

Port Coquitlam Flood Mapping Update

RECOMMENDATION:

None.

PREVIOUS COUNCIL/COMMITTEE ACTION

On September 17, 2019 Council carried the following motion:

That staff prepare flood maps showing current flood risk to Port Coquitlam from the Fraser Basin and provide a report in the fall 2019 with information about the risks facing the community from rising sea levels that align with projections in the most recent Intergovernmental Panel on Climate Change report.

REPORT SUMMARY

Port Coquitlam has participated in the Fraser Basin Council's Lower Mainland Flood Management Strategy ("the Strategy") since its development in 2014. Participants in the strategy have responsibilities or interests related to flood management and include the Government of Canada, the Province of British Columbia, Lower Mainland local governments, First Nations and non-governmental and private sector entities in the region. This report summarizes the flood projections for Port Coquitlam, the regional work completed to date and presents the Strategy's next phase.

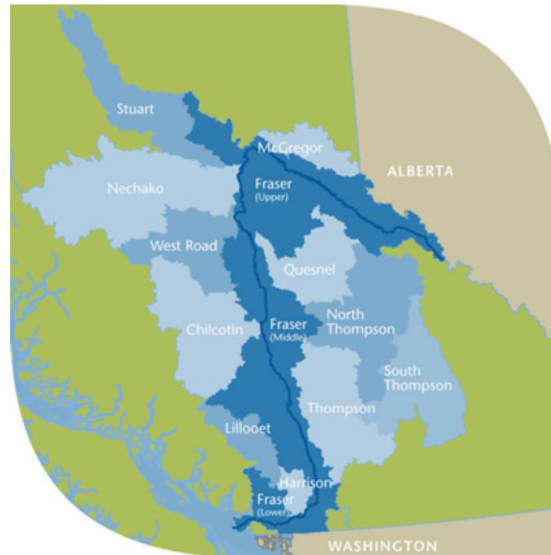
BACKGROUND

The Lower Fraser Watershed is fed by 12 major watersheds.

- | | |
|------------------------------|-------------------|
| 1. The Upper / Middle Fraser | 7. Chilcotin |
| 2. Stuart | 8. North Thompson |
| 3. McGregor | 9. South Thompson |
| 4. Nechako | 10. Thompson |
| 5. Quesnel | 11. Lillooet |
| 6. West Road-Blackwater | 12. Harrison |

These watersheds are illustrated on Figure 1.

Figure 1 – Fraser Basin Watersheds



https://www.fraserbasin.bc.ca/basin_watersheds.html

In addition, the Lower Fraser watershed incorporates a number of smaller watersheds: Stave Lake and River drain into the Fraser between Maple Ridge and Mission; Alouette Lake and River flow into the Pitt River; the Pitt River drains south from Garibaldi Provincial Park through Pitt Lake, emptying into the Fraser River between Pitt Meadows and Port Coquitlam.

Coquitlam Lake drains via the Coquitlam River to empty into the Fraser River just east of the Port Mann Bridge. The Brunette River drains Burnaby Lake and Still Creek to join the Fraser River at Coquitlam.

The Fraser Basin Council's Strategy considers this complex network in its entirety. The complexity of this network is why it is critical that a regional approach be taken.

Flood risk in the Lower Mainland has been historically driven by the annual spring melt (freshet), however, impacts of sea level rise due to climate change is anticipated to contribute to flood risk in the future.

DISCUSSION

Phase 1 of the Fraser Basin Council's Strategy was initiated in 2014 and included four distinct projects:

- Analysis of future flood scenarios
- Regional assessment of flood vulnerabilities
- Lower Mainland dike assessment
- Review of flood management policies and practices

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These projects have been incorporated into a summary report included as Attachment 1. Phase 1 also included flood mapping based upon 4 flooding scenarios:

- A. Present day Coastal Flood (1:500 yr storm, current sea level)
- B. Year 2100 Coastal Flood (1:500 yr storm, 1m sea level rise*)
- C. Present Day Freshet (1:500 yr, high tide, current sea level, 17,000 m3 at hope)
- D. Year 2100 Freshet (1:500 yr, high tide, 1m sea level rise* & moderate climate change, 20,000 m3 at hope)

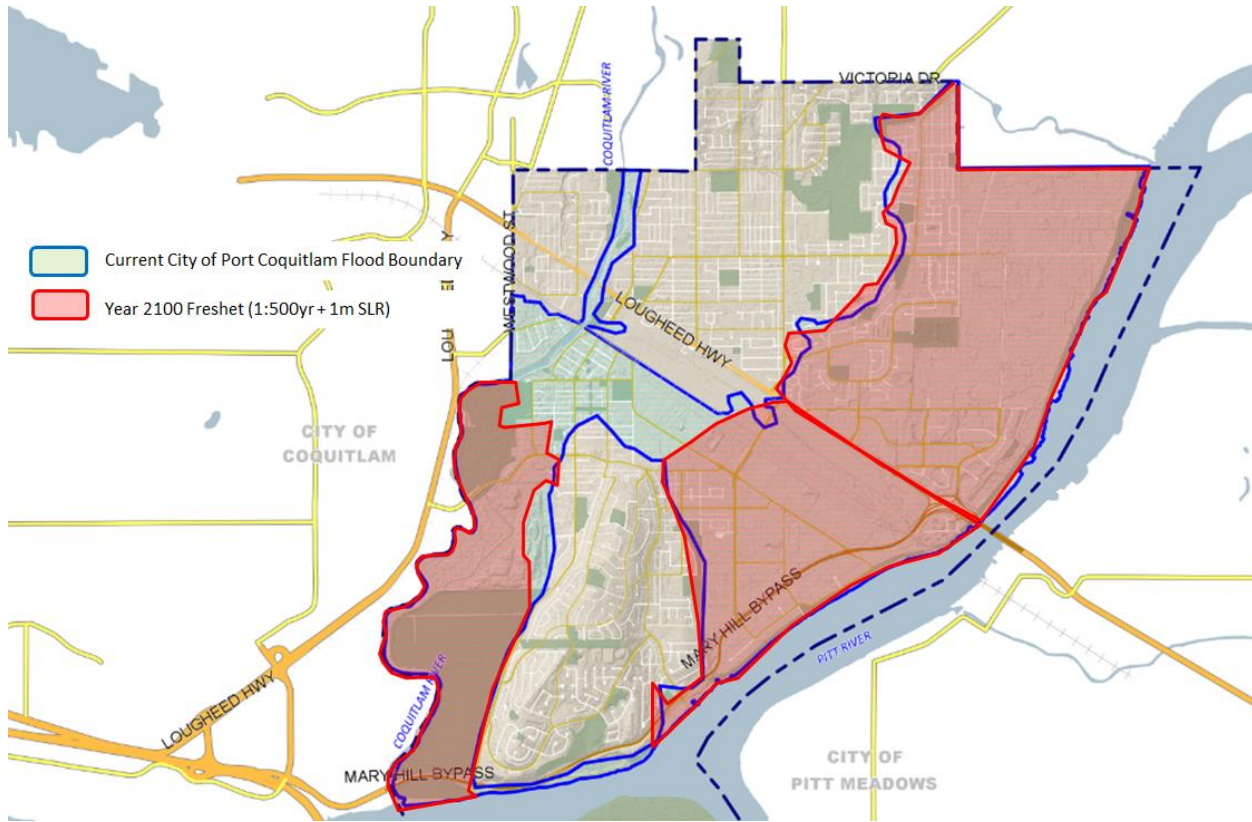
** The Fraser Basin Council's assumption of 1.0m sea level rise by 2100 is consistent with the recent Intergovernmental Panel on Climate Change's findings in their September 2019 Special Report on the Ocean and Cryosphere in a Changing Climate. In this report, the IPCC forecasts global mean sea level changes in the magnitude of 0.29 to 1.1m by 2100 depending on the climate model metrics considered.*

Since the early 1970s the province has generally accepted a 1:200 Annual Exceedance Probability (AEP) event to be the minimum provincial dike design standard for new dikes. Consistent to our neighbouring municipalities, the City of Port Coquitlam has designed and constructed our dikes to these elevations. The 1:200 flow rate is equivalent to the 1948 flood, which is understood to be the second largest Fraser River flood on record, whereas, the Strategy's flood modeling and mapping is based upon the largest flood on record of 1894, commonly referred to as the 1:500 year event.

It should also be recognized that the majority of the existing dikes across the lower mainland do not meet the current minimum provincial standard (1:200 event), as provincial standards have been revised since the majority of dikes were constructed. However, in 2007, the City proactively raised the dikes in the community to ensure we are protected against a 1:200 year flood event. In recent years, the City has completed a number of diking system upgrades to prepare for Fraser River freshets. In addition to large capital projects, the City also completes numerous inspection and maintenance activities to ensure the diking system is maintained to an adequate level.

Flood maps, for the four scenarios above are included as Attachment 2 and the current flood map utilized by the City of Port Coquitlam is included as Attachment 3. The maps are as expected. The City of Port Coquitlam is protected against the 1:200 year flood event; however dike overtopping is predicted for the 1:500 AEP. In Figure 2, the flooding extents of Scenario D (Year 2100 Freshet) have been overlaid on the City's current flood map to demonstrate the comparable footprints.

Figure 2 – Flood Map Overlay



Phase two of the Fraser Basin Council's strategy is underway, and is focused on identifying regional infrastructure priorities for flood mitigation, further exploration of flood mitigation methods and creation of a regional framework for decision making and funding requests to higher levels of government. This work is detailed in a July Briefing included as Attachment 4, and is expected to be completed in 2020. Staff will report back in 2020 with the results of phase two, and any direct implications for Port Coquitlam.

Additionally, the Fraser Basin Council is developing an interactive Lower Fraser Floodplain Model which will be accessible by municipalities and will be used to model the impacts of flood mitigation projects and anticipate this tool to be live in early 2020. This model will be utilized by municipalities for planning improvement projects with the greatest benefit to cost ratios and will help identify unintended consequences prior to construction.

Once phase two is complete, phase three will focus on implementation.

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FINANCIAL IMPLICATIONS

None. This report is for information only.

ATTACHMENTS

Att#1: Lower Mainland Flood Management Strategy – Phase 1 Summary Report

Att#2: Fraser Basin Council – Flood Mapping – Port Coquitlam

Att#3: Current Port Coquitlam Flood Plain

Att#4: Lower Mainland Flood Management Strategy – Flood Strategy Briefing – July 2019

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