

develop a strategic response to flooding. Over the past two years, Long Range Planning (LRP) and Emergency Management Services (EMS) have been coordinating two separate, but related, projects to identify and assess hazards, which are the coastal flood hazard mapping project and the update to the RDN's Hazard, Risk and Vulnerability Assessment. More recently, the RDN's Regional and Community Utilities (RCU) has initiated a project to identify the RDN's critical infrastructure, which may use the findings of the two afore mentioned projects for their needs.

Overview of Sea Level Rise Adaptation Program

Initiated in 2015, the Sea Level Rise Adaptation Program ("Adaptation Program") was originally designed to provide a coordinated response to the changes in provincial legislation related to flood hazards and to provide a land use response to sea level rise. A key achievement of the Adaptation Program, so far, is the development of coastal flood hazard maps. Three types of hazard maps are being produced, including flood inundation maps, flood construction level (FCL) maps and sea level planning areas maps. Flood inundation maps represent the total water depth and extent for storm events and are used to support the development of maps that contain pre-determined FCLs.³ The third type of map, represent sea level rise planning areas that show the change in the flood extent over time (i.e., year 2000, 2100, 2200) and move further inland as sea levels rise. Together, these maps form the beginnings of an Atlas of regional hazard maps. On completion, it is anticipated the Atlas with be presented to the RDN Board as early as January 2020.

The coastal mapping project was implemented in two phases based on geographical distinctions and to distribute the cost of the work over two years, as follows:

Phase 1: (Complete) includes the marine areas in the northern communities of the District of Lantzville, the City of Parksville, the Town of Qualicum Beach, Electoral Areas E, G and H and Indian Reserve Lands.

Phase 2: (To be complete December 2019) includes the marine areas in the southern communities of Electoral Area A and B (Gabriola Island) and Indian Reserve Lands.

To date, project funding has been a combination of Regional Growth Strategy implementation funds (\$155,700) and a grant from the provincial Community Emergency Preparedness Fund (\$150,000). The total amount invested from inception to 2019 is \$309,700. Existing staff resources allocated to oversee the implementation are 0.5 Senior Planner and 0.1 Manager.

Relationship of the Adaptation Program to Other RDN Initiatives

Coinciding with the coastal flood hazard maps, EMS also updated the RDN's Hazard, Risk and Vulnerability Assessment and completed a preliminary Flood Risk Assessment to understand the relative flood risk posed to the region by each type of flood hazard (i.e., overland, river, lake, stream and coastal). These findings confirm that flood hazards continue to pose a significant risk to people and property in the region, especially overland and river, lake and stream flooding followed by coastal flooding. Further details of the EMS project findings will be presented to the Board in January 2020. As with the coastal flood maps, the findings are being shared with RCU

³ Flood Construction Level (FCL) is a measurement from the natural boundary used to determine the safe elevation that a habitable building should be constructed to minimize damages from flooding.

to inform their critical infrastructure project and any other applicable works. (See Attachment 1 – Sea Level Rise Adaptation Program and Related RDN Initiatives).

With the completion of both projects, the Adaptation Program's implementation process was reviewed to identify information gaps and possible next steps. RDN staff, municipal staff and external consultants and resulted identified three possible flood planning options focused on specific areas, including: riverine only, coastal only or a combined method including both riverine and coastal flood areas. Best practices recommend the combined method because it incorporates the relevant hydrological characteristics, upstream river discharge and downstream coastal influences (i.e., storm surge, tide effect, wave effect and wave set-up), resulting in a comprehensive hydrological analysis of the floodplain. In addition, understanding the connectivity between river systems and the coastal plain system will better inform the process for pre-determining FCLs in areas influenced by both systems. For this reason, the RDN should proceed with a region-wide study based on the combined method. In support of this recommendation, the following section provides an outline of the work sequence and financial considerations for a region-wide study.

Proposal for Combined Riverine and Coastal Flood Planning

Overall, an Adaptation Program Implementation Framework has been designed to reflect best practices in risk management established through the federal government's floodplain mapping framework⁴ and the international Sendai Framework⁵. The combined method aligns with these standards as well as the priorities already identified by LRP and EMS to prepare new riverine hazard maps to further land use and emergency planning.

As part of refining the project scope, the RDN will work with a consulting team to prioritize river systems for mapping, including the three designated⁶ river floodplains associated with the Little Qualicum River, the Englishman River and the Nanaimo River as well as the unmapped French Creek area. Historic floodplain maps were produced by the provincial government⁷ for Little Qualicum River, the Englishman River and the Nanaimo River in 1980's and 1990's, which do not incorporate changes in the river systems over the last 40 years, nor do they consider factors relating to climate change, such as changes in precipitation and sea level. Once new riverine hazard maps are completed, a combined coastal and river risk assessment can be completed. The risk assessment process will include both technical analysis and input from key stakeholders. The results will provide a better understanding of the combined flood hazards, the associated risks and evaluate levels of risk tolerability.

Due to the scope and scale of the work program, the work will be implemented over a few years with the exact phasing to be determined through discussions with the consultant team. Once completed, the RDN can proceed with the required next step to identify flood mitigation options and to develop risk reduction plans. (See Attachment 1 – Sea Level Rise Adaptation Program and Related RDN Initiatives).

⁴ Public Safety Canada, Federal Flood Mapping Guidelines, 2019 www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/ndmp/fldpln-mppng-en.aspx

⁵ United Nations International Strategy for Disaster Reduction; Sendai Framework for Disaster Risk Reduction 2015-2013 www.unisdr.org/we/coordinate/sendai-framework

⁶ Regional District of Nanaimo Flood Management Bylaw No. 1469, 2006

⁷ In 2004, the provincial government transferred the responsibility for flood hazard mapping to local governments.

Proposed Financial Plan for 2020 to 2021

The preparation of a detailed cost analysis and scope of work is underway for this project and reflect the total number of river systems mapped and the level of stakeholder engagement required to undertake the risk assessment. With approved funding, a qualified consultant will further refine the project activities and associated costs within the confirmed budget and timeline.

To fund the proposed study, the RDN will need to either fully fund this work or partner with senior government where possible. A scan of external funding opportunities reveals that the provincial Community Emergency Preparedness Fund (CEPF) is available at this time. The RDN has been previously successful in receiving funds through this program and the proposed regional study is eligible under the funding program and the RDN is eligible to apply for a second grant.

The grant maximum is 100 percent of the eligible costs to a maximum of \$150,000. The applicable eligible activities related to the RDN's submission are:

- hydrometric and/or geotechnical data collection and analysis,
- developing or modernizing flood hazard maps,
- completion of a Flood Risk Assessment,
- engaging the community, First Nations, and other local stakeholders to reflect on identified risks to make more effective planning decisions and
- presentation of the Flood Risk Assessment to Council, Board or community organizations.

Approved funding is awarded in two disbursements: 50 percent at the approval of the project, and; 50 percent when the project is complete and the final reporting requirements have been met. All approved activities must be completed within one year of grant approval. Applications under the CEPF require a Board resolution indicating support for the proposed activities and willingness to provide overall grant management. The application deadline is January 24, 2020.

Given this information, it is recommended that the Board endorse this proposal to proceed with the next steps of the Adaptation Program to include riverine hazard mapping and a combined coastal and riverine flood risk assessment.

ALTERNATIVES

1. That the Board allocate \$150,000 in the 2020 budget and endorse the application submission for \$150,000 funding under the provincial Community Emergency Preparedness Fund.
2. That the Board endorse the application submission for \$150,000 funding under the provincial Community Emergency Preparedness Fund.
3. That the Board provide alternative direction.

FINANCIAL IMPLICATIONS

Within the RDN's 2020 Budget process, \$150,000 is requested to begin the process of acquiring new river flood hazard maps and a combined risk assessment as a Regional Growth Strategy implementation project.

If supported by the Board, the CEPF application will include the RDN's proposed budget of \$150,000 and the requested \$150,000 grant for a total project budget of \$300,000 over one year. If the total project budget is not granted, the project scope can be adjusted based on the funds made available and phased over a longer timeline. The disadvantage is that extending the study's timeline will also delay the overall implementation of the Adaptation Program and any other initiatives that benefit from this research. (See Attachment 1, with reference to Program Stages).

STRATEGIC PLAN IMPLICATIONS

Climate Change - Be leaders in climate change adaptation and mitigation, and become net zero by 2032.

The Adaptation Program and the related sub-projects align with the Board's strategic priorities on climate change by being the first regional district to initiate coastal flood hazard mapping and joining other local governments in proactively planning for and increasing community resiliency.



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Attachment:

- Sea Level rise Adaptation program and related RDN Initiatives