



REGIONAL
DISTRICT
OF NANAIMO

Nanaimo River

Flood Hazard Mapping Projects

PRESENTATION TO BOARD

June 13, 2023



KERR WOOD LEIDAL
consulting engineers

+ RDN's Approach to Adaptation



- Flood Risk Assessment Report (part of HRVA, 2019)
- **Strategic Initiatives:** SLR & Climate Adaptation Program & Interdepartmental Working Group; CATAC
- **Projects:** Floodplain mapping, geo hazard risk assessments
- **Development Controls:** Floodplain Bylaw, DPAs, Estuary Conservation Areas, OCP, Zoning & Subdivision regs.
- Infrastructure Planning & Asset Management Program
- Emergency management program
- Community education & volunteers incl. DWWP Program, Search and Rescue

+ Overview – Flood Management



RDN Interdepartmental Working Group

Regional Assessment



Flood Mapping for Priority Floodplains



Implementation

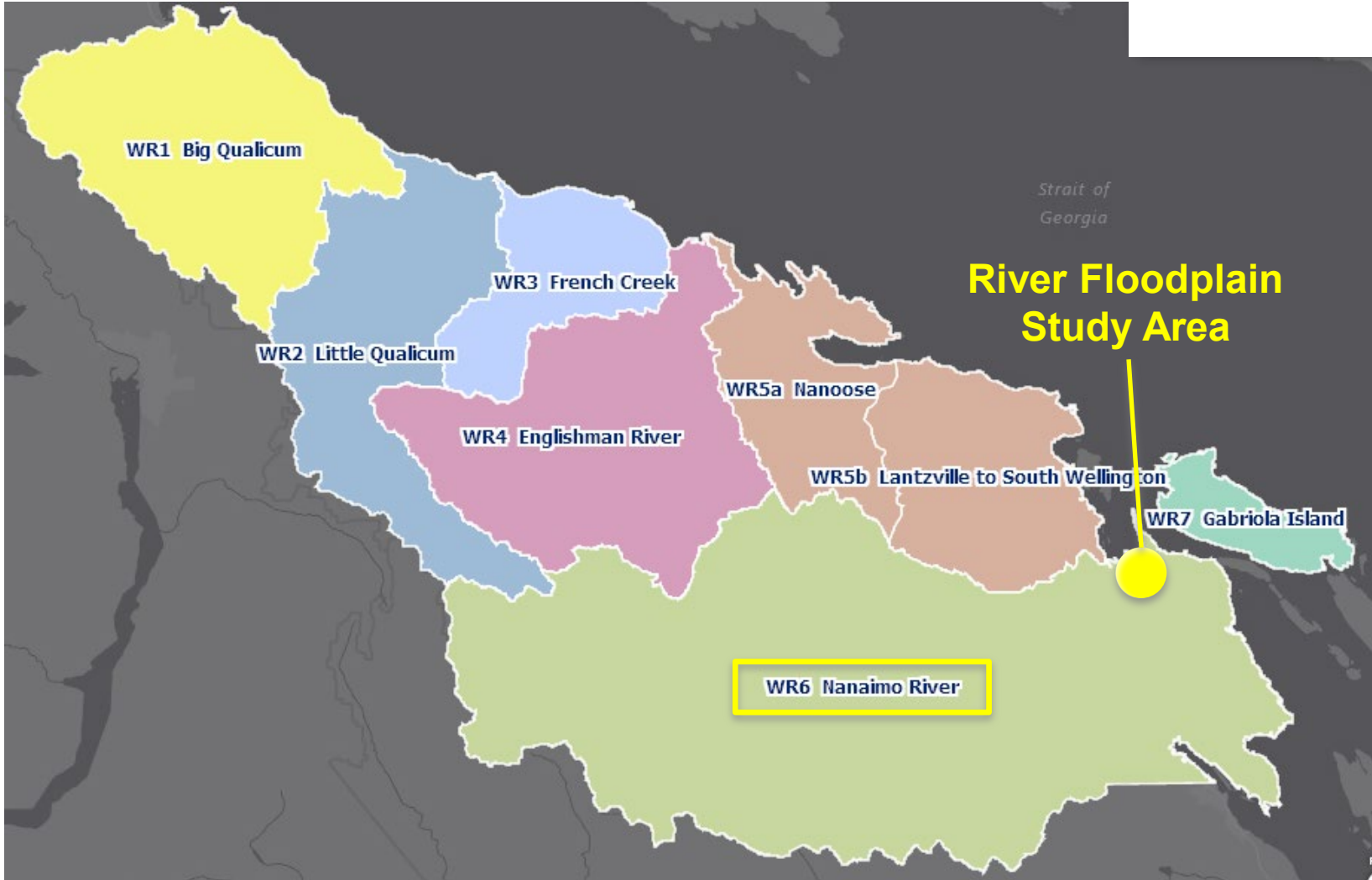
2019

2020 - 2023

2023+

About the River Projects

+ Study Area Locations





Overall Project Goal/ Objectives



1. Update the **regulatory flood hazard maps** for the Nanaimo River
2. Conduct a **high-level flood risk assessment**
3. Provide information to **support present-day and future local government services**
4. **Communicate** the findings

Study Approach

+ Regulatory Flood Mapping Approach

1. Topography & Bathymetry Data

- channel and floodplain shape

2. Hydrologic Assessment

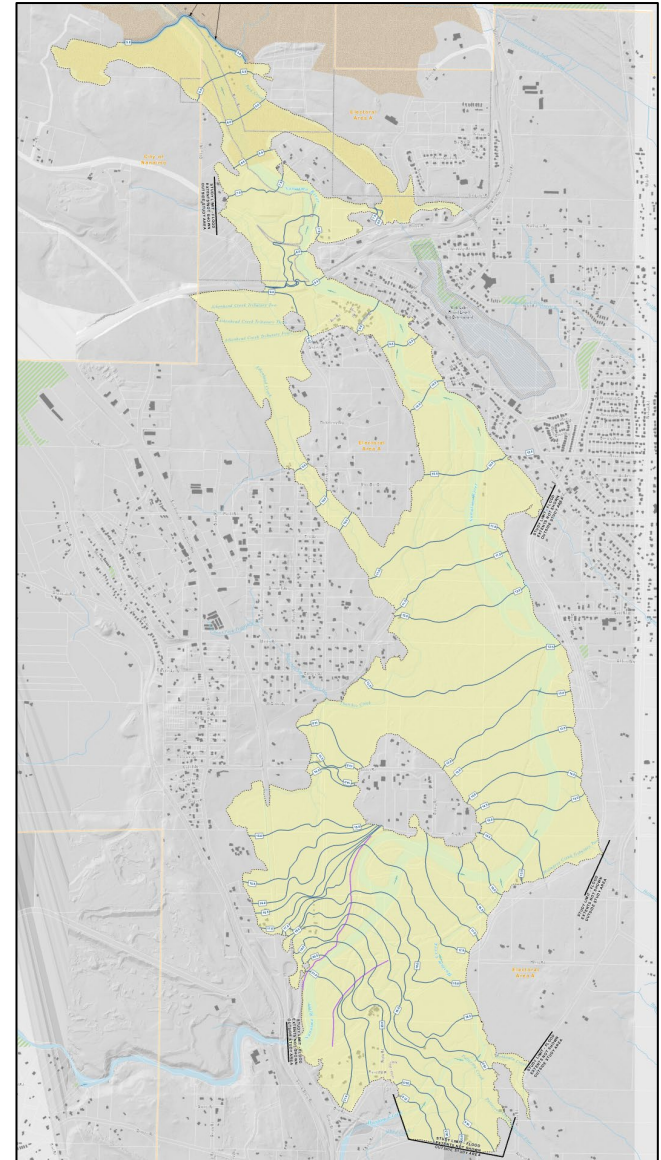
- flood flow size and shape
- climate change allowance

3. Hydraulic Modelling

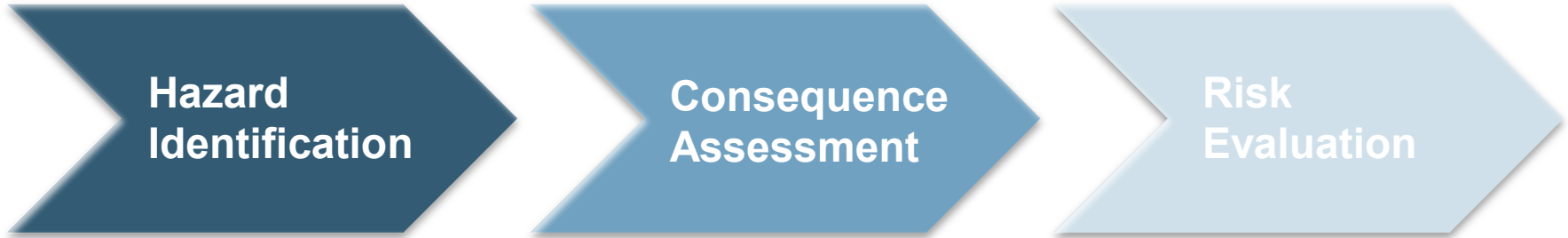
- translating flow to water level
- sea level rise

4. Mapping

- map background features
- map floodplain limits and flood levels



+ Risk Assessment Approach



- Flood hazard mapping
- Includes small and large size floods
- Includes existing and future flood hazards

- **Community Engagement** 
- Quantify flood impacts
- Flood exposure mapping

- Develop risk scores
- Quantify annual losses

+ Consequence Variables Assessed



- Assess the **direct exposure** of key **tangible** community elements:



Buildings Inundated



People in Inundated Area



Transportation Disruption



Water Infrastructure

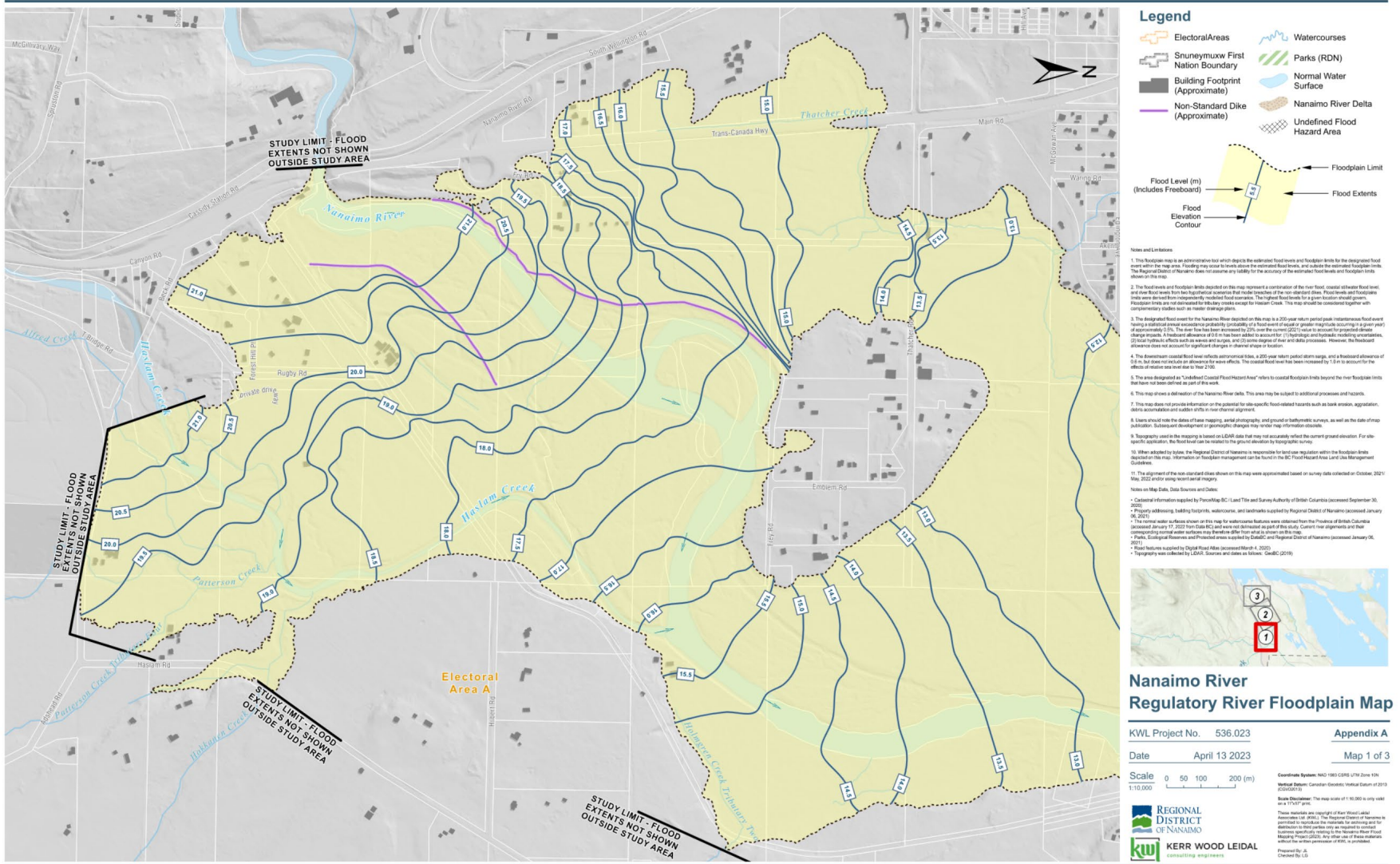
- Other Consequence Variables considered at a high level:

- Tourism businesses
- Agricultural Lands
- Highway Infrastructure
- Cultural sites
- Septic fields and private wells
- Ecological habitat
- Water quality
- Other infrastructure services
- Business disruption/productivity
- Future development

Findings

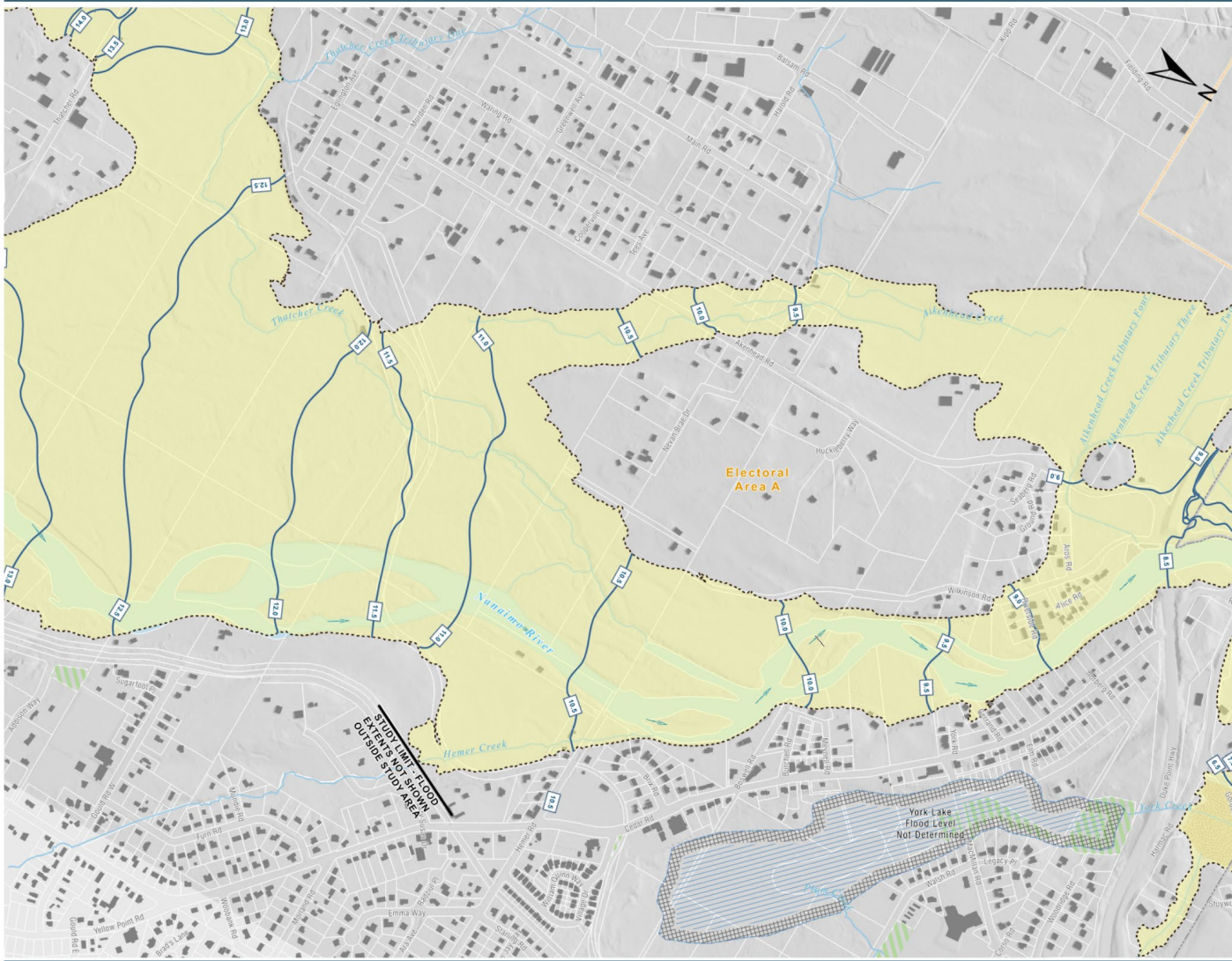


Nanaimo River Floodplain Maps





Nanaimo River Floodplain Maps



Legend

- Electoral Areas
- Watercourses
- Snuneymúxw First Nation Boundary
- Parks (RDN)
- Building Footprint (Approximate)
- Normal Water Surface
- Non-Standard Dike (Approximate)
- Nanaimo River Delta
- Undefined Flood Hazard Area

Flood Level (m) (Includes Freeboard)

Flood Extents

Flood Elevation Contour

Floodplain Limit

Notes and References

- The floodplain map is an administrative tool which depicts the estimated flood levels and floodplain limits for the designated flood plain within the map area. Floodplain maps do not provide the estimated flood levels, or indicate the estimated floodplain limits. The Regional District of Nanaimo does not assume any liability for the accuracy of the estimated flood levels and floodplain limits shown on this map.
- The flood levels and floodplain limits depicted on this map represent a combination of the best flood, coastal shallow flood level, and flow back levels from the hydrological assessment that underlies the map. For non-shaded areas, flood levels and floodplain limits were derived from a hydrological assessment. The highest flood levels for a given location are based on a 200-year return period peak flood. Flood levels and floodplain limits were derived from a hydrological assessment. The highest flood levels for a given location are based on a 200-year return period peak flood. Flood levels and floodplain limits were derived from a hydrological assessment. The highest flood levels for a given location are based on a 200-year return period peak flood.
- The designated flood level for the Nanaimo River depicted on this map is a 200-year return period peak independent flood event being a statistical event, representing a probability of 0.5% of a flood event of equal or greater magnitude occurring in a given year and an elevation of 0.5m. The map has been derived from a 200-year return period peak independent flood event being a statistical event, representing a probability of 0.5% of a flood event of equal or greater magnitude occurring in a given year and an elevation of 0.5m. The map has been derived from a 200-year return period peak independent flood event being a statistical event, representing a probability of 0.5% of a flood event of equal or greater magnitude occurring in a given year and an elevation of 0.5m. The map has been derived from a 200-year return period peak independent flood event being a statistical event, representing a probability of 0.5% of a flood event of equal or greater magnitude occurring in a given year and an elevation of 0.5m.
- The downstream coastal flood level reflects a storm surge, a 200-year return period storm surge, and a flood level allowance of 0.5m. It does not include an allowance for wave effects. The coastal flood level has been determined by 0.5m allowance for the effects of wave effects on the 200-year return period peak independent flood level.
- The area designated as a "limited Coastal Flood Hazard Area" refers to coastal floodplain limits between the four floodplain limits that have not been defined as part of this work.
- This map shows a delineation of the Nanaimo River Delta. This area may be subject to additional processes and hazards.
- This map does not provide information on the potential for site specific flood-related hazards such as landslides, aggregation, debris accumulation and sudden shifts in river channel alignment.
- Users should note the date of base mapping, aerial photography, and ground or bathymetric surveys, as well as the date of map publication. Subsequent development or geomorphic changes to the river map information available.
- Topography used in the mapping is based on LIDAR data that may not accurately reflect the current ground elevation. For spot-check applications, the flood levels are based on the ground elevation topographic survey.
- When adopted by order, the Regional District of Nanaimo is responsible for first-use regulation within the floodplain limits depicted on this map. Information on floodplain management can be found in the BC Flood Hazard Area Level Use Management Guidelines.
- The alignment of the non-standard dikes shown on this map were approximated based on survey data collected on October, 2021/ May 2022 and/or using aerial imagery.

Notes on Map Data, Data Sources and Dates

- Cultural information supplied by PlanMap BC (Land Title and Survey Authority of British Columbia) (accessed September 30, 2021)
- Property addressing, building footprint, watercourse, and landmarks supplied by Regional District of Nanaimo (accessed January 06, 2021)
- The normal water surface shown on this map for watercourse features was obtained from the Province of British Columbia (accessed January 07, 2022) from the BC Hydro and BC Power and is not intended as part of this study. Current road alignments and their corresponding center and outer boundaries are obtained from the British Columbia Open Data Portal (accessed January 06, 2021)
- Parks, Ecological Reserves and Protected Areas supplied by CMREC and Regional District of Nanaimo (accessed January 06, 2021)
- River features supplied by Digital River Atlas (accessed March 4, 2020)
- Topography was collected by Digital River Atlas (accessed March 4, 2020)

Scale 0 50 100 200 (m)

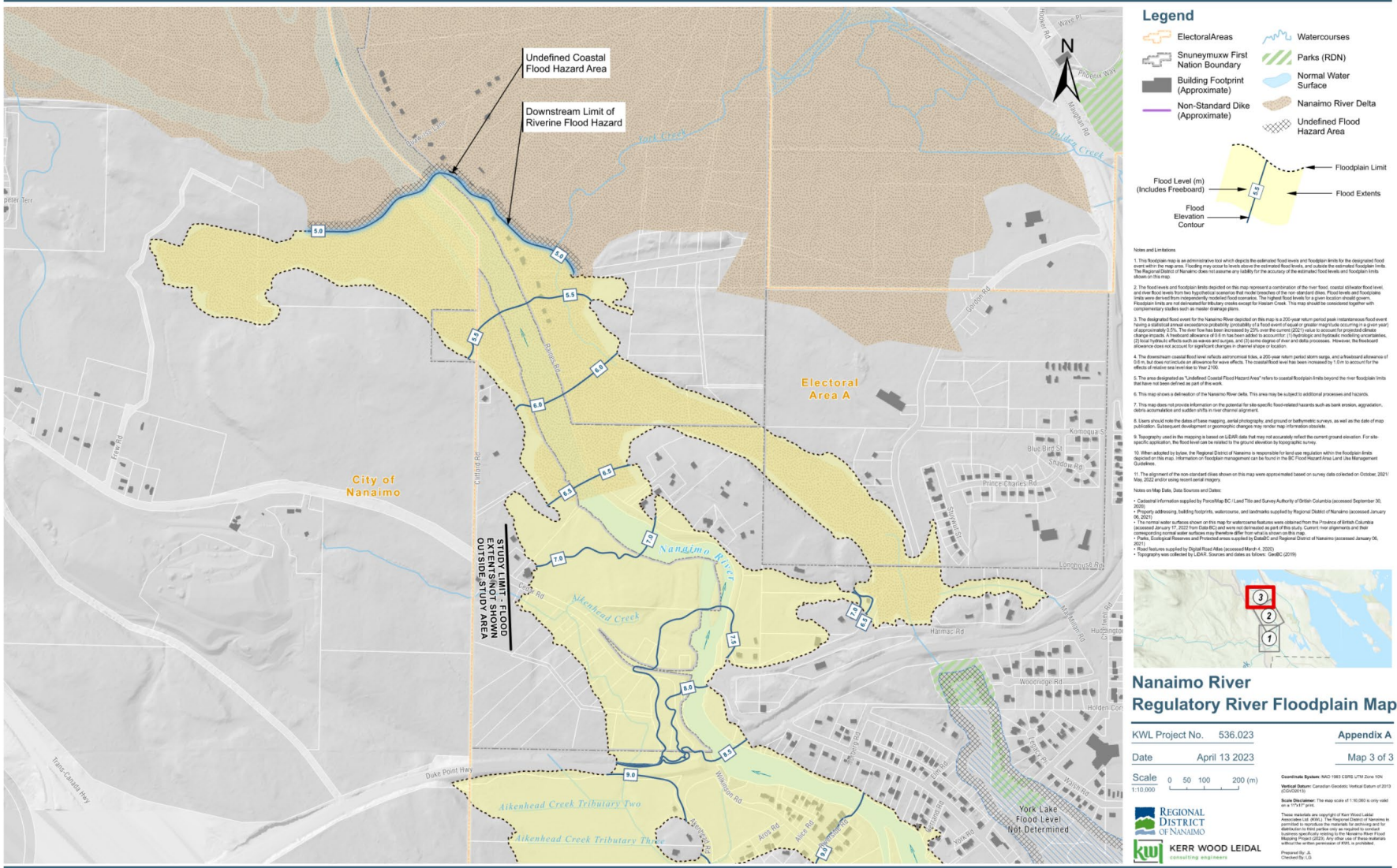
Coordinates System: NAD 1983 CSRS UTM Zone 10N
 Vertical Datum: Canadian Geoid; Horizontal Datum: GDA 1983
 1:10,000
 Note: This map scale of 1:10,000 is only valid at 17°C ± 1°C.

Regional District of Nanaimo
KERR WOOD LEIDL
 consulting engineers

Prepared by: J. Campbell, C.E.



Nanaimo River Floodplain Maps



Nanaimo River Regulatory River Floodplain Map

KWL Project No. 536.023 **Appendix A**

Date April 13 2023 **Map 3 of 3**

Scale 0 50 100 200 (m)

1:10,000

Coordinate System: NAD 1983 CSRS UTM Zone 18N
Vertical Datum: Canadian Geoid (vertical datum of 2011)
Units: Metres
Scale: The map scale of 1:10,000 is only valid at a 17.5° tilt.





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Prepared by:
Checked by: LG



Key Areas Exposed to Flooding



		Nanaimo River
	Residential Communities	<ul style="list-style-type: none">• Riverside• Snuneymuxw First Nation
	Critical Roads	<ul style="list-style-type: none">• Alice Road• Akenhead Road• Raines Road• Riverside Road• Wilkinson Road
	Federal Infrastructure	<ul style="list-style-type: none">• Nanaimo River Hatchery
	Water Infrastructure	<ul style="list-style-type: none">• Harmac Water Supply System

Implementation

+ Implementation – Advancing Resiliency



NEW Shaping Our Future 2040

- Proposed policies **adaptation & mitigations**
- Proposed advocacy policies to **improve legislation, Guidelines & prov/fed funding**



NEW Land Use Regulations

- Proposed Flood Hazard Management **Bylaw**
- Proposed Coastal Flood Hazard **DPA**

NEW Operational Policies

- Geotechnical Information for **Building Inspectors**
- Flood Hazard Bylaw Exemptions for **Planners**

Communications & Education

- RDN Webpage
- Project Overview Reports
- GIS digital map application - coastal & river floodplain maps
- On-going staff orientation & training

+ Thank You/ Hay ch q'a/ Merci



For More Information:

RDN webpage:

www.getinvolved.rdn.ca/river-floodplain-map-update

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