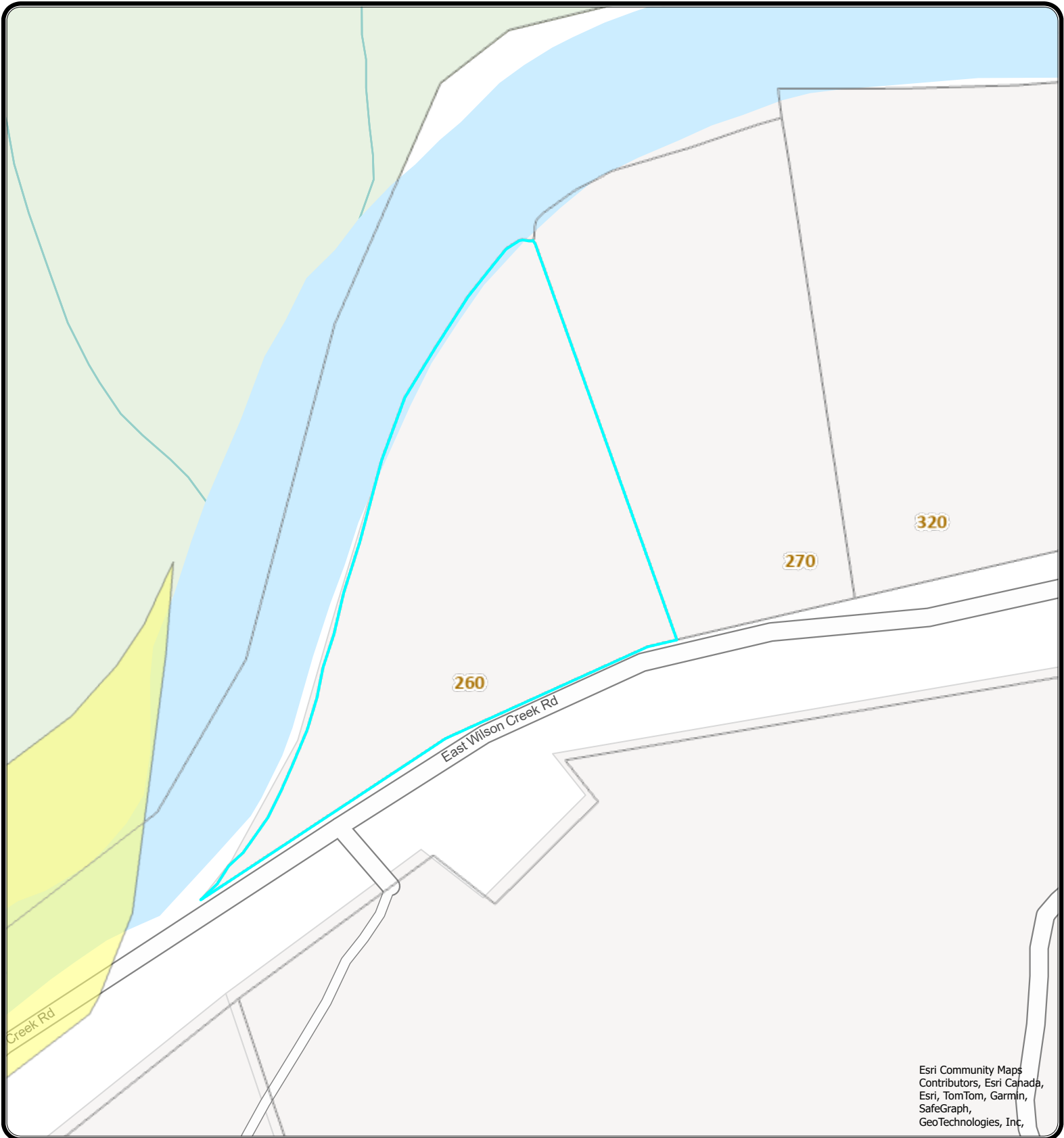
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





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### Legend

-  Non Standard Flooding Erosion Area
-  Electoral Areas
-  Cadastre - Property Lines
-  Address Points

### Map Scale:

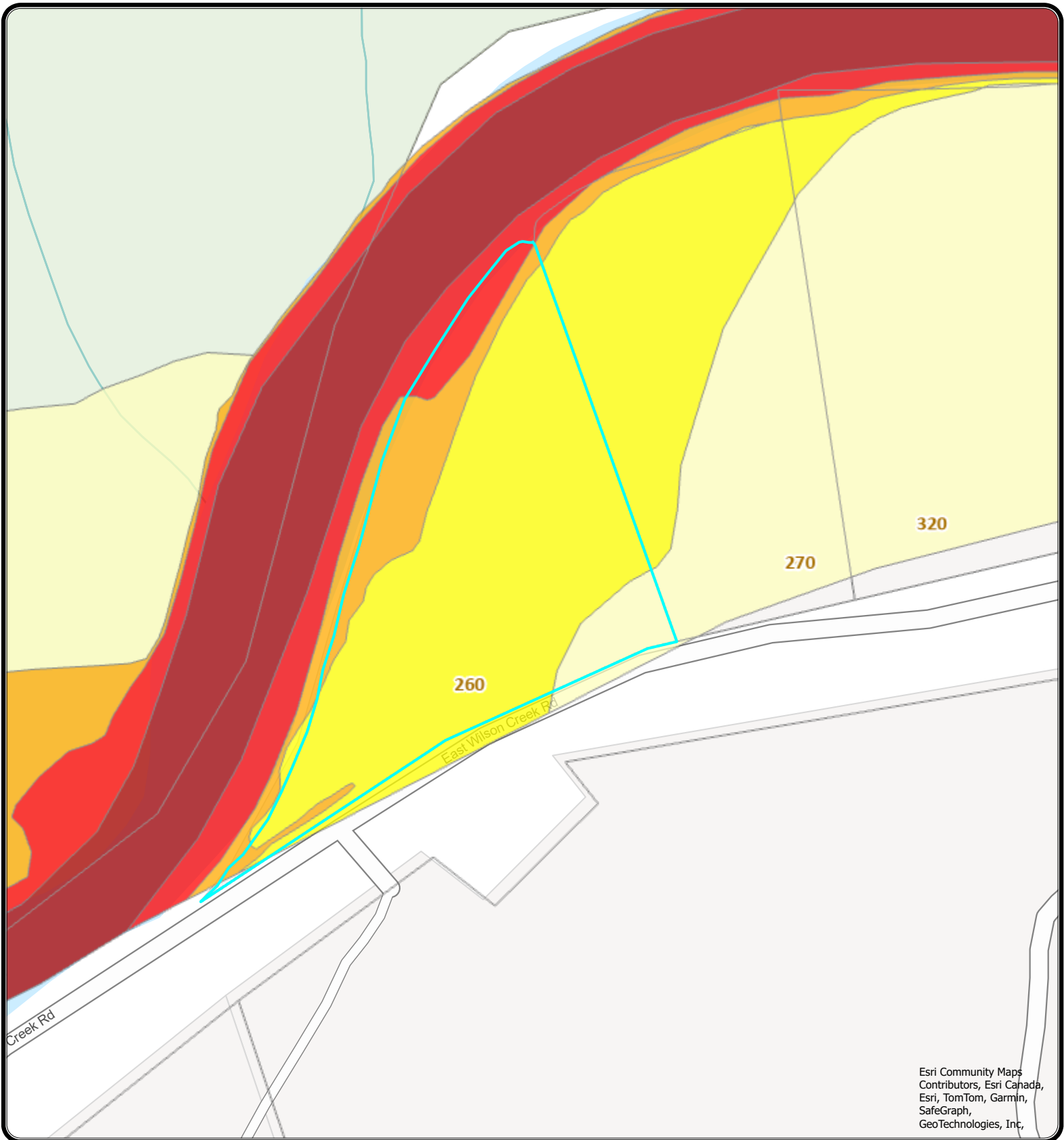
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## Steep Creek Hazard Rating - 2020 Composite

- Very High
- High
- Moderate

### Legend

- Low
- Very Low
- Electoral Areas
- Cadastre - Property Lines
- Address Points

### Map Scale:

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## Legend

### Fire Service Areas

-  N DENVER/SILVER
-  Electoral Areas
-  Cadastre - Property Lines
-  Address Points

### Map Scale:

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Date: October 14, 2025







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### Legend

-  Parks and Rec
-  Electoral Areas
-  Cadastre - Property Lines
-  Address Points

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Date: October 14, 2025



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# **PROPOSAL SUMMARY**

## **Site Specific Floodplain Exemption Application**

### **260 Wilson Creek Road East, Rosebery, BC**

#### **Purpose of Application**

The purpose of this application is to request a Site Specific Floodplain Exemption under RDCK Floodplain Management Bylaw No. 2080, 2009 for the existing primary residence located at 260 Wilson Creek Road East, Rosebery, BC. This application relates solely to the existing primary residence and does not seek approval for any additional residential development within the floodplain setback area.

#### **Existing Structures Intended to Remain**

The existing primary residence is the only structure subject to this application and intended to remain in its current location. The residence is an existing full-time dwelling that has been professionally assessed by Apex Geoscience Consultants Ltd. as part of the accompanying Flood Hazard Assessment.

#### **Other Structures Located on the Property**

Two shipping containers remain on the property and are used exclusively for storage purposes. The containers have been relocated outside the 30 metre floodplain setback and are not intended for residential occupancy.

A CSA-approved park model trailer is located on the property for temporary seasonal use. The park model is not a permanent residence and is not the subject of this application. The park model trailer will be relocated outside the 30 metre floodplain setback and will remain outside the setback area.

Upon relocation of the park model trailer, the only structure remaining within the floodplain setback area and subject to this application will be the existing primary residence.

#### **Actions Taken to Address Previous Review Comments**

Since the previous application review, efforts have been made in good faith to address concerns identified by RDCK staff and to simplify the current application. The shipping containers previously located within the floodplain setback area have been relocated outside the 30 metre floodplain setback and are now used exclusively for storage purposes. In addition, the temporary CSA-approved park model trailer will be relocated outside the 30 metre floodplain setback and is not included as part of this application.

As a result of these actions, the current application has been intentionally narrowed in scope and now relates solely to the existing primary residence.

#### **Floodplain Setback and Flood Construction Level**

Survey measurements completed by Crowsnest Engineering determined that the minimum setback from the primary residential structure footprint to the natural boundary of Wilson Creek is approximately 15.5 metres. The closest measured setback of approximately 11.2 metres relates to spread footings supporting the covered patio roof overhang and not the primary residential structure footprint itself.

Crowsnest Engineering further determined that the average natural boundary elevation in proximity to the residence is approximately 534.845 metres, while the elevation of the lowermost habitable floor surface of the residence is approximately 537.912 metres. This results in a vertical elevation difference of approximately 3.013 metres above the natural boundary, satisfying the 3.0 metre Flood Construction Level requirement contained within RDCK Floodplain Management Bylaw No. 2080, 2009.

Accordingly, no structures subject to this application are located below the required Flood Construction Level. The primary residence satisfies the Flood Construction Level requirement. This application does not seek relief from the Flood Construction Level requirement. The sole purpose of this application is to request a Site Specific Floodplain Exemption for the reduced setback of the existing primary residence from the natural boundary of Wilson Creek.

### **Summary of Apex Flood Hazard Assessment**

The assessment concluded that the primary residence is located within a low composite hazard area; remains approximately 11 to 14 metres beyond the maximum possible erosion limit identified in the BGC Wilson Creek assessment; has a low probability of flooding and bank erosion; and requires no mitigation measures.

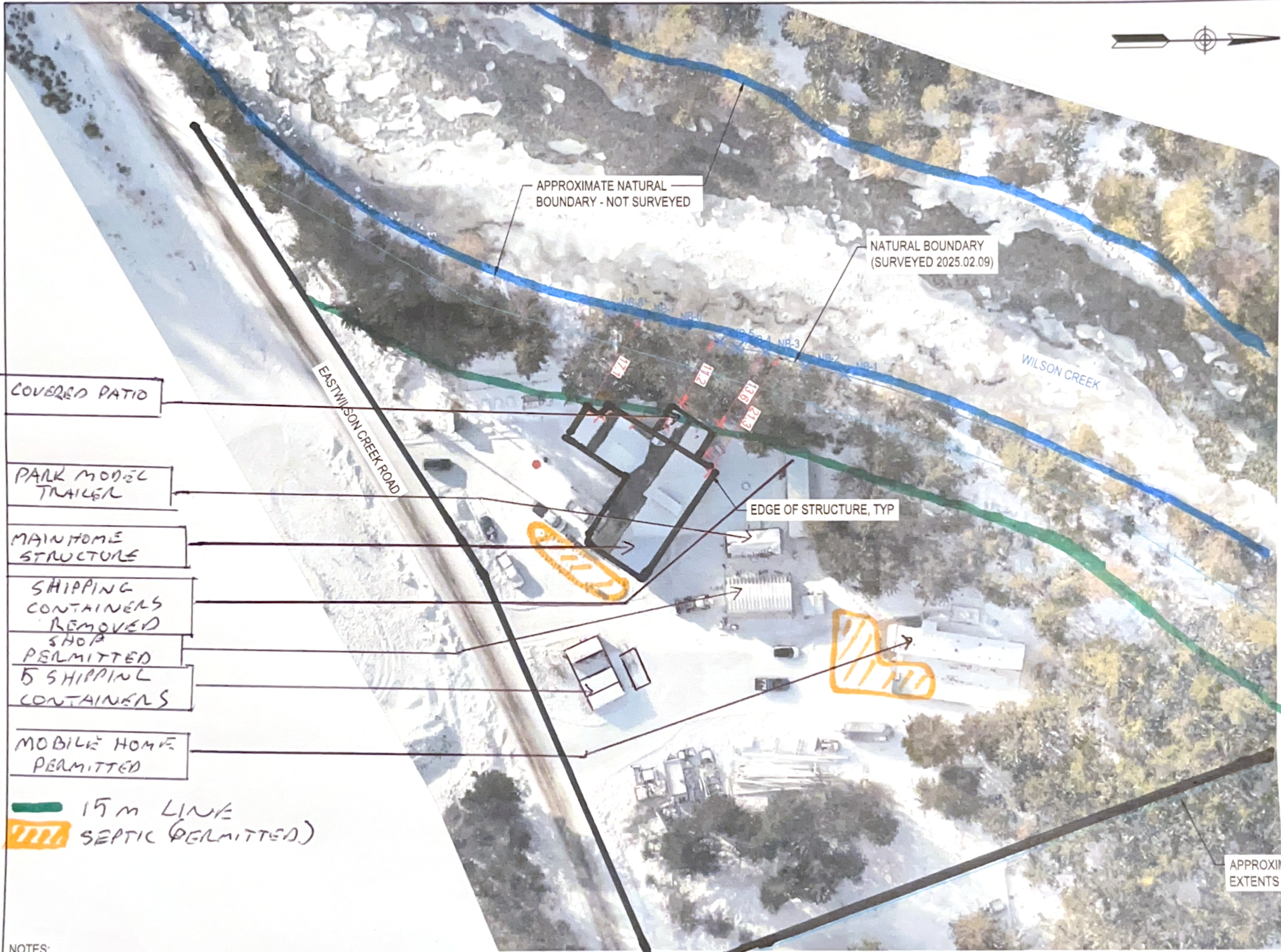
Most importantly, Apex concluded that the home is safe for full-time use (safe for its intended purpose) and requires no mitigation measures.

### **Request**

Based on the findings and conclusions of Apex Geoscience Consultants Ltd. and the survey information prepared by Crowsnest Engineering, the applicant respectfully requests approval of a Site Specific Floodplain Exemption for the reduced floodplain setback applicable to the existing primary residence located at 260 Wilson Creek Road East.

This application concerns an existing residence and does not propose new residential development within the floodplain setback area. The application has been intentionally limited to the existing primary residence. Other accessory or temporary structures located on the property are either situated outside the 30 metre floodplain setback or will be relocated outside the 30 metre floodplain setback and are not part of this exemption request.

The professional assessment concludes that the residence can be safely used for its intended purpose, that the probability of flooding and bank erosion affecting the residence is low, and that no mitigation measures are required. The applicant therefore respectfully requests that the Regional District of Central Kootenay approve the requested Site Specific Floodplain Exemption for the reduced setback applicable to the existing primary residence.



APPROXIMATE NATURAL BOUNDARY - NOT SURVEYED

NATURAL BOUNDARY (SURVEYED 2025.02.09)

WILSON CREEK

EASTWILSON CREEK ROAD

EDGE OF STRUCTURE, TYP

COVERED PATIO

PARK MODEL TRAILER

MAIN HOME STRUCTURE

SHIPPING CONTAINERS REMOVED SHOP

PERMITTED 5 SHIPPING CONTAINERS

MOBILE HOME PERMITTED

15m LINE  
SEPTIC (PERMITTED)

APPROXIMATE EXTENTS

NOTES:

# 260 Wilson Creek Road East, Flood Hazard Assessment

Apex File FA-26-PRIV-01



*Image 1: Looking across Wilson creek towards subject property (KGreen Photo).*

Prepared for:  
Darrell and Audrey Steenhoff  
260 Wilson Creek Road E.

Prepared by:  
Will Halleran P.Geo P.L.Eng  
K. Green P.Geo PhD  
Apex Geoscience Consultants Ltd  
1220 Government St. Nelson, BC



Version Control	Date	Comment
<b>Version 1</b>	March 30, 2026	Submitted to client for comment
<b>Version 2</b>	April 2, 2026	Edited for clarity

# CONTENTS

CONTENTS.....	i
TABLE OF FIGURES.....	iii
1 Executive Summary.....	1
2 Introduction.....	3
3 Methods and Limitations.....	6
3.1 Flood mapping in BC guidelines and Legislated Flood Assessments in a Changing Climate in BC Guidelines (APEGBC 2017, 2018).....	6
3.2 Previous Reports, Documentation and Background.....	6
3.3 Definitions.....	8
3.4 Air photographs used in this investigation.....	9
3.5 Field assessment.....	9
3.6 Elevation Distribution and area (From K.Green).....	10
3.7 Flood Frequency Estimation.....	11
4 Observations.....	13
4.1 Stream channel.....	13
4.2 Flood Frequency.....	14
4.2.1 Q2 estimate for Wilson Creek.....	14
4.2.2 Q200 estimate for Wilson Creek.....	14
4.2.3 Wilson Creek Q200 estimate discussion and climate change consideration.....	15
5 <i>Flooding and Erosion Assessment for 260 Wilson Creek Road E</i> .....	17
5.1 Debris Flood.....	17
5.2 Clear water Flood.....	19
5.2.1 ESTIMATED CLEARWATER 200 YEAR FLOOD DEPTH USING MANNINGS AND CHANNEL GEOMETRY.....	19
6 Summary.....	19
7 Conclusion.....	20
8 disclosure obligation.....	20
9 Literature Cited.....	20
10 FLOOD MAPPING ASSURANCE STATEMENT.....	22
11 Appendix 1: Hydrographs for Kuskanax Creek.....	26
12 Appendix 2: Mannings n values.....	26

## TABLE OF FIGURES

Figure 1: Subject Property 260 E. Wilson Creek Rd. ....	2
Figure 2: NSFEA map from RDCK.....	4
Figure 3: Subject property with BGC composite hazard zones and improbable erosion limit. ....	5
Figure 4: Longitudinal Stream Channel Profiles For Wilson Creek and Tributaries. ....	11
Figure 5: Hypsometric Curve and H60 Elevation (1550m) for Wilson Creek Watershed. ....	11
Figure 6: Hypsometric Curves for Wilson and Kuskanax. ....	12
Figure 7. Figure showing erosion line and hazard areas from BGC report. ....	18

# 1 EXECUTIVE SUMMARY

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This flood hazard assessment evaluates the potential flooding and bank erosion of 260 Wilson Creek Road E (Lot B District Lot 4877 Kootenay District Plan EPP30385). The property is on the southeast side of Wilson Creek near the apex of the fan as delineated by BGC Engineering. BGC Engineering completed a detailed hydrogeomorphic hazard assessment of Wilson Creek (2020) for the RDCK. BGC Engineering has determined that the 1-in-200-year event is likely to be characterized as a debris flood. As part of that assessment BGC stratified Wilson fan by composite hazard zones and delineated bank erosion limits. Most of the subject property including the primary residence (the subject of this exemption) is within a 200-year Low Composite Hazard Zone ( $<1\text{Kn}/\text{M}^2$ ). The primary residence is set back 11m to 14m from the BGC delineated “improbable erosion” limit. The improbable erosion limit defines the maximum possible extent of bank erosion during a 1 in 200-year debris flood event.

Currently the RDCK are reviewing how development near flood and steep creek hazard areas will be managed by updating outdated policies and regulations. The detailed BGC hazard mapping will likely replace the generic flood construction levels (3m) and setback (30m) recommended in RDCK Floodplain Management Bylaw 2080, 2009 for Wilson Creek. The primary residence is set back 15m from and 3m above the natural boundary of Wilson Creek (Crowsnest Engineering).

The RDCK is also developing a risk tolerance policy to strengthen risk-informed land use decisions and enhance community resilience in areas exposed to geohazards, such as floods, landslides, and steep creek hazards (debris flows and debris floods).

Observations of the Wilson Creek channel and banks by Apex Geoscience Consultants Ltd. revealed no evidence of debris flows, debris floods, or channel avulsion on this portion of Wilson Creek Fan. The 1 in 200-year event will be a clear water flood. With consideration for climate change the estimated 200-year flood discharge for Wilson Creek is  $220\text{ m}^3/\text{sec}$ . The primary residence is 1.889 m above this flood level. The probability of flood inundation effecting the primary residence is considered low ( $<0.5\%$  annual probability). For a clear water flood, the location of the property on the inner curve of the creek reduces the likelihood and extent of bank erosion. The likelihood of bank erosion impacting the primary residence is assessed as low ( $<0.5\%$  annual probability). The primary residence can be used safely for the intended purpose of full-time residency. No mitigation measures are required.

Figure 1: Subject Property 260 E. Wilson Creek Rd.



## 2 INTRODUCTION

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In early 2025, Mr. Darrell Steenoff, the owner of 260 Wilson Creek Road E, approached Apex Geoscience Consultants Ltd. to request a Site-Specific Flood Exemption assessment of his property near Wilson Creek, in accordance with RDCK Floodplain Management Bylaw 2080, 2009. At that time, Apex was occupied with other projects and unable to take on the assessment. Mr. Steenoff then hired Crowsnest Engineering, which prepared a Post Construction Hazard Assessment Technical Memorandum. This memorandum was submitted as part of Mr. Steenoff's exemption application. The RDCK provides a term of reference document titled "Professional Engineers/Geoscientists undertaking Geotechnical/Flood Hazard Assessment reports." On January 5, 2026, the RDCK Committee report (file # F2501HN-Steenoff) determined that the Technical Memorandum did not satisfy the terms of reference requirements, identifying five deficiencies that led to the denial of the application.

The deficiencies were identified as:

1. A flood assurance statement
2. Confirmation that the land may be used safely for the use intended.
3. Confirmation of which structures on the property will be subject to the site -specific exemption,
4. Identification of which section of the flood plain bylaw the development is to be exempted from and
5. Recommendations for mitigation measures, such as flood proofing or other protective measures.

At the beginning of March 2026, Mr. Steenoff hired Apex Geoscience to prepare a report in support of his Site-Specific Flood Exemption application.

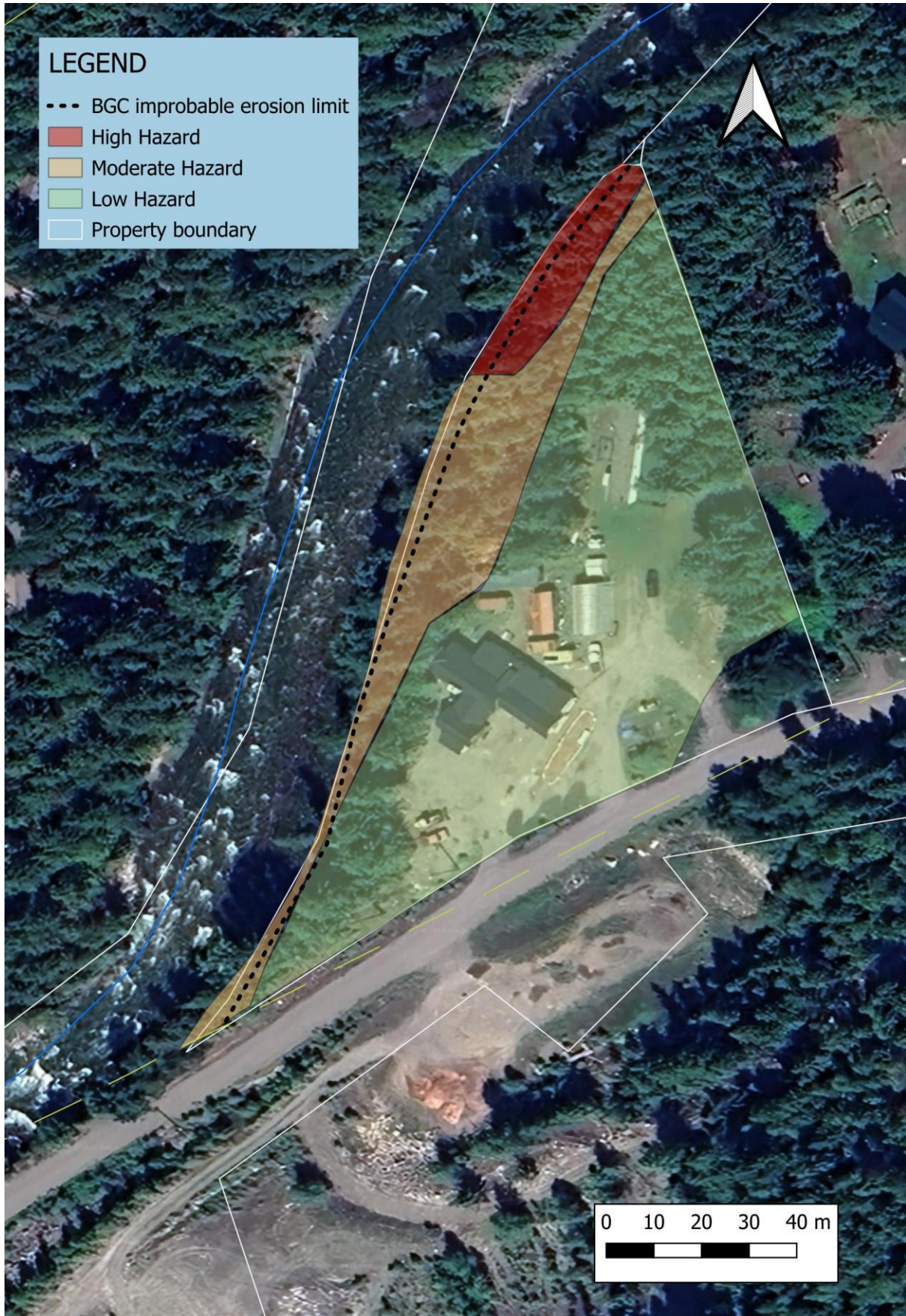
Portions of Wilson Creek fan had a Non-Standard Flooding and Erosion Rating of E (Schedule E Bylaw 2008,2009), the subject property is outside the area rated as E as shown on figure 2. Previously, and as stipulated in Schedule C of Bylaw 2080,2009, the flood construction level along Wilson Creek was 3m above the natural boundary of Wilson Creek with a 30 m setback.

BGC Engineering completed a detailed hydrogeomorphic hazard assessment of Wilson Creek (2020) for the RDCK. BGC Engineering flood plain composite hazard mapping has replaced the NSFA E rating. BGC Composite Hazard zones and bank erosion limits are shown on figure 3. The primary residence is the large building with black roof in figure 3. This exemption is to reduce the set back to ~ 15m and to comment on the newly designated Low Composite Hazard Zone (<1kN/M).

Figure 2: NSFEA map from RDCK.



Figure 3: Subject property with BGC composite hazard zones and improbable erosion limit.



## 3 METHODS AND LIMITATIONS

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### 3.1 FLOOD MAPPING IN BC GUIDELINES AND LEGISLATED FLOOD ASSESSMENTS IN A CHANGING CLIMATE IN BC GUIDELINES (APEGBC 2017, 2018)

Guidelines developed by APEGBC (2017, 2018) outline the current standard of practice for undertaking flood hazard mapping on fans. This assessment incorporates the standards and tasks as required in the APEGBC flood mapping guidelines.

### 3.2 PREVIOUS REPORTS, DOCUMENTATION AND BACKGROUND.

The insights obtained by Apex Geoscience during the 2001 and 2025 hydrological assessments of Wilson Creek are utilized to support informed decision-making regarding the hydrology and associated hazards of Wilson Creek. Of interest, a dam burst flood (from a debris slide) in Burkitt Creek resulted in aggradation of Wilson Creek channel at the confluence of Burkitt Creek. This event (thought to have occurred in 1972) did not trigger a debris flood in Wilson Creek.

Technical Memorandum – Post Construction Hazard Assessment: 260 East Wilson Creek Road, Regional District of Kootenay (RDCK), BC. Lot B, Plan EPP 30385, District Lot 4877, Kootenay Land District. Crowsnest Engineering, February 14, 2025.

Mr. Steenoff commissioned Crowsnest Engineering to prepare a report for inclusion in a Flood Plain Exemption application. Relevant information from this comprehensive document will be referenced in our assessment to eliminate redundancy. According to the findings, bank erosion limits do not extend to the development site. The report further states that, per BGC's analysis, the subject structures would experience impact forces below 1kN/m in a 1-in-200-year flood event. Additionally, Crowsnest determined that the interior floor elevation (living area) is situated 3.013 meters above the stream's natural boundary, and the principal residence footprint maintains a setback of 15.5 meters from this boundary.

RDCK Steep Creek and Flood Plain Study Wilson Creek March 31, 2020, by BGC Engineering: BGC Engineering Inc. (BGC) was retained by RDCK to conduct a comprehensive hydrogeomorphic risk assessment for Wilson Creek. The study identified debris floods as the primary hydrogeomorphic hazard, and a zoned composite hazard map of the fan was developed based on the impact force of a modeled 1:200-year debris flood event. Depth and velocity of the flood waters in this zone were not included in the report. The designation of debris floods as the principal hazard is not substantiated by the observations and data presented within the report, and contrasts with

findings from previous studies. The report included projections of potential bank erosion limits associated with debris flood events of varying return periods. Specifically, for a 1 in 200-year event, bank erosion was estimated to reach up to 15 meters, depending on local factors such as bank height; this extent was depicted on figures that included the subject property. The fan area delineated by BGC exceeds that outlined in the original Non-Standard Flooding and Erosion assessment by including regions formerly classified as part of the inactive alluvial fan. This expanded area encompasses the subject property, which was previously situated on the inactive fan.

RDCK planning staff provided geotechnical and flood assessment reports for nearby properties and a landslide investigation report in the vicinity. The reports were reviewed and the pertinent information summarised below.

Wilson Creek Debris Flow Memorandum Ministry of Forests May 4, 1999: This memorandum details a road failure that caused a debris slide into Wilson Creek, as shown in photographs. The debris deposited into Wilson Creek did not trigger a debris flood.

Flood Hazard Assessment, Wilson Creek Property Rosedale, Klohn Crippen Berger July 24, 2006. This report pertains to #402 Fourth Street, Rosedale. The assessment identifies the fan as an alluvial fan rather than a debris flood fan. It references earlier findings that indicate the stream has remained in its current position for more than 50 years (1939 to 1987), confirming that, as of 2006, the stream channel location remains unchanged. The estimated stream gradient is approximately 2%. Additionally, the report cites WLAP Report #229 by Oxland, which details the impacts of the 1972 flood—considerable erosion of the north bank upstream of the former highway crossing.

Floodplain Setback Relaxation Assessment, District Lot 298, Lots 13-20 of Block 24, Plan 569 Kootenay District, WSA November 6, 2006: The assessment recommended reducing the floodplain setback from 30m to 15m. The lots, located in NSF E hazard rating E on Wilson Creek's south bank, have areas raised 1.2m above the stream's natural boundary with no signs of flooding.

Floodplain Setback Relaxation Assessment, District Lot 298, Lots 14 to 21 of Block 9, Plan 569 Kootenay District, WSA November 16, 2006.

This assessment considered relaxing the setback from 30 meters to 15 meters. The lots are situated between the active Wilson Creek channel and an abandoned channel, with parts of the properties lying within the active Wilson Creek channel itself. Portions of the properties are elevated up to 1.2 meters above the "high water mark."

Natural Hazard Assessment Lot 21 Plan NEP 10379, District Lot 298 Kootenay District, Perdue Geotechnical Services November 14, 2014. This assessment was conducted to identify any natural

hazards that might affect the approval of a building permit. The Melton Ratio (the ratio of drainage area to channel gradient) indicated that Wilson Creek experiences clear water floods but is not prone to debris floods. Field observations of the channel and fan supported this finding. Some areas of the elevated fan were identified as paleo features formed during deglaciation, when the stream carried a considerable sediment load. Over the past millennia, Wilson Creek, with a reduced sediment load, has cut down into this paleo fan.

Regional Flood Frequency analysis, based on data from the Kaslo River, estimated the 200-year flood volume at 378 m<sup>3</sup>/sec. With a 10% increase to account for climate change, the volume rises to 416 m<sup>3</sup>/sec. This amount exceeds the capacity of Wilson Creek's channel and would result in the creek overflowing its banks.

### **3.3 DEFINITIONS**

The pertinent bylaw is Regional District of Central Kootenay Floodplain Management Bylaw NO. 2080, 2009.

The RDCK document includes the following definitions.

**DESIGNATED FLOOD:** A flood, which may occur in any given year, of such magnitude as to equal a flood having a 200-year recurrence interval, based on a frequency analysis of unregulated historic flood records or by regional analysis where there is inadequate stream flow data available.

**DESIGNATED FLOOD LEVEL:** The observed or calculated elevation for the Designated Flood which is used in the calculation of the Flood Construction Level.

**FLOOD CONSTRUCTION LEVEL:** The Designated Flood Level plus the allowance for freeboard and is used to establish the elevation of the underside of a wooden floor system or top of concrete slab for habitable buildings. In the case of a manufactured home, the ground level or top of concrete or asphalt pad on which it is located shall be no lower than the above-described elevation. It also establishes the minimum crest level of a Standard Dike. Where the Designated Flood Level can not be determined or where there are overriding factors, an assessed height above the natural boundary of the water body or above the natural ground elevation may be used.

Where Floodplain Mapping is available, the Flood Construction Level (F.C.L.) for a specific property shall be determined by interpolation from the “200-year frequency Flood Level” as identified in Schedule “B” of this Bylaw, (if not available) 1.5 metres above natural boundary for all other small lakes, ponds, marshes and small watercourses.

NATURAL BOUNDARY means the visible high watermark of any lake, river, watercourse, or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river, watercourse, or other body of water a character distinct from that of the banks thereof, in respect to vegetation, as well as in respect to the nature of the soil itself. In addition, the natural boundary includes the best estimate of the edge of dormant or old side channels and marsh areas.

NON-STANDARD FLOODING AND EROSION AREAS (NSFEA) are areas where standard floodplain setbacks and flood construction levels may not be adequate to provide the necessary level of protection against flooding, erosion and/or debris flow; including alluvial fans, debris flow fans and floodway areas subject to flooding and erosion hazards which require special flooding and erosion precautions.

NON-STANDARD FLOODING AND EROSION RATING (NSFER) is a rating assigned for the purposes of establishing reasonable subdivision and floodplain bylaw requirements. The rating is based upon field experience and all information available to the province at the time it was assigned. As outlined in Schedule C of Bylaw 2080, 2009, the Wilson Creek flood construction level was established at 3 meters above the natural boundary, with a required setback of 30 meters.

### **3.4 AIR PHOTOGRAPHS USED IN THIS INVESTIGATION**

Reviews of historical air photographs have been extensively reported in previous reports. BGC included prints of the airphotos from 1939 to 2006. Apex reviewed airphotos and satellite images from 1966 to 2022.

In all reports analysis of aerial photographs taken over roughly 80 years shows there are no signs of avulsions, flooding outside the existing channel or extensive bank erosion. Additionally, the imagery does not show debris flood deposits or flooding related sediment erosion/deposition on the fan.

### **3.5 FIELD ASSESSMENT**

Kim Green, P.Geo, PhD, conducted field reviews in the project area on September 4th, 2025, as part of field work undertaken for the 2025 Wilson Creek Hydrological Assessment completed for Interfor Corporation that manages a forest license in the watershed. Navigation and documentation for that field assessment were performed using an iPad tablet equipped with Avenza Maps and a georeferenced, high-resolution LiDAR hillshade map (property of Interfor Corporation). The Wilson Creek survey included channel sections both upstream and downstream of the subject property.

### **3.6 ELEVATION DISTRIBUTION AND AREA (FROM K.GREEN)**

Wilson Creek above Slocan Lake has a catchment area of 584 km<sup>2</sup> and spans the Nakusp and Goat Ranges of the northern Selkirk Mountains (Figure 4). At just over 2926 meters Cascade Mountain at the northeastern headwater of Wilson Creek forms the highest point in the watershed. Wilson Creek flows south and discharges into Slocan Lake at Rosebery, BC at approximately 565 meters elevation. Fitzstubbs Creek is the largest tributary to Wilson Creek and Bremner Creek, is the main headwater tributary of Fitzstubbs Creek. All valleys of Wilson Creek display U-shape profiles and complex topographies due to being both scoured by alpine glaciers and containing thick accumulations of glacial sediments left from past deglaciation.

The longitudinal main channel profile for Wilson Creek and major tributary channels considered here is shown in figure 4. Wilson Creek flows generally south with a channel gradient ranging from less than 1% at the downstream end to approximately 10% in the headwater reaches in the Goat Range Provincial Park. The presence of bedrock falls above the confluence with Fitzstubbs Creek is evident as a step in the channel profile. Fitzstubbs Creek above Wilson Creek averages 0.5% for much of its length except for the lower 5 kilometers where there are bedrock cascades. Bremner Creek, Burkitt Creek and Hamling Creek all display hanging valley characteristics with steep gradient reaches directly upstream from the Wilson Creek and Fitzstubbs Creek mainstem channels. Ranch Creek, a tributary to Fitzstubbs Creek and Dennis Creek which is most southern tributary to Wilson Creek both display average gradients of just under 8%.

The hypsometric curve for a watershed provides information on the elevation distribution through the watershed. Watersheds with a substantial amount of higher elevation area will be more strongly influenced by the presence of winter snow, which will persist into the spring, despite warmer temperatures at low elevations. The hypsometric curve for Wilson Creek indicates it is a predominantly high-elevation watershed with 20% of the watershed area above 2000m elevation. Wilson Creek has an upper elevation of over 2900 meters and an H60 elevation (above which includes 60% of the watershed area) of 1550 meters (Figure 6).

Figure 4: Longitudinal Stream Channel Profiles For Wilson Creek and Tributaries.

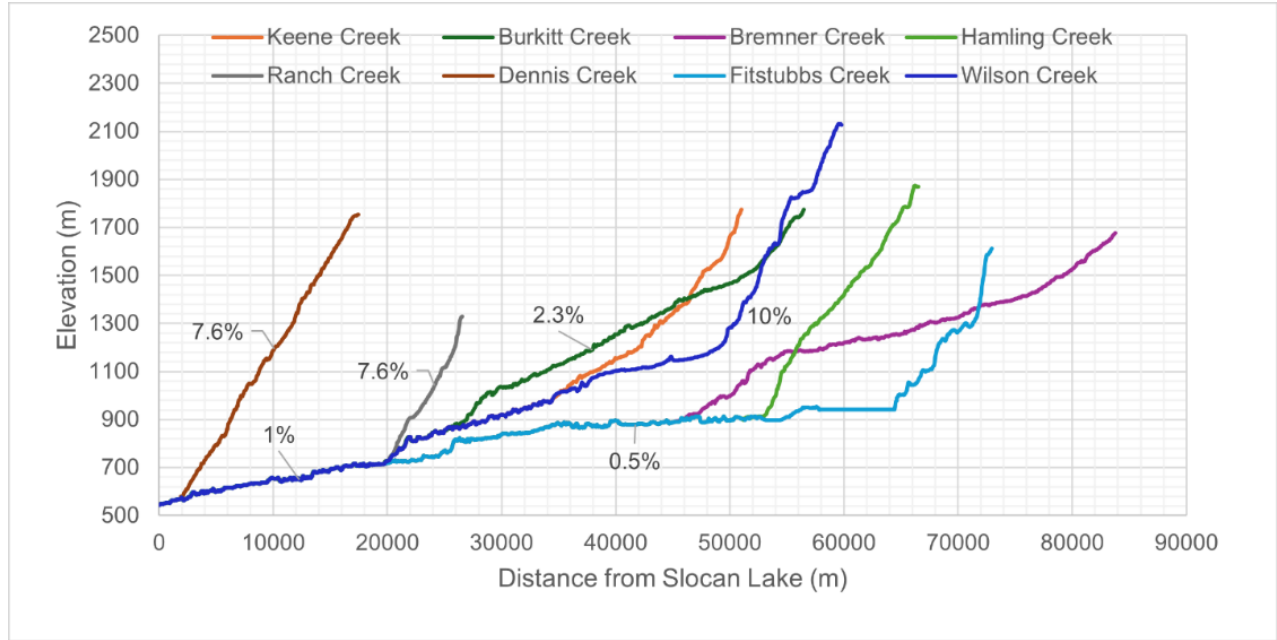
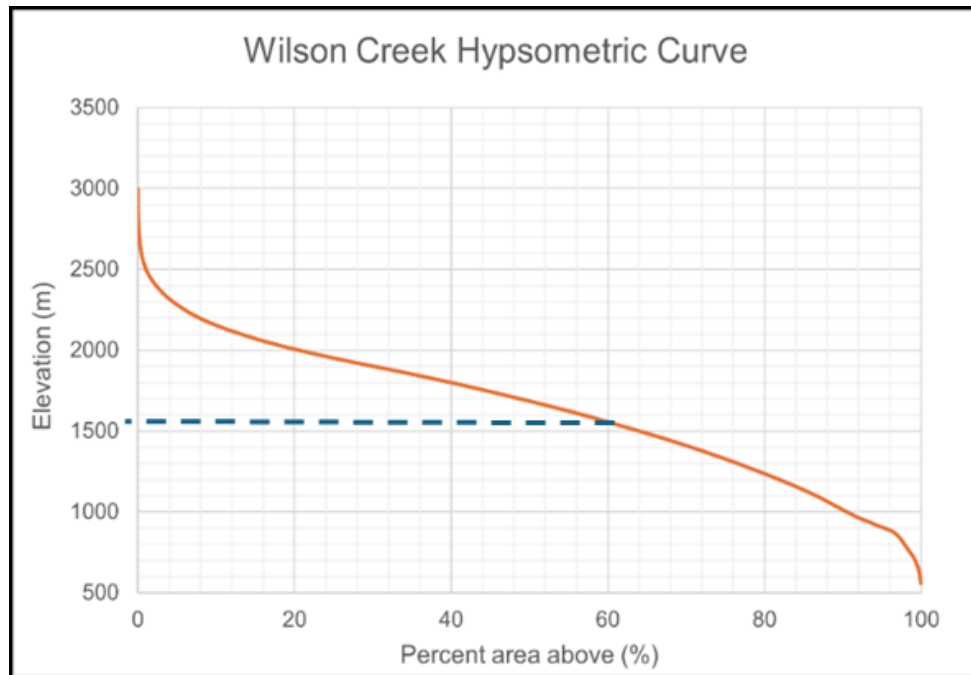


Figure 5: Hypsometric Curve and H60 Elevation (1550m) for Wilson Creek Watershed.



### 3.7 FLOOD FREQUENCY ESTIMATION

Only one year of stream flow gauging is available for Wilson Creek (1916). For ungauged watersheds it is necessary to use multiple methods to produce flood frequencies. The flood frequency is chosen based on best fit for noted hydrogeomorphic features and historical records.

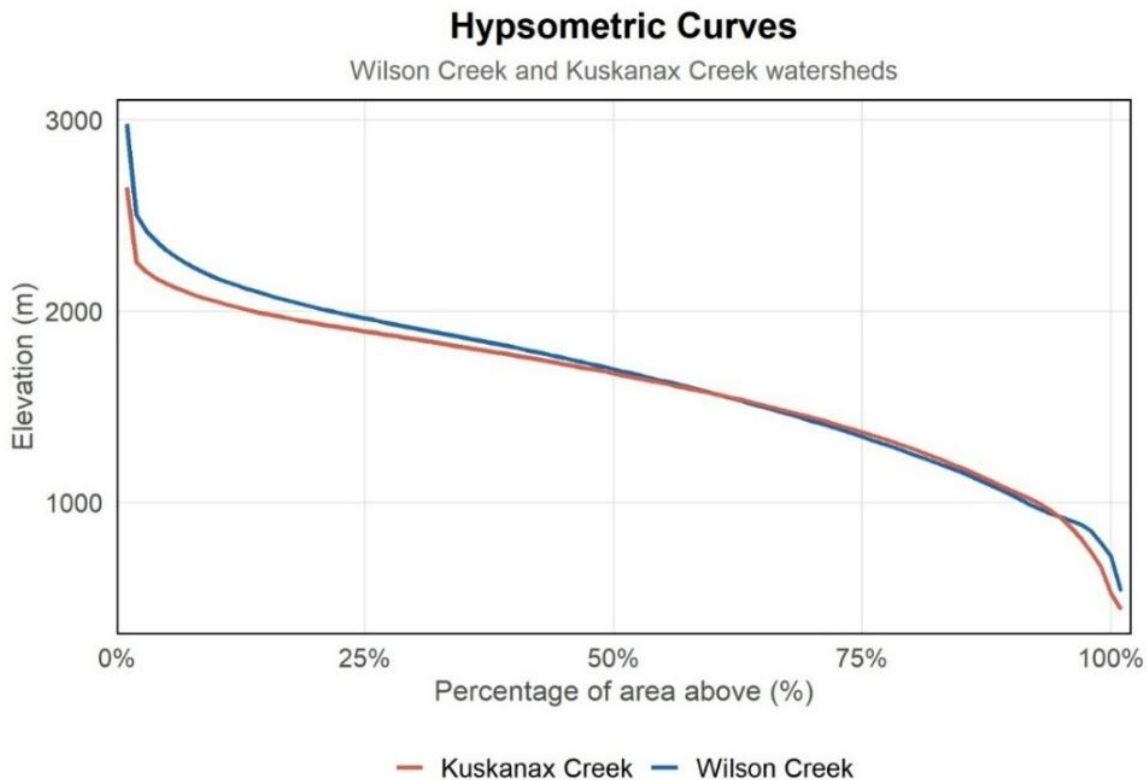
The flow volume of the 2-year return period peak flow ( $Q_2$ ) can be estimated by using hydraulic geometry of the channel and Manning’s equation. Manning’s equation is expressed as,

$$Q = (1/n)(A)(Rh)^{2/3} (S)^{1/2} \quad \text{Eq. 1}$$

where  $Q$  is discharge in  $m^3/s$ , ‘ $n$ ’ is Manning’s number (dimensionless friction coefficient),  $A$  is cross sectional bank full area in  $m^2$ ,  $Rh$  is hydraulic radius in meters (Area divided by the Wetted Perimeter at bank full stage), and  $S$  is slope (rise/run). The measured bank full channel is assumed to represent the  $Q_2$  flow. Manning’s ‘ $n$ ’ is estimated from comparing the appearance of Isaac Brook with pictures of similar stream channels for which the Manning’s ‘ $n$ ’ value is known (<https://culvertbc.ca>).

The relationship between the  $Q_2$  and the  $Q_{200}$  is estimated by comparing the ratio of  $Q_{200}/Q_2$  of nearby gauged watersheds included in British Columbia Regional Flood Frequency Analysis Portal web application. Additionally, the per unit discharge ( $m^3/s$  per  $km^2$ ) of the watershed is estimated from the nearby gauged watersheds. For this assessment, the nearby watershed used in the analysis was Kuskanax Creek. Kuskanax watershed was used due to the similarity in elevation, aspect distribution, and proximity. The hypsometric curve shows the comparison of percentage of elevation.

Figure 6: Hypsometric Curves for Wilson and Kuskanax.



## 4 OBSERVATIONS

The field investigation undertaken for the hydrologic assessment of Wilson Creek collected comprehensive data on channel morphology, hydraulic geometry—including bank full width and depth—indicators of channel disturbance, and bedload sediment grainsize and transport processes.

### 4.1 STREAM CHANNEL

The channel at the north end of the property is 23m wide and 1.1 m deep, the  $D_{90}$  (diameter of the 90<sup>th</sup> percentile) of the mobile bedload is 40cm. The channel morphology is a boulder plane bed with lag boulders over 1 meter. On the south (east) side of the channel there is a flood deposit (gravel) approximately 50cm above the bank full height. Fir and cedar established on this gravel bar appear between 70 and 100-years-old indicating an approximate timing of this major flood event. On the north (west) side of the channel this same ~ 100-year event appears to have eroded the bank to expose large lag boulders.



*Photo 1: Looking across Wilson creek towards the top of the property. Showing elevated old flood deposit estimated at between 70 and 100 years based on the age of the cedar and hemlock.*

## 4.2 FLOOD FREQUENCY

### 4.2.1 Q2 estimate for Wilson Creek

The bank full flow which approximates the Q<sub>2</sub> peak flow of Wilson Creek is calculated using the field-measured channel geometry and gradient (Jarrett, 1985; Bathurst, 1985) Manning's 'n' values (Table 11). The two Manning's numbers used give the range of the visual estimates along the channel.

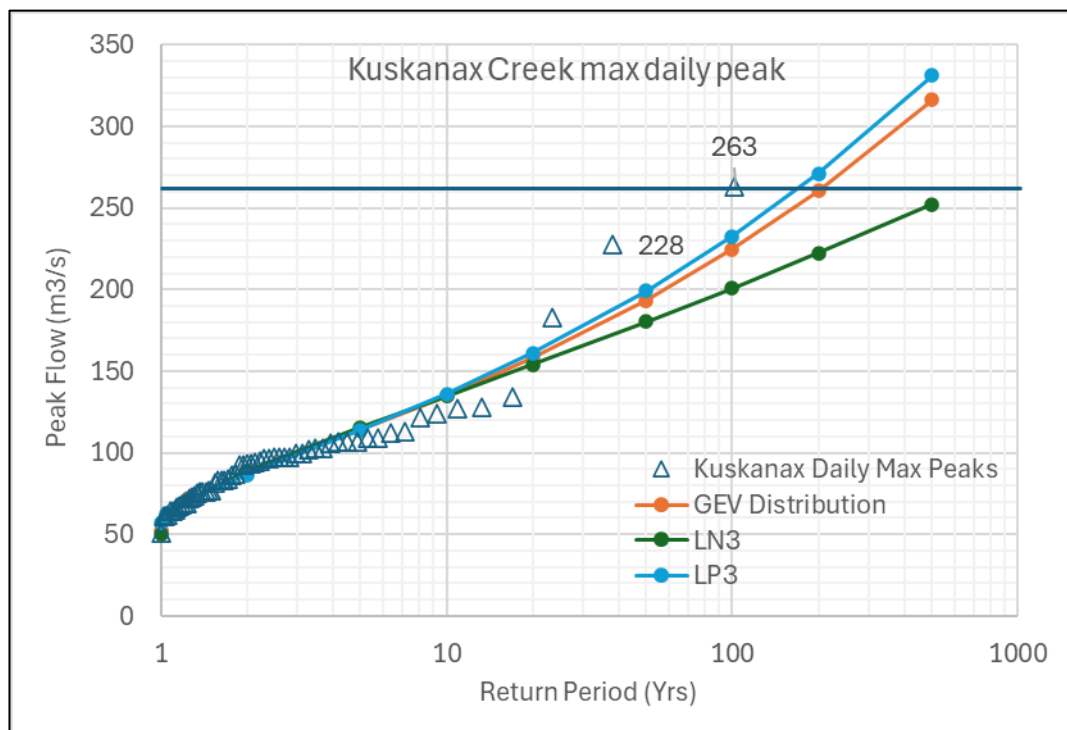
Table 1: Wilson Creek Hydraulic Geometry and instantaneous discharge calculations.

Bank full Width (m)	Average bank full Depth (m)	Bank full Flow Area (m <sup>2</sup> )	Gradient m/m	d <sub>84</sub> (m)	Hydraulic radius (m)	Est Mannings 'n'	Q (m <sup>3</sup> /s) from Mannings equation
						Visual	
23	1.1	25.3	0.0129	0.4	25.2	0.075	38.6
23	1.1	25.3	0.0129	0.4	25.2	0.065	44.5

### 4.2.2 Q200 estimate for Wilson Creek

#### 4.2.2.1 Q2:200 method

Using the generalised extreme value (GEV) distribution, log normal 3 (LN3) distribution, and Log Pearson III (LP3) flood frequency analysis on daily maximum discharge data for Kuskanax Creek (330 km<sup>2</sup>), the Q<sub>2</sub> daily maximum peak flow values are as follows: GEV – 87.7 m<sup>3</sup>/s, LN3 – 88.9 m<sup>3</sup>/s, and LP3 – 86.5 m<sup>3</sup>/s. The corresponding Q<sub>200</sub> values are GEV – 260.6 m<sup>3</sup>/s, LN3 – 222.5 m<sup>3</sup>/s, and LP3 – 271.2 m<sup>3</sup>/s.



For Wilson Creek, using the Kuskanax discharge ratios, the estimated Q200 ratios are GEV 0.33638, LN3 0.399874, and LP3 0.319119.

For Wilson Creek with a Q2 of 38 m<sup>3</sup>/sec the Q200 will be GEV = 112.97 m<sup>3</sup>/sec, LN3 = 95.03 m<sup>3</sup>/sec and LP3 = 119.08 m<sup>3</sup>/sec. For a Q2 of 44m<sup>3</sup>/sec the Q200 flows are 130.80 m<sup>3</sup>/sec, 110.03 m<sup>3</sup>/sec and 137.88 m<sup>3</sup>/sec, respectively.

#### 4.2.2.2 NHC Regional Flood Frequency Equation

$$Q = 10^A * Area^B * MAP^C * MedianZ^D \quad \text{Eq (3)}$$

Q represents the estimated daily peak flow for the given return period. Area is the basin size in km<sup>2</sup>, MAP is mean annual precipitation (mm) from PCIC PRISM data, and MedianZ is median basin elevation (m). For Wilson Creek: area = 562 km<sup>2</sup>, MAP = 1446.3 mm, MedianZ = 1680 m.

Table 2. Regional 1-day duration Flood Frequency Equation exponents from NHC(2020) model for Ecohydro zone 14.4.

Exponent	10-yr RP	100 Yr RP	200-Yr
A	-5.0331	-4.5616	-4.487
B	0.9021	0.8673	0.8584
C	0.567	0.4799	0.465
D	0.8995	0.9088	0.9183

$$Q_{200} = 10^{-4.487} \times (562 \text{ km}^2)^{0.8584} \times (1446.3 \text{ mm})^{0.465} \times (1680 \text{ m})^{0.9183} = 201.69 \text{ m}^3/\text{sec}$$

The 200-year return period flood in Wilson Creek based on the NHC equation above is 201.69 m<sup>3</sup>/s.

#### **4.2.2.3 Unit discharge method**

Wilson Creek watershed covers 562 km<sup>2</sup>, Kuskanax Creek watershed covers 330 km<sup>2</sup>, yielding a ratio of 1.70303. By multiplying Kuskanax's peak flow by this ratio, the range is 378.84–461.86 m<sup>3</sup>/sec.

#### **4.2.3 Wilson Creek Q<sub>200</sub> estimate discussion and climate change consideration.**

The estimated Q<sub>200</sub> for Wilson Creek ranges from 95 m<sup>3</sup>/s to 462 m<sup>3</sup>/s depending on the method used.

It is likely that the unit discharge methods for estimating Q<sub>200</sub> for Wilson Creek over-estimates the Q<sub>200</sub> because the stream flow of Wilson Creek will be attenuated by lakes and broad low gradient valley bottoms (Fitzstubb) that would serve to slow down the delivery of runoff and act as reservoirs. The hydrogeomorphic features (or lack of) along the channel do not support the larger estimates of flow. Additionally, the magnitude the largest floods on record in nearby large rivers with long term discharge gauging (from 1960s) including the Duncan River (1310km<sup>2</sup>) and Illecillewaet River (1150km<sup>2</sup>) both record maximum annual daily peak flows of less than 450 m<sup>3</sup>/s.

A Q<sub>200</sub> of about 200 m<sup>3</sup>/s which is consistent with the Q<sub>2</sub>:Q<sub>200</sub> ratio method and Regional Flood Frequency Equation estimate is a reasonable estimate of the Q<sub>200</sub> flood in Wilson Creek. This is supported by the reported impacts of the 1972 (and 1967) flood event, both of which correspond to a 1:100 flow in Kuskanax Creek. In 1972, the stream remained within its banks, and bank erosion was limited to specific sections of the channel. Historic airphoto interpretation shows no significant impact changes to the channel location for over 80 years indicating floods were confined to the stream channel. The 50cm elevated gravel bar noted during the field review and estimated to be about 100 years old is likely associated with the 1916 or 1933 flood event. The 1972 event may have inundated this bar and caused minor scour but did not erode or deposit appreciable amounts.

News reports of the 1933 flood are included in the government publication Floods and Slides 1886 to 2006. The 1933 floods caused numerous highway and bridge washouts. It is reported that Sandon, Carpenter, and Star Creeks flooded residences and forced evacuations. The New Denver main street was blocked with debris and many buildings undermined. The Slocan River flooded the valley and Springer Creek washed out the highway bridge. It appears from the 1939 airphotos that Wilson Creek mostly stayed within its channel.

The 1916 flood is reported to be the largest since 1894 (largest recorded). Monitoring of the 1916 freshet serendipitously captured the highest recorded flood on the Kaslo River. GEV analysis of the flood indicates a return period of 1:100 to 1:150. There was widespread flooding reported that year.

In 1916 the recording station on Wilson Creek is marked just upstream on Dennis creek reporting 176 m<sup>3</sup>/sec which supports the choice of 200 m<sup>3</sup>/sec for the 200-year return period flood.

#### **4.2.3.1 Climate Change Consideration**

Due to global and regional climate change the prospect for changed hydrological conditions must be incorporated into estimates of future flood hazards (APEGBC, 2020). Although recorded trends for interior B.C. snow melt dominated watersheds show a decrease in flood magnitudes extreme floods are still likely to occur. EGBC suggests adding 10% to the flood magnitudes to account for possible increases.

## **5 FLOODING AND EROSION ASSESSMENT FOR 260 WILSON CREEK ROAD E.**

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The designated flood corresponds to a 1-in-200-year return period. Both this assessment and earlier assessments concluded that such an event would be a clear water flood. However, BGC evaluated the 1-in-200 event as a debris flood and mapped the fan based on that scenario. This assessment will address both possibilities.

### **5.1 DEBRIS FLOOD**

The subject property and primary residence are situated within an area that BGC has mapped as having a low composite hazard, corresponding to a debris-loaded impact force of less than 1 kN/m<sup>2</sup>. The composite hazard maps do not specify flood water depth or velocity; the stated impact force reflects a combination of velocity and debris loading. For context, a column of water 10 cm high exerts a hydrostatic force of approximately 1 kilonewton. According to the NRC publication “Guide for Design of Flood-Resistant Buildings,” an impact force of 1.48 kN/m<sup>2</sup> is considered when mitigation measures are in place. Therefore, the assigned value of less than 1 kN/m<sup>2</sup> represents a low risk to both the structure and its occupants.

The BGC report modeled bank erosion caused by debris floods. Figure 7 shows the maximum potential erosion limit. The primary residence, with its covered deck, sits 11 to 14 meters away from this boundary.

Figure 7. Figure showing erosion line and hazard areas from BGC report.



## 5.2 CLEAR WATER FLOOD

Regional Flood Frequency estimates included here, indicate a 200-year flood is expected to have a flow of 220 m<sup>3</sup>/s. Previous research points to the 1972 flood as the largest documented event on the fan, though floods from 1916 and 1933 were bigger. The recorded flow for the 1916 flood was 176 m<sup>3</sup>/s (measured upstream from Dennis Creek), and this volume would also remain confined within the banks of Wilson Creek.

The 1972 flood caused some local bank erosion on the outer edges of the channel. This flood did not rise enough to erode the flood deposit that sits 0.5 metres above the Wilson Creek channel, nor did it cause significant erosion along the channel bank next to the subject property. Because the property lies on the inside bend of the channel, hydrodynamics dictates there is slower water in this area that would deposit sediment, while faster water on the opposite bank along the outside bend erodes the banks. This natural pattern moves the stream across the floodplain and makes bank erosion less likely along most of the property's creek side boundary.

### 5.2.1 ESTIMATED CLEARWATER 200 YEAR FLOOD DEPTH USING MANNINGS AND CHANNEL GEOMETRY

The flood water depth estimate during a 1-in-200-year event is determined by back analysis of channel geometry using Manning's n assuming ~ 220 m<sup>3</sup>/sec.

Table 3: 1 in 200-year flood depth.

Bank full Width	Average bank full Depth (m)	Flow Area (m <sup>2</sup> )	Gradient m/m	Est Mannings n	Hydraulic radius	Q (m <sup>3</sup> /s) from Mannings equation
23	2.23	51.29	0.013	0.04	27.46	221.8

Using channel geometry, a reduced Manning's number assuming planar flow in the flood's upper section, and a 1-in-200-year flood rate of 220m<sup>3</sup>/sec, the flood level is approximately 1.13 m above the natural (1.1 m depth bank full) boundary (Table 3) for a total channel depth of 2.23m.

## 6 SUMMARY

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Based on analyses of the 1972 flood impacts, prior assessments, channel studies, and flood frequency evaluations, the 200 year flood elevation above the natural boundary of Wilson Creek ranges from 0.5 to 1.13 meters.

The principal residence is located 3.012 meters above the creek's natural boundary and approximately 1.889 meters above the estimated 1-in-200-year flood level.

Positioned on the inner curve of the creek, the property is less susceptible to bank erosion. Even in the unlikely scenario of a debris flood, the primary residence remains 11 to 14 meters distant from the maximum possible erosion limit.

## **7 CONCLUSION**

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Accounting for climate change, the estimated 200-year flood discharge for Wilson Creek is 220 m<sup>3</sup>/sec. The probability of flooding or bank erosion affecting the primary residence is low (<0.2% annually). The home is safe for full-time use (safe for its intended purpose) and requires no mitigation measures.

## **8 DISCLOSURE OBLIGATION**

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Subject to the following, the Qualified Professional (QP) will keep confidential all information, including documents, correspondence, reports, and opinions, unless disclosure is authorized in writing by the client. However, in keeping with Engineers and Geoscientists BC's Code of Ethics, if the QP discovers or determines that there is a material risk to the environment or the safety, health, and welfare of the public or worker safety, the QP shall notify the client as soon as practicable of this information and the need that it be disclosed to the appropriate parties. If the client does not take the necessary steps to notify the appropriate parties in a reasonable amount of time, the QP shall have the right to disclose that information to fulfill his/her ethical duties, and the client hereby agrees to that disclosure.

## **9 LITERATURE CITED**

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APEGBC 2017. Flood mapping in BC APEGBC Professional Practice Guidelines V1.0. Available online at [apeg.bc.ca/For-Members/Professional-Practice/Professional-Practice-Guidelines](http://apeg.bc.ca/For-Members/Professional-Practice/Professional-Practice-Guidelines) [accessed: 08/03/2025]. 50 pp

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Apex Geoscience Consultants Ltd. 2026. Wilson Creek Hydrological Assessment of Wilson Creek for Interfor

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- Northwest Hydraulic Consultants 2020. British Columbia Extreme Flood Project, Regional Flood Frequency Analysis – Technical development report and manual to complete a regional flood frequency analysis (Bulletin 2020-1-RFFA, NHC NP3004476). Report prepared by Northwest Hydraulic Consultants Ltd (NHC). For the British Columbia Ministry of Forests, Lands, Natural Resource Operations, and Rural Development.
- Marcus, W.A., Roberts, K., Harvey, L., and G. Tackman 1992. An evaluation of methods for estimating Manning's n in small mountain streams. *Mountain Research and Development*, V.12., No. 3., pp. 227-239.
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- RDCK: Regional District of Central Kootenay Floodplain Management Bylaw NO. 2080, 2009.
- RDCK: Terms of reference, Requirements for Professional Engineers/Geoscientists undertaking Geotechnical reports/flood hazard assessment reports November 2009
- Water Survey of Canada 1973. Flood of May-June 1972. 133 pp
- Yochum S.E., Comiti F., and E., Wohl (2014). Photographic Guidance for Selecting Flow Resistance Coefficients in High-Gradient Channels. USFS General Technical Report RMRS-GTR-323.

Note: This statement is to be read and completed in conjunction with the current Engineers and Geoscientists BC *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC* ("the guidelines") and is to be provided for flood assessments for the purposes of the *Land Title Act*, Community Charter, or the *Local Government Act*. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority

Date: April 2, 2026

Regional District of Central Kootenay  
202 Lakeside Drive, Nelson B.C. V1L 6B9

Jurisdiction and address

With reference to (CHECK ONE):

- Land Title Act* (Section 86) – Subdivision Approval
- Local Government Act* (Part 14, Division 7) – Development Permit
- Community Charter (Section 56) – Building Permit
- Local Government Act* (Section 524) – Flood Plain Bylaw Variance
- Local Government Act* (Section 524) – Flood Plain Bylaw Exemption

For the following property ("the Property"): 260 Wilson Creek Rd E

LOT B DISTRICT LOT 4877 KOOTENAY DISTRICT PLAN EPP30385

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a Qualified Professional and is a Professional Engineer or Professional Geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, sealed, and dated, and thereby certified, the attached Flood Assessment Report on the Property in accordance with the guidelines. That report and this statement must be read in conjunction with each other. In preparing that Flood Assessment Report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

1. Consulted with representatives of the following government organizations:  


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2. Collected and reviewed appropriate background information
3. Reviewed the Proposed Development on the Property
4. Investigated the presence of Covenants on the Property, and reported any relevant information
5. Conducted field work on and, if required, beyond the Property
6. Reported on the results of the field work on and, if required, beyond the Property
7. Considered any changed conditions on and, if required, beyond the Property
8. For a Flood Hazard analysis I have:
  - 8.1 Reviewed and characterized, if appropriate, Flood Hazard that may affect the Property
  - 8.2 Estimated the Flood Hazard on the Property
  - 8.3 Considered (if appropriate) the effects of climate change and land use change
  - 8.4 Relied on a previous Flood Hazard Assessment (FHA) by others
  - 8.5 Identified any potential hazards that are not addressed by the Flood Assessment Report
9. For a Flood Risk analysis I have:
  - 9.1 Estimated the Flood Risk on the Property
  - 9.2 Identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
  - 9.3 Estimated the Consequences to those Elements at Risk

10. In order to mitigate the estimated Flood Hazard for the Property, the following approach is taken:

- 10.1 A standard-based approach
- 10.2 A Risk-based approach
- 10.3 The approach outlined in the guidelines, Appendix F: Flood Assessment Considerations for Development Approvals
- 10.4 No mitigation is required because the completed flood assessment determined that the site is not subject to a Flood Hazard

11. Where the Approving Authority has adopted a specific level of Flood Hazard or Flood Risk tolerance, I have:

- 11.1 Made a finding on the level of Flood Hazard or Flood Risk on the Property
- 11.2 Compared the level of Flood Hazard or Flood Risk tolerance adopted by the Approving Authority with my findings
- 11.3 Made recommendations to reduce the Flood Hazard or Flood Risk on the Property

12. Where the Approving Authority has not adopted a level of Flood Hazard or Flood Risk tolerance, I have:

- 12.1 Described the method of Flood Hazard analysis or Flood Risk analysis used
- 12.2 Referred to an appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk
- 12.3 Made a finding on the level of Flood Hazard or Flood Risk tolerance on the Property
- 12.4 Compared the guidelines with the findings of my flood assessment
- 12.5 Made recommendations to reduce the Flood Hazard or Flood Risk

13. Considered the potential for transfer of Flood Risk and the potential impacts to adjacent properties

14. Reported on the requirements for implementation of the mitigation recommendations, including the need for subsequent professional certifications and future inspections.

Based on my comparison between:

[CHECK ONE]

- The findings from the flood assessment and the adopted level of Flood Hazard or Flood Risk tolerance (item 11.2 above)
- The findings from the flood assessment and the appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk tolerance (item 12.4 above)

I hereby give my assurance that, based on the conditions contained in the attached Flood Assessment Report:

[CHECK ONE]

- For subdivision approval, as required by the *Land Title Act* (Section 86), "that the land may be used safely for the use intended":  
[CHECK ONE]
  - With one or more recommended registered Covenants.
  - Without any registered Covenant.
- For a development permit, as required by the *Local Government Act* (Part 14, Division 7), my Flood Assessment Report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of this section [Section 491 (4)]".
- For a building permit, as required by the *Community Charter* (Section 56), "the land may be used safely for the use intended":  
[CHECK ONE]
  - With one or more recommended registered Covenants.
  - Without any registered Covenant.
- For flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* and the *Amendment Section 3.5 and 3.6* associated with the *Local Government Act* (Section 524), "the development may occur safely".
- For flood plain bylaw exemption, as required by the *Local Government Act* (Section 524), "the land may be used safely for the use intended".

I certify that I am a Qualified Professional as defined below.

April 2, 2026

Date

Prepared by

Will Halleran P.Geo P.L.Eng

Name (print)

Signature

1220 Government Street,

Address

Nelson B.C.

250-551-5887

Telephone

will.h@apexgeo.ca

Email



Reviewed by

Kim Green P.Geo

Name (print)

Signature

If the Qualified Professional is a member of a firm, complete the following:

I am a member of the firm Apex Geoscience Consultants Ltd.

and I sign this letter on behalf of the firm.

(Name of firm)

# 11 APPENDIX 1: HYDROGRAPHS FOR KUSKANAX CREEK

Station: 08NE006      Data Type: Daily

Parameter Type: Flow      First Year: 1964      Last Year: 2024      **Apply**

▼ Legend

— 1964-2024 Data

## Discharge (m<sup>3</sup>/s) ⓘ

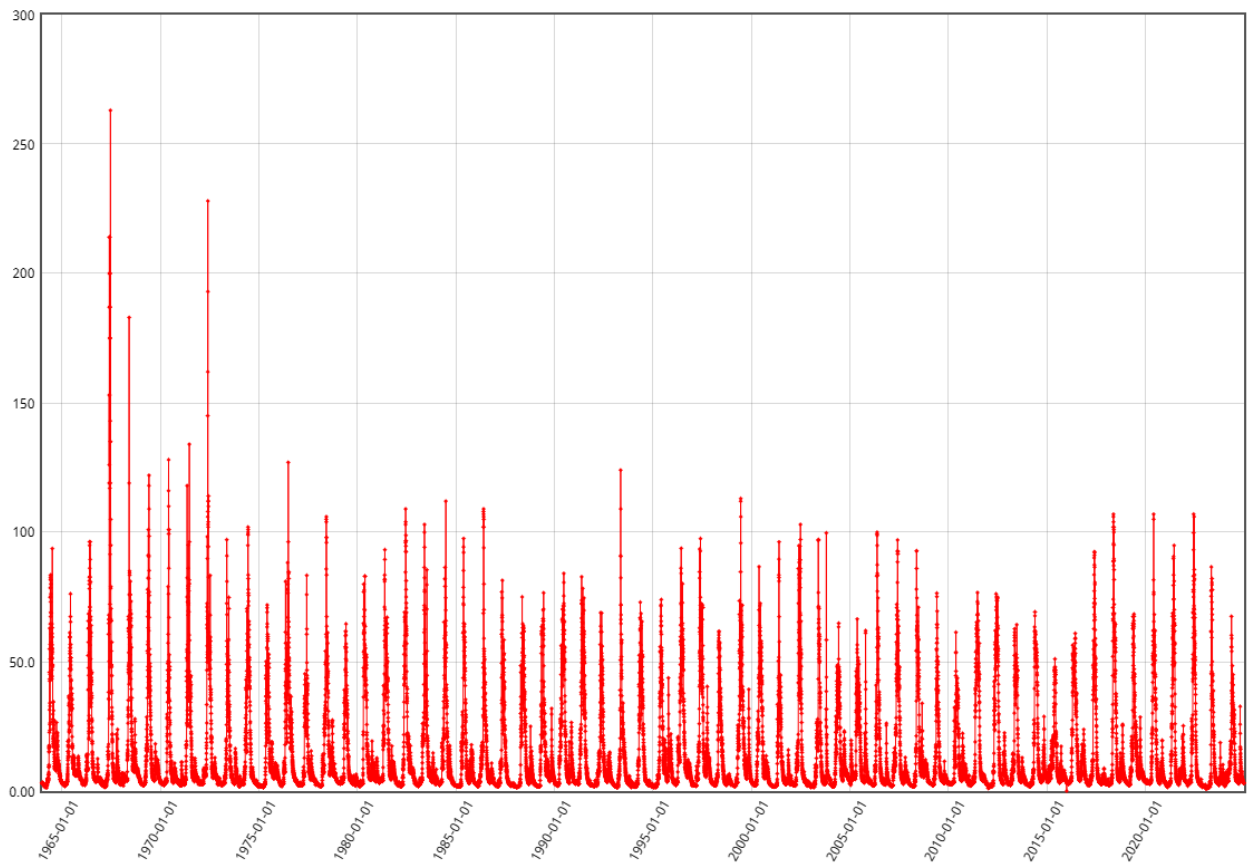


Figure 7: 1964-2024 Kuskanax hydrograph Water Survey of Canada Station 08NE006

# 12 APPENDIX 2: MANNINGS N VALUES



MANNING'S 'N' VALUE: **0.073**

*Location:* Boundary Creek near Porthill, Idaho

*Discharge at peak, m<sup>3</sup>/s:* 72

*Description of Channel:* Bed consists of boulders;  $d_{50} = 210\text{mm}$ ,  $d_{84} = 375\text{mm}$ . Banks are composed of boulders and have trees and brush along top.



MANNING'S 'N' VALUE: **0.075**

*Location:* Rock Creek near Darby, Mont.

*Discharge at peak, m<sup>3</sup>/s:* 42

*Description of Channel:* Bed consists of boulders;  $d_{50} = 220\text{mm}$ ,  $d_{84} = 415\text{mm}$ . Banks are composed of boulders and have trees and brush.

<https://culvertbc.ca/Manning-image/n0075.htm>