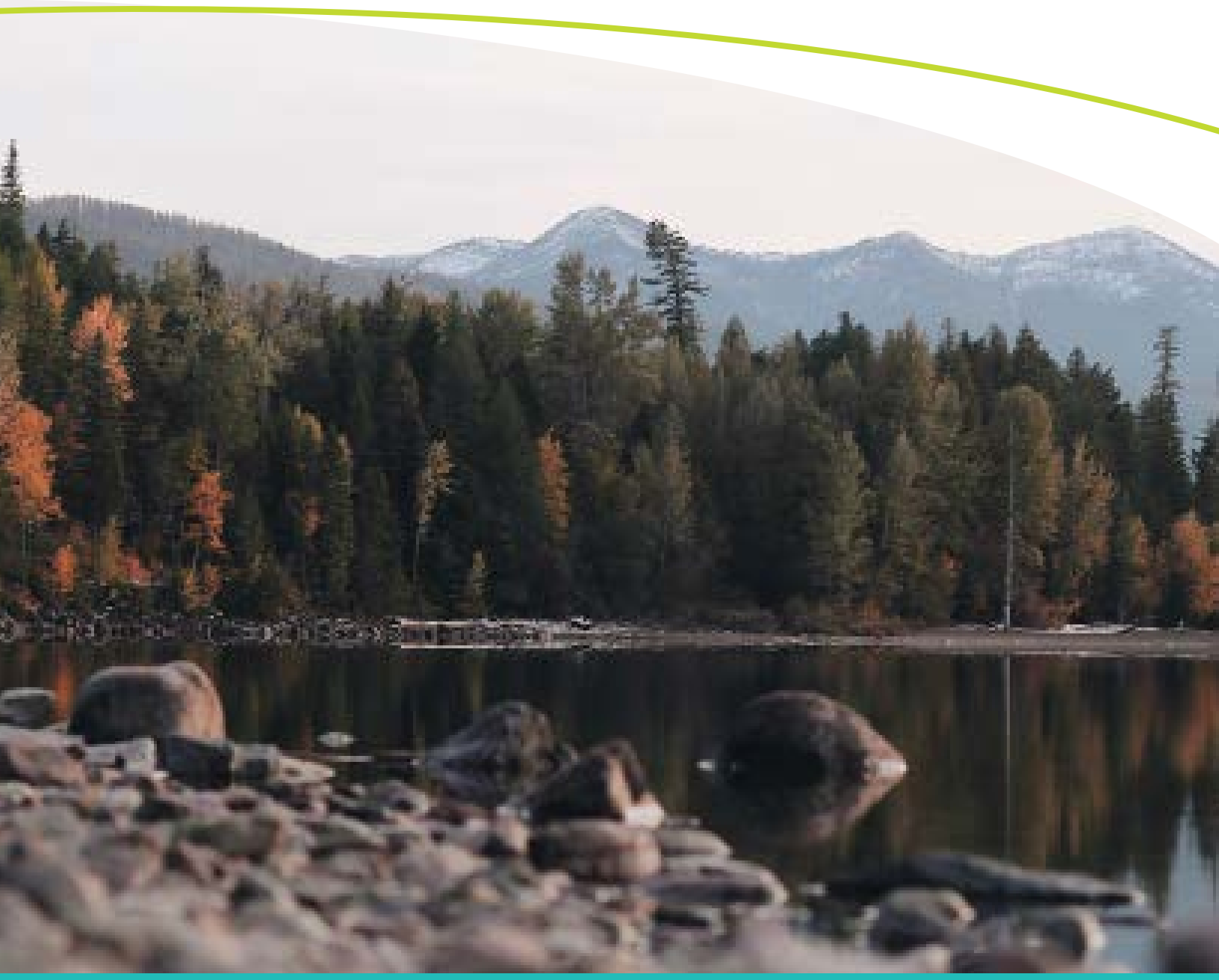
WHAT YOU NEED TO KNOW ABOUT

SHAWNIGAN LAKE FLOOD HAZARD MANAGEMENT BYLAW NO. 4348

COWICHAN VALLEY REGIONAL DISTRICT



CVRD

2022

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 Shawnigan Lake Flood Hazard Management Bylaw No. 4348 (2021), which takes into account the most recent data on lake levels, as well as the expected impacts of climate change to the year 2100, the most significant of which is a 20% increase in watercourse discharges to the lake. 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

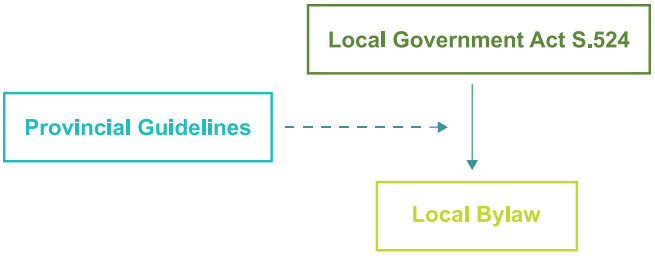
Designated Flood Level is the expected still water level of the lake during flood conditions that have a probability of occurring once every 200 years, and assumes an increase of 20% in precipitation in the Shawnigan Lake watershed, based on expected climate change.

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 maps attached to Bylaw 4348. It includes allowances for wave runup and freeboard.

Freeboard allows for ordinary wave action on the lake that would affect buildings and structures in flood conditions.

Wave Runup is the expected height of waves at the shoreline produced by prevailing winds based on the fetch length at any location on the lake.

Fetch is the distance travelled by wind or waves across open water.



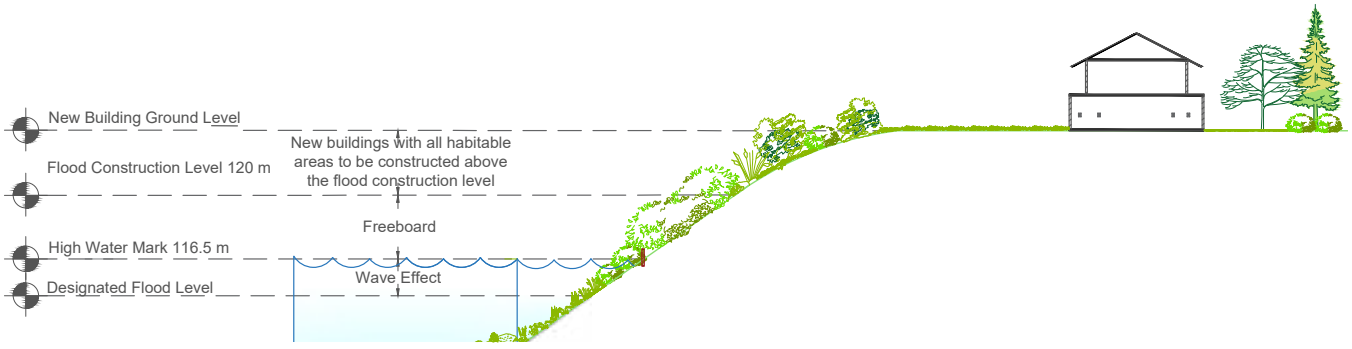
WHY DO THIS NOW?

The Regional District has recently obtained updated floodplain mapping for Shawnigan Lake and updated information on the **designated flood level** of the lake based on historic flooding. This includes the February 2020 flood event, precipitation trends impacted by climate change and detailed **wave runup** analysis. The **flood construction levels** recommended by the Regional District's consultants on the basis of this information are 0.5 to 0.7 m higher than the levels established by the provincial Ministry of Environment when the previous floodplain mapping was prepared in 1979. 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 area.

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 lakes should be constructed with all habitable areas above the designated flood level, which is the level the lake is expected to reach during a flood that has a statistical probability of occurring once every 200 years, plus an allowance for **freeboard** and **wave runup**.

An anticipated 20% increase in precipitation affecting lake levels will impact residential buildings constructed in the next few years, whose life expectancy is not expected to extend beyond the year 2100. The bylaw provisions are designed to protect these new buildings from anticipated flooding throughout their lifetime, including that resulting from greater volumes of water that are expected to flow into the lake during extreme precipitation events. This is an example of adaptation to climate change —ensuring that new buildings near Shawnigan Lake can be safely occupied even though more extreme precipitation events may be impacting the level of the lake when flooding occurs.



WHAT IS THE BYLAW TRYING TO ACHIEVE?

PROTECT LIFE

Habitable areas of homes need to be above flood and wave/debris levels to provide a haven during the high lake 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 lake is in flood.

PROTECT PROPERTY

The main purpose of the bylaw is to protect property from damage associated with Shawingan Lake 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 lake or downstream in Shawnigan Creek. They also prevent new buildings from crowding the shoreline. Minimum FCLs also protect sensitive shoreline ecosystems that support diverse plant, animal and insect communities. Protection of the riparian environment adjacent to Shawnigan Lake is the main purpose of the riparian area protection development permit area designations in the South Cowichan Official Community Plan and development permits issued in accordance with the related permit guidelines. Requiring that new buildings be constructed above expected flood levels has beneficial consequences for the lake and shoreline ecosystems and the enjoyment of the lake by all residents.

WHAT DOES THE BYLAW MEAN?

Bylaw 4348 requires that new buildings containing habitable areas—primarily residential dwellings—be constructed at or above the FCL designated in the bylaw, which is 120 m referenced to a standard vertical datum point established by Natural Resources Canada (CGVD2013). 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 if wave runup effects could

be amplified by local bulkheads, retaining walls, revetments or other structures constructed on the shoreline. 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 worse climate change scenarios, subject to building height restrictions in the zoning bylaw.

The zoning regulations for the Shawnigan Lake area require a 15 m setback between the high-water mark of Shawnigan Lake 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 **flood construction level**. 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 4348. 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.

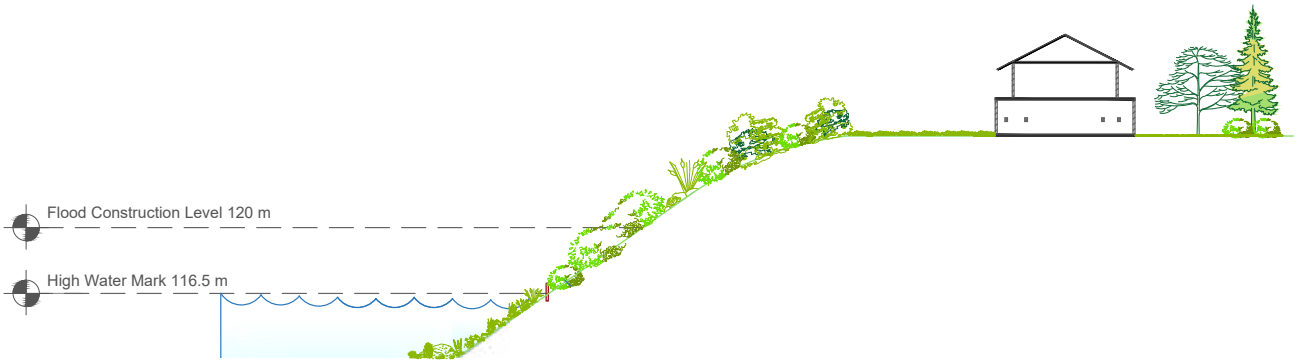
SHAWNIGAN LAKE FLOOD MANAGEMENT BYLAW 4348

FIVE EXAMPLES OF DIFFERENT LOT CONSTRAINTS

EXAMPLE 1: HIGH 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.

Figure 1: High Slope with Adequate Setbacks



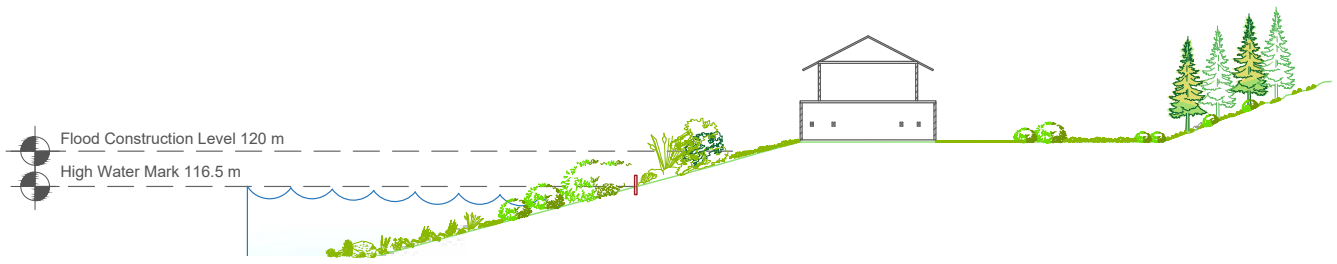
EXAMPLE 2: MODERATE TO LOW SLOPE WITH LIMITED SETBACK AREA

In some locations the existing terrain may restrict the feasibility of developing outside of the 30 m DPA, or even outside the 15 m regulatory setback. If a property is limited by sharp inclines or the presence of large trees, a development permit or a variance may be required. See Figure 2.

In some situations, both will be required. See Figure 3. If an existing building within the 15 m setback were to be removed, any reconstruction or new building must be constructed beyond the 15 m setback.

Figure 2: Moderate to Low Slope Outside of 15 m Setback but Within 30 m DPA

Figure 3: Moderate to Low Slope Within 15 m Setback and 30 m DPA



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

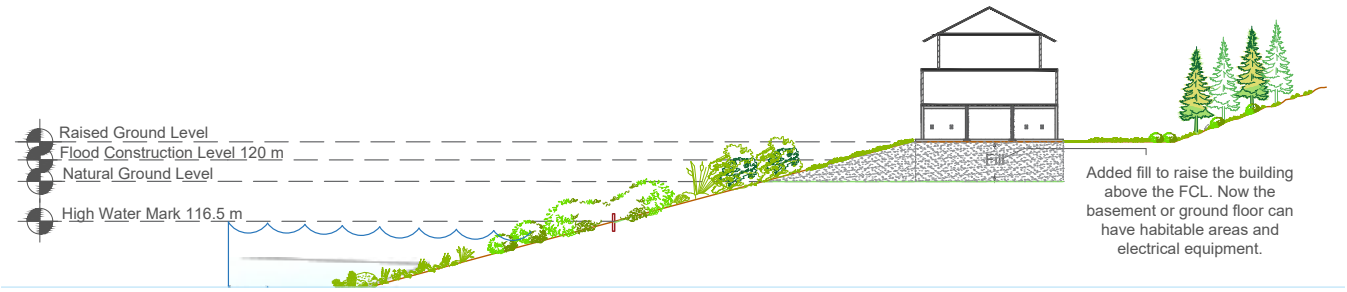
For proposed buildings with a portion below the established FCL, the entire portion of the building must remain non-habitable. Basement areas may be located below the FCL if they don't contain habitable areas or equipment, such as furnaces and breaker panels, that could be damaged or create a hazard 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 IS HABITABLE

A building may be raised with fill or other engineered solution. See Figure 5.

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



FOR MORE INFORMATION

COWICHAN VALLEY REGIONAL DISTRICT
www.cvrd.ca

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

LEGISLATED FLOOD ASSESSMENTS IN A CHANGING CLIMATE IN BC
www.egbc.ca