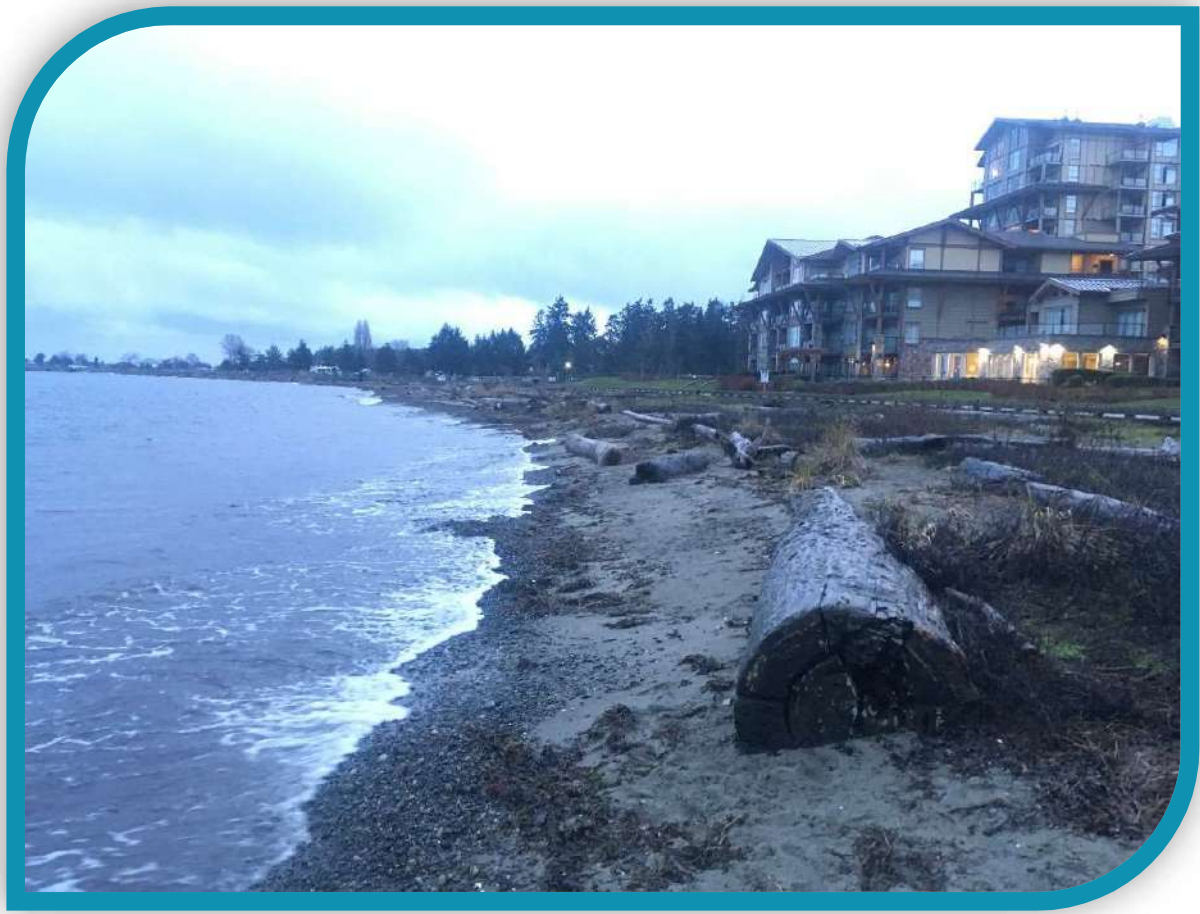
Regional District of Nanaimo
Coastal Flood Hazard Map Atlas
Map Series 8/8: Inundation Maps for 1.0 m RSLR



Cover Photo: King Tide in Parksville. © Photo by Ebbwater Consulting

March 31, 2019

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CASCADIA COAST RESEARCH LTD.

Index

Introduction 2

Overview of Maps 2

Notes to Map User 3

Print Instructions 4

References 4

Coastal Storm Inundation Maps - 6.7% AEP, 1.0 m RSLR - Map Tile Index 5

Coastal Storm Inundation Maps – 0.5% AEP, 1.0 m RSLR - Map Tile Index 17

Introduction

The map atlas accompanies a floodplain mapping study by Ebbwater Consulting Inc. and its partner Cascadia Coast Research Ltd. for the Regional District of Nanaimo (RDN). It contains a collection of maps which show the impacts of coastal flood hazards affecting the RDN. This information will in turn be used to inform and update policy and planning instruments, such as flood construction levels (FCLs), Sea Level Rise Planning Areas, and general strategic planning as relevant for the Official Community Plan (OCP) with the goal of reducing community risk to coastal flooding.

This work generally followed the approach set out in the Professional Practice Guidelines for Flood Mapping in BC (APEGBC 2017). It also references the Provincial Coastal Floodplain Mapping – Guidelines and Specifications (Kerr Wood Leidal 2011) as well as various provincial documents developed to provide guidance on sea level rise (Ausenco Sandwell, 2011a, 2011b, 2011c).

This map atlas is designed to accompany a Floodplain Mapping Report (Ebbwater Consulting Inc. and Cascadia Coast Research Ltd. 2019) and is intended for the purposes set out in that report only. See the main report for further details on the methodology, results and limitations.

Overview of Maps

We assessed and mapped the coastal storm-induced flood hazard for 6.67% and 0.5% Annual Exceedance Probabilities (AEPs) (15-, and 200-year indicative return period, respectively). We considered these two AEP scenarios for three relative sea level rise scenarios (RSLR 0 m, 0.5 m, and 1.0 m), resulting in a total of 6 scenarios that were modelled and mapped along the coastline of the RDN. Due to the large geographical area of the RDN, the maps have been divided into 10 map tiles.

This map series shows coastal storm inundation for the 1.0 m RSLR (map series 8). It is part of a larger Coastal Flood Hazard Map Atlas, which includes the map series listed below:

Coastal Flood Hazard Map Atlas		
Series	**Map Title**	**Scenarios**
Series 1	Flood Construction Levels Regulatory Maps for 0.5 m RSLR	• 0.5% AEP, 0.5 m RSLR
Series 2	Flood Construction Levels Regulatory Maps for 1 m RSLR	• 0.5% AEP, 1 m RSLR
Series 3	Flood Construction Levels Reach Maps for 0.5 m RSLR	• 0.5% AEP, 0.5 m RSLR
Series 4	Flood Construction Levels Reach Maps for 1 m RSLR	• 0.5% AEP, 1 m RSLR
Series 5	Sea Level Rise Planning Area Maps	• 0.5% AEP for 0.5 m RSLR and 1 m RSLR
Series 6	Coastal Storm Inundation Maps for 0.0 m RSLR	• 6.67% AEP and 0.5% AEP for 0.0 m RSLR
Series 7	Coastal Storm Inundation Maps for 0.5 m RSLR	• 6.67% AEP and 0.5% AEP for 0.5 m RSLR
Series 8	**Coastal Storm Inundation Maps for 1.0 m RSLR**	• **6.67% AEP and 0.5% AEP for 1.0 m RSLR**

Notes to Map User

1. This map is designed to accompany a Floodplain Mapping Report (Ebbwater Consulting Inc. and Cascadia Coast Research Ltd., 2019) and is intended for the purposes set out in that report only. See the main report for further details on the methodology, results and limitations.
2. Flood water depths were developed using a 6.67% and 0.5% Annual Exceedance Probability (AEP) flood and 1.0 m Relative Sea Level Rise (RSLR) (present-day).
3. The adopted values for sea level rise are based on guidelines from Ausenco Sandwell (2011). These are subject to change and RSLR values may need to be reassessed in future.
4. Water depths DO NOT include a freeboard allowance.

Limitations:

1. The accuracy of the presented flood depths is limited by available data and modelling approaches. Water elevations were interpolated from 1D cross-shore transects to calculate the flood depth layer. Please refer to report for detailed discussion of limitations.
2. The accuracy of the floodplain extent is limited by the accuracy of the base surveys and mapping data. The floodplain limits were not established on the ground by legal survey.
3. This map was produced by Ebbwater Consulting Inc. using generally accepted best practice and guidelines for the Province of British Columbia. However, flooding may still occur outside the defined floodplain boundary, and Ebbwater Consulting Inc. and Cascadia Coast Research Ltd. do not assume any liability by reason of the failure to delineate flood areas on this map.
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6. Base map and parcel layers were provided by different data owners and are subject to differences.

Data Sources:

1. Flood Construction Reference Plane (FCRP) values provided by Cascadia Coast Research Ltd.
2. Water depths were interpolated from a limited number of transects and are relative to onshore topography.
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5. LiDAR data surveyed in 2016 was used to create the Digital Elevation Model (DEM).
6. OSM Humanitarian Data Model and CARTO’s Positron, created using derivatives of OpenStreetMap data - openstreetmap.org (© OpenStreetMap contributors; cartography license CC BY-SA)

Print Instructions

All maps are designed and scaled to be printed at ANSI D.

References

APEGBC. 2017. “Flood Mapping in BC - APEGBC Professional Practice Guidelines - V1.0.” Prepared For British Columbia Ministry of Forests, Lands and Natural Resource Operations.

Ausenco Sandwell. 2011a. “Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use - Draft Policy Discussion Paper.” Prepared for BC Ministry of Environment.

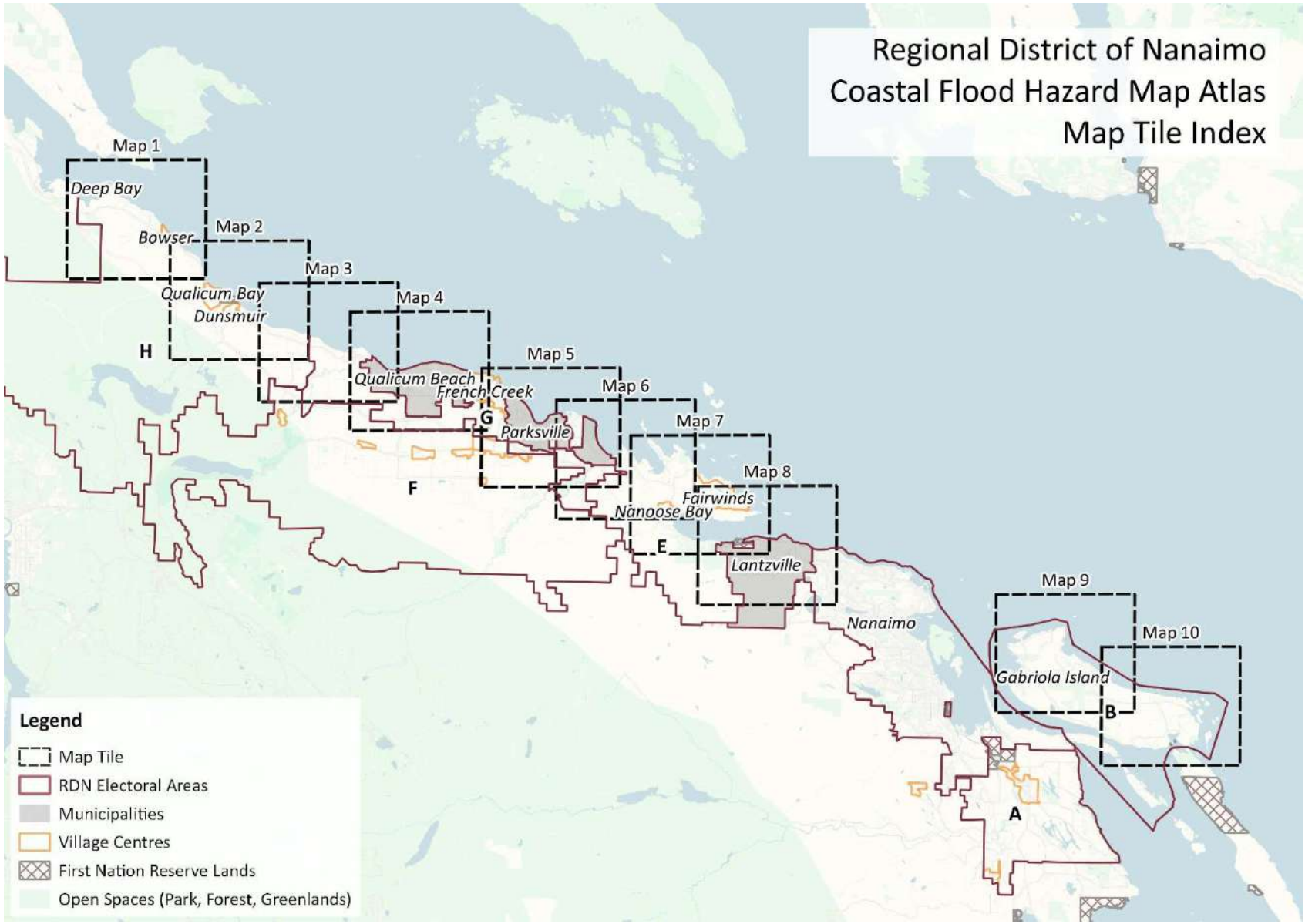
———. 2011b. “Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use - Guidelines for Management of Coastal Flood Hazard Land Use.” Prepared for BC Ministry of Environment.

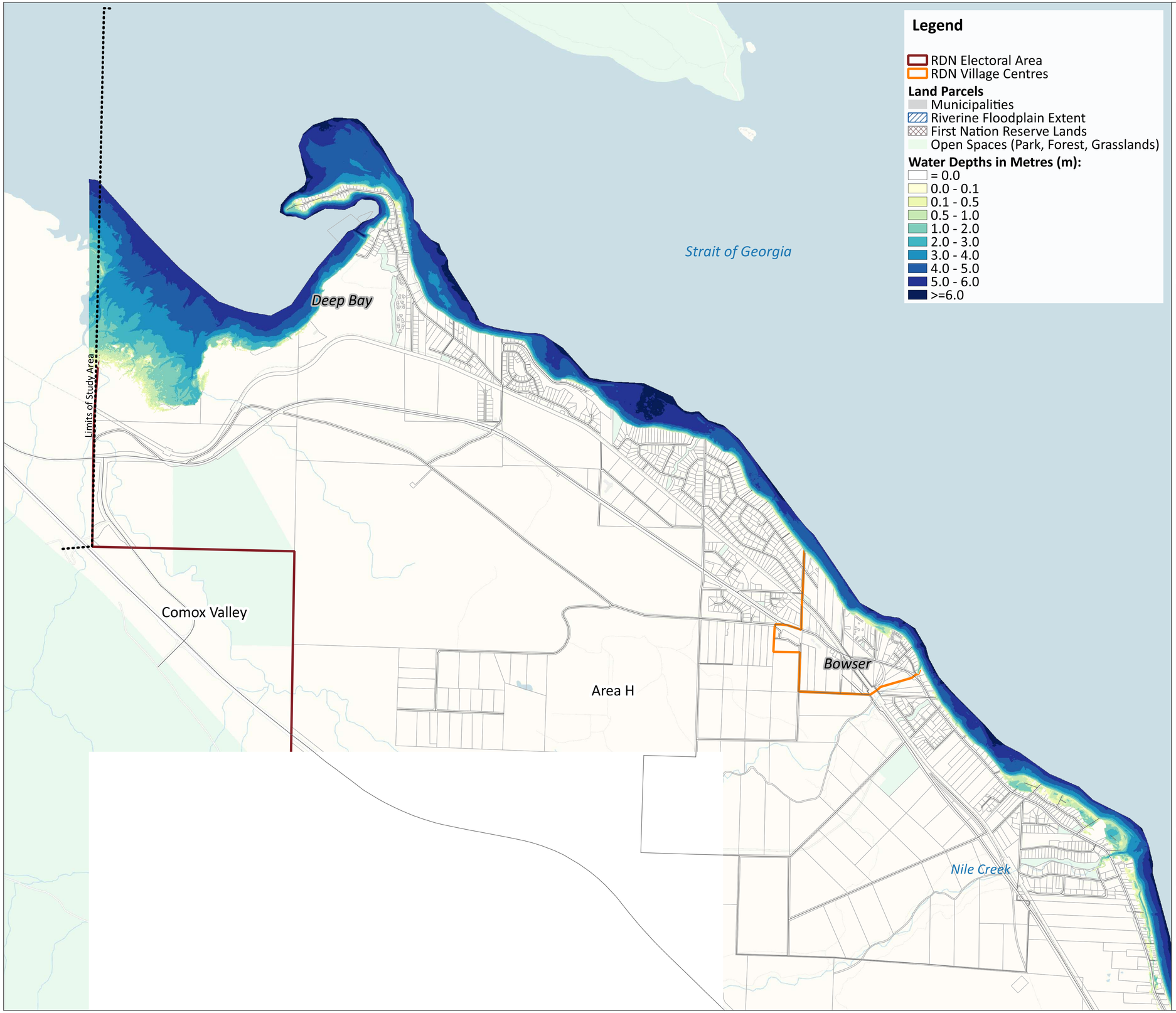
———. 2011c. “Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use - Sea Dike Guidelines.” Prepared for BC Ministry of Environment.

Ebbwater Consulting Inc., and Cascadia Coast Research Ltd. 2019. “Regional District of Nanaimo Coastal Floodplain Mapping Final Report.” Prepared for Regional District of Nanaimo.

Kerr Wood Leidal. 2011. “Coastal Floodplain Mapping – Guidelines and Specifications.” Prepared for Ministry of Forests Lands & Natural Resource Operations.

Coastal Storm Inundation Maps - 6.7% AEP, 1.0 m RSLR - Map Tile Index





Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):

- = 0.0
- 0.0 - 0.1
- 0.1 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
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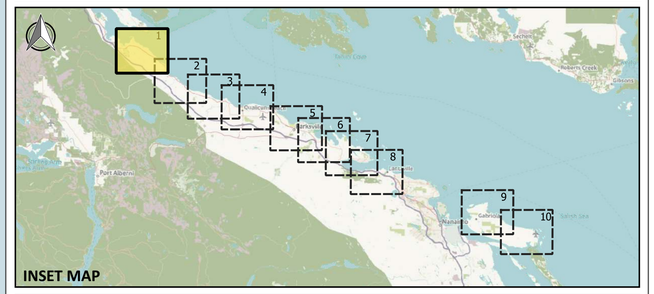
Regional District of Nanaimo

ELECTORAL AREA H (1 OF 3)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 1 of 10



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Date Created:	March 31 2019
Coordinate System:	NAD83, UTM 10N
Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

Professional Engineer — Province of British Columbia — T. S. Lyle # 30561 — Engineer

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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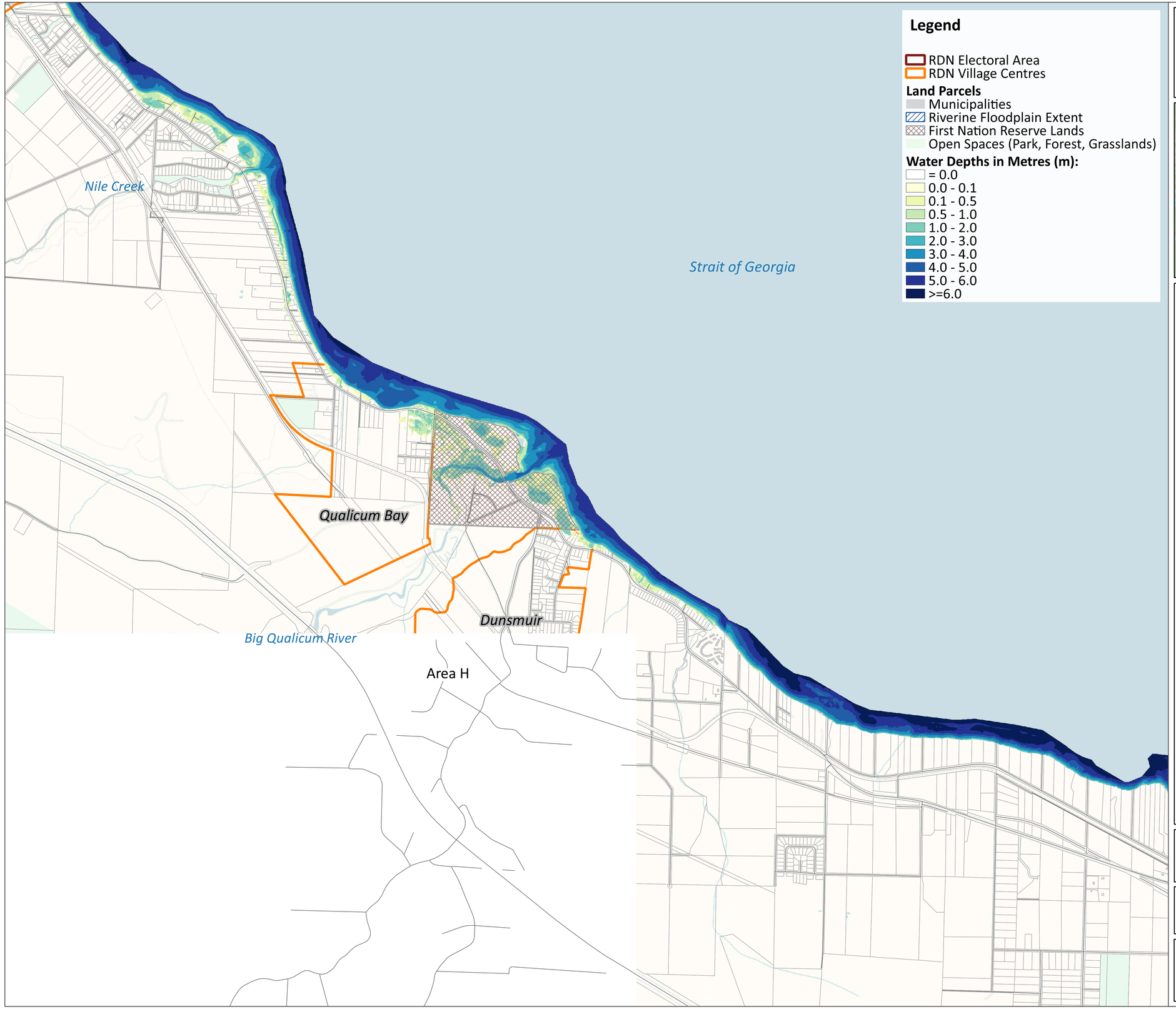

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

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- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

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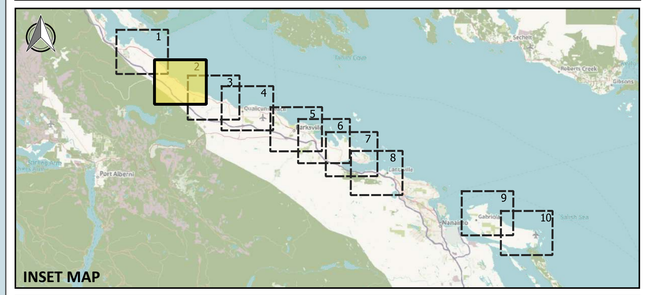
REGIONAL DISTRICT OF NANAIMO

ELECTORAL AREA H (2 OF 3)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 2 of 10



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4. Water depths DO NOT include a freeboard allowance.

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Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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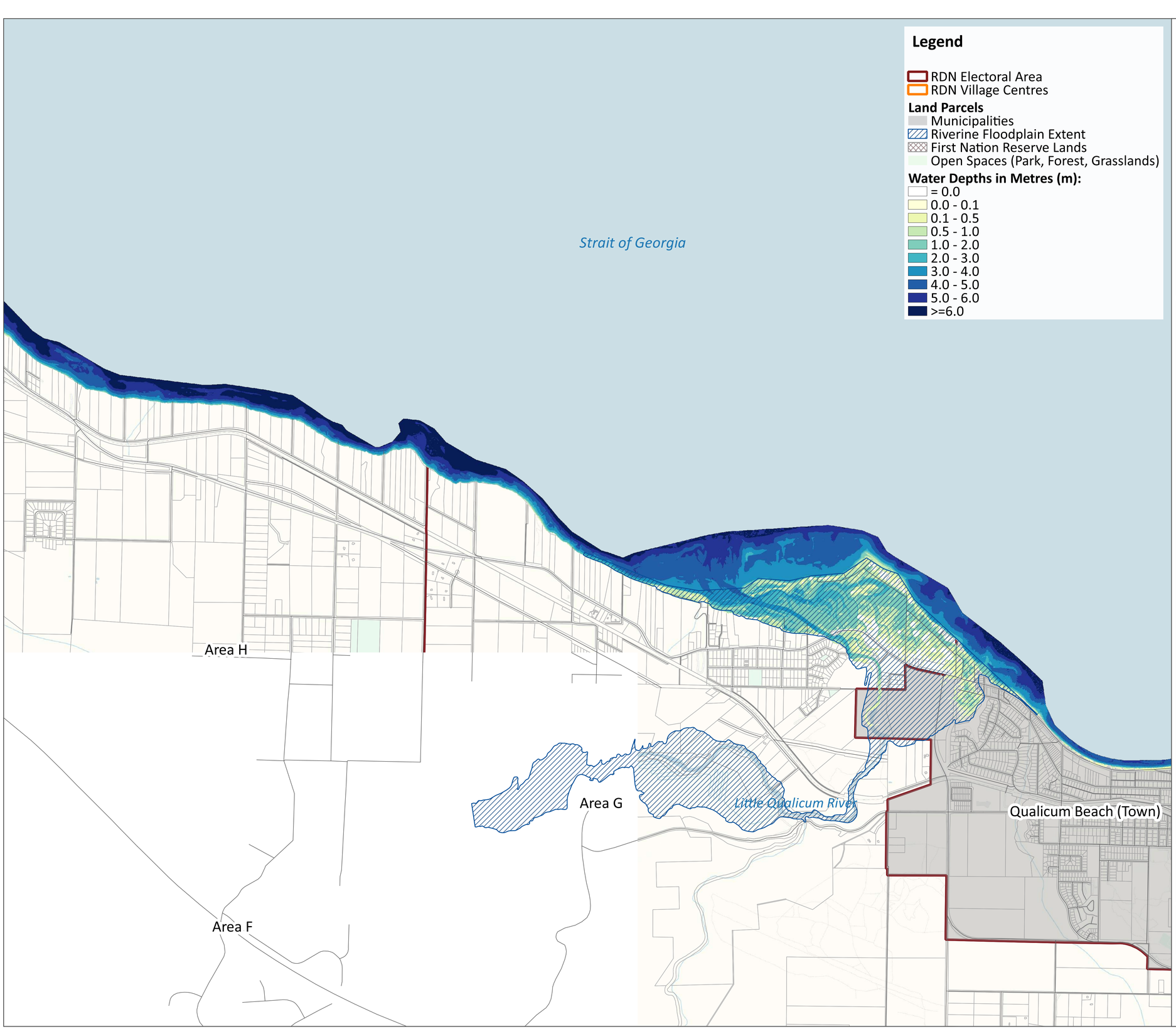
ELECTORAL AREAS H (3 OF 3) & G (1 OF 2)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 3 of 10

REGIONAL DISTRICT OF NANAIMO



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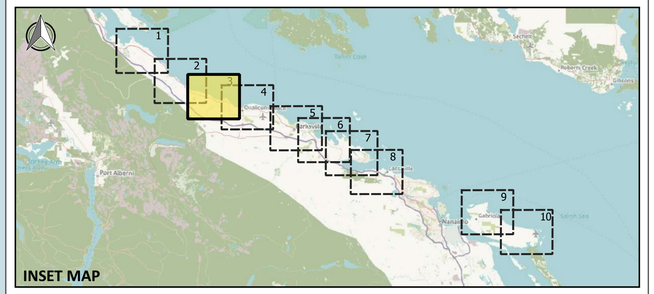

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Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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CASCADIA COAST RESEARCH LTD.

TOWN OF QUALICUM BEACH
COASTAL STORM INUNDATION MAP

6.67% AEP & 1 m RSLR

Map 4 of 10

REGIONAL DISTRICT OF NANAIMO

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

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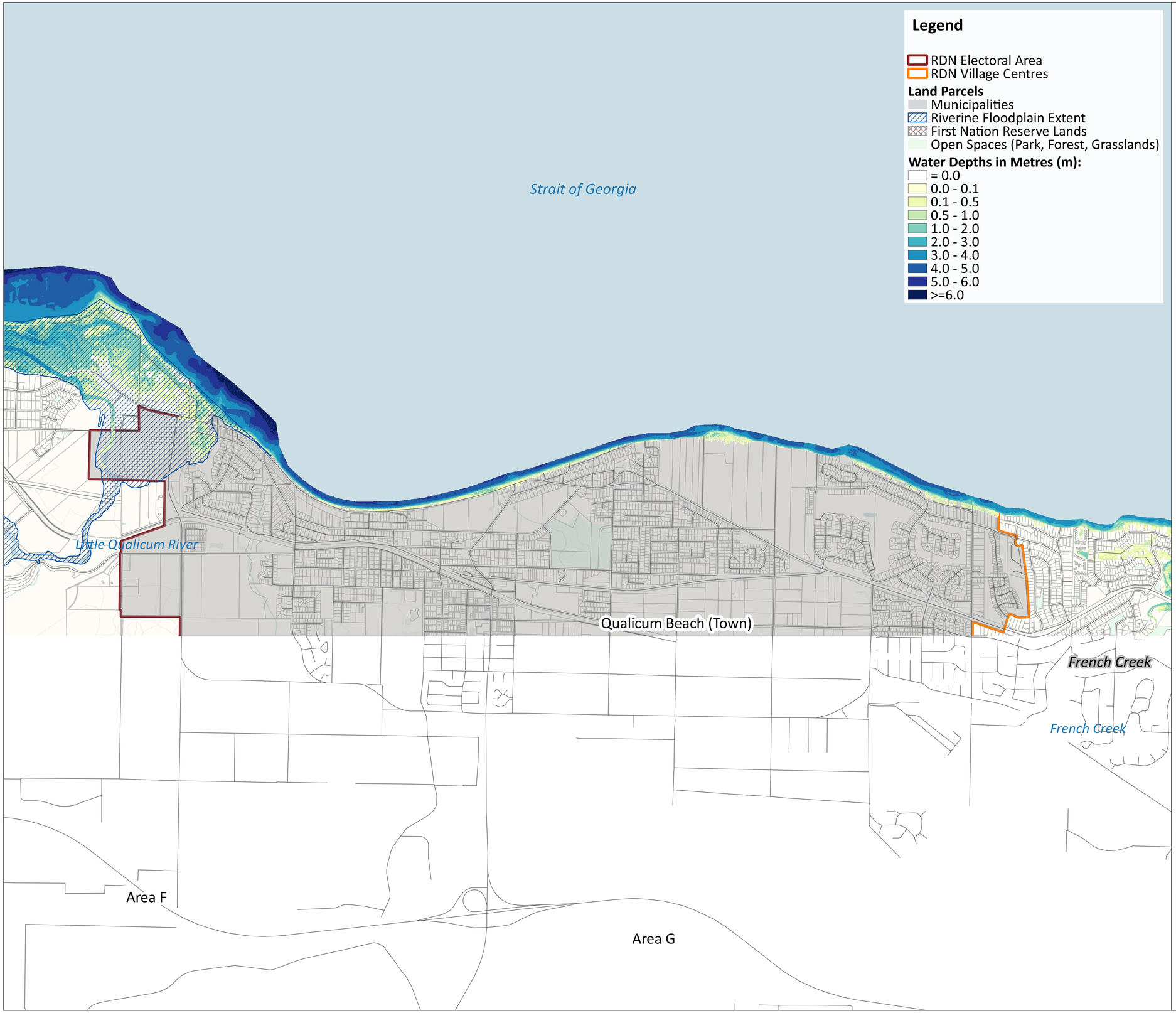

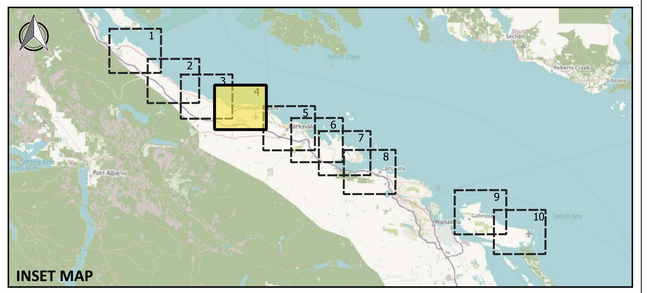

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PROFESSIONAL ENGINEER — T. S. LYLE — # 30051 — PROVINCE OF BRITISH COLUMBIA

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

French Creek

Area G

Strait of Georgia

Parksville (City)

Bellevue/Church Road

Area F

Englishman River

Area G

Area E

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
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- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):

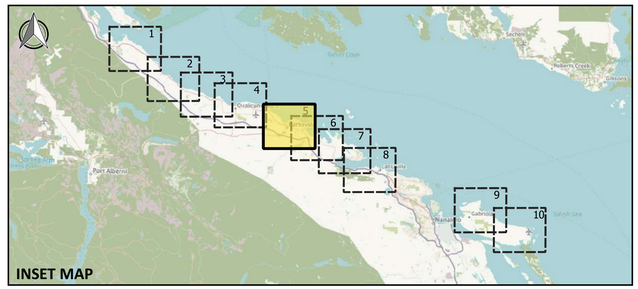
- = 0.0
- 0.0 - 0.1
- 0.1 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- 4.0 - 5.0
- 5.0 - 6.0
- >=6.0

REGIONAL DISTRICT OF NANAIMO

CITY OF PARKSVILLE
COASTAL STORM INUNDATION MAP

6.67% AEP & 1 m RSLR

Map 5 of 10



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3. The adopted values for sea level rise are based on guidelines from Ausenco Sandwell (2011). These are subject to change and RSLR values may need to be reassessed in future.
4. Water depths DO NOT include a freeboard allowance.

Limitations:
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Date Created:	March 31 2019
Coordinate System:	NAD83, UTM 10N
Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE — # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

ELECTORAL AREAS G (2 OF 2) & E (1 OF 2)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 6 of 10

Regional District of Nanaimo

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels
- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):
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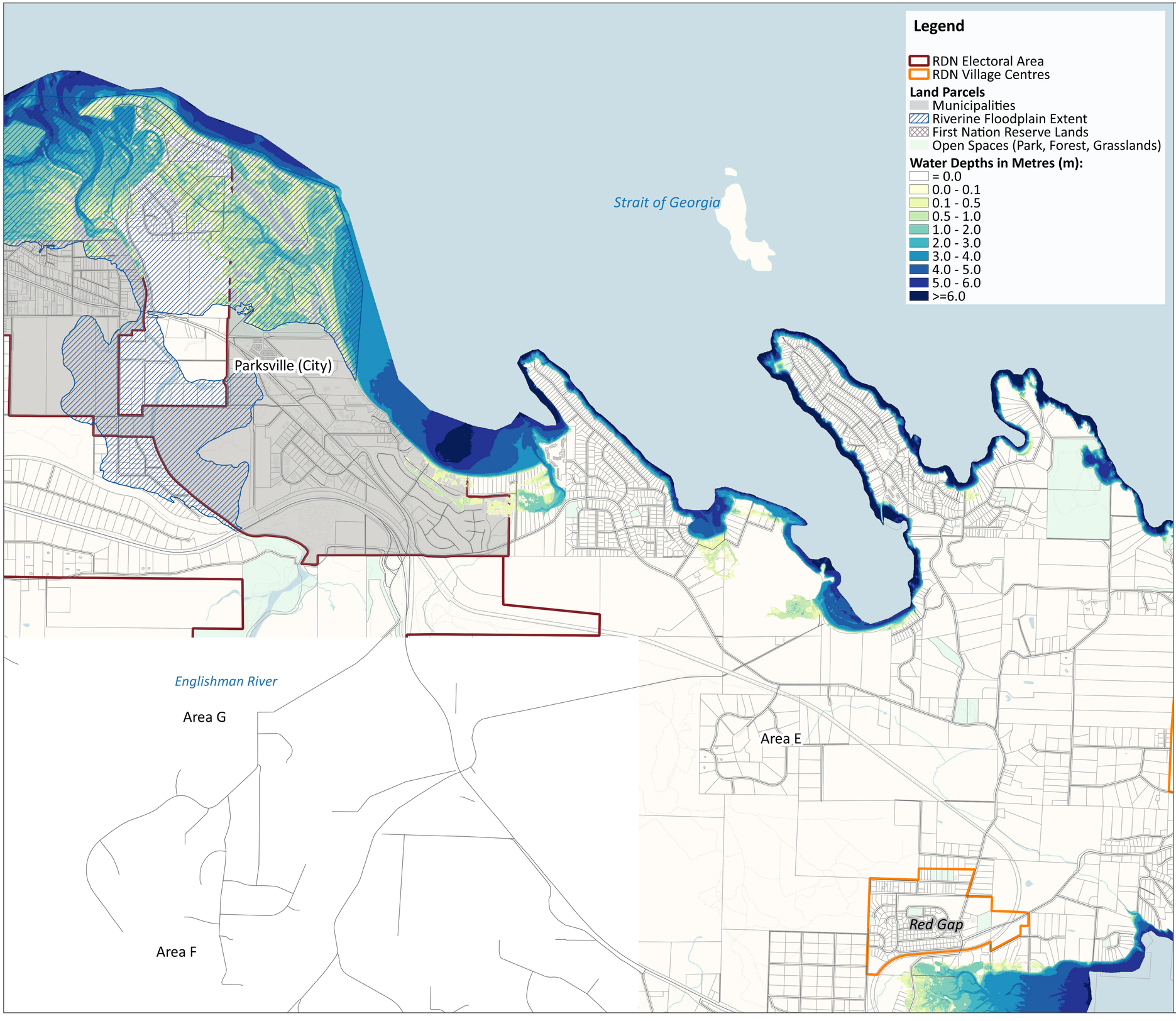

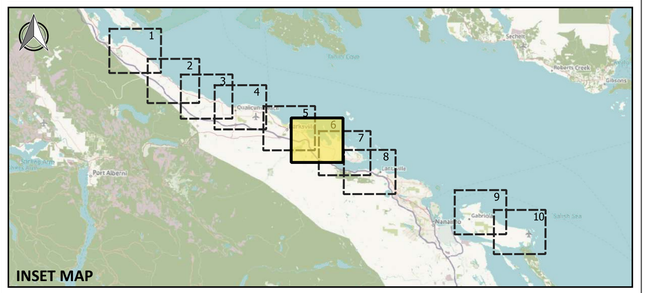

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Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

Professional Engineer — Province of British Columbia — T. S. LYLE — # 30051

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater Consulting

Cascadia Coast Research Ltd.

Strait of Georgia

Fairwinds

Area E

Red Gap

Area C

Lantzville

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

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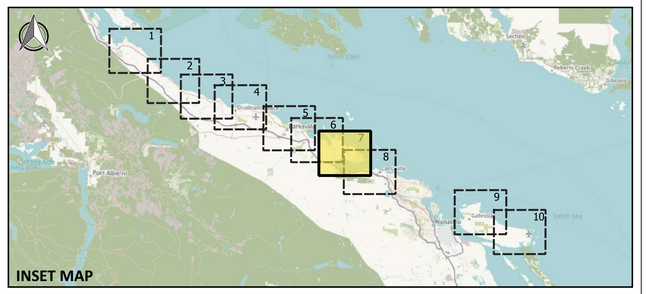
Regional District of Nanaimo

ELECTORAL AREA E (2 OF 2)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 7 of 10



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Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

Professional Engineer — Province of British Columbia — T. S. LYLE — # 30051

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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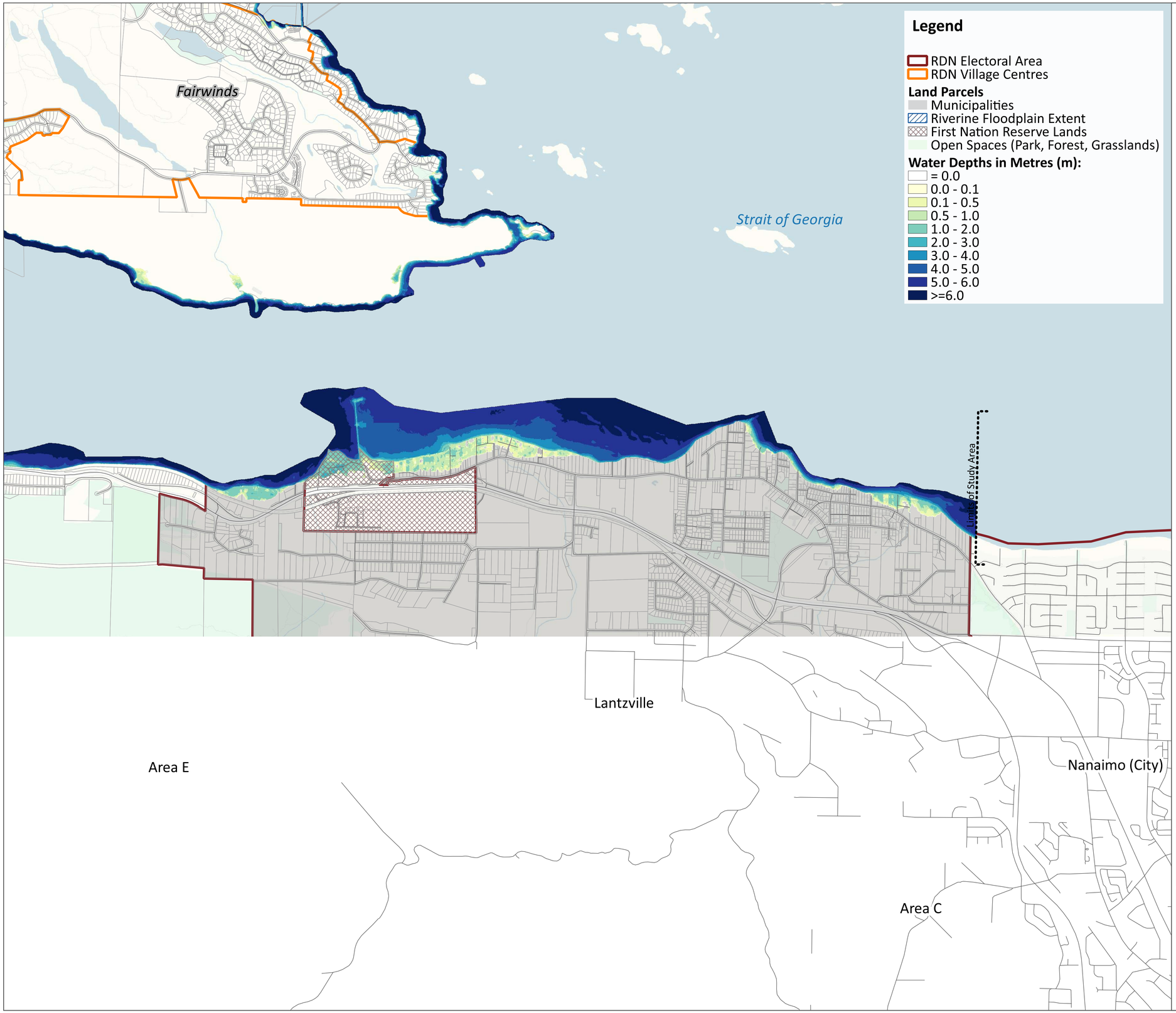
CASCADIA COAST RESEARCH LTD.

DISTRICT OF LANTZVILLE
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 8 of 10

REGIONAL DISTRICT OF NANAIMO



Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels
- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

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- 0.1 - 0.5
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- 1.0 - 2.0
- 2.0 - 3.0
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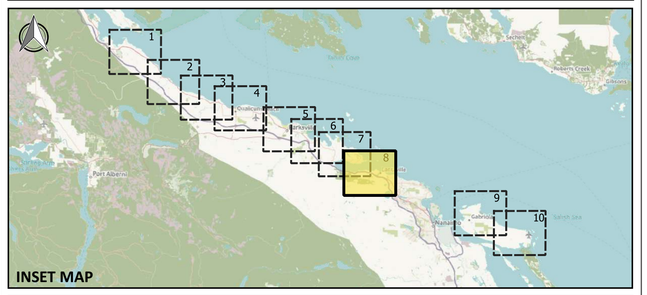

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Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30061 — ENGINEER

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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CASCADIA COAST RESEARCH LTD.

Strait of Georgia

Limits of Study Area

Gabriola Island

Area B

Nanaimo (City)

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
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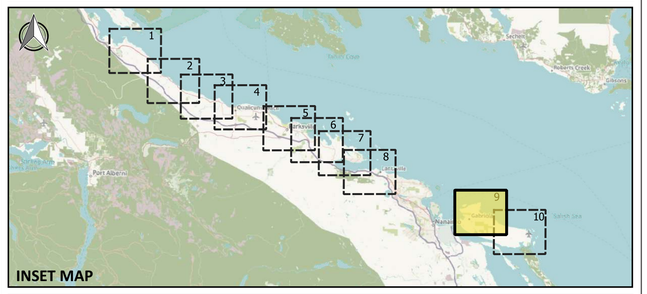
ELECTORAL AREA B (1 OF 2)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 9 of 10



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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30061

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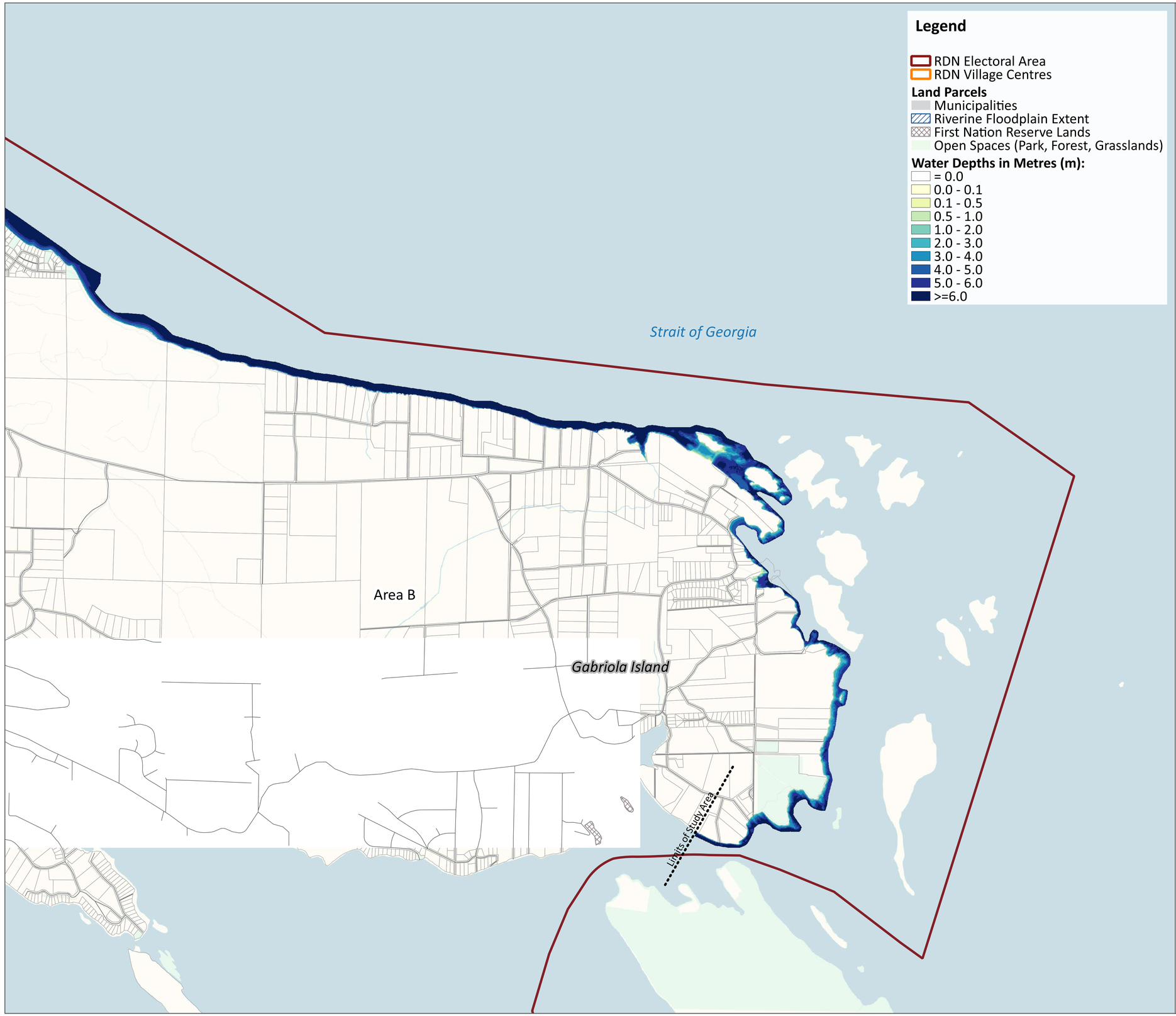

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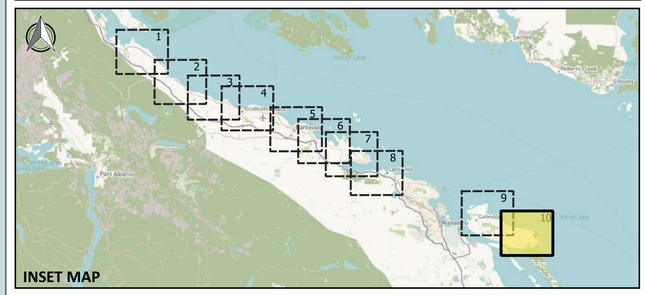
REGIONAL DISTRICT OF NANAIMO

ELECTORAL AREA B (2 OF 2)
COASTAL STORM INUNDATION MAP
6.67% AEP & 1 m RSLR

Map 10 of 10



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Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30051

N

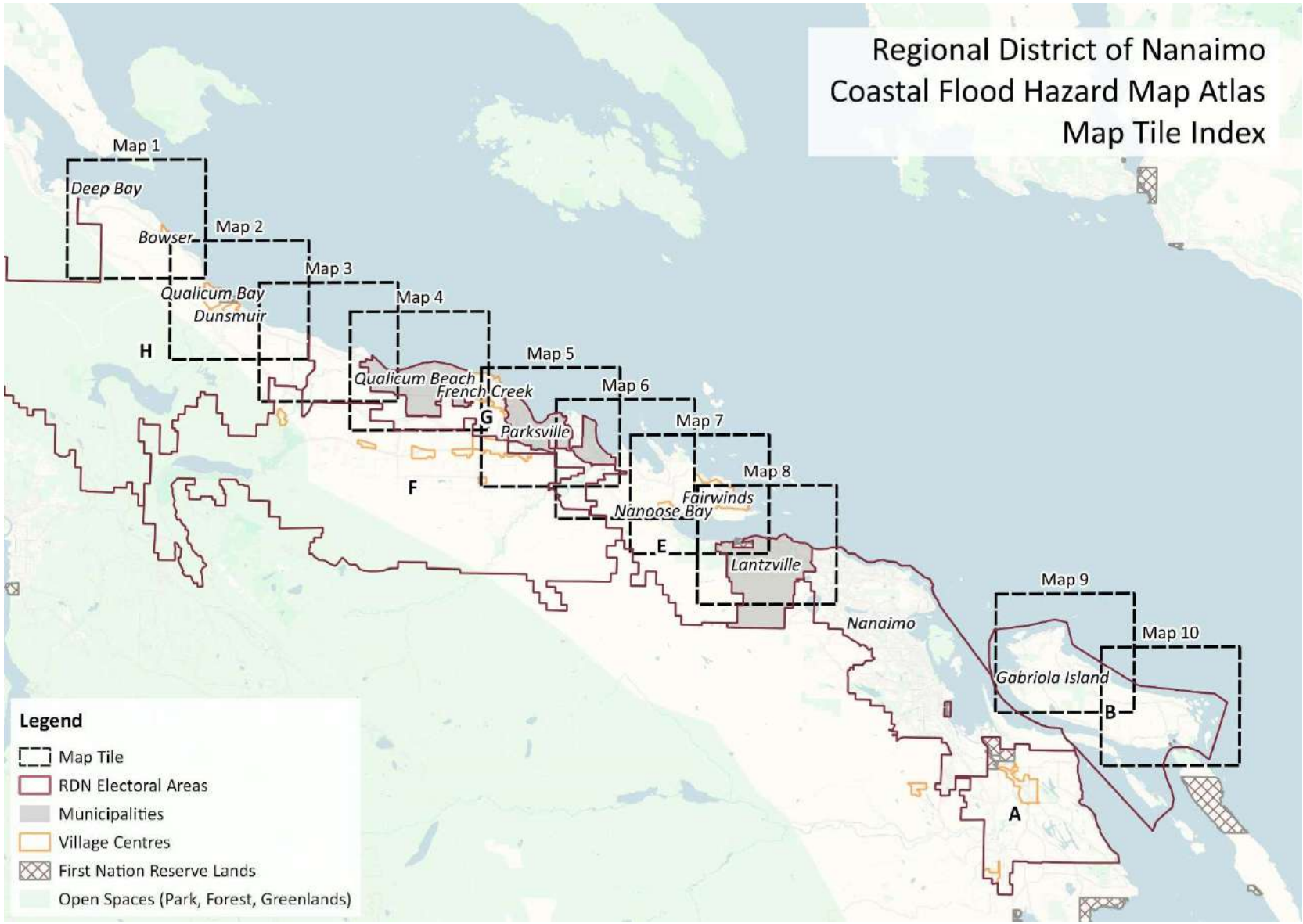
Scale: 1:15,000

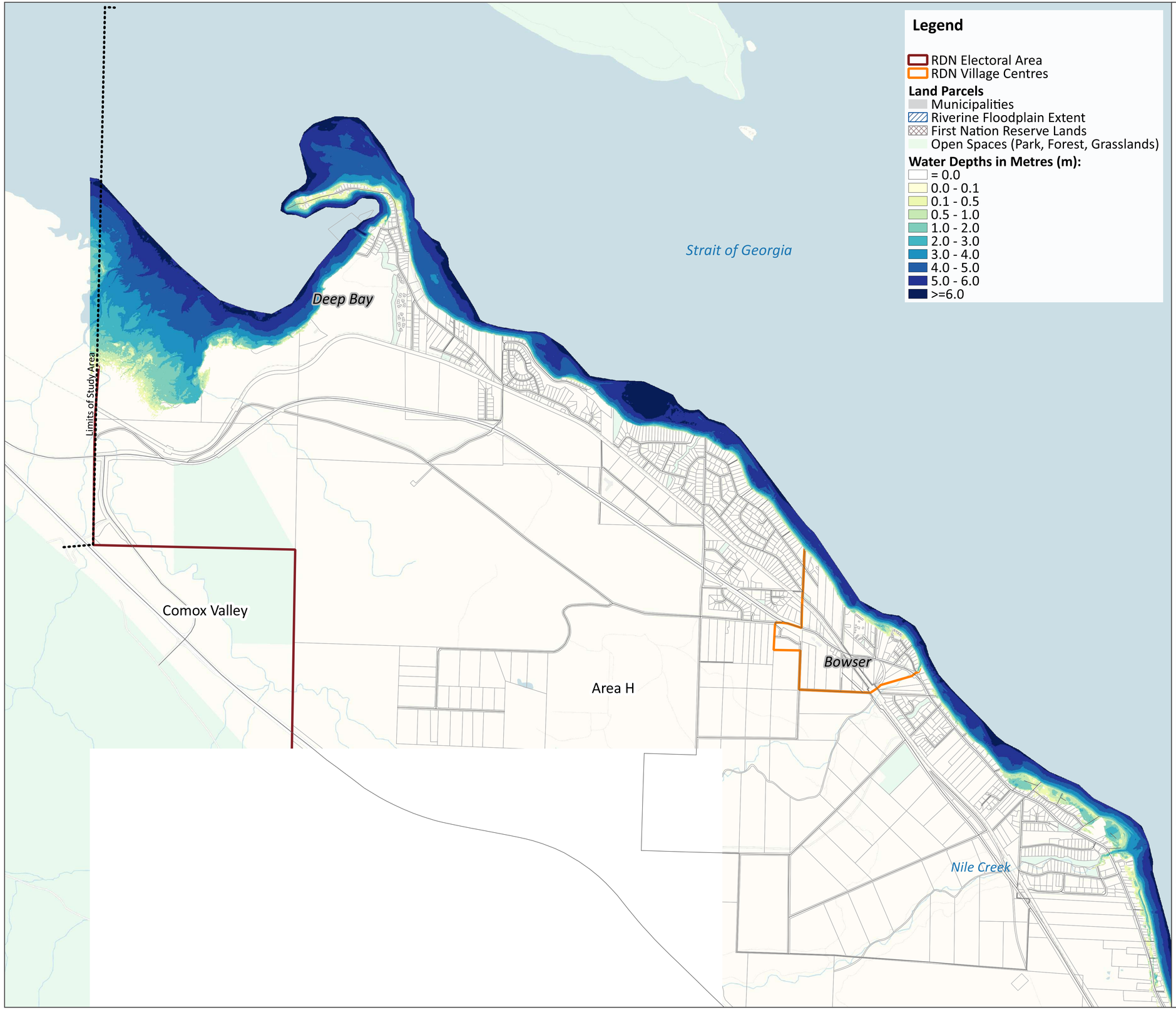
0 0.25 0.5 0.75 1 km

ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

Coastal Storm Inundation Maps – 0.5% AEP, 1.0 m RSLR - Map Tile Index





Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

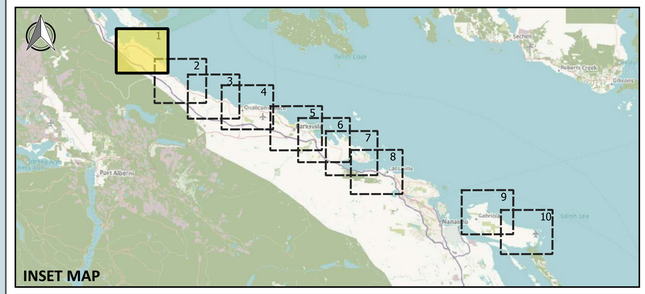
Water Depths in Metres (m):

- = 0.0
- 0.0 - 0.1
- 0.1 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- 4.0 - 5.0
- 5.0 - 6.0
- >=6.0

ELECTORAL AREA H (1 OF 3)
COASTAL STORM INUNDATION MAP

0.5% AEP & 1 m RSLR

Map 1 of 10



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3. The adopted values for sea level rise are based on guidelines from Ausenco Sandwell (2011). These are subject to change and RSLR values may need to be reassessed in future.
4. Water depths DO NOT include a freeboard allowance.

Limitations:
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Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — T. S. LYLE — # 30061 — BRITISH COLUMBIA — CANADA

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

Nile Creek

Strait of Georgia

Qualicum Bay

Dunsmuir

Big Qualicum River

Area H

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):

- = 0.0
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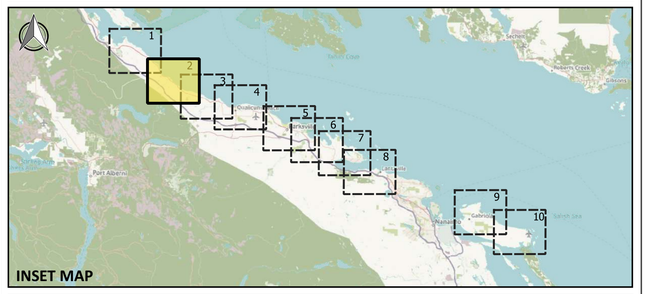
ELECTORAL AREA H (2 OF 3)
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 2 of 10



INSET MAP

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Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

ELECTORAL AREAS H (3 OF 3) & G (1 OF 2)
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 3 of 10

Regional District of Nanaimo

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels
- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):
- = 0.0
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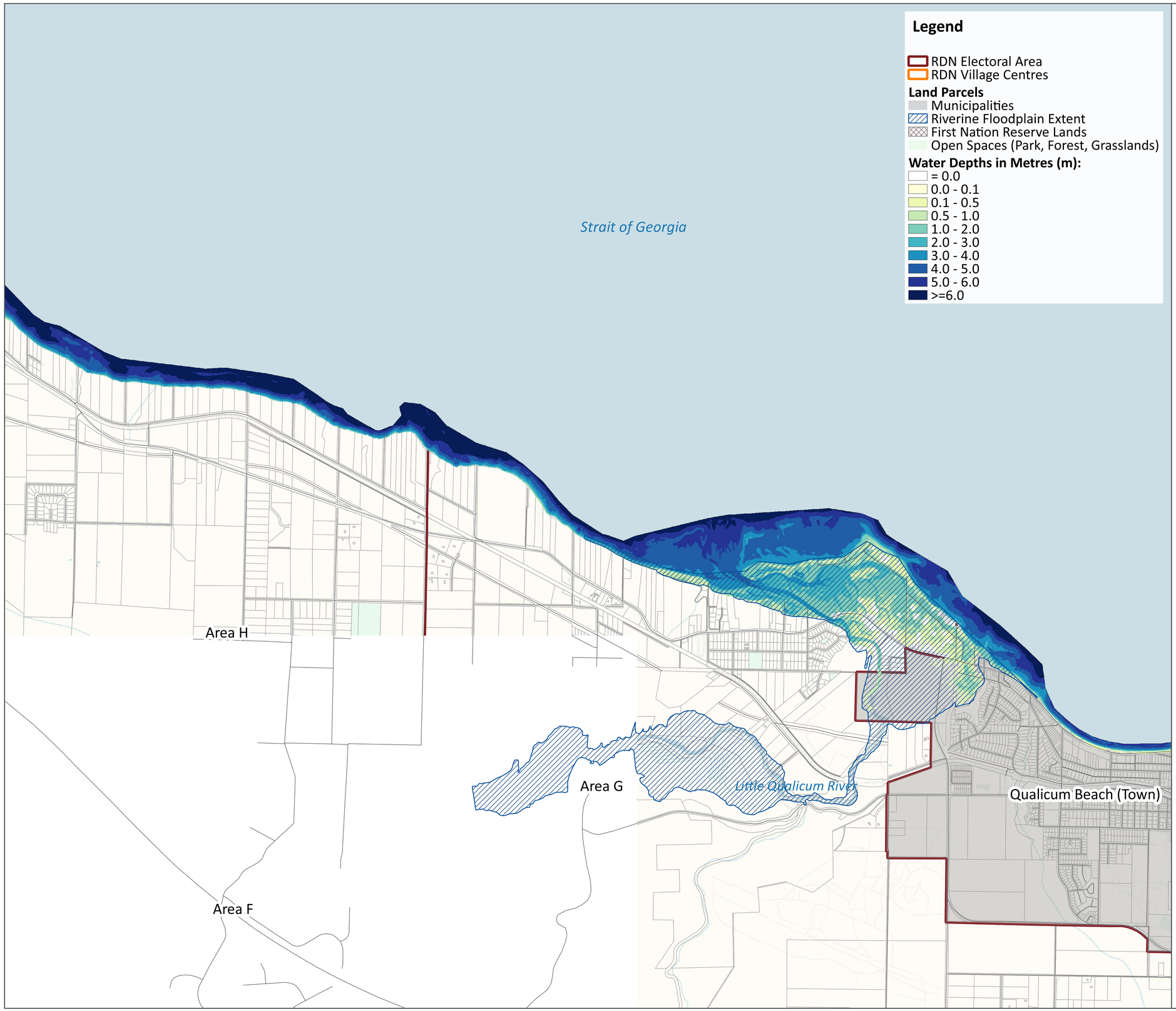

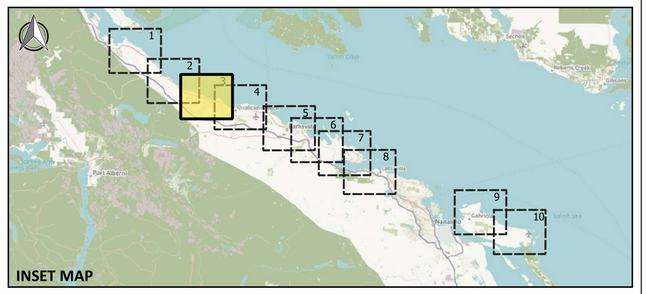

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Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

Professional Engineer — Province of British Columbia — T. S. LYLE # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater Consulting

Cascadia Coast Research Ltd.

TOWN OF QUALICUM BEACH
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 4 of 10

REGIONAL DISTRICT OF NANAIMO

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels
- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

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- >=6.0

Strait of Georgia

Little Qualicum River

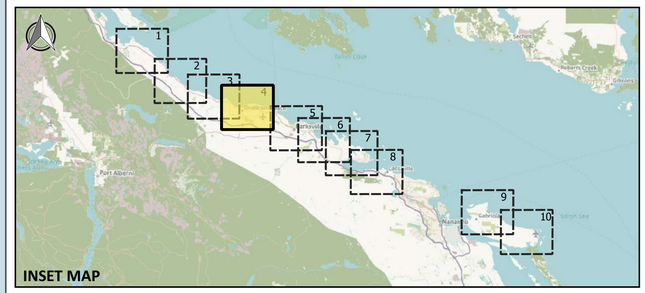
Qualicum Beach (Town)

French Creek

French Creek

Area F

Area G



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PROFESSIONAL ENGINEER — T. S. LYLE — # 30051 — PROVINCE OF BRITISH COLUMBIA

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

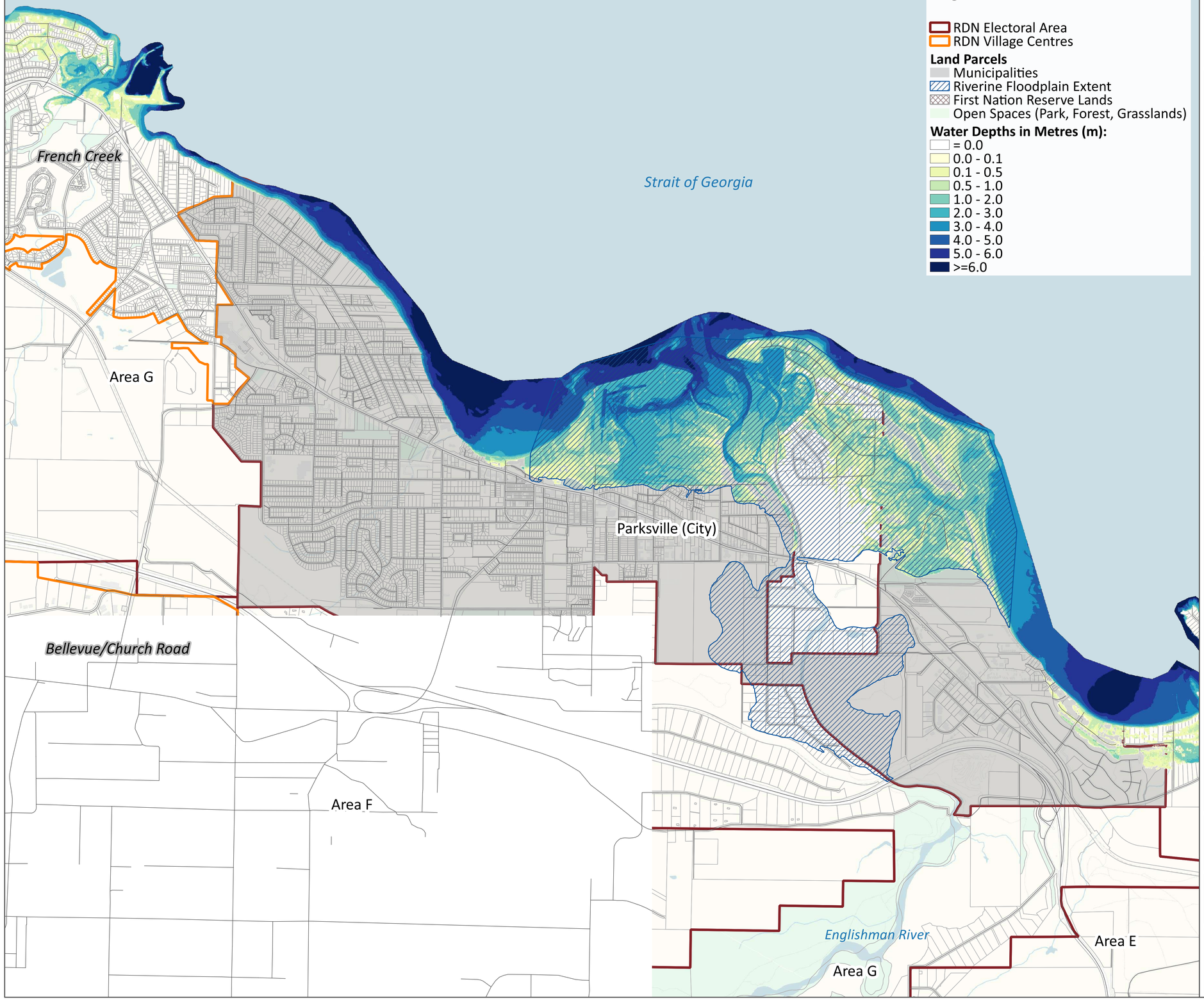
ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

CITY OF PARKSVILLE
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 5 of 10

REGIONAL DISTRICT OF NANAIMO



Legend

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- RDN Village Centres

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- Municipalities
- Riverine Floodplain Extent
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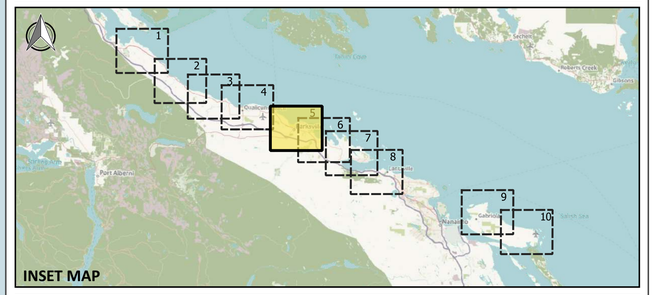
- 5.0 - 6.0
- >=6.0



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N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

ebbwater CONSULTING

CASCADIA COAST RESEARCH LTD.

ELECTORAL AREAS G (2 OF 2) & E (1 OF 2)
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 6 of 10

Regional District of Nanaimo

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels
- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
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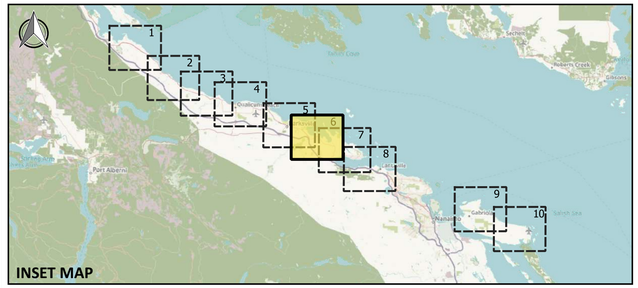

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Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30051

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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CASCADIA COAST RESEARCH LTD.

Parksville (City)

Strait of Georgia

Englishman River

Area G

Area F

Area E

Red Gap

Strait of Georgia

Fairwinds

Area E

Red Gap

Area C

Lantzville

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):

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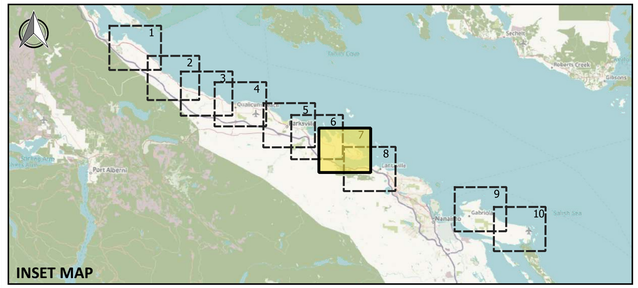
- 3.0 - 4.0
- 4.0 - 5.0
- 5.0 - 6.0
- >=6.0

Regional District of Nanaimo

ELECTORAL AREA E (2 OF 2)
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 7 of 10



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3. The adopted values for sea level rise are based on guidelines from Ausenco Sandwell (2011). These are subject to change and RSLR values may need to be reassessed in future.
4. Water depths DO NOT include a freeboard allowance.

Limitations:
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Vertical Datum:	CGVD 2013
Paper Size:	ANSI D

Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

Professional Engineer — Province of British Columbia — T. S. LYLE # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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CASCADIA COAST RESEARCH LTD.

DISTRICT OF LANTZVILLE
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 8 of 10

REGIONAL DISTRICT OF NANAIMO

Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels
- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

Water Depths in Metres (m):
- = 0.0
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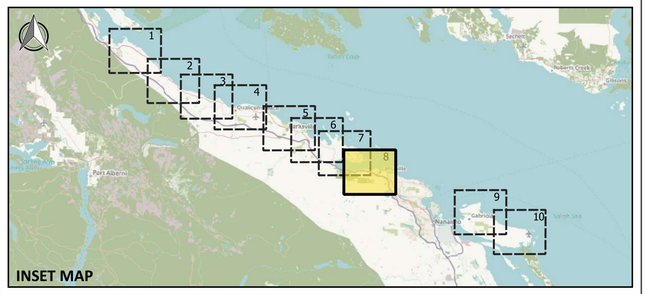

Fairwinds

Strait of Georgia

Limits of Study Area

Lantzville

Area E

Nanaimo (City)

Area C

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Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. S. LYLE # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

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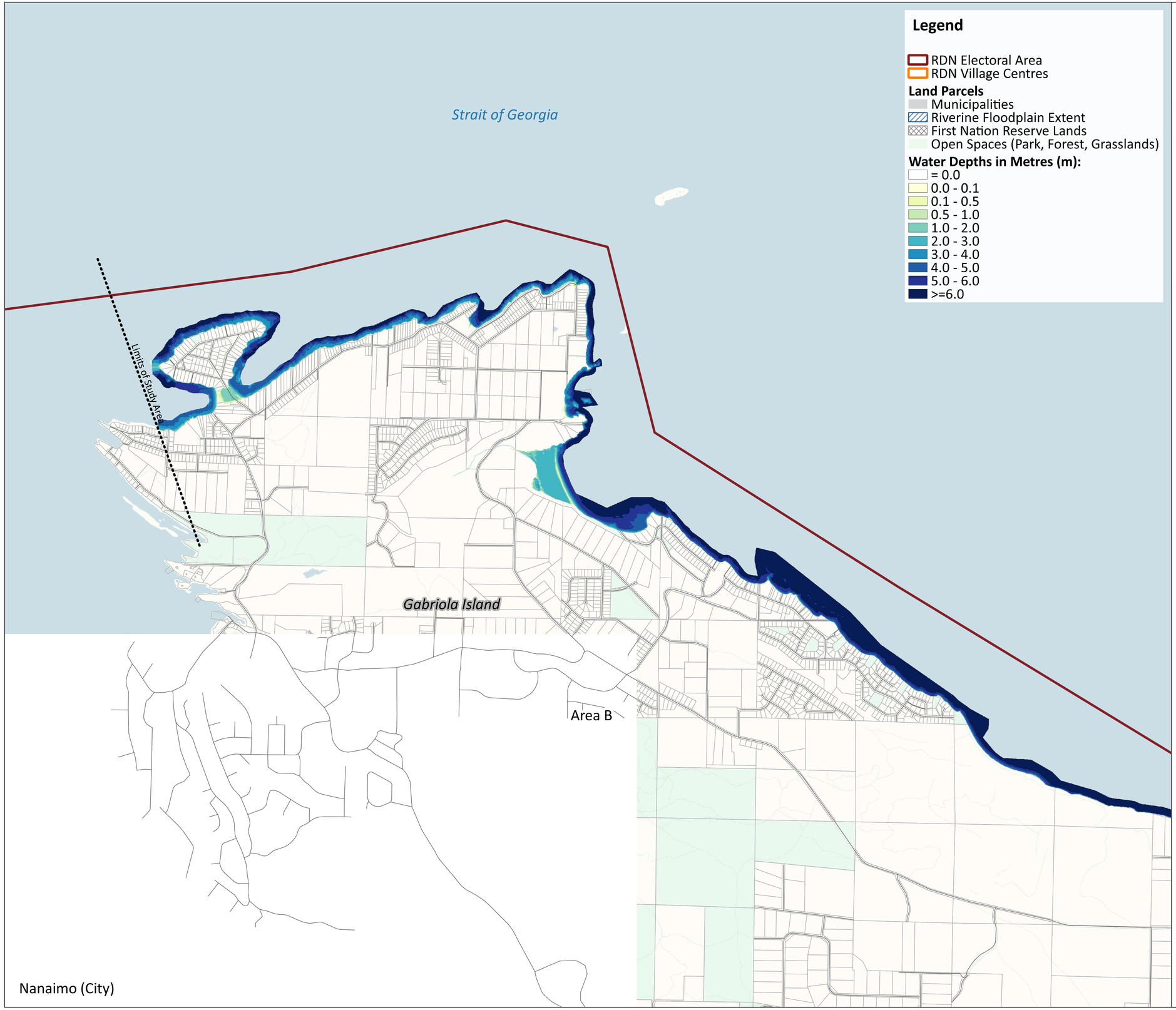
CASCADIA COAST RESEARCH LTD.



Legend

- RDN Electoral Area
- RDN Village Centres

Land Parcels

- Municipalities
- Riverine Floodplain Extent
- First Nation Reserve Lands
- Open Spaces (Park, Forest, Grasslands)

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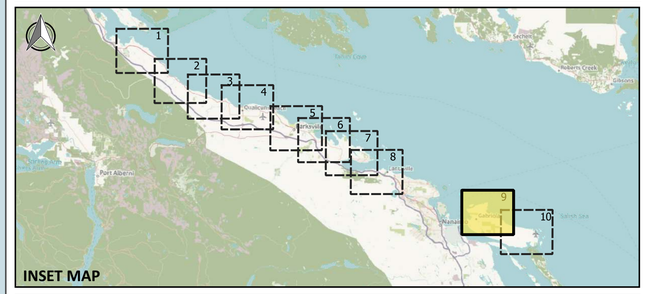
Regional District of Nanaimo

ELECTORAL AREA B (1 OF 2)
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 9 of 10



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Prepared By:	NS
Reviewed By:	AC
Checked By:	TL

Professional Engineer — Province of British Columbia — T. S. Lyle — # 30061

N

Scale: 1:15,000

0 0.25 0.5 0.75 1 km

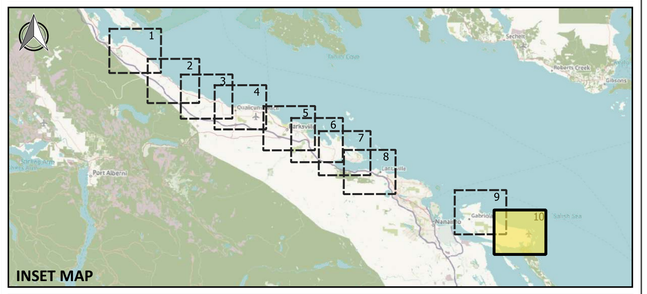
ebbwater Consulting

Cascadia Coast Research Ltd.

ELECTORAL AREA B (2 OF 2)
COASTAL STORM INUNDATION MAP
0.5% AEP & 1 m RSLR

Map 10 of 10

REGIONAL DISTRICT OF NANAIMO



Legend

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Land Parcels
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Strait of Georgia

Area B

Gabriola Island

Limits of Study Area

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0 0.25 0.5 0.75 1 km

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CASCADIA COAST RESEARCH LTD.