December 5, 2018 **FAQ**

LILLOOET RIVER FLOODPLAIN MAPPING FINAL REPORT (2018) RESULTS
Frequently Asked Questions (FAQ)

Please note: *this document will continue to evolve, as additional questions and information come to light; if you have a question that is not addressed in this document, please contact the Pemberton Valley Dyking District, Líl'wat Nation, Squamish-Lillooet Regional District or Village of Pemberton.*

What is floodplain mapping and why was it done?
Floodplain maps identify areas that experience periodic flooding from nearby rivers, lakes, streams and the sea.

Floodplain mapping is useful in estimating the extent and depth of different magnitude floods to inform the development of appropriate flood emergency response measures and to aid in planning for future flood resistant development and infrastructure.

Areas of B.C. that are highly susceptible to flooding have been designated as floodplains by the federal and provincial governments. Floodplain maps show the location of the normal channel of a watercourse, surrounding features or developments, ground elevation contours, flood levels and floodplain limits—the elevation and horizontal extent of the high water marks of a 200-year flood.

Why was the Lillooet River floodplain mapping updated?
The Pemberton Valley is identified as a floodplain area.

The last substantial update to floodplain mapping on the Lillooet River was conducted in 1990, with dike design profiles updated in 2002. Since that time, modelling technology and methodology have evolved significantly.

Flow records are available for the Lillooet River for almost 100 years and show an increase in flood peaks since about the late 1970s. Flow records also indicate that the timing of floods has shifted from more spring freshet (snowmelt) floods to fall and early winter (rain-on-snow) flooding.

In 2010 a large landslide occurred on the side of Mt. Meager (the largest landslide in Canadian history), approximately 65km upstream from Pemberton. A significant amount of material from this slide is now making its way through the Lillooet River system, affecting channel stability and the amount of flow the river can carry within its channel.

The increase in flood peaks, combined with the potential effects of climate change, and the effects on the Lillooet River from the 2010 Mt. Meager landslide meant that the 1990 floodplain maps were no longer valid. This affects public safety and land use planning.

What information does the floodplain map provide?
Three types of maps were produced:

- **Designated floodplain maps** showing 200-year flood levels plus a freeboard of .6m (this is the current technical standard for floodplain mapping)
- **Flood depth maps** for 50-, 100- and 200-year floods
- **Flood hazard maps** showing a hazard rating based on how deep and fast the floodwater will be based on flood modeling. The flood depth and hazard maps are intended primarily for emergency response planning.

What were the findings of the 2018 Lillooet River floodplain mapping?
Some overtopping of dikes can be expected for a 50-year flood and the current dikes will not adequately protect against a 200-year flood.

What does return period mean? What does a 50-, 100- or 200-year flood mean?
Return period is an estimate of the likelihood and severity of extreme events. It is based on the statistical analysis of data (such as historical climatic records, flood measurements, or frequency data), to provide a probability that an event of any given magnitude will occur **in any given year**.

Return Period	Probability of flood **in any given year**
50 years	2% per year
100 years	1% per year
200 years	0.5% per year

How likely is it that my property will flood?
Residents are encouraged to locate their property area on the maps to understand their flood risk. The floodplain, depth and hazard maps all have colour coding to denote water levels and risk.

How many properties are directly impacted by the largest predicted flood?
In a 200-year flood, most properties in the Pemberton Valley floodplain would currently have some flood impacts.

Based on these findings, what does the 2018 Lillooet River Floodplain Mapping Report recommend?
The full list of recommendations is available on pages 90-92 of the Report. Recommendations include planning new development away from high hazard areas, implementing the new Flood Construction Levels (FCLs), updated flood emergency response plans, increased sediment management and better monitoring with additional flow gauges.

While increasing the dike levels to a standard that would withstand a 200-year flood is likely to be costly, the PVDD is currently assessing the feasibility of dike upgrades. The Report recommends “that a dialogue regarding tolerable flood risk be initiated.” This dialogue would seek to find a reasonable balance between life safety concerns, economic impact and the stress that news such as this could cause to affected residents.

Will climate change increase the risk of severe floods?
Climate change effects are expected to increase the peak flow rate over the next 80 years. This will be closely monitored.

Who is the consultant who conducted the 2018 Lillooet River Floodplain mapping?
Northwest Hydraulic Consultants (NHC) was founded in 1972 and comprises a team of water resource engineers, scientists, and planners who focus on innovative and effective

solutions for protecting, managing, and developing water resources. NHC's physical hydraulic modeling facilities comprise the largest commercial hydraulics laboratory operation in western North America. NHC actively integrates technical analysis into water-related environmental issues, including determining threats of flooding to communities, providing solutions that improve the effectiveness and efficiency of water use, and protecting and restoring ecosystems. NHC has successfully completed thousands of projects in North America, and many other projects in Asia, Latin America, the Middle East, and Africa.

What should property owners do?
Emergency preparedness is a shared responsibility. Property owners and all residents should:

- Review the information provided by their local government and read the 2018 floodplain mapping report in its entirety.
- Become familiar with measures to make homes more flood resistant - https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/preparedbc/preparedbc-guides/preparedbc_flood_information_for_homeowners_and_home_buyers_2018.pdf
- Have an emergency plan - https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/preparedbc/preparedbc-guides/preparedbc_household_emergency_plan_2018.pdf
- Contact your local authority for building permit advice specific to your situation if you are planning to build.
- Contact your local authority emergency program staff with any additional questions you may have regarding this report.
- Sign up for the SLRD and Village of Pemberton emergency alert systems to be notified directly of imminent emergencies or advisories. (The alert system is a free service available to all residents of the Pemberton Valley).
    - SLRD: www.slrd.bc.ca/SLRDAlert
    - Village of Pemberton: www.epactnetwork.com/en/signup/pemberton
- Follow the Líl'wat Nation (@LilwatNation), SLRD (@TheSLRD) and Village of Pemberton (@VillageOfPemberton) on Facebook

I've bought land and I'm planning to build. How does this affect me?
Contact the building permit department of your local authority for up-to-date advice about Flood Construction Levels (FCLs).

I've put in an application for a building permit. How does this affect me?
Contact the building permit department of your local authority for up-to-date advice about Flood Construction Levels (FCLs).

The report recommends increased FCLs for many areas. What are FCLs?
Flood Construction Level, or FCL means 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 a concrete slab for habitable buildings.

What is freeboard?
Freeboard is a factor of safety usually expressed in metres above a flood level for purposes of floodplain management. For example, 0.6m of freeboard above peak flow for a 200-year flood is the standard for dikes.

What are the Pemberton Valley Dyking District, Squamish-Lillooet Regional District,

Líl'wat Nation and Village of Pemberton doing about this matter?
The first step is to make the Report available to the public and provide an opportunity for questions.

All four jurisdictions are working together and immediate action has been taken on a number of the Report's recommendations while others are in progress.

The report recommendations include:

- Informing authorities, residents and stakeholders of the increased flood hazards (*Ongoing)*
- Updating emergency response plans to take into account the increased flood hazards (*status: working group formed to develop interim flood response plan and work to complete a full flood response plan by the fall of 2019)*
- Designated floodplain maps, with new data, be adopted for the Lillooet River
- Updated Flood Construction Levels (FCLs) applied to future development
- Additional modeling and mapping be carried out to determine the 200-year tributary flows, with mapping of Birkenhead River a priority
- The provincial River Forecast Centre be made aware of flood hazard in Pemberton Valley (*status: complete. Trigger points for high stream flow advisories, flood watch and flood warnings have been adjusted to reflect new data)*
- Improved flood protection measures including sediment removal and critical dike upgrades (*status: ongoing*)
- Increased monitoring with additional flow gauges, particularly on the Birkenhead River and tributaries

What steps are being taken to mitigate the risk in the area? Will the dikes be raised?
The four jurisdictions will work together with federal and provincial authorities to explore all options for mitigation and funding. Raising the dikes high enough to prevent a 200-year flood now and in the future is likely to be a challenge, but all four jurisdictions are working together to increase flood protection as quickly as possible.

I'm in a high hazard area. Should I move?
This is a difficult question to answer because individuals have very different ideas about risk tolerance. All residents should consider their specific circumstances, become familiar with options to make homes more flood resistant and have an emergency plan in place that all household members understand.

Can I trust these results?
The floodplain mapping was completed by a reputable company of professional geotechnical and hydrological engineers who specialize in mapping watercourses. The methodology used is consistent with the current professional practice guidelines for floodplain mapping in British Columbia. Best practice flood modeling and survey methods were used. Further, the Ministry of Forests, Lands, Natural Resource Operations and Rural Development has reviewed the report and has stated that the methodology used was "conservative, and not precedent setting."

Where can I find more information?
The full report, supporting videos and documents, are available on the SLRD website. Residents with specific technical questions should contact the Pemberton Valley Dyking District administration office at trustees@pvdd.ca Please Note that the PVDD does not administer building permits or control flood construction levels, any questions regarding these matters should be directed to your local jurisdiction.

Residents with other questions or concerns including building permits and flood construction levels are asked to contact their respective jurisdiction:

- Líl’wat Nation
  604-894-6115
  info@lilwat.ca
- SLRD
  604-894-6371
  info@slrd.bc.ca
- Village of Pemberton
  604-894-6135
  admin@pemberton.ca