

# OAKWOOD PARK ESTATES ENVIRONMENTAL ASSESSMENT FOR MILLSTONE RIVERFRONT AT 1-1 TERMINAL AVE

PREPARED FOR:  
THE CITY OF NANAIMO  
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**CORVIDAE**  
ENVIRONMENTAL CONSULTING INC

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# 1 INTRODUCTION

Corvidae Environmental Consulting Inc. (Corvidae) is pleased to provide this environmental assessment for the proposed development at 1-1 Terminal Ave, on Millstone River, Nanaimo, B.C.

The intent of this report is twofold:

- Providing confirmation that the shoreline at this site location is, in-fact, marine (estuarine) and not freshwater habitat. However, as per direction from the City of Nanaimo, all estuarian areas are to be classified as Riparian with a 30 m setback assessment area.
- A detailed site assessment of the 30 m setback area from top of bank of the Millstone River as per the City of Nanaimo Development Permit Area (DPA) 2 regulations, and in anticipation of the updated Official Community Plan to become DPA 1. As shown in Figure 1, there is currently 10 m of shoreline that is vegetated at this time, the remainder is a paved parking lot.

The proposed development is provided in the conceptual design (see Appendix A) and includes a net environmental improvement of the currently impermeable area with additions of vegetation and raingardens. Appendix A provides details on the pervious vs impervious areas for the proposed project. Corvidae's Qualified Environmental Professional (QEP) focused on the 30 m area from high water mark for the purposes of this report. The high water mark, with the planned 3 to 1 slope would be the present natural boundary and considered the top of bank.

## BACKGROUND

The site is currently a paved parking lot and abandoned building. Historically, this area has been disturbed for more than 100 years, due to its central location in Nanaimo. The current condition of the area is derelict buildings and paved areas. This planned project will revitalize this area, adding connecting trails and greenspace, removal of invasive species and improvement of the riparian habitat. It will also meet the City of Nanaimo's objectives in the Master Plan. Specifically, Section 6.4 *Expand and Improve Trail and Greenway System* states that the public favors more trails for walking and cycling, trails being the most requested outdoor facility. The proposed trail extension will be a continuation of well used trail along the shoreline through Maffeo Sutton Park, Georgia Park, Harbourfront Walkway and a commuter cyclist route.

Strongitharm Consulting previously received a memo from Kevin Brydges, R.P.Bio and Environmental Protection Officer in Development Services with the City of Nanaimo. The memo states that the provincial Riparian Area Protection Regulation (RAPR) does not apply to this section of the river as it is estuarine, thus there is no SPEA to be calculated.<sup>1</sup> The shoreline DPA applies, DPA 2 – Environmentally Sensitive Areas.

An estuary is an area where a freshwater river or stream meets the ocean. In estuaries, the salty ocean mixes with a freshwater river, resulting in brackish water. Water continually circulates into and out of an estuary. Water level and salinity rise and fall with the tides.<sup>2</sup> From Corvidae's assessment of the location,

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<sup>1</sup> Kevin Brydges. September 7<sup>th</sup>, 2021. *Email correspondence*.

<sup>2</sup> National Geographic. 2021. *Resource Library: Encyclopedic Entry*. Accessed on: September 23, 2021.



it is a marine environment with shellfish and marine habitat along the shoreline of the project area, specific details provided below.

## 2 PROPOSED DEVELOPMENT

The northern portion of the project area is within 30 m setback area of the high-water mark of the Millstone River, part of the Riparian DPA, as specified by the City of Nanaimo environmental planner. This area is currently paved, except for 10 m of shoreline (less in some areas). A path is proposed inside the 15 m shoreline setback area, to connect with the existing path along the shoreline in Maffeo Sutton Park. This area is currently a concrete parking lot. The rest of the 30 m area will include trees, shrubs, forbs seating, rain gardens, drop-off parking and access. See the design plans for details. All building structures will be located outside of the 30 m estuary setback. This area includes treed areas, a rainwater garden, seating and parking (Appendix A). The community area along the river will add to the connectivity in the community.

The proposed trail will be a 4 m wide continuation of the paved trail from the parks to the east including Maffeo Sutton Park, Georgia Park, Harbourfront Walkway and a commuter cyclist route. The trail will be wheelchair accessible and run along the edge of the future Riverfront Park, occurring along the northern boundary of the 1-1 Terminal Ave property (10 U 431257 E, 5446936 N to 10 U 431348 E, 5446919 N).





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 1: Property Location with current site conditions

Property Location Parcel



**CORVIDAE**  
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0 25 50 100 150 200 Meters

Project: 1 - 1 Terminal Avenue | Sources: City of Nanaimo, ESRI Basemap

Corvidae Project No.  
COR-2021-113

Rev. #	Date
0	December 1, 2021

**Figure 1**

### 3 APPLICABLE REGULATORY FRAMEWORKS

The Provincial Riparian Areas Protection Regulations (December 2019) only applies to freshwater and therefore does not apply to this location.

In consulting the City of Nanaimo Official Community Plan (OCP) Map 3: Development Permit Areas & Heritage Conservation Areas, DPA 1 – Watercourses and DPA 2 – Environmentally Sensitive Areas apply.<sup>3</sup> DPA 2 – Environmentally Sensitive Areas refers to the 15 m assessment area adjacent to Millstone River.

*Since 1997, land use activities adjacent to watercourses and riparian areas in the City have been regulated under the City Watercourse Development Permit Area (DPA) and the City's Zoning Bylaw. The Zoning Bylaw sets requirements for subdividing land and siting buildings. It specifies that, as a general rule, no new structures, buildings, additions, driveways, parking lots, fences, etc., can be built within a watercourse setback area.*

*Rivers and streams with significant riparian areas have 30 m setbacks; however, most streams and creeks have 15 m setbacks, and minor streams that are isolated or indirectly flow into fish bearing watercourses have 7.5m setbacks. Lakes, wetlands and marine foreshore areas all have 15 m setbacks. Setback areas are measured from the Wetland Boundary for lakes and ponds, from the Natural Boundary of the ocean for marine shorelines, and from the 'Top of Bank' for rivers, creeks and streams.*

The top of bank for the new plan is from the present natural boundary (high water mark) due to the 3:1 slope. The present natural boundary is defined as "...the visible high water mark of any lake, river, stream or other body of water where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself."<sup>4</sup>

The City of Nanaimo Watercourse Protection states that lakes, wetlands and marine foreshore areas all have 15 m setbacks; and a 30 m setback from the present natural boundary for the Millstone River estuarian area. The City's Official Community Plan (OCP) modifies this rule by designating all watercourses, lakes, ponds and their setbacks as Watercourse Development Permit Areas (DPAs). This allows structures to be built within a setback area, provided a Development Permit (DP) is obtained. The Permit allows for the management of activities that can take place in a watercourse setback and the compensation needed within the setback area to maintain a 'no net loss' of habitat.<sup>5</sup> Within this setback area, non-permanent structures such as trails may be constructed following approval and permitting by the City of Nanaimo.

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<sup>3</sup> City of Nanaimo. 2008. City of Nanaimo Officially Community Plan. Map 3: Development Permit Areas & Heritage Conservation Areas. Available at: [Layout \(nanaimo.ca\)](https://www.nanaimo.ca/layout/nanaimo.ca). Accessed on: October 25, 2021.

<sup>4</sup> Ministry of Forests, Lands and Natural Resource Operations. 2011. Land Procedure Accretions and Derelictions. Available at: [accretions.pdf \(gov.bc.ca\)](https://www2.gov.bc.ca/gov2/accretions.pdf). Accessed on: October 25, 2021.

<sup>5</sup> City of Nanaimo. 2021. *Watercourse Protection*. Available at: [Watercourse Protection \(nanaimo.ca\)](https://www.nanaimo.ca/watercourse-protection). Accessed on: September 23, 2021.



The following numbered list is from section 6.6 of the City of Nanaimo OCP policies for trail infrastructure:

6. Trails may be constructed in watercourse leave strips, steep slopes and other undevelopable lands where their presence will not negatively impact on environmental qualities, agricultural or other resource values, or endanger users.
7. Trail planning, design, construction and maintenance on “environmentally sensitive lands” will adhere to the *Trail Implementation Plan* and the *Guidelines for Municipal Works and Services Within Environmentally Sensitive Areas (ESAs)* as updated.<sup>6</sup>

Provided these policies are followed, no other environmental permitting related to Millstone River is required for the proposed mixed-use development and trail construction.

This memo does not discount other relevant legislation that must be followed throughout development including:

#### **Provincial**

- British Columbia (BC) *Wildlife Act* (1996)
- Invasive Species Council of BC
- *Weed Control Act* (1996, current as of October 2016)

#### **Federal**

- Migratory Birds Act (1994)
- Species at Risk Act (2002)
- Fisheries Act (2019)

## **4 METHODS**

### **DESKTOP REVIEW**

Baseline biophysical conditions were compiled by reviewing the best available data and information including existing reports for the area and conducting searches of online provincial and federal databases:

- BC Conservation Data Centre (BC CDC 2021a and 2021b);
- BC HabitatWizard (Province of BC 2021);
- Aerial photographs of the property (Google Earth 2021);
- City of Nanaimo mapping system and database.

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<sup>6</sup> City of Nanaimo. 2008. Official Community Plan: Section 6.6 Trail Infrastructure. Accessed on: September 22, 2021.



## FIELD ASSESSMENT

A Qualified Environmental Professional (QEP) from Corvidae conducted a field assessment on September 16, 2021 (see Appendix B for photos). At the time of assessment, it was clear that the area in the project area was tidal, with the High-Water Mark (HWM) (also referred to as the Present Natural Boundary) being marine in nature, not freshwater. The change from marine environment to freshwater was surveyed by the QEP to be approximately 125 m upstream. This was evident by a change in substrate including a change from shellfish occurring in the marine area, to none in the freshwater area. The site assessment verified the City of Nanaimo Biologist's findings that is a marine shoreline.

## 5 ENVIRONMENTAL ASSESSMENT

Corvidae completed a site visit on September 16, 2021. The property is predominantly a paved area, with shoreline vegetation including with high densities of Himalayan blackberry and English ivy. The shoreline is large rock, with vegetation species listed in Table 1. There is extensive human use, indicated by the invasive species and garbage along the shoreline. Appendix B shows photos of the shoreline vegetation.

### CLIMATE AND BIOGEOCLIMATIC ZONE

The project is located within the Coastal Douglas-fir (CDF) biogeoclimatic zone, specifically in the Moist Maritime Coastal Douglas-fir Subzone (CDFmm) (BC CDC 2020b). The CDFmm occurs at low elevations (<150 m) along southeast Vancouver Island, the southern Gulf Islands, and part of the Sunshine Coast. The CDFmm has the mildest climate in Canada. This subzone has a long growing season with warm, dry summers and mild, wet winters.

### TERRAIN AND SOILS

Soils in the CDF biogeoclimatic zone, generally derived from morainal, colluvial, and marine deposits, are typically Brunisols, grading with increased precipitation to Humo-Ferric Podzols (Pojar et al. 1991).

The property is sloping steeply to the north, to the river. The shoreline is large rocks and chunks of concrete from historical use.

### VEGETATION

Dry forests in the CDFmm zone are typically dominated by Douglas-fir, arbutus, and western redcedar. Grand fir and shore pine may also be present. Salal (*Gaultheria shallon*), dull Oregon-grape (*Mahonia nervosa*), ocean spray (*Holodiscus discolor*), baldhip rose (*Rosa gymnocarpa*), and red huckleberry (*Vaccinium parvifolium*) are common in the shrub layer. Bracken fern (*Pteridium aquilinum*), snowberry (*Symphoricarpos* spp.), grasses, and pacific sanicle (*Sanicula crassicaulis*) are common in the herb layer. Oregon beaked moss (*Eurhynchium oregonum*), step moss (*Hylocomium splendens*), and electrified cat's-tail moss (*Rhytidiadelphus triquetrus*) dominate the well-developed moss layer (Pojar et al. 1991).





The majority of the property is paved. The species typically occurring in this area are not occurring on the property, likely due to long term human disturbance. The section along the shoreline that is vegetated includes species listed in Table 1.

At the time of the assessment the tide was ebbing into the wetted area adjacent to the project. The QEP also noted a muddy substrate interspersed with gravels and cobbles covered in barnacles and saltwater mollusks. Given the visual markings of tidal influences on the landscape, marine muddy substrate and abundant presence of saltwater organisms including barnacles and molluscs, the waterbody description of this segment of Millstone River is estuarine.

**Table 1. Plant species observed on site during field visit on September 16**

Common Name	Scientific Name	BC Provincial Status <sup>1</sup>	SARA Schedule 1 Status <sup>2</sup>
Bigleaf maple	<i>Acer macrophyllum</i>	Yellow	--
Canada thistle	<i>Cirsium arvense</i>	<b>Invasive</b> ; Exotic	--
Common snowberry	<i>Symphoricarpos albus</i>	Yellow	--
English ivy	<i>Hedera helix</i>	<b>Invasive</b> ; Exotic	--
Field dock	<i>Rumex pseudonatronatus</i>	Exotic	--
Himalayan blackberry	<i>Rubus armeniacus</i>	<b>Invasive</b> ; Exotic	--
Oceanspray	<i>Holodiscus discolor var. discolor</i>	Yellow	--
Orchard grass	<i>Dactylis glomerata</i>	Exotic	--
Scentless chamomile	<i>Matricaria perforata</i>	<b>Invasive</b> ; Exotic	--
Scotch broom	<i>Cytisus scoparius</i>	<b>Invasive</b> ; Exotic	--
Spurge-laurel	<i>Daphne laureola</i>	<b>Invasive</b> ; Exotic	--
Sword fern	<i>Polystichum munitum</i>	Yellow	--
Trailing blackberry	<i>Rubus ursinus</i>	Yellow	--

<sup>1</sup> BC CDC 2021a

<sup>2</sup> Government of Canada 2021

## WILDLIFE

The forested habitat is found in the Coastal Western Hemlock biogeoclimatic zone is home to many wildlife species. Black-tailed deer, black bear, marten and gray wolf are the most common large mammals in this zone on Vancouver Island. For bird species in this zone, the following typically occur: great horned owl, barred owl, ruffed grouse, band-tailed pigeon, northern flicker, hairy woodpecker, common raven, Steller's jay, chestnut-backed chickadee, red-breasted nuthatch, varied thrush, red-tailed hawk, Townsend's warbler. The following amphibians may occur in this biogeoclimatic zone: western toad, Pacific treefrog, western red-backed salamander (Pojar et al. 1991).

The property provides a corridor along the river's edge for wildlife, and the trees provide nesting habitat for birds, and cover for small mammals, amphibians and reptiles.

During the site assessment the species in Table 2 were found on the site.



**Table 2. Wildlife Species observed on site during field visit on September 16, 2021**

Common Name	Scientific Name	BC Provincial Status <sup>1</sup>	SARA Schedule 1 Status <sup>2</sup>
Common gull	<i>Larus canus</i>	Yellow	--
American crow	<i>Corvus brachyrhynchos</i>	Yellow	--
Robin	<i>Turdus migratorius</i>	Yellow	--
Pacific Wren	<i>Troglodytes pacificus</i>	Yellow	--

<sup>1</sup> BC CDC 2021a<sup>2</sup> Government of Canada 2021

## SPECIES AT RISK

A query of the BC CDC iMap tool yielded occurrences of the following 9 species at risk and 3 ecosystems at risk within a two-kilometer radius of the property (BC CDC 2021b). Species are listed in Table 3 and the location of occurrences in relation to the property is provided in Figure 2.

**Table 3. Species at risk that may occur in the vicinity of the project area**

Common Name	Scientific Name	BC Provincial Status <sup>1</sup>	SARA Schedule 1 Status <sup>2</sup>
<b>Species</b>			
American bittern	<i>Botaurus lentiginosus</i>	Red	--
Vancouver Island Beggarticks	<i>Bidens amplissima</i>	Blue	Special concern
Purple martin	<i>Progne subis</i>	Blue	--
Western Painted Turtle	<i>Chrysemys picta</i>	Blue	Special concern
Great blue heron	<i>Ardea herodias fannin</i>	Blue	Special concern
Bog bird's-foot Lotus	<i>Lotus pinnatus</i>	Red	Endangered
Western bumblebee	<i>Bombus occidentalis</i>	Blue	--
<b>Ecosystems</b>			
Douglas-fir / dull Oregon-grape	<i>Pseudotsuga menziesii / Mahonia nervosa</i>	Red	--
Grand fir/ Dull Oregon-grape	<i>Abies grandis / Mahonia nervosa</i>	Red	--

<sup>1</sup> BC CDC 2021a<sup>2</sup> Government of Canada 2021

## CRITICAL HABITAT

A review of CDC iMap (2021) was completed and the Douglas-fir/dull Oregon-grape ecosystem was identified within the property boundary. However, during the site visit it was evident that this ecosystem is not present. The area has been entirely disturbed with invasive species, concrete debris and garbage present.



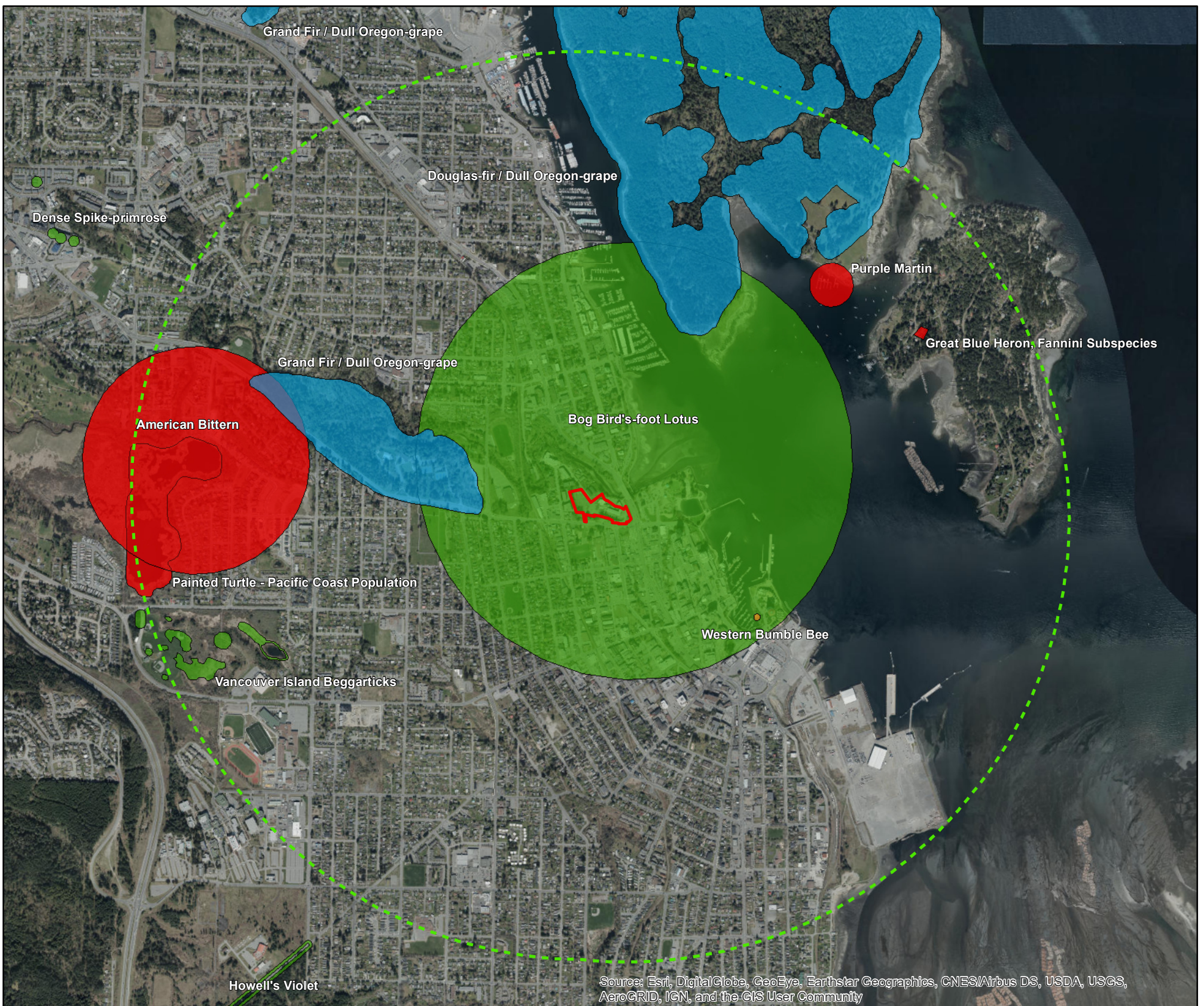
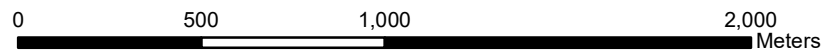
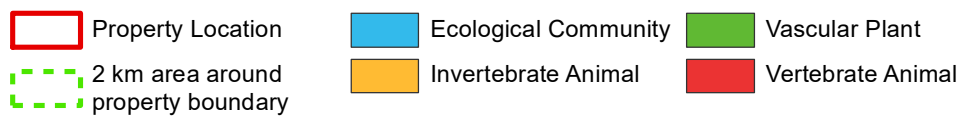


Figure : CDC Species at Risk



Project: 1 Terminal Avenue | Source: ESRI Basemap, DataBC



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Rev. #

0

Date

December 1, 2021

**Figure &**

## 6 ENVIRONMENTAL PROTECTION MEASURES

### SHORELINE REVEGETATION

Due to pre-existing disturbance on the subject property, the proposed development would improve the estuarian area by removing existing pavement, removing concrete pieces on the shoreline, removal of debris and invasive species, and reducing the slope to a 3:1 to add more vegetation. Following that building a trail that connects with the existing pathways through Maffeo Sutton Park, and access, sidewalk, viewing platforms and drop off parking, there will be planting native vegetation in the remaining the 30 m area that is currently paved. These areas will be revegetated with the native species that naturally occur in this ecosystem, including big leaf maple, willow, snowberry and ocean spray (details provided in Table 4). The area directly above the high-water mark will be bioengineered with live willow staking (*Salix pacifica*). This is an effective way of reducing the slope and creating estuarian habitat for wildlife. They will be planted at a high density to improve habitat in the area. A detailed landscape design plan has been provided as part of the application with the detailed native plant species list (also shown in Tables 4 and 5).

**Table 4. Riparian Vegetation Species to be Planted**

Species Name	Quantity
<i>Cornus sericea</i>	14
<i>Mahonia Aquifolium</i>	34
<i>Myrica californica</i>	18
<i>Physocarpus capitatus</i>	18
<i>Polystichum munitum</i>	214
<i>Ribes sanguineum</i>	29
<i>Rosa nutkana</i>	36
<i>Salix scouleriana</i>	57
<i>Sambucas racimus</i>	19
<i>Spiraea douglasii</i>	143
<i>Symphoricarpos alba</i>	39

### NET REDUCTION IN IMPERMEABLE SURFACES

With the planned development there will be a net increase of 1126 m<sup>2</sup> of permeable area that will be a combination of riparian vegetation, rain gardens and permeable pavers in the 30 m area. This is a net improvement of vegetation and greenspace from what it is now (see Appendix A). As shown in the design plan, the area that is now parking lot (within the 30 m area) will become vegetated, with the exception of the trail, a portion of sidewalk, trail, access and terracing for seating.

### IMPROVEMENT OF STORMWATER QUALITY

With the proposed design and development there will be rainwater gardens and advanced treatment in run-off into the shoreline and estuarian environment, in comparison to what is currently on site. Currently the stormwater runs directly from the parking lot to the shoreline and estuarian environment. There are detailed rainwater garden planting plans, with vegetation species listed in the landscape design plan.

The species included in the rainwater garden are provided in Table 5.



**Table 5. Rainwater Garden Vegetation Species**

<b>Trees</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Acer griseum</i>	Paperbark Maple
<i>Cornus kousa 'Milky Way'</i>	Milky Way Kousa Dogwood
<i>Nyssa sylvatica</i>	Tupelo
<i>Cercidiphyllum japonicum</i>	Katsura Tree
<i>Chamaecyparis nootkatensis 'Pendula'</i>	Nootka Flase Cypress
<i>Styrax japonicus 'Emerald Pagoda'</i>	Japanese Snowbell
<b>Shrubs</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Aster novae-angliae</i>	New England Aster
<i>Carex bunchanii</i>	Leatherleaf Sedge
<i>Carex obnupta</i>	Slough Sedge
<i>Cornus sanguinea 'Midwinter Fire'</i>	Midwinter Fire Dogwood
<i>Polystichum munitum</i>	Sword Fern
<i>Quisetum hyemale</i>	Scouring Rush
<i>Juncus 'Carmen's Grey'</i>	Soft Common Rush
<i>Salix purpurea 'Nana'</i>	Swdar Arctic Blue Leaf Willow
<i>Spiraea douglasii</i>	Hardhack
<i>Physocarpus capitatus</i>	Pacific Ninebark
<i>Vaccinium ovatum</i>	Evergreen Huckleberry
<i>Verbena bonariensis</i>	Tall Verbana

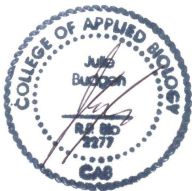


## 7 CONCLUSION

The northern portion of the project area overlaps a 30-meter estuarian assessment area on the Millstone River. The area of Millstone River north of the 1-1 Terminal Ave property is estuarine due to tidal influences from the Salish Sea and thus the RAPR is not required (as confirmed with the City of Nanaimo).

The City of Nanaimo Watercourse Protection webpage states that estuary areas all have 30 m setbacks, and these setbacks are measured from the present natural boundary of the ocean shoreline. A 30 m estuarine setback has been applied to the design plan, measured from the present natural boundary (highwater mark) of the estuary. The permanent structures (buildings) of the proposed development will not encroach this setback area. The proposed trail is planned to occur within the 30 meter setback as is permitted in Section 6.6 of the City of Nanaimo OCP. There will be an overall increase of 1126 m<sup>2</sup> in the 30 m DPA area, with an increase in native vegetation and habitat for wildlife. Overall, it will be an improvement from what is currently in place with respect to increase in greenspace, removal of invasives, decrease of concrete debris and surface areas and providing viewing platforms and trail connectivity for the downtown core of Nanaimo.

Report Prepared By:



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# APPENDIX A – DESIGN PLAN







THIS DOCUMENT HAS BEEN ELECTRONICALLY CERTIFIED WITH DIGITAL CERTIFICATE AND ENCRYPTION TECHNOLOGY AUTHORIZED BY THE ABC. THE AUTHORITY ORIGINAL IS IN ELECTRONIC FORM. ANY PRINTED VERSION CAN BE RELIED UPON AS A TRUE COPY OF THE ORIGINAL. WHEN SUPPLIED BY D'AMBROSIO architecture + urbanism, BEARING IMAGES OF THE PROFESSIONAL SEAL AND DIGITAL CERTIFICATE OR WHEN PRINTED FROM THE DIGITALLY CERTIFIED ELECTRONIC FILE.

- NOTES:
1. Development scenario based on preliminary information and assumptions subject to changes and verification.
  2. Topographic information shown on the site has been manipulated from the existing and is preliminary in nature. Please refer to the legal survey for existing topographic information.
  3. Riparian setbacks and Natural Boundary are shown as per the legal survey provided by Turner and Associates and JE Anderson & Associates and are preliminary in nature. Both will need to be confirmed.
  4. Top of Bank established based on City of Nanaimo definition. Exact location will need to be confirmed.
  5. Floor Area Ratio (FAR) is shown inclusive of allowable base density and the additional requirements to achieve maximum allowable density within the zone based on providing 100% of required parking underground.
  6. Project Data is calculated as per City of Nanaimo Regulations.
  7. All numbers are approximate and subject to confirmation of technical and regulatory requirements.
  8. Density calculations are based on gross site area and are inclusive of road area and open space area.
  9. Lot numbers have been assigned for the purposes of this study. Lot lines are diagrammatic. All legal information to be prepared by qualified BCLS.

rev no	description	date
4	Re-issued for RZ Tech. Upd. 3	07/29/2022
3	Re-issued for RZ Tech. Upd. 2	06/03/2022
2	Re-issued for RZ Tech. Update	05/17/2022
1	Issued for Rezoning App.	07/22/2021

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project name  
**Millstone Waterfront**  
Nanaimo, B.C.

sheet title  
**Indicative Urban Design Plan**

project no.	1932
drawing file	DAU Drawing Standards
date issued	June 3, 2022
scale	As Noted
drawn by	AC
checked by	FDA
revision no.	sheet no.

## APPENDIX B – SITE PHOTOGRAPHS

**Photo 1. Looking at the shoreline of Millstone River and adjacent vegetation. September 2021.**



**Photo 2. Example of shoreline vegetation along Millstone River. The invasive English Ivy was seen in abundance. September 2021.**



**Photo 3. Mud, gravel and cobble substrate on the floor of Millstone River. Marine species including barnacles and mollusks were observed in abundance indicating the area is estuarine. September 2021.**



**Photo 4. Looking at the wetted width and highwater mark of Millstone River. September 2021.**

