

WHAT YOU NEED TO KNOW ABOUT
COWICHAN AND KOKSILAH RIVERS
FLOOD HAZARD MANAGEMENT NO. 4381
COWICHAN VALLEY REGIONAL DISTRICT



INTRODUCTION

In BC, local governments, including the Cowichan Valley Regional District (CVRD), are responsible for land use management. This includes the management of land use in relation to natural hazards, such as flooding. The authority of local governments to manage flooding hazards is set out in the *Local Government Act*, and provincial policy guidance is provided in the Ministry of Environment and Climate Change “Flood Hazard Area Land Use Management Guidelines” (Provincial Guidelines). Many local governments in the province have bylaws that require buildings to be constructed to avoid or to minimize flood damage, either from rivers or from coastal flooding. The authority of the provincial government to provide discretionary financial assistance in relation to flood damage may depend on the affected buildings having been constructed in accordance with the standards specified in the Provincial Guidelines.

In view of this responsibility, the CVRD is proposing CVRD Bylaw No.4381 – Cowichan/Koksilah Rivers Flood Hazard Management 2021, which takes into account the most recent data on flows in the lower reaches of the Cowichan and Koksilah Rivers, as well as the expected impacts of climate change to the year 2100, the most significant of which is an assumed 20% increase in precipitation in the two watersheds. The construction requirements in the bylaw will apply in addition to construction standards set out in the BC Building Code and the applicable Regional District zoning bylaw, and in addition to development requirements that might be specified in a riparian area protection development permit.

Common terms found in the Bylaw are identified in green throughout this document.

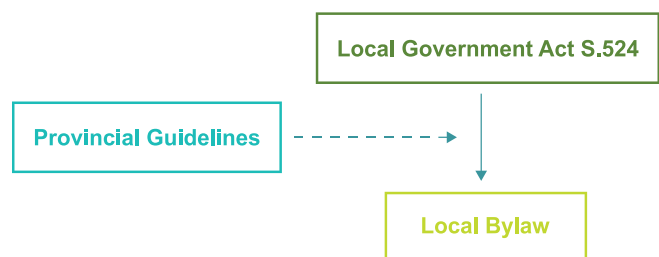
DEFINITIONS

Designated Flood Level is the expected still water level of the river during flood conditions that have a probability of occurring once every 200 years, and assumes an increase of 20% in precipitation in the Cowichan River watershed, based on expected climate change.

Flood Construction Level (FCL) is the minimum elevation required to situate the underside of a floor structure for habitable areas or for the storage of goods or household effects above the designated flood level and is indicated on Floodplain Maps 1 through 5 attached to Bylaw 4381. It includes an allowance for freeboard. Elevations indicated on the maps are referenced to Canadian Geodetic Vertical Datum 2013 (CGVD 2013).

Freeboard allows for localized river behaviour related to debris accumulation, sedimentation and wave action that could affect buildings and structures in flood conditions.

High Water Mark (HWM) means the water mark identified on the plan of subdivision or the plan accompanying the instrument conveying Crown land in fee simple, which plan was most recently filed in a Land Title Office or **natural boundary** as determined by a B.C. Land Surveyor.



WHY DO THIS NOW?

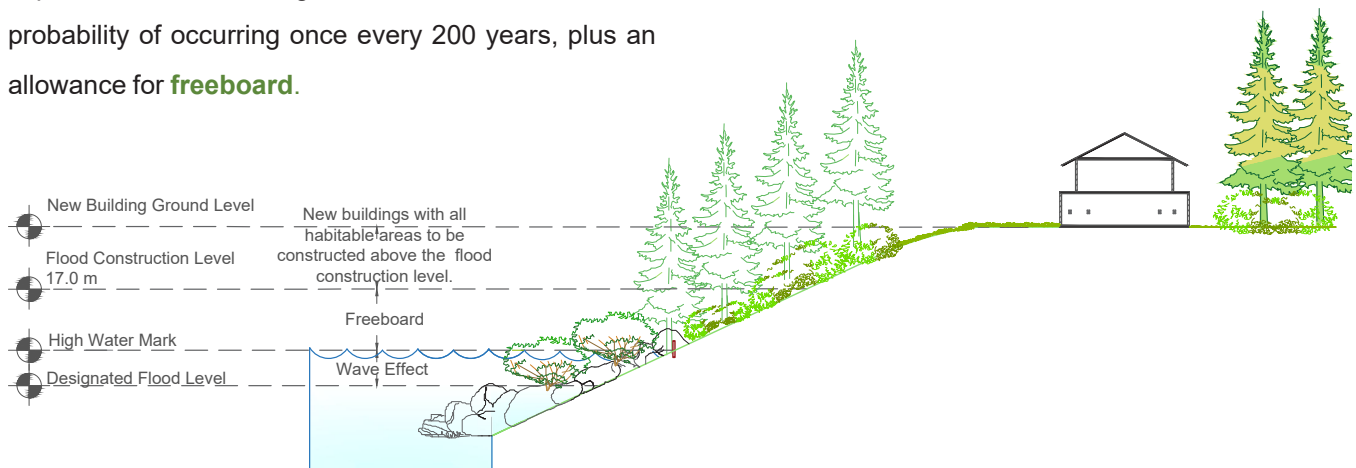
The Regional District has recently obtained updated floodplain mapping for the lower reaches of the Cowichan and Koksilah Rivers and updated information on the **designated flood level** of the rivers based on historic flooding, including the February 2020 flood event. The Regional District's policy is to protect buildings and structures from flood damage based on the most current data on the nature and extent of the flood hazard, including the effects of climate change, beginning with the Shawnigan Lake, Riverbottom Road and lower Cowichan/Koksilah River areas.

PROVINCIAL GUIDANCE

The Provincial Guidelines indicate land use management standards for various types of flood hazard, including those associated with freshwater bodies and the sea (coastal flooding). New buildings adjacent to major rivers should be constructed with all habitable areas above the designated flood level, which is the level the river is expected to reach during a flood that has a statistical probability of occurring once every 200 years, plus an allowance for **freeboard**.

New buildings should also be located at least 30 meters (m) horizontally from the water body. (The Regional District's zoning bylaws already require a minimum setback of 30 m for buildings and structures adjacent to the Cowichan and Koksilah Rivers.)

For residential buildings constructed in the next few years, whose life expectancy is not expected to extend beyond the year 2100, a 20% increase in precipitation impacting river levels is anticipated in connection with climate change. The bylaw provisions are designed to protect these new buildings from anticipated flooding throughout their lifetime, including the greater volumes of water that are expected during extreme precipitation events. This is an example of adaptation to climate change—ensuring that new buildings near the Cowichan Koksilah Rivers can be safely occupied even though more extreme precipitation events may be impacting the level of the river when flooding occurs.



WHAT IS THE BYLAW TRYING TO ACHIEVE?

PROTECT LIFE

Habitable areas of homes need to be above flood levels to provide a haven during the high water levels reached during and after extreme precipitation events. Design of buildings should also ensure that life support systems—communication systems, space heating, fire protection, key emergency access and egress routes—will remain functional while the river is in flood.

PROTECT PROPERTY

The main purpose of the bylaw is to protect property from damage associated with the Cowichan and Koksilah Rivers flooding. This includes buildings, structures and the contents of the buildings—furniture, appliances and other household effects. While some homeowners may be able to obtain flood insurance, the best protection against property damage from flooding is to locate buildings above the flood level expected during the building's lifetime. This bylaw does not apply to accessory buildings that are unlikely to be seriously damaged by flooding nor to those that do not contain household goods that would be damaged or destroyed by flooding.

SUSTAIN THE ENVIRONMENT AND PROTECT SHORELINE CHARACTER

The new regulations minimize the possibility that floods will result in building materials and other debris ending up in the river or downstream in Cowichan Bay. They also prevent new buildings from crowding the riverbank. Minimum FCLs also protect sensitive riparian and coastal ecosystems that support diverse plant, animal and insect communities.

Protection of the riparian environment adjacent to the Cowichan Koksilah Rivers is the main purpose of the riparian area protection development permit area designations in the Official Community Plan for the Electoral Areas and development permits issued in accordance with the related permit guidelines. Requiring that new buildings be constructed above expected flood levels also has beneficial consequences for the river, coastal and riparian ecosystems.

WHAT DOES THE BYLAW MEAN?

Bylaw 4381 requires that new buildings containing habitable areas—primarily residential dwellings—be constructed at or above the FCLs designated in the bylaw, which vary depending on the location of the parcel upon which the building will be constructed and include a freeboard allowance of **0.6 m**. The FCLs range from **17.5 m** at the Allenby Road Bridge on the Cowichan River and **16.5 m** above Cowichan Station Bridge on the Koksilah River to **9.4 m** at Somenos Lake and **4.0 m** at the Cowichan estuary. (FCLs in the bylaw are measured from a standard geodetic elevation that approximates mean sea level.)

The FCL can be achieved by selecting a building location on the parcel that will produce compliance with the bylaw, or by using fill or a supporting structure to elevate the building. Basement areas may be located below the FCL if they don't contain habitable areas or equipment, such as furnaces and breaker panels, that could be damaged or create a hazard in the event of a flood. Building permit applications will have to include elevation information to enable the building inspector to determine that the building will comply with the bylaw. The building inspector

may require site-specific analysis by a professional engineer in the case of any uncertainty as to the location of the boundary of the floodplain that cannot be resolved by reference to the digital version of Floodplain Maps 1 through 5. A parcel-specific flood hazard assessment will be required if the local water levels are disturbed or increased by an upstream geotechnical event, river channel avulsion or migration.

There is no reason that an owner cannot construct their building to achieve a higher elevation and obtain a greater margin of safety in relation to future flooding, including more significant climate change scenarios, subject to building height and siting restrictions in the zoning bylaw.

The zoning regulations for the lower reaches of the Cowichan and Koksilah Rivers require a **30 m** setback between the HWM or the natural boundary of the river and any new building or structure. This regulation, and any riparian area protection development permit siting requirements, will apply to any fill or structural support that is provided to elevate a building or structure to the minimum FCL. This siting information will also have to be shown on building permit applications.

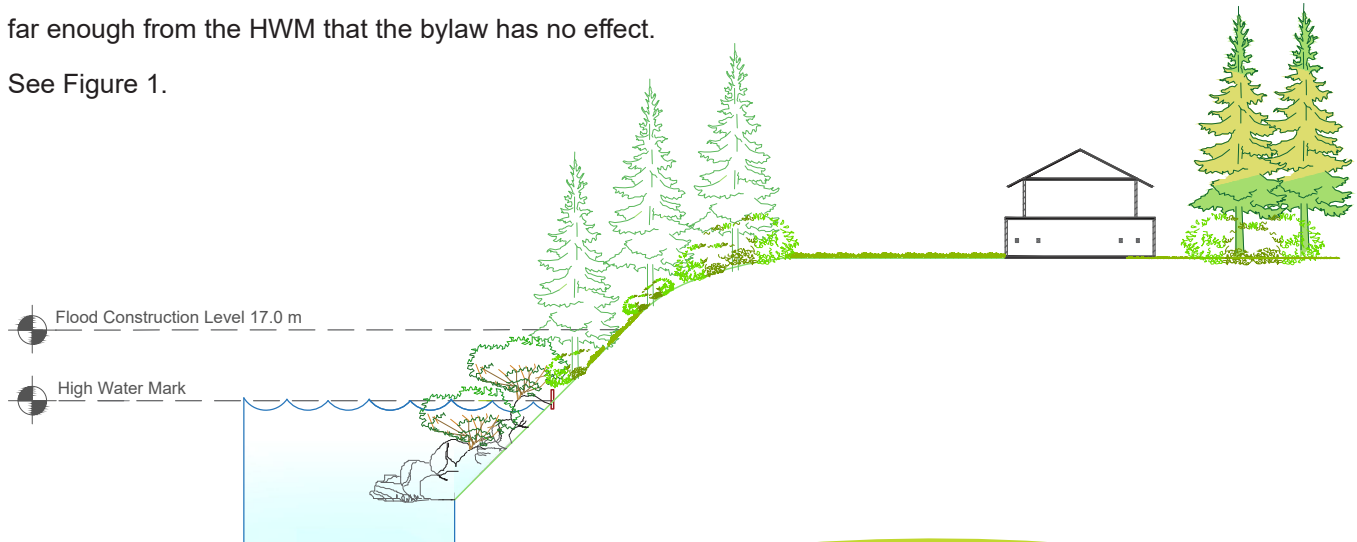
The *Local Government Act* permits any property owner to apply to the Regional Board for an exemption from the requirements of Bylaw 4381. Applicants will have to provide a report by a qualified professional engineer who certifies that the land can be used safely even though the building doesn't comply with the bylaw. If an exemption is approved, the owner may be required to grant a covenant to the Regional District that includes specific building requirements recommended by the qualified professional engineer. The CVRD board of variance does not have jurisdiction to vary a minimum FCL.

RIVERBOTTOM ROAD FLOOD HAZARD MANAGEMENT BYLAW 4381

EXAMPLE 1: EXTREME SLOPE WITH ADEQUATE SETBACKS

Figure 1: Extreme Slope with Adequate Setbacks

The existing buildings are high enough and set back far enough from the HWM that the bylaw has no effect. See Figure 1.



EXAMPLE 2: HIGH SLOPE WITH LIMITED SETBACK AREA

be required. See Figures 2 and 3. If an existing building within the 30 m setback were to be removed, any reconstruction or new building must be constructed beyond the 30 m setback line, and at the appropriate FCL.

In some locations, the existing terrain may restrict the feasibility of developing outside of the 30 m DPA, and setback. If a property is limited by sharp inclines or the presence of large trees, a development permit and a variance will be required. If a building is proposed within 30 m of a HWM, a development permit and variance application will

Figure 2: High Slope Within 30 m Setback and DPA

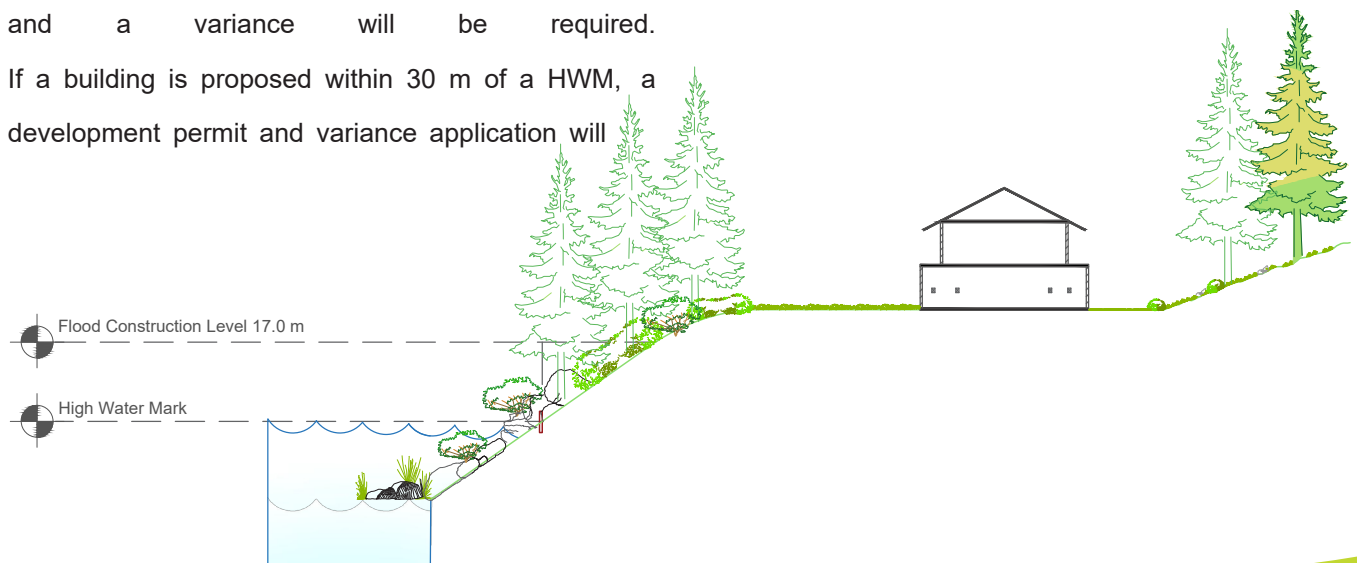
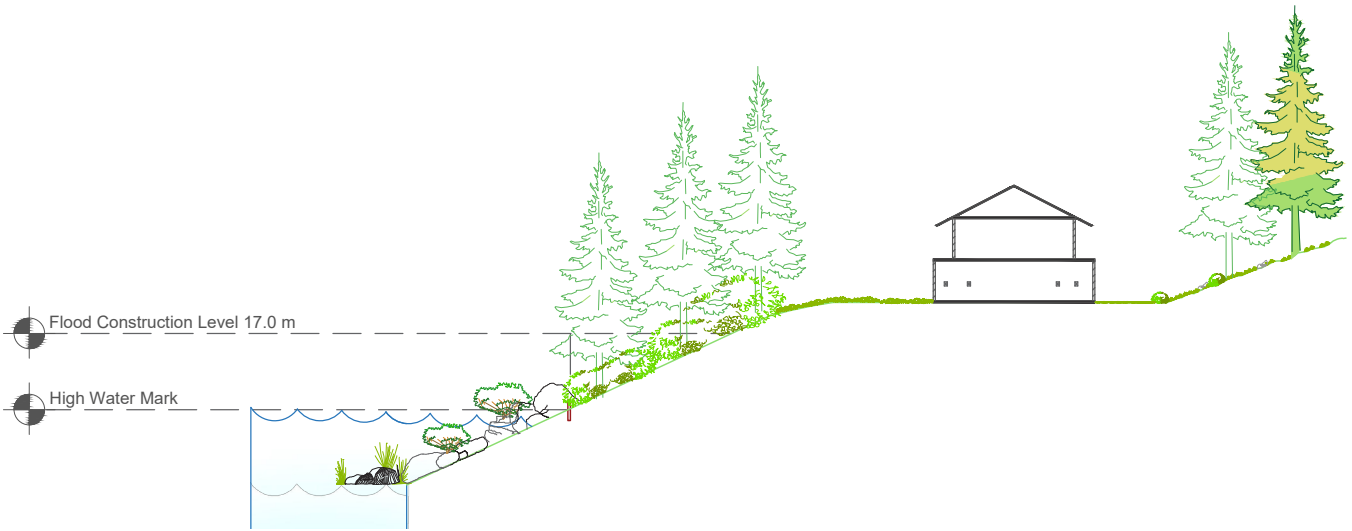


Figure 3: Medium to Low Slopes Within 30 m
Setback and DPA

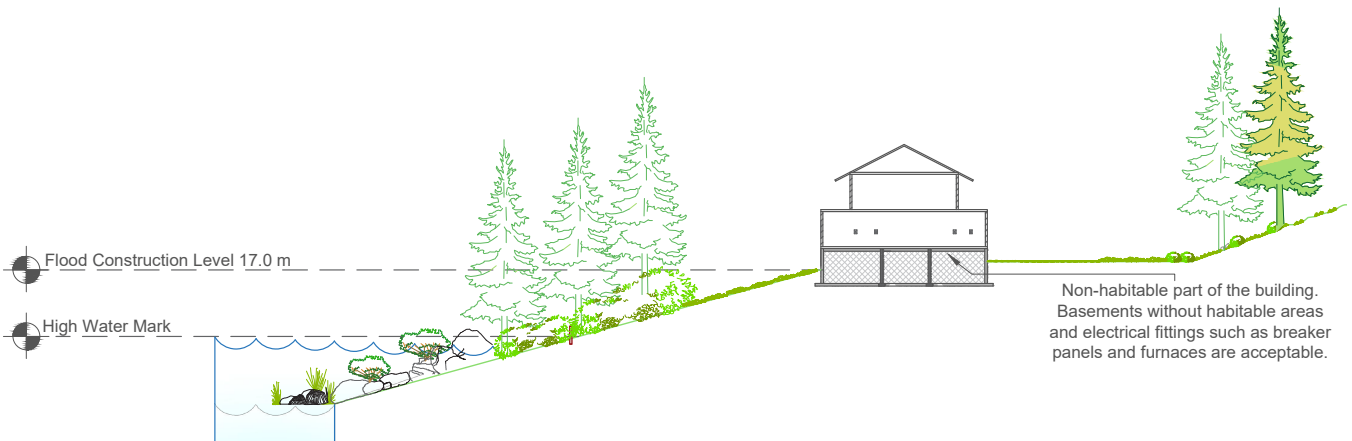


EXAMPLE 3: VERY LOW SITES WITH LIMITED SETBACK AREA – HABITABLE SPACE ABOVE FCL WITH NO FILL ADDED

For proposed buildings with a portion below the established FCL, the entire portion of the building must remain non-habitable. Basement areas may be located below the FCL if they don't contain habitable

areas or equipment, such as furnaces and breaker panels that could be damaged or create a hazard in the event of a flood. See Figure 4.

Figure 4: Very Low Sites with Limited Setback Area – Habitable Space Above FCL

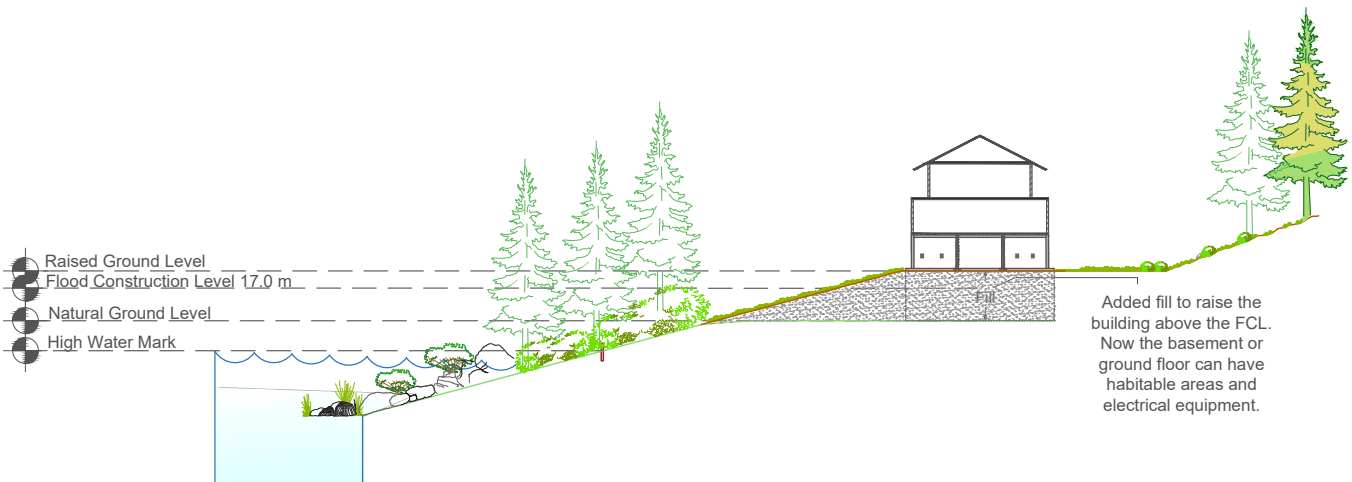


EXAMPLE 4: VERY LOW SITES WITH LIMITED SETBACK AREA – ADDING FILL WHERE ALL SPACE ABOVE FCL ARE HABITABLE

For proposed buildings with a portion below the established FCL, the entire portion of the building must remain non-habitable. Basement areas may be located below the FCL if they don't contain habitable

areas or equipment such as furnaces and breaker panels that could be damaged or create a hazard in the event of a flood. Alternatively, a building may be raised with fill or other engineered solution. See Figure 5.

Figure 5: Very Low Sites with Limited Setback Area – Habitable Space Above FCL Adding Fill or Other Structural Support Habitable Space Above FCL



EXAMPLE 5: TWO SCENARIOS

The FCL specified for the floodplain for any particular parcel of land, for the purposes of s. 524(6)(a) of the *Local Government Act*, and referenced to Canadian Geodetic Vertical Datum 2013 (CGVD2013), is shown in two scenarios, Figure 6 and Figure 7. The *LGA* provides an exemption procedure for situations where the bylaw wording is too onerous for a particular site, permitting a qualified engineer to certify that the building will be safe to occupy if not constructed in accordance with the bylaw.

Figure 6: If the proposed building envelope lies entirely between two isolines on the applicable floodplain map, the higher of the FCLs indicated on the floodplain map for those isolines applies.

Figure 7: If the proposed building envelope straddles an isoline, the FCL indicated on the applicable floodplain map for that isoline applies; and in any other case, the highest FCL indicated on the applicable floodplain map for any isoline that intersects the parcel on which the proposed building envelope occurs.

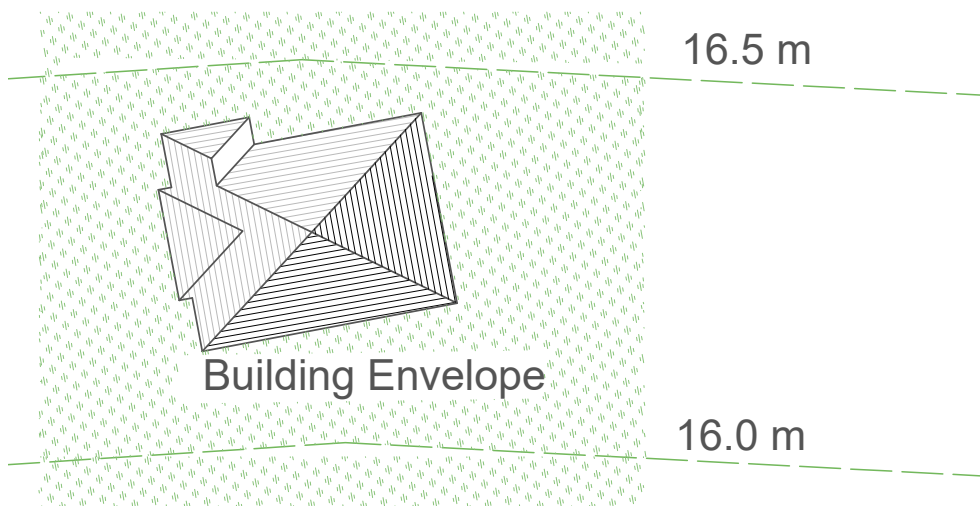


Figure 6: FCL 16.5 m applies

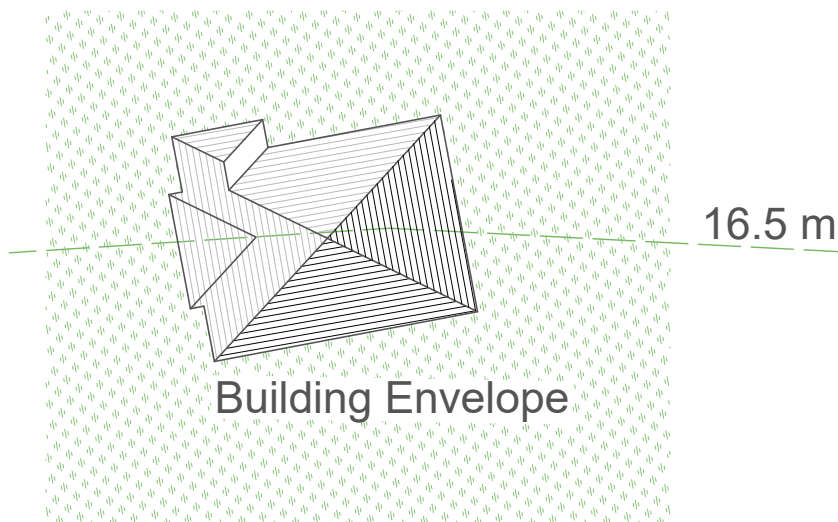


Figure 7: FCL 16.5 m applies

FOR MORE INFORMATION

COWICHAN VALLEY REGIONAL DISTRICT
www.cvrld.ca

**PROVINCE OF BRITISH COLUMBIA FLOOD
 HAZARD LAND USE MANAGEMENT**
www2.gov.bc.ca

**LEGISLATED FLOOD ASSESSMENTS IN A
 CHANGING CLIMATE IN BC**
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