THE CORPORATION OF THE CITY OF VERNON
REPORT TO COUNCIL

SUBMITTED BY: Roy Nuriel
Economic Development Planner

COUNCIL MEETING: REG ☒ COW ☐ I/C ☐
COUNCIL MEETING DATE: March 28, 2022
REPORT DATE: March 16, 2022
FILE: 3340-20 (OCP00089 / ZON00376)

SUBJECT: **OFFICIAL COMMUNITY PLAN AMENDMENT AND REZONING APPLICATIONS FOR PORT OKANAGAN AT 2525 LAKESHORE ROAD AND 7295 OKANAGAN LANDING ROAD**

PURPOSE:

To review the applications to amend the Official Community Plan land use designation at 2525 Lakeshore Road and 7295 Okanagan Landing Road and to rezone the properties from 'R5 - Four-plex Housing Residential' and 'C10 - Tourist Commercial' to 'P5 - Private Park' and to a new Comprehensive Development Area (CD7) zone to allow the development of "Port Okanagan" - a mixed use waterfront village with multi family residential and commercial uses, including a resort hotel, designed around park space and an environmentally sensitive wetland area.

RECOMMENDATION:

THAT Council support, in principle, the application to amend the Official Community Plan land use designation for a portion of the properties at Lot A, Plan EPP57999, Sec 30, Twp 9, DL 62, ODYD and Lot 5, Plan KAP58651, DL 62, ODYD (2525 Lakeshore Road and 7295 Okanagan Landing Road) from 'Mixed Use - Medium Density Commercial and Residential' to 'Park' and from 'Park' to 'Mixed Use - Medium Density Commercial and Residential', as shown in Attachment 5 and outlined in the report titled "Official Community Plan Amendment and Rezoning Applications for Port Okanagan at 2525 Lakeshore Road and 7295 Okanagan Landing Road" dated March 16, 2022 and respectfully submitted by the Economic Development Planner;

AND FURTHER, that Council support presenting the proposed Official Community Plan Amendment application at a public open house in order to seek public input prior to the Public Hearing;

AND FURTHER, that Council support, in principle, the application to rezone Lot A, Plan EPP57999, Sec 30 Twp 9, DL 62, ODYD and Lot 5, Plan KAP58651, DL 62, ODYD (2525 Lakeshore Road and 7295 Okanagan Landing Road) from 'R5 - Four-plex Housing Residential' and 'C10 - Tourist Commercial' to 'P5 - Private Park' and to a new Comprehensive Development Area (CD7) zone, as shown in Attachments 7 and 8, in order to develop the Port Okanagan mixed use development.

ALTERNATIVES & IMPLICATIONS:

1. THAT Council not support the application to amend the Official Community Plan land use designation for a portion of the properties at Lot A, Plan EPP57999, Sec 30, Twp 9, DL 62, ODYD and Lot 5, Plan KAP58651, DL 62, ODYD (2525 Lakeshore Road and 7295 Okanagan Landing Road) from 'Mixed Use - Medium Density Commercial and Residential' to 'Park' and from 'Park' to 'Mixed Use - Medium Density Commercial and Residential', as shown in Attachment 5 and outlined in the report titled "Official Community Plan Amendment and Rezoning Applications for Port Okanagan at 2525 Lakeshore Road And 7295 Okanagan Landing Road" dated March 16, 2022 and respectfully submitted by the Economic Development Planner;

AND FURTHER, that Council not support the application to rezone Lot A, Plan EPP57999, Sec 30, Twp 9, DL 62, ODYD and Lot 5, Plan KAP58651, DL 62, ODYD (2525 Lakeshore Road and 7295 Okanagan Landing Road) from 'R5 - Four-plex Housing Residential' and 'C10 - Tourist Commercial' to 'P5 - Private Park' and to a new Comprehensive Development Area (CD7) zone, as shown in Attachments 7 and 8, in order to develop the Port Okanagan mixed use development.

Note: This alternative does not support the Official Community Plan (OCP) amendment and rezoning applications. As such, the development would not proceed as proposed.

ANALYSIS:

A. Committee Recommendations:

Should Council support the applications in principle, the Advisory Planning Committee (APC) will review the proposed Official Community Plan amendment and rezoning applications following the OCP public open house and prior to first and second readings. This would allow the APC an opportunity to provide recommendations related to the development after considering the input from the OCP open house.

B. Rationale:

1. Background

The subject properties are located at 2525 Lakeshore Road and 7295 Okanagan Landing Road (Figures 1 and 2) and have a total area of 6.35 hectares (15.7 acres). The site includes approximately 7 acres of an environmentally sensitive wetland area known as the Marshall Wetlands. The subject properties are located within the Waterfront Neighbourhood Centre and designated Mixed Use Core Areas 'A' and 'B' in the Waterfront Neighbourhood Centre Plan (WNCP) (Attachment 1).

Avillia Developments proposes to develop the properties into a mixed use waterfront village called "Port Okanagan". Administration has been working with Avillia's team over the past several months to review the Master Plan for the property and align their development proposal with the policies in the WNCP. The Master Plan features a mixed use village with residential buildings, commercial uses, a hotel and conference centre and preservation of existing wetlands in a park area with a network of pedestrian pathways and public lake access (Attachments 2 and 3). Port Okanagan would offer a unique opportunity to increase public enjoyment of the lake while creating a tourist and residential destination, as envisioned in the WNCP and Council's strategic policies for the community's waterfront.

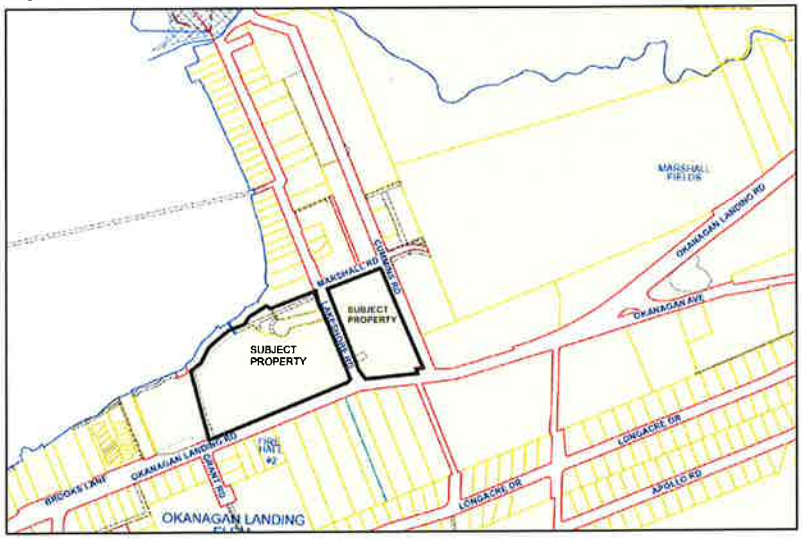

Figure 1 - Location of Subject Property

The applicant has applied for an Official Community Plan (OCP) amendment and rezoning to a new Comprehensive Development area (CD7) zone. This report outlines a recommended process for Council to consider these development applications. Due to the scale of the plan and the required authorization by other agencies for developing near wetlands and other environmentally sensitive areas, Administration recommends, at this stage, to support the applications in principle, and to present the proposed OCP amendment at a public open house. Should these recommendations be supported, Administration will provide Council a summary of the public input from the open house and the recommendations from the Advisory Planning Committee (APC).

Figure 2 - Aerial View of Subject Property

2. Official Community Plan (OCP) Amendment

The subject properties are designated in the OCP as 'Mixed Use - Medium Density Commercial and Residential' and 'Park' (Attachment 4). The WNCP, a supplementary plan to the OCP, designated the site that is east of Lakeshore Road as Area A - Mixed Use Core, and west of Lakeshore Road as Area B - Mixed Use Core (Attachment 1). Section 5.1 of the WNCP provides the following guidance for Mixed Use Core:

> *"The Mixed Use Core would provide residents and visitors with a neighbourhood centre that offers a variety of shops, restaurants, services, housing, employment and accommodation opportunities. This core area of the neighbourhood centre would provide for all of these uses in a mixed, compact, walkable format, with commercial uses primarily at street level and residential uses above".*

The applicant is seeking two amendments to the OCP:

a) change the OCP designation of Mixed Use - Medium Density Commercial and Residential on the ~3 acres surrounding the watercourse at 7295 Okanagan Landing Road and 0.32 acres at 2525 Lakeshore Road to the designation Park. This amendment follows the recommendations in the environmental assessment report to provide appropriate Streamside Protection and Enhancement Area (SPEA) buffers (Attachment 12). Qualified environmental professionals (QEP) surveyed the stream channel, wetlands and other sensitive areas on the site and determined the required protected area. This area also includes green space. In total, 45% of the property would be a protected riparian area (SPEA) and an open green space and park area.

b) change the OCP designation of Park on the ~1.63 acres at the northeast portion of 7295 Okanagan Landing Road to Mixed Use - Medium Density Commercial and Residential. This area would site the mixed use village with residential buildings, commercial uses, and the hotel and conference centre.

3. Rezoning Application Amendment

The subject parcels are currently zoned 'R5 - Four-plex Housing Residential' and 'C10 - Tourist Commercial' in Zoning Bylaw #5000 (Attachment 6).

The applicant is seeking two rezoning approvals:

a) Rezoning from R5 - Four-plex Housing Residential to P5: Private Park (Attachment 9). While the purpose of this zone is for "the preservation and enhancement of private park and open space for private use", the applicant is proposing that this park will also be available for public use and as such it is recommended the applicant be required to register an easement on the property to permit full public access to the enhanced SPEA and greenspace area (~7 acres) as a condition of the rezoning and subdivision. Thus, the applicant and subsequent land owners would be responsible for developing and maintaining a park area that remains an amenity available to the public.

b) Rezoning from R5 - Four-plex Housing Residential and C10 - Tourist Commercial to a new CD7 zoning district (Attachment 7). The existing R5 zoning is not aligned with the OCP and the WNCP. The draft Comprehensive Development Area 7 (CD7) zone (Attachment 8) for Port Okanagan better reflects the guidelines and policies in the WNCP and desired uses, density, form and character for the site. Specifically, the proposed CD7 zoning district will offer a range of shops, restaurants, services, park and naturalized areas along the lakeshore, with a mix of residential dwellings, hotel suites, convention centre and parking. The proposed building design, layout, height and massing in the CD7 zone are aligned with section 5.1 Mixed Use Core in the WNCP and the building heights in the C10A - Tourist Commercial and Residential zone, which is a primary zone in the Waterfront Neighbourhood Centre. The site plan has been developed around protection of the wetland and creek, with setbacks on the site established based on the environmental review and the Riparian Area Protection Regulation (RAPR).

The development proposal consists of a mix of low-rise to mid-rise buildings up to 10 storeys above grade, with underground parking structures as well as at-grade parking. Attachments 3 and 10 illustrate the proposed preliminary site plan and massing model, reflecting the maximum heights permitted in the proposed CD7 zone. The attached renderings do not yet reflect step backs and articulation on the tower buildings recommended by the Administration, which would reduce the visual impact of the buildings on the street and adjacent properties (Figures 3 and 4).

A description of each parcel is provided in the following table for reference (see Attachments 7 and 8):

Area	Current Zone	Proposed Zone	Proposed Use
A	R5	CD7	4-9 storey multi family residential building with parking
B	R5 & C10	CD7	Maximum 10 storey hotel and convention centre with commercial and above ground parkade
C1	R5	CD7	2-4 storey retail with second storey professional services, with or without residential units, and surface parking; Maximum 6 storey multi family residential building with parking
C2	R5	CD7	2-4 storey commercial development with or without residential units, and surface parking; 6-10 storey multi family residential building with parkade
Park and SPEA	R5	P5	Open green space, park, wetland, creek and walking trails with no buildings

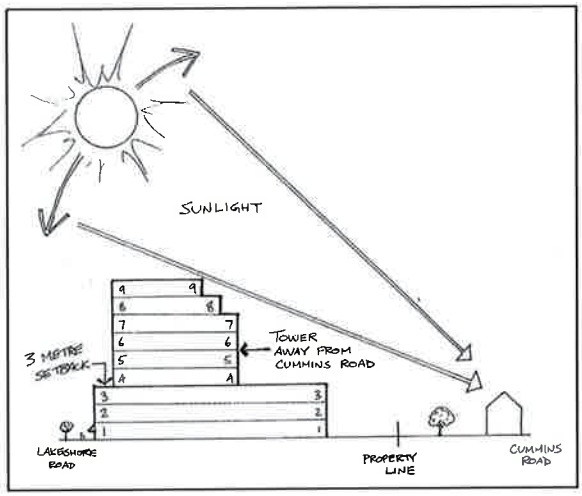

Figure 3 – Tower Setbacks

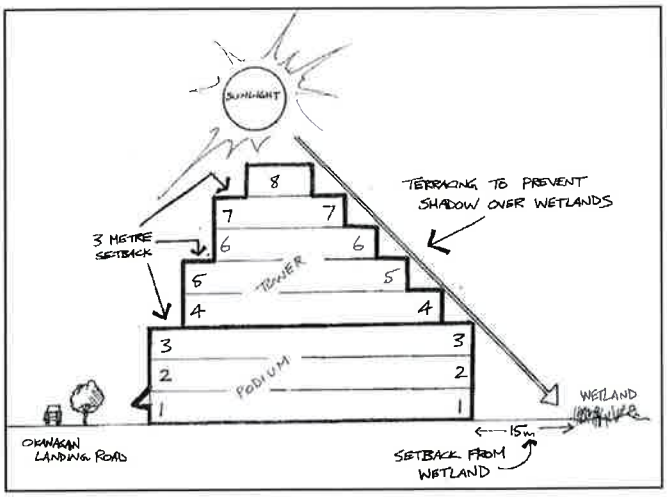

Figure 4 – Shadow Impacts on Neighbouring

4. Site Constraints

a) Environment

Figure 5 – Port Okanagan Wetlands

The subject parcels are situated within both Low and Medium Conservation Value areas as depicted on the Environmental Management Areas Strategy map (Attachment 11), which is a part of the OCP and considered as part of the development permit process. The site includes a high value wetland habitat and a sensitive ecosystem, as well as the foreshore of Okanagan Lake.

The applicant has submitted an Environmental Assessment report prepared by Ecoscape (Attachment 12). The report addresses the City's Development Permit guidelines and specifies the appropriate Streamside Protection and Enhancement Areas (SPEA) and other environmentally sensitive areas. The report also assesses potential terrestrial and aquatic resources, the potential for rare and/or endangered species and habitats, and mitigation measures. The report was accepted by the Administration and a conditional Development Permit approval was provided to the applicant, to enable them to make a Water Sustainability Act (WSA) Section 11 application, as well as to apply to obtain a Fisheries Act Authorization (DFO) under paragraphs 34.4(2)(b) and 35(2)(b) for works that may impact fish habitat. The provincial and DFO permits, if issued, will need to be provided to the City prior to the potential approval of the OCP and rezoning bylaw amendments.

b) Floodplain and Watertable

The subject property is on the foreshore of Okanagan Lake and is located near the headwaters of Vernon Creek where it meets Okanagan Lake. The subject parcels also have a high water table. In a recent flood mapping report prepared for the City of Vernon, the site has been identified as a floodplain hazard area (Attachment 13). It is recommended that prior to any

subdivision approval, the applicant provide the City with a flood hazard assessment report prepared by a Qualified Professional in accordance with the 'Flood Hazard Area Land Use Management Guidelines' of the Province of British Columbia and the 'Professional Practice Guidelines - Legislated Flood Assessments in a Changing Climate in BC' adopted by EGBC. In addition, it is recommended that the applicant be required to register a section 219 restrictive covenant in favour of the City specifying conditions that will certify that the land is safe for the intended use and releasing and indemnifying the City from liability in the event of damage caused by flood or erosion.

c) Archaeological Potential

The BC Remote Access to Archaeological Data (RAAD) online application administered by the BC Archaeology Branch finds the subject property to be located within a polygon of high archaeological potential. The applicant has provided an Archaeological Overview Assessment for the site, prepared by Ursus Environmental Consulting Ltd. (Attachment 14). In their report, the consultant provided the following recommendation:

> *"...five (5) areas of archaeological potential were located within the development project area. As such, any ground disturbance or development proposed within the areas of archaeological potential should be subject to an archaeological impact assessment (AIA) under a S12.2 Heritage Inspection Permit. For the areas within the property assessed with low potential it is the authors' opinion that no further archaeological work is warranted for these portions of the project area".*

The archaelogy report and its recommendations will be included in future development permits for the site.

d) Height Restrictions

The subject properties are within the radius of the Vernon Regional Airport's 4000m perimeter area, in which the height of structures is a maximum of 45 metres. As such, the maximum height in the proposed CD7 zoning district is below 45m.

e) Services and Infrastructure Development

A rezoning review includes a review of the existing condition of servicing and infrastructure adjacent to the property. City bylaws require the applicant to construct all non-conforming on-site and off-site infrastructure works and install services. This involves either constructing the required works or providing a detailed design and cost estimate of those works for future installation and registering a no-build covenant on the title of the property requiring construction as a condition of future development approval. As the Port Okanagan proposal also includes a subdivision application, a detailed list of conditions would be included as part of the subdivision approval. Administration has been working with the applicant's technical team to identify the required on-site and off-site improvements and land dedication, if appropriate. Should Council support the OCP amendment and rezoning applications, Administration would recommend that the subdivision and its imposed conditions be approved and registered prior to final adoption of the bylaw amendments.

5. Public Participation

The Port Okanagan proposal became public in January 2021, when the applicant introduced their vision for the site via signage on the subject property and a project website, which included a mechanism for engagement and contact with the applicant (Attachment 15).

For any proposed amendment to the OCP, Section 475 of the Local Government Act (LGA) specifies that Council should provide one or more opportunities for consultation with persons, organizations and authorities it considers affected. In addition, the City's corporate OCP Amendment Applications Policy (Attachment 16) requires that an open house be held to provide community residents with an additional opportunity to consider the application.

During the referral stage, Administration provided copies of the applications to several organizations and authorities, including the Okanagan Indian Band, which has reserve land adjacent to the Waterfront Neighbourhood. Should Council support the applications, in principle, Administration recommends that the City host an in person public open house in April 2022. In addition to the open house, information on the applications and related documents would be provided online on the Engage Vernon website. In a future report to Council, should Council support the applications in principle, Administration would provide a summary of the public input and the recommendation of the APC. In addition, during the legislative process, neighbourhood residents would have another opportunity to provide comments at the Public Hearing, should Council grant First and Second Readings.

6. In summary, Administration supports in principle the OCP amendment and rezoning applications for the following reasons:

   a) The Port Okanagan proposal is consistent with the WNCP, a supplementary plan to the OCP, and offers a vibrant anchor to the emerging neighborhood area.

   b) The proposed OCP amendment for ~3 acres surrounding the watercourse at 7295 Okanagan Landing Road and ~0.32 acres at 2525 Lakeshore Road from 'Mixed Use - Medium Density Commercial and Residential' to 'Park', and ~1.63 acres on the northeast portion of 7295 Okanagan Landing Road from 'Park' to 'Mixed Use - Medium Density Commercial and Residential' reflects the goals of the WNCP and protects sensitive environmental areas on the site.

   c) The proposed draft Comprehensive Development Area 7 (CD7) zoning district will conform with the proposed OCP designation, and offer a mixed use development with regulations related to building design, layout, height and massing that align with section 5.1 Mixed Use Core in the WNCP and the C10A - Tourist Commercial and Residential zone, which is a prominent zone in the Waterfront Neighbourhood Centre Plan.

C. Attachments:

Attachment 1 – Waterfront Neighbourhood Centre Plan (WNCP) land use map
Attachment 2 – Letter from the applicant dated March 16, 2022
Attachment 3 – Proposed development concept site plan
Attachment 4 – OCP land use designation map
Attachment 5 – Proposed OCP amendment map
Attachment 6 – Zoning map
Attachment 7 – Proposed zoning amendment map
Attachment 8 – Proposed draft Comprehensive Development Area (CD7)
Attachment 9 – P5 - Private Park zoning district
Attachment 10 – Proposed Port Okanagan building massing
Attachment 11 – City of Vernon Environmental Management Areas (EMA) map
Attachment 12 – Environmental Assessment by Ecoscape Environmental Consultants Ltd.
Attachment 13 – City of Vernon Floodplain map
Attachment 14 – Archaeological Overview Assessment by Ursus Heritage Consulting Ltd.
Attachment 15 – Port Okanagan Development online webpage
Attachment 16 – OCP Amendment Applications - Policy

D. Council's Strategic Plan 2019 - 2022 Goals/Action Items:

The subject rezoning application involves the following objectives in Council's Strategic Plan 2019 - 2022:

- Promote transit oriented housing and mixed use development
- Work towards a sustainable Vernon – environmentally, economically and socially
- Be a leader in economic development

E. Relevant Policy/Bylaws/Resolutions:

1. The subject properties are designated in the OCP 'Mixed Use - Medium Density Commercial and Residential' and 'Park', and zoned 'R5 - Four-plex Housing Residential' and 'C10 - Tourist Commercial' in Zoning Bylaw #5000. The Waterfront Neighbourhood Centre Plan (WNCP), a supplementary plan to the OCP, designated the site that is east of Lakeshore Road as Area A - Mixed Use Core, and west of Lakeshore Road as Area B - Mixed Use Core.

2. The applications are to amend the Official Community Plan land use designation at 2525 Lakeshore Road and 7295 Okanagan Landing Road to reflect the watercourse of the Marshall Wetlands and rezone the properties from 'R5 - Four-plex Housing Residential' and 'C10 - Tourist Commercial' to 'P5: Private Park' and to a new Comprehensive Development Area (CD7) in order to develop Port Okanagan - a comprehensive, mixed use, waterfront development with tourist commercial, retail office and multi-family residential, designed around park space and a creek.

3. Development within the Waterfront Neighbourhood Centre would qualify for a revitalization tax exemption under bylaw #5362. The Revitalization Tax Exemption Program is intended to accomplish Council's objectives by providing property tax relief to property owners who undertake eligible construction within the Waterfront Neighbourhood Centre.

BUDGET/RESOURCE IMPLICATIONS:

N/A

Prepared by:

X _____
Roy Nuriel
Economic Development Planner

X _____
Kim Flick
Director, Community Infrastructure and Development

Approved for submission to Council:

_____
Will Pearce, CAO

Date: 23. MARCH. 2022

REVIEWED WITH

- ☐ Corporate Services
  - ☐ Bylaw Compliance
  - ☐ Real Estate
- ☐ RCMP
- ☐ Fire & Rescue Services
- ☐ Human Resources
- ☐ Financial Services
- ☐ COMMITTEE:
- ☐ OTHER:
- ☐ Operations
  - ☐ Public Works/Airport
  - ☐ Facilities
  - ☐ Utilities
- ☐ Recreation Services
- ☐ Parks
- ☒ Current Planning
- ☒ Long Range Planning & Sustainability
- ☐ Building & Licensing
- ☒ Engineering Development Services
- ☐ Infrastructure Management
- ☒ Transportation
- ☒ Economic Development & Tourism

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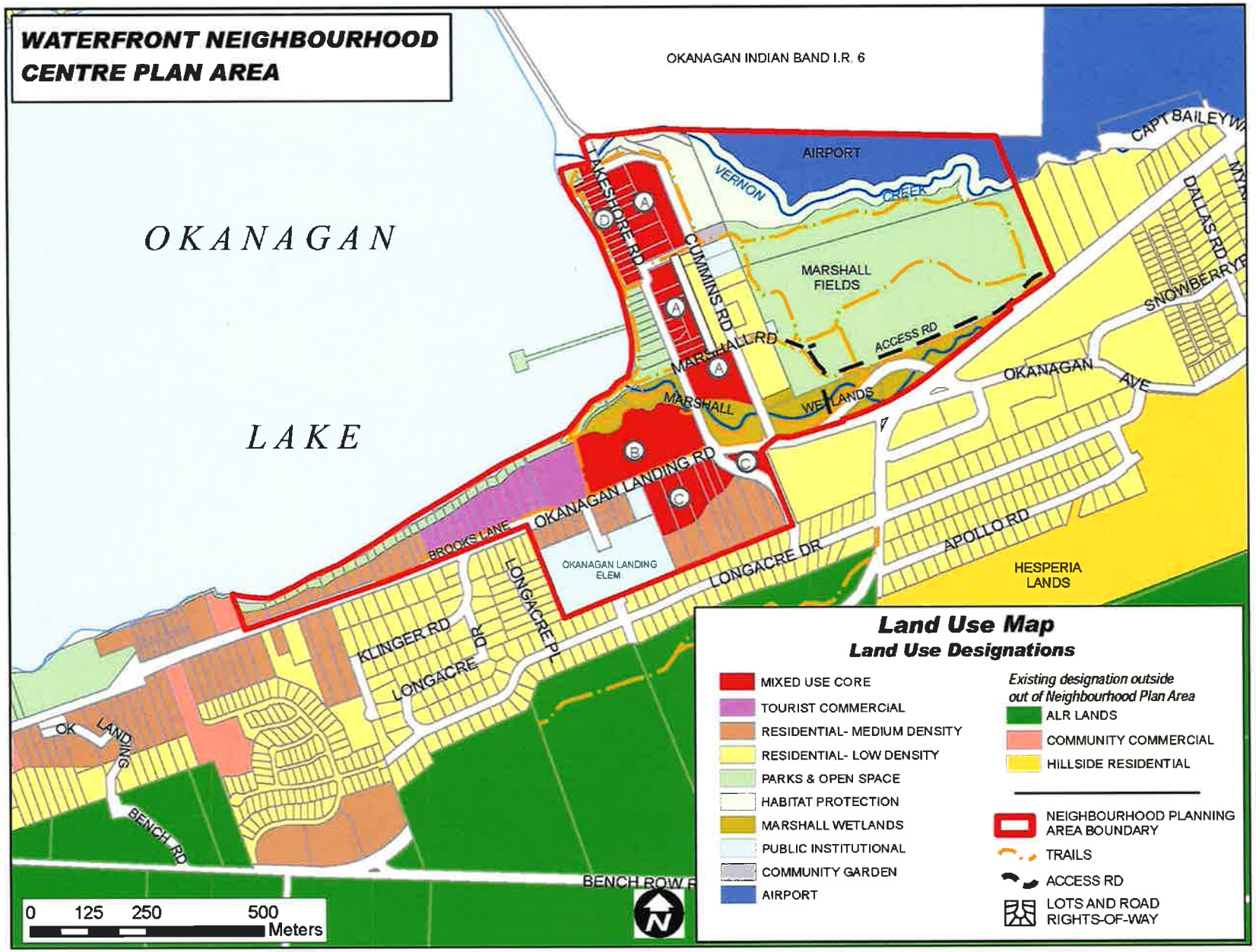
Map 3



Attachment 1

Avillia developments

March 16, 2022

His Worship Victor Cumming and Councillors
City of Vernon
3400 30 Street
Vernon, BC V1T 5E6

Subject: Official Community Plan Amendment and Rezoning for Port Okanagan

Dear Mayor and City Council,

On behalf of our team at Avillia Developments, I want to express our sense of pride and enthusiasm for the Port Okanagan proposal.

At Avillia, we work to create developments that we would be proud to live, work, and vacation in, and we believe this proposed development will support both our vision and the vision set forth in Waterfront Neighbourhood Plan. This *village* will provide for a great sense of community, a gathering place, and an exciting development in Vernon by creating a vibrant destination that we believe will be frequented by residents and visitors alike.

Close to three years ago, our team began working through the process of environmental, technical and design assessments for this beautiful waterfront property. In the fall of 2021, we submitted our application for a minor plan amendment and a site-specific rezoning for our lands located at 2525 Lakeshore Drive and 7295 Okanagan Landing Road, Vernon, BC.

The general intent of the OCP Amendment is a mapping amendment to the parcel north of Okanagan Landing Road and east of Lakeshore Road to accurately reflect the current watercourse of the Marshall Wetlands on site. The current OCP (Bylaw 5470, 2013) land use map shows an alternate course for the wetland area that was never constructed. This proposal includes enhancements to the existing creek and wetland to minimize disruptions and better support fish habitats and ecology of the lakeshore, creek, and wetland.

Avillia developments

The rezoning proposal includes a Comprehensive Development (CD) Zone that is intended to support attractive streetscapes and a lively destination park space that is connected to beachfront. We have worked closely with the planning department to ensure that the development supports the City's vision for the future of this area. The site is currently designated in the Waterfront Neighbourhood Centre Concept Plan (WNCCP) (Bylaw 5277, 2010) as Area A and Area B 'Mixed Use Core' and is currently zoned C10A: Tourist Commercial and Residential, and R5: Fourplex Housing Residential.

The proposed development is aligned with the City's vision for the Waterfront Neighbourhood Centre, as a mixed-use neighbourhood that provides residents and visitors with opportunities to enjoy Vernon's waterfront. The comprehensive development will offer a range of shops, restaurants, services, parkland and naturalized areas along the lakeshore along with a mix of residential dwellings and a resort hotel. The site is designed to provide direct access for residents and visitors to amenities in a highly walkable environment.

The building design, layout, and heights in the CD zone are aligned with section 5.1 Mixed Use Core in the WNCCP, and the building heights established in the C10A zone. The site plan has been developed around the wetland and creek and the internal setbacks on site were established based on environmental review and stream protection and enhancement area (SPEA) regulations. The proposed development will consist of a mix of low-rise to mid-rise buildings up to 10 storeys with underground parking structures and at-grade parking.

Throughout the application and review process, our team has worked closely with staff and provided updates to Council members. We are all working toward a common goal of a delivering a family-oriented place with a sense of community through collaboration, creativity, innovation, and quality design.

We look forward to advancing this unique opportunity to Vernon City Council for consideration.

Yours sincerely,

Patrick Shaver, President
Avillia Developments

avillia.com

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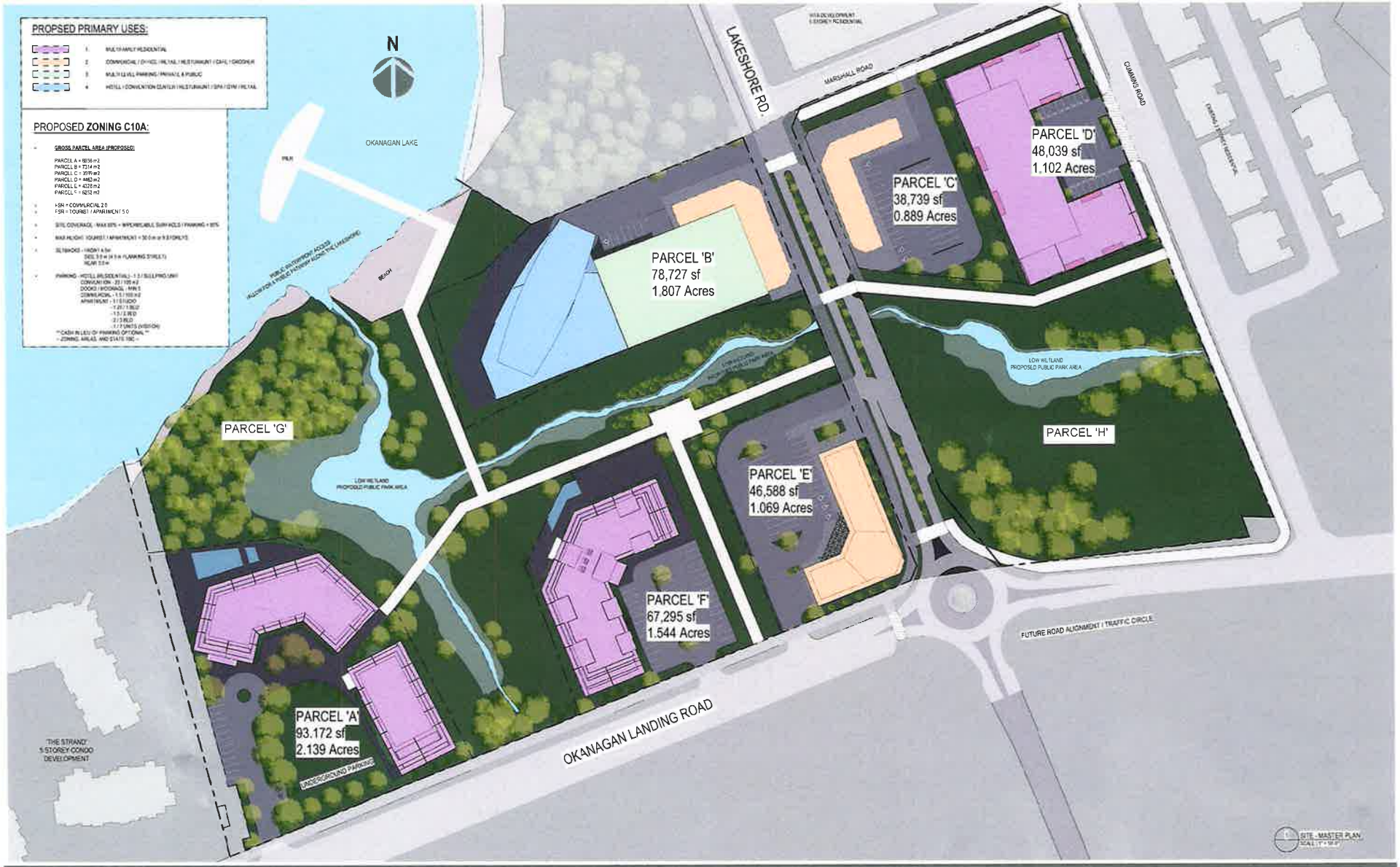
(780) 435-1388 | 1-833-AVILLIA (284-5542) | mail@avillia.com



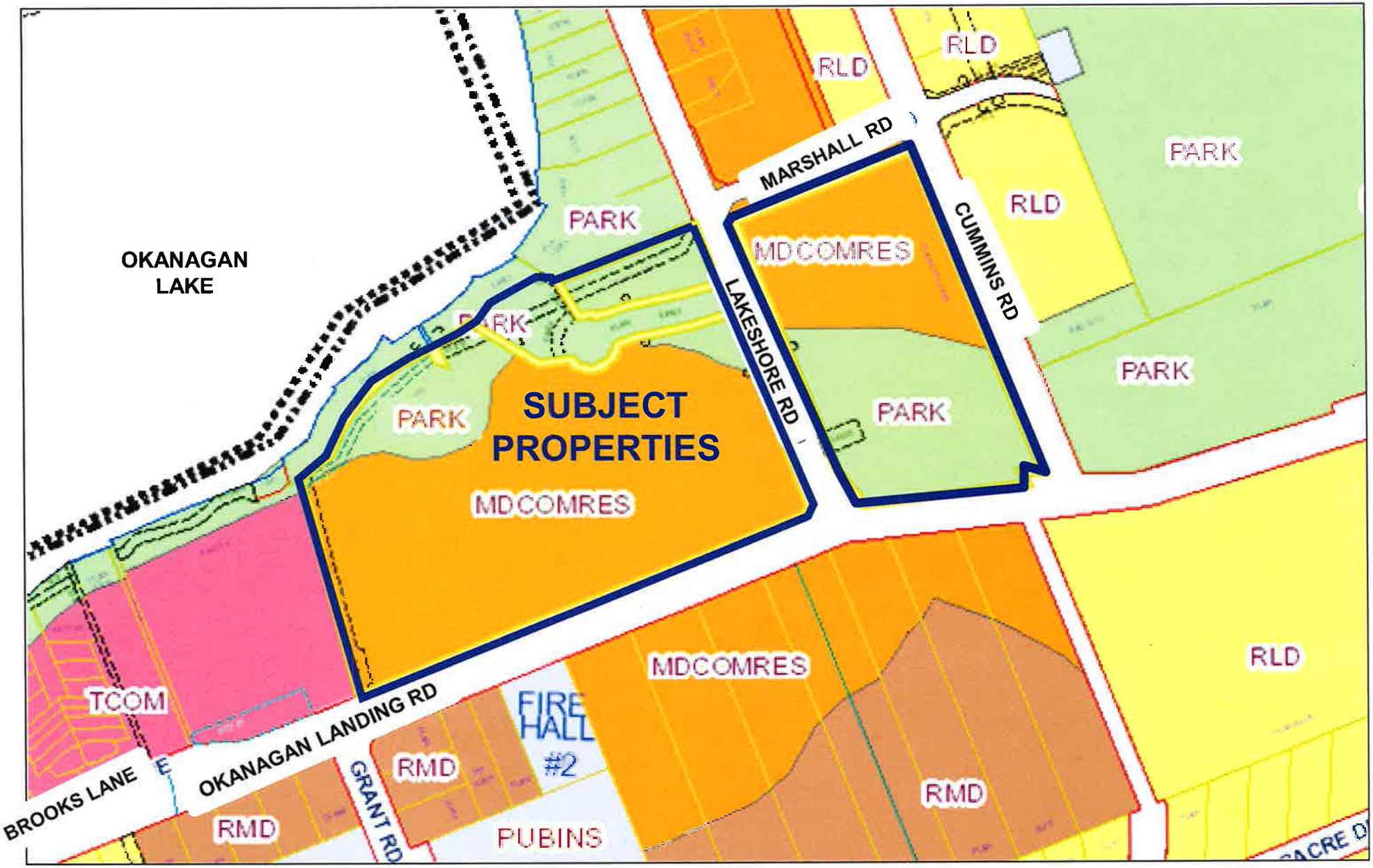
MQN ARCHITECTS

MASTER SITE PLAN

PORT OKANAGAN
2525 LAKESHORE DRIVE, VERNON, BC

DRAWING: P200
PROJECT: 20476
SCALE: As indicated

Attachment 3



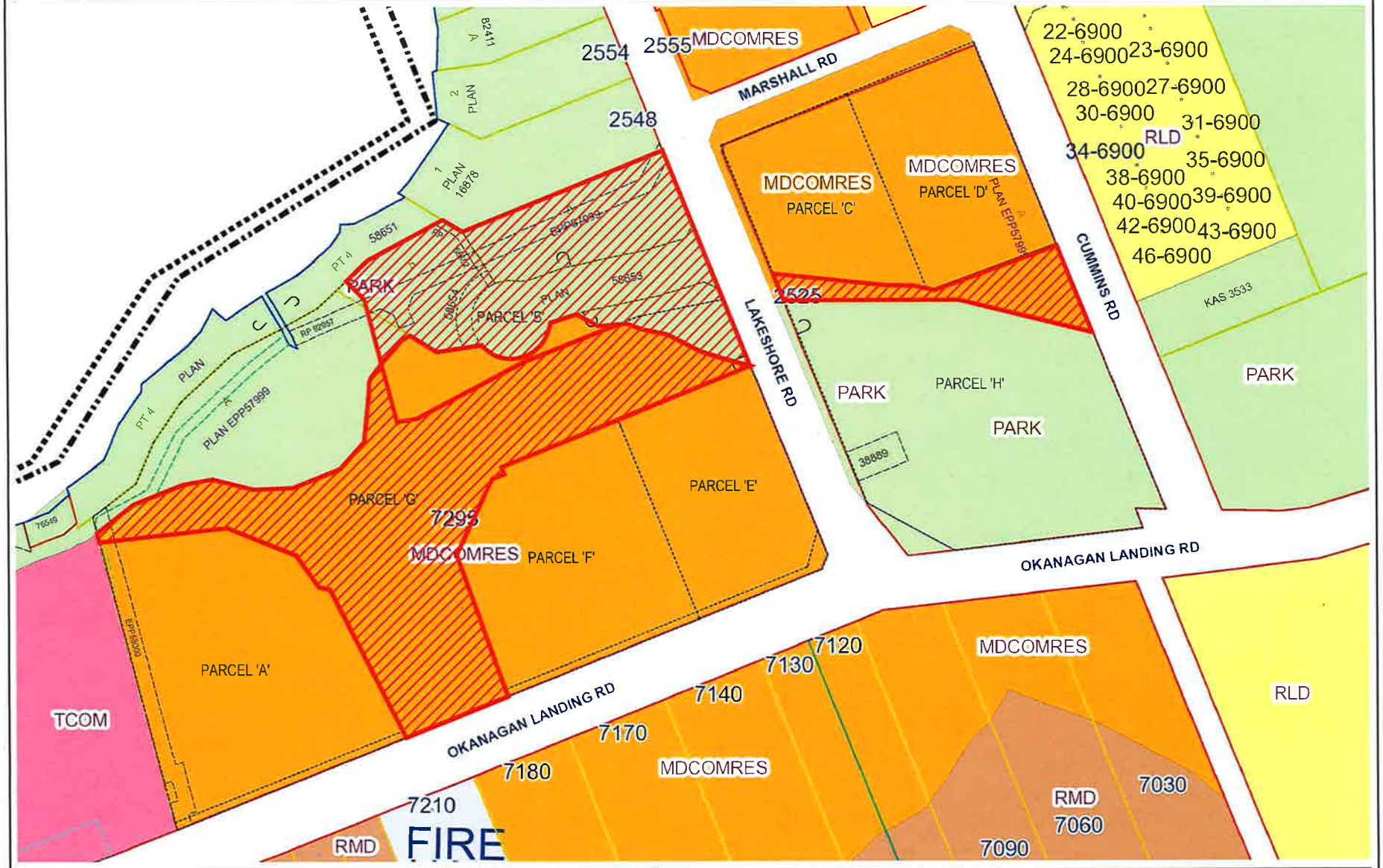
MDCOMRES – Mixed Use – Medium Density Commercial and Residential
PARK – Residential – Medium Density
TCOM – Tourist Commercial
RLD – Residential – Low Density
RMD – Residential – Medium Density
PUBINS – Public & Institutional

OCP Designation

ZON00376

Attachment 4

Vernon Essentials Site



102 0 51 102 Meters

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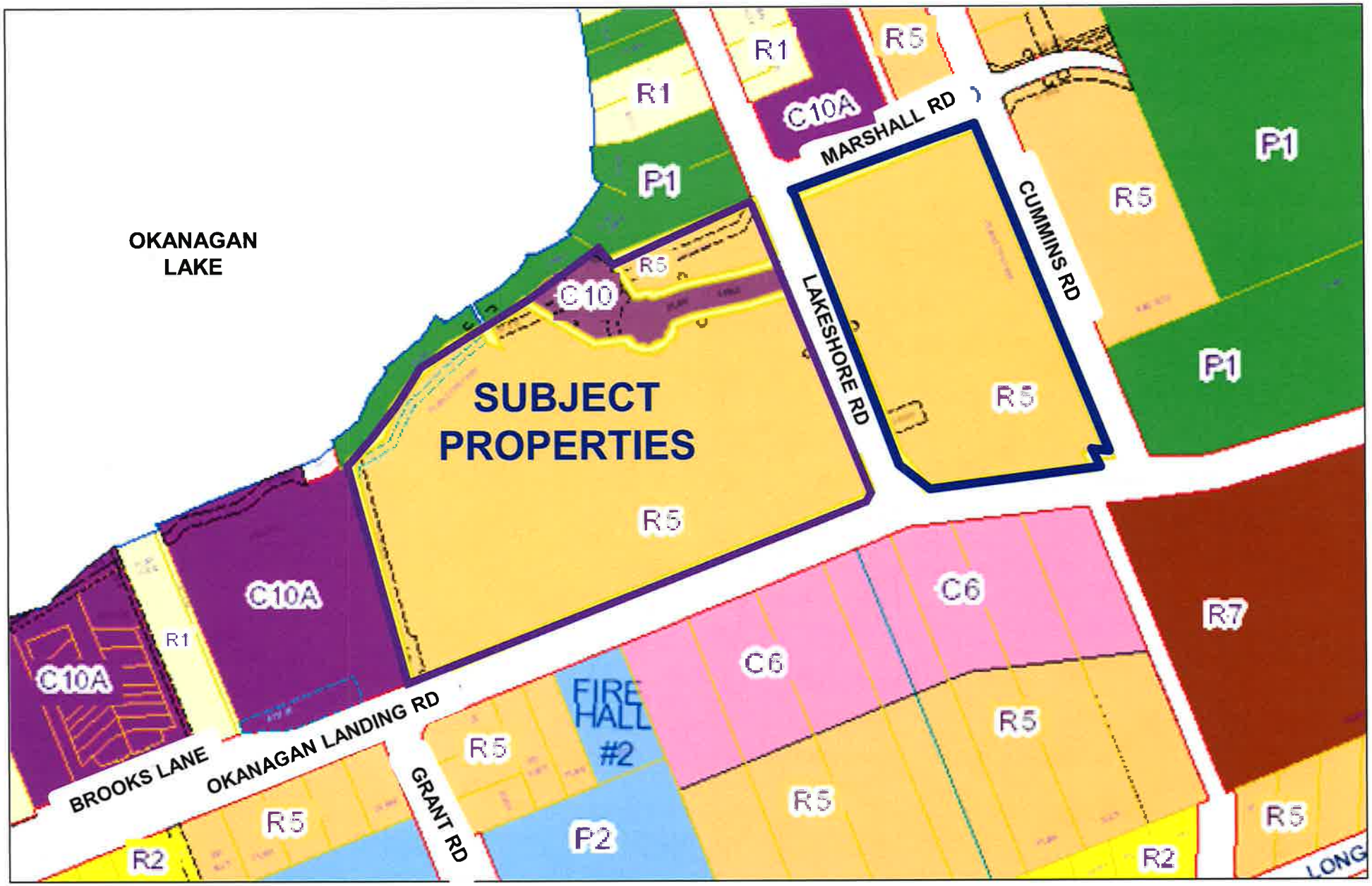
Area of Amendment
MDCOMRES To PARK
PARK To MDCOMRES

This drawing has been produced by the City of Vernon's Geographic Information System. The data provided is derived from a variety of sources with varying levels of accuracy. The City of Vernon makes no warranty or representation, expressed or implied, with the regard to the correctness, accuracy and/or reliability of the information contained herein.

Attachment 5

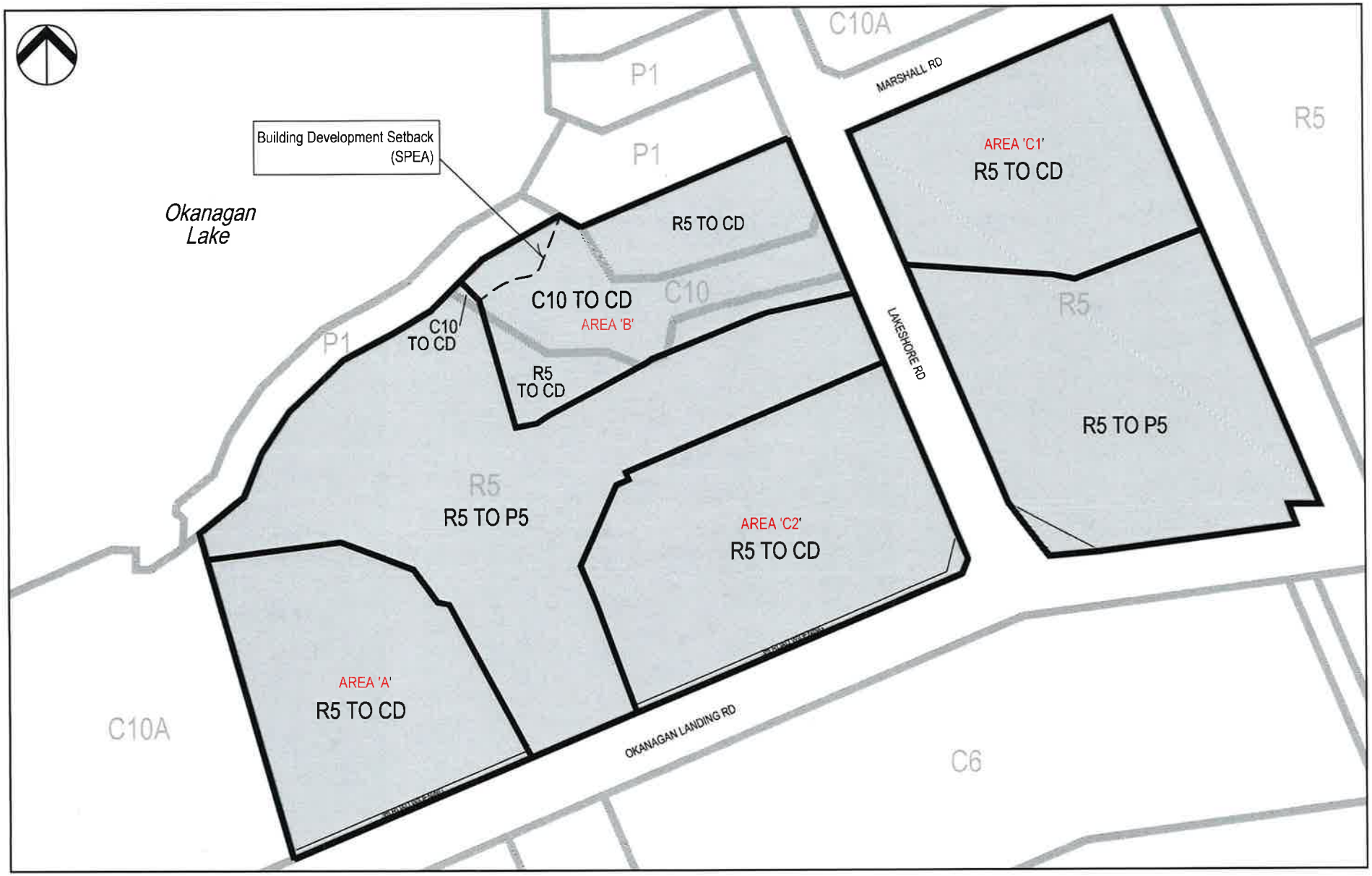


R5 – Four-Plex Residential
C10A – Tourist Commercial and Residential
C10 – Tourist Commercial
C6 – Village Commercial
P1 – Parks and Open Space
R7 – Mobile Home Residential
P2 – Public Institutional

Zoning Designation

ZON00376

Attachment 6



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Area of Rezoning

MODIFIED DATE: 2022.03.07
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Okanagan Landing

From R5-Fourplex Housing Residential
& C10-Tourist Commercial
To CD-Comprehensive Development

Attachment 7

March 3, 2022 CD7 Zone: PORT OKANAGAN

Comprehensive Development Area 7 Provisions

1. **Purpose**

   Provide for the comprehensive development of a mixed-use, pedestrian-oriented community which includes destination commercial visitor accommodations, residential, commercial, and tourist uses.

2. **Uses for Residential Area A, as shown on Appendix 1**
   a. Apartment Housing
   b. Group home, major
   c. Home Based business, minor
   d. Row Housing
   e. Row Housing Stacked
   f. Seniors Assisted Housing
   g. Seniors Housing
   h. Seniors Residential Care
   i. Seniors Supportive

3. **Uses for Hotel Commercial Area B as shown on Appendix 1**
   a. Brewing and Distilling, Class A
   b. Business Support Services
   c. Care Center, major
   d. Clubs – private
   e. Convenience Vehicle Rentals
   f. Cultural exhibit, private
   g. Emergency protective services
   h. Exhibition and convention facility
   i. Equipment Rentals
   j. Food Primary Establishments
   k. Guide and Tour Services
   l. Financial Services
   m. Health Services
   n. Hotels
   o. Liquor primary establishment, minor
   p. Liquor primary establishment, major
   q. Marine Equipment Rental
   r. Non accessory parking
   s. Offices
   t. Participant Recreation Services, indoor
   u. Personal Services
   v. Public market
   w. Real Estate Office

x. Retail Cannabis Sales
y. Retail stores, convenience
z. Retail stores, general
aa. Retail stores, licensee
bb. Retail street sales
cc. Shopping centre

4. Uses for Mixed Use Area C, as shown on Appendix 1

a. Apartment housing
b. Artist Studios
c. Brewing and Distilling, Class A
d. Broadcasting Studios
e. Cannabis Sales
f. Care Center, major
g. Commercial Schools
h. Community Recreation Centres
i. Custom Indoor Manufacturing
j. Education Services, Private
k. Guide and Tour Services
l. Financial Services
m. Health Services
n. Legal Services
o. Liquor primary establishment, minor
p. Offices
q. Home based business, minor
r. Personal Services
s. Real Estate Office
t. Retail Cannabis Sales
u. Retail stores, convenience
v. Retail stores, general
w. Retail stores, licensee
x. Retail street sales
y. Used goods store
z. Seniors assisted housing
aa. Seniors housing
bb. Seniors residential care
cc. Seniors supportive housing
dd. Shopping centre

5. Subdivision Regulations

a. Minimum lot width is 26.0 m

b. Minimum lot area is 2000 m2

6. Development Regulations for Site Layout and Built Form

a. The maximum number of apartment dwellings shall be 800.
b. The maximum number of Hotel units shall be 160.
c. The maximum Floor Area for Non-Residential Uses shall be 9105m2.
d. The maximum gross site coverage is 58%, including impermeable surfaces.
e. The maximum Floor Space Ratio shall be 6.0.
    i. Above grade parkade structure Floor Area shall not be included as part of the Floor Space Ratio calculation.
f. Maximum building Heights for each sub-area shall be in accordance with the following table:

	Maximum Building Height (m / storeys)	Maximum Podium Height (m / storeys)
Area		
A – Residential	38.0 /10	
B – Hotel Commercial	38.0/10	23.0m / 6
C – 1 – Mixed Use	23.0 / 6.0	
C – 2 – Mixed Use	38.0 / 10.0	

g. For building heights over two storeys and facing public road right-of-way, massing shall be modulated using a variety of design techniques including elevation changes, terraces, and architectural features and a variety of plantings or other landscape features to support a dynamic streetscape.
h. Setbacks shall be as follows:
    i. Minimum front yard Setback along public roadways is 4.5 m, except:
        1. Where a commercial building or commercial portion of a building is located on Lakeshore Road or Marshall Road, the front yard shall be a minimum 1.0 m, or
        2. Where a commercial building or commercial portion of a building is located on Okanagan Landing Road, the front yard shall be minimum 2.5 m.
    ii. Maximum front yard Setback along public roadways is 6.0 m
    iii. Any portion of a building above 18.0m in height must be a minimum of 2.5m from any property line abutting a street.
    iv. Minimum side yard is 0.0m, except it is 1.0m from a flanking street

v. Minimum rear yard is 0.0m

i. In Mixed Use Area C, Apartment housing, Apartment housing, tourist, Seniors assisted housing, Seniors residential care, Seniors housing and Seniors supportive housing are only allowed above the first storey and requires a separate at-grade access from the commercial uses. In the case of elevator equipped buildings, uses may share elevators provided security measures are in place to restrict access to residential areas.

7. Development Regulations for Building Design and Features

a. The design of the project shall establish a common architectural theme, and the principal design elements, finishing materials, colours and roof styles shall be applied to each building.
b. All exterior finishing materials must be of good quality, durable and attractive in appearance, and all exposed building faces shall have consistent and harmonious exterior finishing materials.
c. Design and finishing of entrance and corner locations on public roadways at Lakeshore Road and Marshall Road, and at Lakeshore Road and Okanagan Landing Road shall address the street with a high standard of appearance.
d. Commercial uses at-grade may include a mix of orientations to Lakeshore Road, Marshall Road, Okanagan Landing Road and can be oriented to the internal park areas to create a vibrant publicly accessible destination space.
e. Commercial building facades at-grade shall incorporate design features such as clearly defined commercial entrances, glazing, decorative lighting, overhead weather protection fascia signage and landscape elements that are complementary to the architectural theme of the development in order to create an engaging and comfortable pedestrian environment.
f. The exposed surfaces of the above ground parkade structure shall have a decorative façade that is complementary to the architectural theme of the development.

8. Development Regulations for Landscaping, Lighting, Vehicle Parking

a. On-site landscaping shall use plant materials that provide colour throughout the year to enhance the appearance of the development during the cold weather months.
b. On-site security and building lighting must not illuminate beyond the Site boundary but may be oriented in a direction other than downwards if the purpose is to highlight architectural features or building elements.
c. Illumination near the wetland and park space will be designed in consultation with an ecologist to minimize impacts on wildlife.
d. Underground parking garages shall be permitted to be built to the property line.
e. Vehicular access to parking shall be designed to minimize disruption to the Yard, sidewalks, existing trees, and existing streetscape and where possible, should be provided from the street which has the lowest vehicle volume.

9. Other Development Regulations

a. In Hotel and Commercial Area B, the Hotel and Exhibition and convention facility should be the primary use(s) and all the other listed uses shall be considered secondary uses.
b. In Mixed Use Area C, individual buildings may be either residential or commercial in use, or a combination of residential and commercial uses.
c. Individual Retail Stores and Liquor Stores shall be limited to 350m2 of Floor Area.
d. Personal Service Shops shall be limited to 240m2 of Floor Area for each individual business.
e. Individual restaurants and coffee shops shall be limited to 350m2 of Public Space.
f. For seniors assisted housing, seniors residential care, seniors housing, seniors supportive housing and hotel use, a safe drop-off area for patrons shall be provided on the site.
g. A combination of private open space and communal open space area minimums shall be as follows:
    i. 2.0m2 per bachelor dwelling, seniors assisted housing or seniors supportive housing or seniors housing unit;
    ii. 4.0m2 per 1 bedroom dwelling, and
    iii. 5.0m2 per dwelling with more than 1 bedroom.

h. In addition to the regulations listed above, general development regulations of Section 4 (Building Shadow Analysis, Height and Grade, Lighting, Riparian Area Assessments yards), the specific use regulations of Section 5; the landscaping and fencing provisions of Section 6; and, the parking and loading regulations of Section 7(Bylaw 5788) apply.

12.5 P5 : Private Park

P5

12.5.1 Purpose

The purpose is to provide a **zone** for the preservation and enhancement of **private park** and **open space** for private use.

12.5.2 Primary Uses

- **park, private**
- **golf course** (Bylaw 5359)

12.5.3 Secondary Uses

- **boat launch**
- **boat lifts**
- **boating**
- **docks, private**
- **residential security/operator unit**
- **temporary moorage**

12.5.4 Subdivision Regulations

- Minimum **lot width** is N/A.
- Minimum **lot area** is N/A.

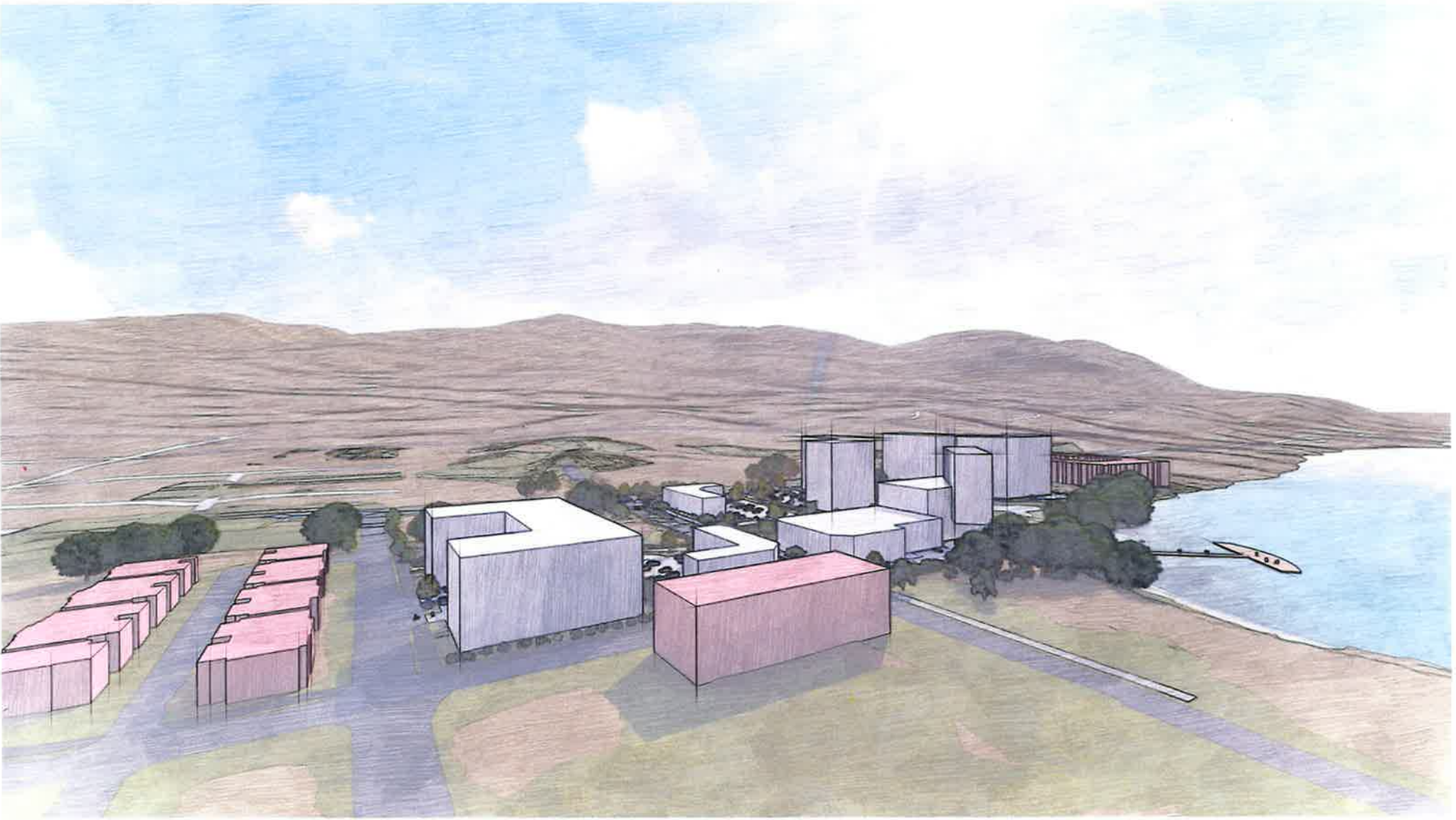
12.5.5 Development Regulations

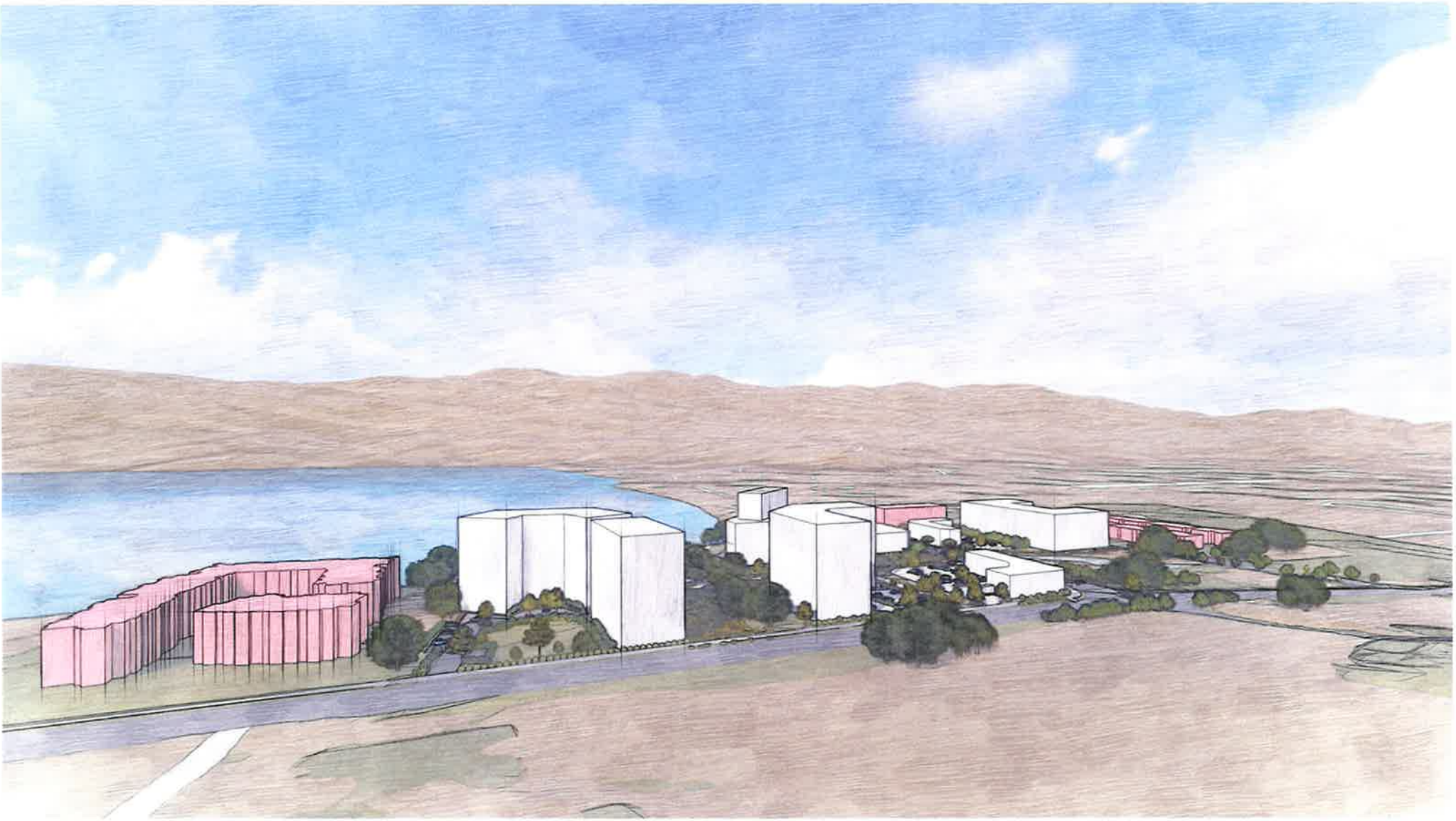
- Maximum **height** is 8m.
- Minimum **front yard** is 6.0m.
- Minimum **side yard** is 4.5m, except it is 7.5m for a **flanking street** or where the **abutting** land is zoned or designated Residential or Agriculture.
- Minimum **rear yard** is 4.5m, except it is 7.5m for a **flanking street** or where the **abutting** land is zoned or designated Residential or Agriculture.

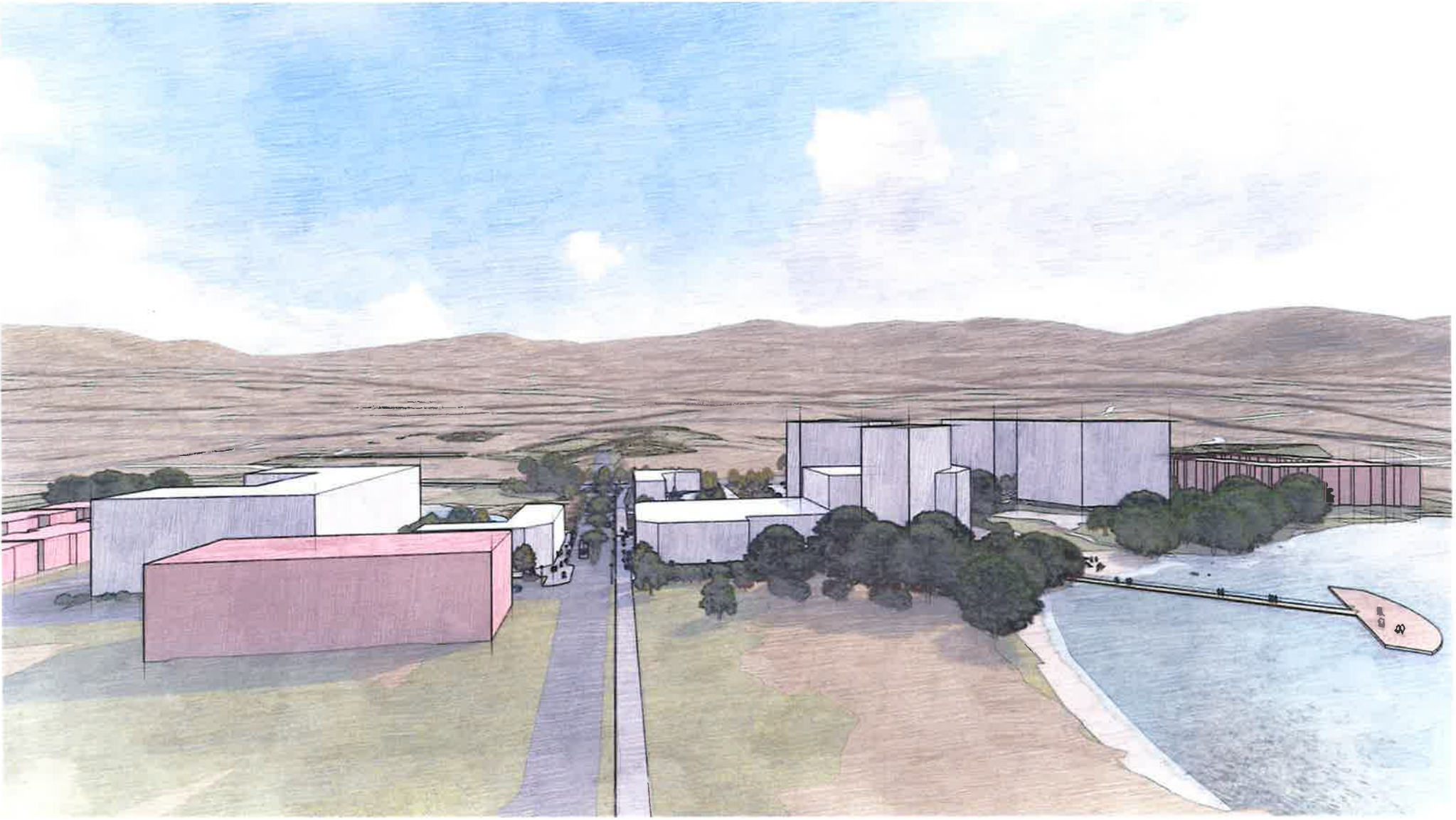
12.5.6 Other Regulations

- Only one **residential security/operator unit** is permitted on a **site**, limited to properties greater than 10 ha.
- In addition to the regulations listed above, other regulations may apply. These include the general **development** regulations of Section 4 (secondary **development**, **yards**, projections into **yards**, lighting, agricultural setbacks, etc.); the specific use regulations of Section 5; the **landscaping** and fencing provisions of Section 6; and, the parking and loading regulations of Section 7.
- As per Section 4.10.2 - All **buildings** and **structures**, **excluding perimeter fencing (garden walls and fences)** on **lots abutting** City Roads as identified on Schedule "B" shall not be sited closer to the City Road than the setback as per the appropriate zone measured from the offset Rights of Way as illustrated on Schedule "B". *(Bylaw 5440)*

Attachment 10







Environmental Management Areas (EMA) map

Attachment 11

A Attachment 12

2525 LAKESHORE ROAD & 7295 OKANAGAN LANDING ROAD, VERNON, BC

Environmental Assessment

PLAN EPP57999 LOT A DISTRICT LOT 62
PID: 030-532-736

Prepared For:

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ECOSCAPE
Environmental Consultants Ltd.

February 2021

File No. 19-2951

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FIGURES

APPENDICES

1.0 INTRODUCTION

Ecoscape Environmental Consultants Ltd. (Ecoscape) was retained by Avillia Developments Ltd. (client) to complete an Environmental Assessment for a proposed mixed-use development at 2525 Lakeshore Road and 7295 Okanagan Landing Road, Vernon, BC (subject property). The subject property is legally described as Lot A, Plan EPP57999, District Lot 62, Section 30, Township 9, Osoyoos Division of Yale Land District (**Figure 1**). The subject property is zoned as Four-Plex Housing Residential (R5) along the southeastern shoreline of Okanagan Lake. The subject property occurs within the Neighborhood Development District 2 (DD2) as per the City of Vernon (COV) Official Community Plan (OCP) (Bylaw 5470, 2013). In addition, the subject property is situated within both a Medium and High Conservation Value areas as depicted on Map 14 of the Environmental Management Areas Strategy, which is a part of the OCP and accounted for in the development permit process for DPA 2.

The purpose of this report is to address the COV Development Permit guidelines for developments in DPA 2, specify an appropriate Streamside Protection and Enhancement Areas (SPEA) or riparian buffers, environmental sensitivity assessment, identify potential environmental impacts of the proposed work, and describe the current conditions of the subject property. This report also provides an assessment of potential terrestrial and aquatic resource values, the potential for rare and/or endangered species and habitats, and subsequently provides mitigation measures to protect and enhance the natural integrity of existing ecological lakeside and wetland communities.

2.0 PROPOSED WORKS

The proposed development includes the construction of a mixed-use development, disturbed wetland relocation and compensation, and restoration landscaping. The proposed mixed-use development will be a total of 34,678 m^2 (8.6 acres) in area and is comprised of the following:

- Parcel A – Targeting Residential = 2.139 Acres
- Parcel B – Targeting Retail, Office & Hotel = 1.807 Acres
- Parcel C – Targeting Retail & Office = 0.889 Acres
- Parcel D – Targeting Residential = 1.102 Acres
- Parcel E – Targeting Retail = 1.446 Acres
- Parcel F – Targeting Residential = 1.248 Acres

These proposed land uses are still under consideration and may be revised as plans for the site are developed. The proposed wetland compensation area will encompass a total area of 2,436 m^2 (0.53 acres). The proposed development plan is provided in **Figure 2**.

It is expected that 2 *Water Sustainability Act* (WSA) Section 11 applications will be required prior to construction; one approval application for the proposed disturbed wetland relocation and

compensation work and one notification application for storm water discharge, both of which will require the preparation of Environmental Management Plans (EMPs). The EMPs will include the content of this report as well as a detailed landscaping plan with the prescribed restoration/mitigation measures, site grading, and environmental monitoring and reporting requirements.

The *Riparian Areas Protection Regulation* (RAPR) methods for setback determination have been conducted as part of this report and a Provincial submission will be required once site plans are formalized. In addition, it will be necessary to obtain a *Fisheries Act* Authorization under paragraphs 34.4(2)(b) and 35(2)(b) of the act for works that may result in the death of fish or the harmful alteration, disruption or destruction of fish habitat (HADD). Based on discussions with COV staff, this Environmental Assessment will be submitted as part of a Development Permit Application in order to obtain a Conditional Approval for the Development Permit based on COV's review only. The Development Permit would be conditional upon obtaining a *Fisheries Act* Authorization, RAPR assessment approved by the Province and/or a WSA Section 11 permit(s). In addition, a detailed stormwater management plan and transportation impact assessment will be required/updated at later stages of the proposed development.

This project is based upon numerous previous assessments, public processes, and former proposed restoration plans (EBA Engineering Consultants Ltd., 2008; Kerr Wood Leidal Associates Ltd., 2009; **Appendix A**). Our scope has considered these previous discussions and plans, while attempting to provide a basis for discussions to transition this project from paper space to implementation. In 2019, both the Provincial *Riparian Areas Regulation* (now RAPR) and the Federal *Fisheries Act* changed. These changes in legislation have influenced this project and both occurred after Avillia had purchased the property. As a result, this site has challenges to obtain compliance with RAPR, despite the previous planning. Therefore, this assessment is considered a working report to allow for engagement of the COV and subsequently form the basis for engagement of other agencies such as the Province or Federal Department of Fisheries and Oceans. The proposed development is in compliance with the COV Waterfront Neighborhood Centre Plan (Bylaw 5277, 2010).

3.0 INFORMATION SOURCES

The following databases were queried on September 11, 2020 to find relevant information on the subject property and surrounding lands:

- BC Conservation Data Centre (CDC);
- BC Habitat Wizard;
- Foreshore Inventory and Mapping of Okanagan Lake 2016 update;
- Sensitive Ecosystems Inventory: Coldstream Vernon, 2007; and,
- Species at Risk Act Public Registry.

4.0 ENVIRONMENTAL SETTING

4.1 Ecosystem Communities and Vegetation

Site visits were conducted on September 12, 2019 by Kris Mohoruk, March 9, 2020 by Kyle Hawes B.Sc., R.P.Bio and April 16, 2020 by Scott Layher, M.Sc., R.P.Bio (pending) Natural Resource Biologists with Ecoscape. The subject property occurs within a high value wetland habitat surrounded by the residential areas of Okanagan Landing Road to the south, Lakeshore Road through the property and Cummins Road to the east. Okanagan Lake is to the north of the subject property. The subject property occurs within the Okanagan variant Very Dry Hot subzone of the Interior Douglas-fir biogeoclimatic zone (IDFxh1). The IDFxh1 is the driest variant of the Interior Douglas-fir zone and is characterized by a long growing season with warm dry summers, but the region commonly experiences summer moisture deficits. The subzone occupies the lower elevations of the southern Okanagan valley, Similkameen valley, along the Thompson river from northeast of Kamloops west to the Fraser River valley and its tributaries in the Lytton-Lillooet region. Winters are cool with low to moderate snowfall. The IDFxh1 is dominated by mixed open forests of Douglas-fir and Ponderosa pine with an understory typically comprised of pinegrass, red-stemmed feathermoss, and birch-leaved spirea (Hope et al., 1991).

The existing terrestrial ecosystem mapping (TEM) polygons from the Sensitive Ecosystem Inventory (SEI) for Coldstream Vernon (Iverson and Uunila, 2008) were adjusted and classification changes were made to more accurately describe the polygons at a finer spatial scale based upon the field inventory and professional judgment. With the existing TEM as a baseline, the polygons covering the subject property were ground-truthed to verify the accuracy of the ecological classification and updated to document current site conditions and ecological features. Twenty-seven polygons represented by five different ecosystems were identified within the subject property and are displayed in **Table 1** and **Figure 3**. Site photos are provided in **Appendix B**.

TABLE 1. Ecosystem communities occurring within the subject property

Polygon #	Ecosystem Code	Structural & Seral Stage	Site Series Name	Provincial Status[1]
1, 2, 4	RW	2	Rural, herb	
5, 13	RW	-	Rural	
17	RW	5B	Rural, young broadleaf forest	
3	UR	-	Urban	
6	ES	-	Exposed Soil	
7, 18, 26	Wm05	5	Cattail marsh	Blue
7, 23, 24, 25, 26	Wm06	-	Great bulrush marsh	
8, 9, 10	RZ	-	Road Surface	
11, 12, 14, 22	CF	-	Cultivated Field	
15, 21	Fl03	5	Pacific willow – Red-osier dogwood - Horsetail, broadleaf	Red
16, 27	SW	-	Shallow water	
19, 24	Wm07	-	Baltic rush saline meadow/marsh	
20	Fm01	5	Cottonwood – Snowberry - Rose, broadleaf	Red
22	Wm00	-	Reed canarygrass	
23	RI	-	River	

[1] **Yellow**: Not considered at risk. **Blue**: Of special concern. **Red**: Endangered or threatened. **Various**: May be one of multiple potential listings, depending upon more detailed taxonomic classification.

Polygons 1, 2, 4, 5, 13 and 17 all correspond to areas disturbed from rural development. Polygon's 1, 2, and 4 have a representative herb layer, polygons 5 and 13 are entirely disturbed and polygon 17 is comprised of a young Siberian elm (*Ulmus pumila*). The vegetation in these areas are largely comprised of non-native reed canarygrass (*Phalaris arundinacea*), with bulrush spp. (*Cyperaceae*), common cattail (*Typha latifolia*), and sedge spp. (*Carex* spp.) on wetter areas and non-native species such as Kentucky bluegrass (*Poa pratensis*), Manitoba maple (*Acer negundo*), orchard grass (*Dactylis glomerate*), chicory (*Cichorium intybus*), and perennial sowthistle (*Sonchus arvensis*) on the drier sites.

Polygon 3 located to the east of Lakeshore road corresponded to a public utility building and as such was coded as an urban ecosystem. Polygon 6 corresponded to an area of exposed soils located on the southwest corner of Lakeshore Road and Okanagan Landing Road.

Polygon 18 and 50% of polygon 7 and 70% of polygon 26 were cattail marshes, a blue-listed ecosystem. Vegetation was comprised of primarily cattails with beaked sedge (*Carex utriculata),* hard-stemmed bulrush (*Schoenoplectus acutus*), and duckweed spp. (*Lemna* spp.) to a lesser extent. The surface substrate remains moist saturated for the majority of the growing season and water depths may be up to 1 m in the spring but recede in the late summer.

Polygons 25, 50% of polygon 7, 20% of polygon 23, 70% of polygon 24 and 30% of polygon 26 were Great bulrush marshes. Plant diversity is low in these areas and was only comprised of hard-

stemmed bulrush. Spring freshet can result in water depths of 1.5 m with significant growing-season drawdown typically occurring.

Polygons 8, 9 and 10 corresponded to road surfaces located along the northern boundary of the subject properties on either side of Lakeshore Road.

Polygons 11, 12, 14 and 80% of polygon 22 are coded as cultivated fields and represent areas disturbed from historical agricultural activities. These areas generally have a similar non-native species composition as the rural areas; reed canarygrass, Kentucky bluegrass, orchard grass, chicory, and perennial sowthistle.

Polygons 15 and 21 are a red-listed Pacific willow – Red-osier Dogwood – Horsetail ecosystem. These ecosystems are comprised of a closed canopy of Pacific willow (*Salix lucida*) with a shrub layer composed of red-osier dogwood (*Cornus stolonifera*), speckled alder (*Alnus incana*), and Mackenzie willow (*Salix prolixa*), with a spare understory comprised of horsetails (*Equisetum* spp.).

Polygons 16 and 27 are comprised of shallow water habitat. Vegetation is comprised of submerged macrophytes including pondweed (*Potamogeton* spp.) and coontail (*Ceratophyllum demersum*).

Polygon 19 and 30% of polygon 24 are Baltic rush saline meadow/marsh ecosystems. These communities represent wetter portions of disturbed old field with vegetation consisting of lenticular sedge (*Carex lenticularis*) with Baltic rush (*Juncus balticus*), foxtail barley (*Hordeum jubatum*), field sedge (*Carex praegracilis*), and silverweed (*Argentina anserina*) occurring in the drier margins.

Polygon 20 is a red-listed Cottonwood – Snowberry – Rose ecosystem. These habitats are comprised of an open-canopy of black cottonwood (*Populus balsamifera*), with a diverse shrub layer composed of red osier-dogwood, common snowberry (*Symphoricarpos albus*), choke cherry (*Prunus virginiana*) and rose species (*Rosa* spp.). The herb layer is represented by star-flowered lily-of-the-valley (*Maianthemum stellatum*), rough horsetail (*Equisetum hyemale*), showy aster (*Aster conspicuous*), blue wildrye (*Elymus glauca*), and non-native species such as Kentucky bluegrass and Manitoba maple.

Twenty percent of polygon 20 is represented by an unclassified ecosystem that was used to represent reed canarygrass habitat.

Eighty percent of polygon 23 is coded as river to represent the area of flow between the patches of wetland on either side of Lakeshore Road.

The BC Conservation Data Centre (CDC) was accessed on September 11, 2020 and reviewed for at-risk ecological communities that occur within a 1.0 km radius of the subject property. The search results are included in **Table 1**.

TABLE 2. CDC listed at-risk ecological community occurrences within 1 km of the subject property (CDC, 2020).

Common Name	Scientific Name	BC List[1]	Occurrence ID	Distance
Black Cottonwood / Common Snowberry – Roses	*Populus trichocarpa / Symphoricarpos albus – Rosa* spp.	Red	10456	Approximately 488 m northeast of the subject property.
Hard-stemmed Bulrush Deep Marsh	*Schoenoplectus acutus* Deep Marsh	Blue	12484	Overlays the subject property.

[1] **Yellow**: Not considered at risk. **Blue**: Of special concern. **Red**: Endangered or threatened. **Various**: May be one of multiple potential listings, depending upon more detailed taxonomic classification.

4.2 Wildlife

Due to the scope of this assessment, a detailed wildlife assessment of the project area was not conducted. However, detailed wildlife assessments were conducted for previous reports (EBA Engineering Consultants Ltd., 2008). As such, no further wildlife assessments are warranted. Incidental bird species observations included American Goldfinch (*Spinus tristis*), American Robin (*Turdus migratorius*), Waxing sp. (*Bombycilla* sp.), Killdeer (*Charadrius vociferus*), Northern Flicker (*Colaptes auratus*), Osprey (*Pandion haliaetus*), and Red-winged Blackbird (*Agelaius phoeniceus*). In addition, evidence of muskrat was observed on the west side of the subject property. The native riparian and wetland vegetation on the subject property provides valuable refuge, foraging, perching and/or nesting habitat for birds, herptiles and small mammals.

4.2.1 Species at Risk

The CDC was accessed and reviewed for species-at-risk and critical habitat occurrences within a 1.0 km radius of the subject property. Species-at-risk results are provided in **Table 3**. In addition, the subject property is overlain by a masked CDC occurrence record. Ecoscape did not obtain details about the masked occurrence record from the CDC. Critical habitat occurrences are provided in **Table 4**.

TABLE 3. CDC listed at-risk species occurrences within 1 km of the subject property (CDC, 2020).

Common Name	Scientific Name	SARA Schedule 1[2]	Occurrence ID	Distance	Critical Habitat	Likelihood
American Badger, *jeffersonii* subspecies	*Taxidea taxus jeffersonii*	Endangered	10214	Record overlays the subject property	Non-forested grassland and shrubland ecosystems, however their range is between 16 to 64 km^2 and can therefore migrate through a range of habitats [3]	Low
Grasshopper Sparrow	*Ammondramus savannarum pratensis*	Special Concern	6094	Approx. 100 m south of the subject property	Large human created grasslands; pastures, hayfields and natural prairies with well-drained poor soils with sparse perennial herbaceous vegetation.[5]	Low
Great Basin Spadefoot	*Spea intermontana*	Threatened	3735 & Wildlife Species Inventory Incidental Observations	Between 30 m and 340 m from the subject property	Grasslands and open woodlands with small pools preferrably temporary ponds for breeding and terrestrial habitats for foraging, hibernation and aestivation. Requires loose, deep and friable soils for brrowing.[6]	High
Mexican Mosquito Fern	*Azolla Mexicana*	Threatened	6290	Approx. 530 m northeast of the subject property.	Wetland species of sheltered still waters; ponds, ditches, oxbow ponds and lakeshores.[7]	Moderate

Painted Turtle-Intermountain - Rocky Mountain Population	*Chrysemys picta bellii*	Special Concern	12764	Partially overlays the subject property.	Shallow waters of ponds, lakes, oxbows and marshes with muddy substrates, emergent aquatic vegetation, exposed vegetation root mats, floating logs and open banks.[8]	High
Western Harvest Mouse	*Reithrodontomys megalotis*	Special Concern	2241	Record overlays the subject property.	Dry gullies bordering grasslands and shrub-steppe rangelands, old fields, ponderosa pine forests, and both grazed and ungrazed sagebrush and antelope brush habitats.[9]	Moderate
Western Screech-owl *macfarlanei* subspecies	*Megascops kennicottii macfarlanei*		8104	Record overlays the subject property.	Riparian woodlands with black cottonwood, water birch trembling aspen in a matrix of dry coniferous forests with ponderosa pine and Douglas-fir. Nests in woodpecker cavities and nest boxes.[10]	High[11]

[1] **Yellow**: Not considered at risk. **Blue**: Of special concern. **Red**: Endangered or threatened; [2] **NAR = Not at Risk**: A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances. **SC = Special Concern**: A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats. **E = Endangered**: A wildlife species facing imminent extirpation or extinction. **T = Threatened**: A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. **DD = Data Deficient**: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
[3] COSEWIC, 2012a; [5] COSEWIC, 2013; [6] COSEWIC, 2007a; [7] COSEWIC, 2008; [8] BCMFLNRO, 2015; [9] COSEWIC, 2007b; [10] COSEWIC, 2012b; [11] Although there is a high potential for the Western Screech-owl to occupy the subject property, there is a low potential for them to occupy areas within the proposed development footprint.

TABLE 4. Critical habitat occurrences within 1 km of the project area (CDC, 2020).

Common Name	Scientific Name	BC List[1]	SARA Schedule 1[2]	Critical Habitat ID	Critical Habitat Status	Distance	Critical Habitat
Desert Nightsnake	*Hypsiglena chlorophaea*	Red	Endangered	110311	Final	10 km grid square overlapping the subject property.	Rock outcrops, talus slopes, shrub-steppe, grassland, riparian, and open Ponderosa pine and Douglas fir forests[3]
Great Basin Spadefoot	*Pituophis catenifer deserticola*	Blue	Threatened	110426	Final	10 km grid square overlapping the subject property.	See Table 3.
Mexican Mosquito Fern	*Azolla Mexicana*	Blue	Threatened	6290	Final	Approximately 470 m northeast of the subject property.	See Table 3.
Western Rattlesnake	*Crotalus oreganus*	Blue	Threatened	110196	Final	10 km grid square overlapping the subject property.	Rock outcrops, talus slopes, shrub-steppe, grassland, riparian, and open Ponderosa pine and Douglas fir forests[3]

[1] **Yellow**: Not considered at risk. **Blue**: Of special concern. **Red**: Endangered or threatened; [2] **NAR = Not at Risk**: A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances. **SC = Special Concern**: A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats. **E = Endangered**: A wildlife species facing imminent extirpation or extinction. **T = Threatened**: A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. **DD = Data Deficient**: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
[3] Environment and Climate Change Canada, 2019.

4.3 Aquatic Conditions

There is one surveyed wetland that spans either side of Lakeshore Road and includes a surveyed stream channel between the two wetlands within the subject property. The wetland habitat has been heavily disturbed from historical agricultural activities; however, it still provides essential habitat for a variety of birds, mammals and herptiles.

The subject property occurs along Segment 138 of the Okanagan Foreshore Inventory and Mapping (FIM). It is currently described as 90% single-family land use and 10% multi-family at the time of the assessment. The shore type was described as 100% gravel. The nearshore substrates were composed of 80% sand, 15% gravel, and 5% boulder. The foreshore vegetation was classified as landscaped with sparse (<10%) coverage of low shrubs (<2 m), sparse (<10%) tree cover and a patchy distribution. Native aquatic vegetation was largely absent but beds of invasive Eurasian milfoil are present along Kin Beach and most likely fronting the property. Foreshore modifications were abundant throughout the segment, including a dock density of 27.45 docks per km, a groyne density of 5.23 per km, 70% of the segment has retaining walls, and there were 2 boat launches, 2 marinas and 1 boat house documented. The condition of the foreshore of the property is consistent with adjacent properties to the north and south and generally consistent with the FIM. The Aquatic Habitat Index (AHI) current rating was very low, potential was very low and the juvenile rearing potential was low (Schleppe, 2010).

The foreshore along the subject property is located within an Okanagan Large Lakes Foreshore Protocol No Colour Zone for Freshwater Mussels and Foreshore Plants (BC MFLNRORD, 2018). The Provincial No Colour Zone indicates that the habitat has not been assessed for Rocky Mountain Ridged Mussel and for foreshore plant SAR presence as of 2017 (BC MFLNRORD, 2018 A). No foreshore plant SAR or mussel shells were observed at the subject property during the site assessment, including those of Rocky Mountain ridged mussels (*Gonidea angulata*) (RMRM). However, a non-detection of RMRM does not imply there are no mussels present at the site and formal mussel surveys were not completed to determine presence. RMRM are present along Kin Beach and across the Vernon Arm, indicating that presence may be possible because a Red Zone is in close proximity.

Kokanee (*Oncorhynchus nerka*) are the fish species of primary concern with respect to shoreline development and aquatic habitat alteration along Okanagan Lake. A review of Kokanee shore spawning zoning information for Okanagan Lake revealed that the subject property is located within a Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) No Colour Zone for shore spawning Kokanee. While shore spawning Kokanee have not previously been documented within the vicinity of the subject property, substrates may provide suitable spawning, foraging and general living habitat for a number of fish species. **Table 5** provides a list of species documented to occur in Okanagan Lake.

TABLE 5. Species of fish found in Okanagan Lake (MECCS, 2020)

Common Name	Scientific Name
Brook Trout	*Salvelinus fontinalis*
Bull Trout	*Salvelinus confluentus*
Burbot	*Lota lota*
Carp	*Cyprinus carpio*
Chiselmouth	*Acrocheilus alutaceus*
Kokanee	*Oncorhynchus nerka*
Lake Trout	*Salvelinus namaycush*
Lake Whitefish	*Coregonus clupeaformis*
Largescale Sucker	*Catostomus macrocheilus*
Leopard Dace	*Rhinichthys falcatus*
Longnose Dace	*Rhinichthys cataractae*
Longnose Sucker	*Catostomus*
Mountain Whitefish	*Prosopium williamsoni*
Northern Pikeminnow	*Ptychocheilus oregonensis*
Peamouth Chub	*Mylocheilus caurinus*
Prickly Sculpin	*Cottus asper*
Pumpkinseed	*Lepomis gibbosus*
Pygmy Whitefish	*Prosopium coulterii*
Rainbow Trout	*Oncorhynchus mykiss*
Redside Shiner	*Richardsonius balteatus*
Smallmouth Bass	*Micropterus dolomieu*
Slimy Sculpin	*Cottus cognatus*
Yellow Perch	*Perca flavescens*
Rocky Mountain (Western) Ridged Mussel	*Gonidea angulata*
Western Floater Mussel	*Anodonta kennerlyi*
Winged Floater Mussel	*Anodonta nuttalliana*

5.0 ENVIRONMENTALLY SENSITIVE AREAS ANALYSIS

The COV has developed a Sensitive Ecosystem Ranking methodology in Appendix 3 of the Environmental Management Areas Strategy in their OCP. The COV's ranking strategy is limited to three Sensitive Ecosystem Ranking Classes: High (7.0 to10), Medium (3 to 6.9) and Low (0 to 2.9) respectively, which are based off of the Conservation mapping conducted as part of the *Conservation Analysis and Updated Ecosystem Mapping for the Central Okanagan Valley* (Haney and Iverson, 2009). Alternatively, the RDCO Environmentally Sensitive Areas (ESA) from their Terms of Reference for Professional Reports for Planning Services were based on assessed using sensitive ecosystems mapping. From this, conservation ranking maps were produced, showing the relative importance and sensitivity of various ecosystems. The RDCO uses four conservation ranking classes: Very High (7.0 to 10), High (3.0 to 6.9), Moderate (0.067 to 2.9), and Low (0 to 0.066) (**Table 6**). In this case, a four-class system is preferable to help differentiate between high value areas (i.e., Very High or High) and better understand potential ecological risks.

Data sources used to determine the weighted average of each class included: Terrestrial Ecosystem Mapping (TEM), Sensitive Ecosystem Inventory (SEI), Vegetation Resource Inventory (VRI), wetlands and riparian features, grasslands, and elevation and aspect based on the TRIM DEM. Therefore, the RDCO four-class system was utilized to rank the ESAs on the subject property. A four-class system allowed for greater precision and accuracy in ranking the ecosystems present compared to the COV's three class system.

TABLE 6. Environmentally Sensitive Areas.

Class	Class Range	Significance
Very high	7.0 – 10.0	Locally & provincially significant ecosystems; critical importance to rare wildlife species
High	3.0 – 6.9	Ecologically important based on ecosystem rarity and sensitivity and/or value to rare wildlife
Moderate	0.067 – 2.9	Low to moderate ecological value or importance as wildlife habitat Low
Low	0 – 0.066	Little to no inherent ecological value or importance as wildlife habitat

1 Source: RDCO Terms of Reference
https://www.regionaldistrict.com/media/20329/Handout%20TofR.pdf

Using the RDCO ESAs as a baseline, Ecoscape assessed the subject property to ensure these ratings were consistent with current site conditions. Criteria such as stand, landscape, regional rarity, successional stage, structural complexity, and levels of disturbance were all considered in the determination of environmental sensitivity. Further, wildlife habitats as they relate to species at risk, connectivity, adjacency, and edge effects were also considered. Based upon these criteria, professional judgment was used to determine the sensitivity of the subject property. Ecosystem condition (i.e. level of disturbance, invasive species presence, etc.) was also considered when evaluating ecosystem units. The assessment addressed the potential for conservation and wildlife movement corridors to reduce the effects of fragmentation and isolation from adjacent natural habitats.

At the time of the site visit, the subject property was not recently disturbed and the wetland and riparian habitats were in varying states of disturbance. Due to presence of wetland habitats, the potential for Species at Risk, and importance as a corridor, most of the subject property was given a Very High and Moderate ESA ratings. Ecosystem polygons described as rural were given a Moderate ESA ranking, with the exception of polygon 1, which had a greater level of disturbance (i.e., partial road/trail). The exposed soil and road surface polygons were given a Low ESA ranking due to the high level of disturbance. All of the Red-listed ecosystem polygons were given a Very High ESA ranking due to the presence of functioning wetland habitat. ESA rankings for the subject property have been displayed on **Figure 4**.

6.0 RIPARIAN SETBACK ASSESSMENT

Riparian setback requirements for the subject property are regulated under the Provincial *Riparian Areas Protection Regulation* (RAPR) and the COV OCP (Bylaw 5470, 2013). As per RAPR, the setback determination is generally based on the high-water mark (HWM). However, the RAPR states the following:

"Where a lake is gauged and agencies have agreed on a calculated lake level, this value may be used as the HWM. The QEP needs to ensure that this agreed level includes those areas that are seasonally inundated once in five years on average. Where natural indicators on the shoreline (e.g., change in soil, change in vegetation) show that wave action or other hydrological processes affect the shoreline to such an extent that the recommended HWM is not applicable at that site (e.g., highly exposed or sheltered sites). A site-specific HWM can only be used where the QEP has provided a technical rationale for why the recommended HWM is not applicable. The technical rationale must include photo documentation of the site shoreline with a stake or marker indicating the location of both the recommended HWM and the proposed HWM."

Following the RAPR regulations and the very shallow grade at the subject property, we rationalize use of the 342.6 m above sea level (asl) contour and PNB herein for determining setbacks. Use of the 342.6 m asl as the PNB for Lake Okanagan has been an approach utilized by multiple municipalities with lake frontage (e.g., City of Kelowna, City of West Kelowna), although we note that there is variability between sites. On many projects we have completed, PNB typically falls between 342.6 and 343 depending upon wave action, fetch, and other physical processes that affect wave action and vegetation establishment (e.g., soils). To determine if the 342.6 m elevation falls within the normal HWM in recent periods, the 10-year HWM average from 2008-2018 (excluding outlier year 2017) was determined to be 342.47 m asl (MoE 2020), which is commensurate with the target HWM and below the surveyed PNB of 342.6 m asl. The 10-year HWM average suggests that use of the 342.6 contour elevation would typically be representative of the HWM during most years when considering recent operational changes by the Province. This ensures that the subject property is not seasonally inundated in a standard five-year return period.

Riparian setbacks are based on Zones of Sensitivity (ZOS) for the following three different factors:

- Litter fall and insect drop;
- Large woody debris, bank, and channel stability; and
- Shade (30 meters due south).

The SPEA is then determined from the ZOS with the greatest setback area. The provincial RAPR results in a 30 m setback from the PNB of Okanagan Lake at the subject property, a setback of 15 m for the wetland and a 10.6 m setback from the stream. **Figure 5** illustrates the various setbacks from Okanagan Lake, wetland and the stream and the resultant 23,686 m^2 SPEA, which encompasses a portion of the proposed development.

7.0 IMPACT ASSESSMENT

The proposed development includes the construction of a mixed-use development, wetland relocation and compensation, and restoration landscaping. The loss of several patches of the wetland, encompassing a total area of 812 m^2 will be offset by compensation at a 3:1 ratio and riparian enhancement on the subject property. The wetland that will be impacted as a result of the proposed development is in a highly disturbed area and the proposed wetland compensation area will result in an overall gain in wetland and riparian habitat function and quality. Although any loss of wetland habitat is considered to be a risk (i.e., loss of ecosystem services, biodiversity, habitat, water filtration etc.), Ecoscape anticipates that impacts on aquatic and riparian resource values as a result of the construction can be mitigated through restoration and enhancement plans detailed herein are adhered to. Our assessment does not consider the cumulative effects of the proposed development on a larger shoreline area, wetland and riparian habitats or the cumulative impacts originating from shoreline developments across the lake as a whole and similar proposals occurring within nearby wetland habitats or within a specific municipality. Without appropriate mitigation measures, the proposed works could have the following environmental impacts:

- There is potential for the release of fine sediments in the wetland, SPEA and/or lake during the clearing and grading stages of the proposed development, and during the wetland construction and restoration activities. Sedimentation in wetlands can impact biological activity, stress wildlife, change breeding and feeding behaviors, and can also affect downstream habitats;
- Potential to encounter water during excavations which may result in the release of turbid water to the lake and/or wetland;
- Improper handling and disposal of construction materials and debris could result in the addition of deleterious substances (e.g., fuel, oil, hydraulic fluid, construction materials, debris) to the adjacent wetland, SPEA and/or Okanagan Lake and subsequent negative impacts to aquatic life, associated habitat, and surface water quality;
- Improper handling and disposal of construction materials and debris could result in the addition of deleterious substances to Okanagan Lake and/or wetland and subsequent negative impacts to fish, wildlife, associated habitat, and/or surface water quality;
- With an anticipated encroachment into the SPEA and wetland, due care must be employed to ensure that further encroachment in these areas are avoided. Delineation must occur immediately adjacent to the work area to prevent further encroachment into the wetland and SPEA. A clearly delineated limit of disturbance should be installed in areas where encroachment is not intended prior to initiating construction activities. If further disturbance occurs to wetland, it must be compensated for;
- Potential to encounter archaeological sites protected under the *Heritage Conservation Act*;

- Potential to directly or indirectly impact wildlife and wildlife habitat during clearing, earthworks, and roadworks, including disruption of migration, breeding, or other behavior as a result of tree falling, site grading, construction noise, impacts to air quality, and other alterations to existing wildlife habitat and cover; and,
- Potential to introduce or facilitate the spread of invasive and noxious plant species resulting from ground disturbance and seed dispersal.

8.0 MITIGATION MEASURES

Ecoscape provides the following mitigation measures to minimize the risks of impacts to wildlife and associated habitats during the proposed works. This document will be made available to the contractor prior to initiating the works and it should be kept onsite during works. This demonstrates that the contractor is aware of the mitigation measures and that they are being followed.

8.1 General

- The BC Archeological Branch should be contacted to evaluate the potential for an archaeological impact associated with the proposed development prior to initiating any land disturbances;
- Prior to any site disturbance, the determined riparian/wetland setbacks must be clearly marked/staked in the field by the surveyor or other suitable means to prevent any further encroachment within the SPEA and/or wetland. The setback boundary must then be delineated using orange snow fence (or similar), which will also help prevent any construction debris from entering the SPEA, wetland and/or lake;
- Staging, parking, storing of equipment, and stockpiling of materials must be within designated areas within the construction footprint and not using public lands or encroaching beyond the disturbance limits associated with the proposed works;
- Equipment and vehicle access should use existing roads, trails, and other disturbed areas to minimize the disturbance footprint;
- The appropriate Development Permits and approvals must be obtained from the COV prior to demolition and construction activities within the subject property. The Development Permit, approvals and Environmental Management Plan(s)must be kept onsite at all times.; and,
- All potential wildlife attractants, including food, beverages, and other strong smelling or perfumed materials must be removed from the site daily.

8.2 Best Management Practices

Ecoscape provides the following mitigation measures to minimize the risks of impacts to wildlife and associated habitats. Best Management Practices (BMPs) have been adapted from BC Ministry of Environment Standards and Best Practices for Instream Works (2004a). This document will be made available to the contractor prior to initiating the works and it should be kept onsite during proposed works to demonstrate that the contractor is aware of the recommendations and that they are being followed.

There are numerous Provincial Best Management Practices that are applicable to the proposed works and should be adhered to. The following is a brief list of pertinent BMPs for this project:

- Develop with Care Environmental Guidelines for Urban and Rural Land Development (Polster et al., 2014);
- Guidelines for Amphibian and Reptile Conservation during Road Building and Management Activities in British Columbia (Ministry of Environment and Climate Change Strategy, 2020);
- Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (BC MFLNRO, 2014);
- Best Management Practices for Amphibian and Reptile Salvages in British Columbia (BC MFLNRO, 2016);
- Standards and Best Practices for Instream Works (BC MoWLAP, 2004); and,
- Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (BC MFLNRO, 2013).

8.3 Work Timing Windows

8.3.1 Avian Nesting Periods

Avian nesting periods should be considered to protect nesting birds within and adjacent to the proposed work area.

- Section 6 of the Federal *Migratory Birds Convention Regulation* protects both the nests and eggs of migratory birds. The project area falls within the Canadian Avian Nesting Zone A1 (MECCS, 2020). The general avian nesting period for migratory birds within this zone is **March 26th to August 9th**. Section 34 of the Provincial *Wildlife Act* protects all birds and their eggs, and Section 34(c) protects their nests while they are occupied by a bird or egg. The project area falls within the Northern Okanagan Basin ecodistrict. The avian nesting period for all birds within this ecodistrict is **February 18th to September 12th** (Birds Canada, 2020);

- If vegetation clearing activities are required during the identified avian nesting period, pre-clearing nesting surveys may be required by an Environmental Monitor (EM) to identify active nests;
- If active nests are found within the clearing limits, a buffer will be established around the nest until such time that the EM can determine that nest has become inactive. The size of the buffer will depend on the species and nature of the surrounding habitat. Buffer sizes will generally follow provincial BMP guidelines or other accepted protocol (e.g., Environment Canada). In general, a minimum 20 m buffer will be established around songbird nests or other non-sensitive (i.e., not at risk) species;
- Clearing and other construction activities must be conducted within 72 hours following the completion of the pre-clearing nesting surveys. If works are not conducted in that time, the nesting surveys are considered to have expired and a follow-up survey will be completed to ensure that no new nests have been constructed; and,
- The nests of Bald Eagle, Golden Eagle, Peregrine falcon, Gyrfalcon, Osprey and Burrowing Owl are protected year-round whether they are active or not as per Section 34(b) of the *Wildlife Act*. Best management practices relating to raptors and their nests can be found in Guidelines for Raptor Conservation during Urban and Rural Land Development in BC (2013).

8.3.2 Amphibian Least-Risk Timing Window

Table 7 summarizes the key habitats and life history timing for painted turtle and the three amphibian species that could be potentially present within the proposed work area. While there are no specific timing work windows for these species, there are periods over the year when they would be more at-risk. In particular, risks are greatest during hibernation, while eggs are laid or during larval stages, particularly when drawdown and stranding would have a high consequence of mortality to individuals that are unable to avoid physical habitat changes. In addition, excavating during the period of time in which Great Basin spadefoots are hibernating could also pose a risk.

The least-risk timing window for land disturbances is represented by the yellow polygon, whereas the least risk timing window for instream disturbances is represented by the grey polygon. The primary species to avoid disturbing are the Painted Turtle (BC Blue-listed; SARA Schedule 1 – Special Concern) and Great Basin Spadefoot (BC Blue-listed; SARA Schedule 1 – Threatened). Painted turtle emergence depends largely on temperature cues, but is thought to occur in late March in the Okanagan valley. Whereas the Great Basin Spadefoot generally hibernate within 0.6 m to 6 m from the breeding pond between November and April and their reproductive mode is generally between April and early July.

TABLE 7. Life history summaries and timing of critical developmental stages of painted turtle and pond-breeding amphibians expected to occur in the project area. Biological information was synthesized from RIC (1998), and Orchard (1984).

Species	Reproductive Mode/Habitat	Typical Terrestrial Habitats	Critical Life History Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Painted Turtle	Eggs and larvae aquatic/ lakes, ponds, and slow moving streams.	Underground burrows, occasionally under or within logs; some populations may be neotenic.	HIB - in pond												
			MATE												
			NEST												
			HATCH												
Great Basin Spadefoot	Small ponds and pools, temporary or permanent	Arid regions with sandy soils in open habitats with loose friable soils that allow burrowing, rodent burrows are thought to be important. Have been found burrowed under 30 cm2 flat rocks within 0.6-6 m from the breeding pond.	HIB - on land												
			ED												
			IH												
			LDM												
Western Toad	Small ponds and pools, temporary or permanent	Most forested habitats in all biogeoclimatic zones and ecoregions. Hibernation sites are generally 180-6230 m from breeding sites and they use rodent burrows, under large rocks, lods, root wads, or under stream or lake shore banks. Hibernacula must be below the frost	HIB - on land												
			ED												
			IH												
			LDM												
Northern Pacific Treefrog	Shallow ponds with lots of vegetation; not necessary to be permanent	Forests; often on trees and shrubs; also common along shores. Hibernate underground in mammals burrows, rock crevices or under rotten logs.	HIB - on land												
			ED												
			IH												
			LDM												

HIB-hibernation; MATE-mating; NEST-nesting (on land); HATCH-eggs hatching; ED - Egg deposition; IH - Incubation/Hatching; LDM - Larval Development

8.3.3 Fisheries Least-risk Timing Window

Considering that the subject property is located within a Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) No Colour Zone for shore spawning Kokanee, there are no timing window restrictions. However, there is the potential for Rainbow Trout to utilize the foreshore area. The general least-risk timing window for Rainbow Trout is July 22nd – October 31st. It is recommended that any instream works be conducted within this timing window.

8.4 Herptile Crossing Requirements

It may be necessary to modify the stream crossing culvert under Lakeshore Road in order to facilitate safe herptile crossing. In addition, it is anticipated that the culvert downstream of

Okanagan Landing Road will require modifications to facilitate herptile crossing. However, further assessment/monitoring of the existing crossings would be recommended to determine the need for any modifications and/or the need for additional crossings. Tunnels with associated fencing are the most common form to mitigate herptile mortality. Tunnels must be installed in conjunction with fencing in order to guide animals into the entrance way of the tunnel and prevent them from accessing the above road surface. The box, arch, and rounded tunnel structures are recommended because they provide natural, relatively flat/horizontal crossing substrate, and sufficient air, light, and clearance for hopping amphibians. Rounded tunnels are discouraged as amphibians will be inclined to climb the walls and are less likely to cross the tunnel. **Box, arch and rounded tunnels that are buried into the ground and provide an interior height of at least 0.5 m that are as wide and as short as feasible are recommended (Bylaw 3842 Schedule F)**. Suitable microclimate and light requirements can be achieved by designing tunnels with wider/larger openings or with an open-top or partial open-top tunnel (i.e., a storm grate, etc.). Skylighted/grated tunnels can be used along roads that receive snow.

The tunnels must be lined with local, moisture-holding soil, such as soil with high organic matter (i.e., wood and humus) as well as sand, branches and other natural materials in order to encourage herptiles to utilize the crossing. Soils are to contain fines and if stones/rocks are in the substrate, they are to be no larger than 5 cm in order to achieve a high-moisture holding surface and produce a level traveling surface. Sediment baffles (e.g., open plate) may be used to encourage the natural substrate to remain in the tunnel if it experiences any water flows. The tunnel should be installed at a <2% grade (except when there is an open grate top to the road) that helps to ensure a sediment holding capacity. Cover objects such as one relatively large boulder/log or 2–3 cobbles/pieces of wood per 10 m should be present near the entrances of all terrestrial crossing structures to provide shelter and safety cover and as much natural vegetation at the entranceways as possible should be retained during construction; where needed, additional planting should occur after construction. Tunnel entrance bottoms (including the soil level inside the tunnel) should be at ground level as to ensure wildlife do not need to "step up" or "step down" to enter the structure. If a slope leads to the entrance, it should not be steeper than 1:1 or 45˚. Drainage ditches or sloped excavation should be used to divert most runoff water away from the entrance while still allowing some rainwater to enter the tunnel to keep soils moist for amphibians.

It is possible that the existing drainage culverts may already be located and designed correctly for use by local herptile species and may require only guide fencing to facilitate crossing and reduce road mortality. If the culvert becomes frequently inundated with water, some amphibians and reptiles may not be able to swim through them. Retrofitting water-carrying culverts with shelves (benches) attached to the inside of the walls, above the high-water line, can make them viable passageways. If this is not the case, the existing stream crossing shall be modified to be a box, arch or rounded tunnel that is buried into the ground and provide an interior height of at least 0.5 m with as wide as a width as possible with as short of a length as possible is feasible are

recommended. The tunnels shall not be fully submerged in order to achieve adequate access to surface oxygen.

Fencing is an essential component to successful crossing structures for herptiles. Fence lengths will depend, in part, on the species, terrain, and number and spacing of crossing structures. Care must be taken to avoid leaving fencing and crossing structure gaps at herptile movement hotspots because the gaps may have the adverse effect of funnelling animals onto the road. It is important to provide a way over the fence for animals caught on the road side of the fence, where they would be exposed to traffic and at a greater risk of heat exposure and desiccation. Fencing should have a solid, durable framework (stakes, posts, and sheeting) to provide an effective barrier for the target species and to withstand the weight of snow and impact of snow removal. General considerations for fence design are as follows:

- Posts
    - Steel posts will not break under snow loads.
    - Posts that are closer together (e.g., spaced 2–3 m apart) will prevent both fence sag and collapse during severe weather events and snow removal.
    - Stakes or posts should be placed along the road-facing side of the fence to deter climbing and should be buried at least 30 cm into the ground.
- Materials
    - The choice between recommended fencing materials depends on the target species.
    - Use materials that allow drainage through or beneath the fence at wet sites to avoid water pooling at or near a crossing structure
    - Use opaque fence materials, especially where snakes or turtles occur.
    - Fence material should not be flammable in areas that experience frequent wildfires.
    - Mesh should not be used as fencing material. Several species of amphibians can climb plastic ¼" mesh fences, and some small snakes can pass through or get stuck in ¼" mesh
- Fence depth and height
    - The fence should be buried to a minimum depth of 10 cm, and have a fold 10–20 cm wide to create a lip that is directed away from the road This is to deter animals from digging under the fence and to reduce the risk of the fence material being pulled out of the ground when bumped.
    - If fences could be inundated by spring runoff, their height should be at least 0.5 m higher than the high-water level in spring to prevent animals from jumping or climbing over the fence.

- When more than one species is targeted for mitigation, fence height should be the tallest height recommended for all target species (Table 3). The use of an overhanging lip along the top of the fence can allow the fence to be shorter (see next point).
- The fence should include an overhanging lip along the top. It should extend 6 cm outward, away from the road (horizontally), and then 4 cm downward (vertically).

- Additional requirements:
  - Fencing must connect to tunnel entrances smoothly and without gaps. There should be no rip rap or stepped ground that would deter or impede animals moving along the fence from entering the tunnel.
  - Escape routes are required for animals caught on the road side of the fence. They can be created in several ways:
  - On sloped right-of-ways, construct the top of the fencing at or below road level
  - Backfill the road side of the fence with dirt to the height of the fence; e.g., ACO Systems Ltd. makes a curved fence product that is backfilled with dirt. It allows animals to cross over the backside of the fence along its entire length
  - Install ramps every 3–5 m on the road side of the fence. Ramps should have a maximum slope of 1:1; they can be created in the shape of a half cone that tapers smoothly from a semi-circle on the ground to the apex at the top of the fence (Photo 37); adding fine plastic mesh or sticky fabric makes it relatively easy for animals to climb up the ramp.
  - Fence ends should be curved or installed in a 90° "U" design to direct amphibians and reptiles away from the road This curved section should be a minimum of 200 cm long, though longer is better (BC Ministry of Environment and Climate Change Strategy, 2020).

ACO fencing may be a suitable solution for the subject properties. Exact fencing details will be determined at the detailed design phase following further investigation. Further details on species specific crossing and fencing requirements are provided in **Appendix C** and/or Guidelines for Amphibian and Reptile Conservation During Road Building and Management Activities in British Columbia (BC Ministry of Environment and Climate Change Strategy, 2020). The Preliminary Stormwater Management Summary and Drawings prepared by WSP provide additional detail of how the herptile crossings will also convey stormwater (**Appendix D**)

8.5 Worksite Isolation

The in-stream containment measures to be used during construction will depend upon the existing site conditions and flows, therefore this will be determined at the time of construction by the EM, engineer and contractor. The following containment measures may be used in whole or in combination at the discretion of the EM depending upon site conditions and which technique is likely to best mitigate impacts to aquatic resources:

- The in-stream work area may be isolated using a silt curtain which would allow the work to occur within the water while controlling turbid water. If this technique is used, a fish salvage of the containment area will be required prior to the start of construction;
- Depending upon flows, the main flows may be directed to a temporary culvert using a sandbag headwall. This temporary culvert would direct flows away from the work area so the work could occur within a "dry" section of the channel. Dewatering of any areas of the channel would also require a fish salvage; and,
- It may be necessary to obtain a BC *Wildlife Act* permit if any amphibian/fish salvages are required to facilitate the works.

8.6 Clearing and Grubbing

- Clearing and grubbing limits must be clearly marked in the field prior to construction and minimized wherever possible. Unnecessary impacts to native vegetation and soils must be avoided at all times. Important wildlife habitat, including veteran trees, snags, and other features, will be identified by the EM prior to construction works (i.e., flagged or otherwise marked to prevent disturbance).
- Flagging or snow fencing must be used to clearly delineate the construction disturbance limits prior to commencement of works and must remain in place for the duration of works.
- In the event that land and/or natural vegetation is disturbed or damaged beyond the development footprint area, these areas should be restored and/or replanted with plant material native to the area under the direction of the EM.

8.7 Erosion and Sediment Control

This section addresses minimizing the potential for the introduction of deleterious substances to Okanagan Lake, SPEA, and/or the wetland. The following recommendations must be adhered to throughout all stages of construction:

- The release of silt, sediment, sediment-laden water, raw concrete, concrete leachate, or any other deleterious substances into any drainage or areas of high environmental value must be prevented at all times;
- Silt fence must be installed between the proposed works Okanagan Lake and the wetland/stream to mitigate the risks to aquatic resources associated with runoff and sediment transport. It is recommended that silt fence is installed just outside of the determined setback limits to prevent any debris/deleterious substances from entering the steep slope and the lake;
- Silt fencing must be installed as directed by the EM in a field-fit manner, as required. ***Silt fence must be staked into the ground and trenched a minimum of 15 cm to prevent flow underneath the fence and must remain taut to prevent material from moving over the fence. Silt fencing should contain sufficient storage capacity to collect runoff and sediment deposition during storm events***. Silt fencing will be monitored on a regular basis and any damages or areas where the integrity and function of the fencing has been compromised should be repaired or replaced promptly. Silt fence must remain in place where required until the completion of the project;
- All construction debris must be kept outside of the SPEA and steep slopes and should be removed from the property on a regular basis;
- Stockpiling of fill material within the SPEA must not occur without consent from the environmental monitor (EM). Any fill material, if required for construction, must be located outside of the SPEA beyond the silt fence;
- Ensure that onsite machinery is in good operating condition, clean, and free of leaks, excess oil or grease. No equipment refueling can take place within 30 m of Okanagan Lake or the wetland/stream;
- Erosion and sediment control (ESC) should incorporate the measures described below to mitigate risks during construction works. The plan is generally based upon provincial BMPs and other specifications and includes the following principles:
    - Construction works should be conducted during periods of warm, dry weather with no forecasted precipitation;
    - Construction works should be scheduled to reduce the overall amount of time soils are exposed;
    - Natural drainage patterns should be maintained where possible;
    - Existing native vegetation should be retained where possible; and,
    - Stormwater and sediment-laden runoff should be directed away from exposed soils within the construction area.

- Exposed soils along slopes should be stabilized and covered where appropriate using geotextile fabric, polyethylene sheeting, tarps, or other suitable materials to reduce the potential for erosion resulting from rainfall, seepage, or other unexpected causes; and,
- Adjacent roadways should be kept clean and free of fine materials. Sediment accumulation upon the road surfaces must be removed and disposed of appropriately.

8.8 Turbid and Concrete Water Management

Options for turbid water management include the following;

- Surface flows should be directed away from the construction site to avoid the degradation of water quality in the nearby wetland or any local watercourses. If flows cannot be directed offsite and surface waters become turbid from flowing over exposed soils, the sediment-laden waters should be conveyed to a sediment trap or sump located at a low point of the construction site. The trap or sump should be of sufficient capacity to collect waters and allow settling of fine materials prior to discharge;
- Discharging to local stormwater will only be an option if prior approval is gained from the COV;
- Discharge to Okanagan Lake may be an option provided that water discharged is within the allowable limits for turbidity under the ambient water quality guidelines for turbidity, suspended and benthic sediments; see below (BC MoE, 2019). Any water discharged to Okanagan Lake must be approved by the EM prior to discharge and the EM would need to be onsite full time;
- Other equivalent sediment and erosion control measures may include check dams (e.g., rock or sand bag) to slow flows along drainage channels and ditchlines, sumps, or other settling areas for turbid waters;
- pH levels will also be monitored as required. Levels must conform to MOE guidelines (2001); and,
- Emergency measures must be implemented if downstream pH has changed more than 1.0 pH unit, measured to an accuracy of +/- 0.2 pH units from the background level, or is recorded to be below 6.0 or above 9.0 pH units.

Turbidity levels under the Ministry of Environment guidelines for fish and aquatic habitats (BC MoE, 2019) are as follows:

- During clear flow periods, induced turbidity should not exceed 8 NTU above background levels at any given time and no more than an average of 2 NTU above background levels over a 30-day period; and,

- During turbid flow periods, induced turbidity should not exceed background levels by more than 5 NTU at any time when background turbidity is between 8 and 50 NTU. When background exceeds 50 NTU, turbidity should not be increased by more than 10% of the measured background level at any one time.

8.9 Spills

Spills of deleterious substances can be prevented through awareness of the potential for negative impact on aquatic habitats and with responsible housekeeping practices onsite. Maintenance of a clean site and the proper use, storage and disposal of deleterious liquids and their containers are important to mitigate the potentially harmful effects of spills and/or leaks.

- Ensure equipment and machinery are in good operating condition, free of leaks, excess oil, and grease. Equipment needs to be pressure/steam-washed prior to use within close proximity of a watercourse;
- Standalone fuel tanks, generators, and other potential spill sources will be surrounded by a secondary containment designed to hold back 110% of the volume of the container materials;
- All spill events will be recorded and reported to the site supervisor and EM. In the event of a spill, the site supervisor will be immediately notified by workers onsite. The supervisor will then be responsible for contacting a mechanic (if necessary), the Project Manager, and the EM;
- Any spill will be reported immediately to the Project Manager and the EM. In the event of any fluid spills or leak exceeding 5 L or any spill quantity in or near water, the Spill Response Plan must be followed including immediate containment, cleanup/mitigation, and immediate reporting to the EM;
- Reportable Levels for Certain Substances (as per Schedule 1 of the *Environmental Management Act* Spill Reporting Regulations are available online at: http://www.env.gov.bc.ca/epd/codes/spill-reporting/index.htm) will be immediately recorded and reported to the site supervisor and EM.
- Spills shall be contained, absorbed, and disposed of in accordance with the regulations outlined in the Environmental Management Act and using the following general steps:
    - Assess, monitor and prevent the hazard or threat;
    - Stabilize, contain, remove and clean up the hazard or threat;
    - Evacuate personnel if necessary;
    - Recover and rehabilitate wildlife;

- Restore wildlife habitat;
- Take other steps to address the long-term impacts resulting from the spill; and,
- Report the spill event (within 48 hours) to the Provincial Emergency Program 24-hour hotline at 1-800-663-3456.

- Spills occurring on dry land will be contained, scraped and disposed of appropriately. Contaminated material will be stored on tarps and covered to prevent mobilization and will be disposed of in accordance with the *Environmental Management Act*;
- Copies of contact phone numbers for notification of all of the required authorities in the event of a spill/emergency response should be posted and clearly visible at the site;
- Copies of contact phone numbers for notification of all the required authorities in the event of a spill/emergency response will be kept posted and clearly visible onsite;
- Spill containment kits must be kept readily available onsite during construction in case of the accidental release of a deleterious substance to the environment. Any spills of a toxic substance should be immediately reported to the Emergency Management BC 24-hour hotline at **1-800-663-3456**, as well as Ecoscape at **1-250-491-7337**;
- In areas where contaminated sites are identified during construction activities, they will be managed for human and ecological health risks. This may include collecting soil samples to submit to a lab, additional excavations to attempt delineation and consultation with contaminated sites risk management specialists; and,
- Soil from known contaminated sites will be characterized prior to removal and then sent for disposal to an appropriate waste management facility.

8.10 Foreshore Use

The foreshore area is not proposed to be altered/disturbed in this application and will be dedicated to COV parks. The following general recommendations must be adhered to in order to prevent foreshore disturbance and to enhance the ecological integrity of the subject property:

- No beach grooming, addition of sand, removal or alteration of cobbles/boulders, dredging or removal of riparian vegetation is to occur at any time. There must be no disturbance to substrates occurring along the foreshore of the subject property;
- No works are to occur below the 343 m elevation (HWM) of Okanagan Lake without having a provincial *Water Sustainability Act* Section 11 application submitted, approved and in the possession of the property owner and contractor; and,

- The construction of permanent structures such as patios, boardwalks, boat houses, hot tubs, pools, etc. are not permitted within the SPEA.

8.11 Air Quality

Air quality standards must be met at all times during the project. Dust control can be achieved by reducing the spatial extents and amount of time that soils are exposed during construction activities. Reducing traffic speed and volume can also reduce dust concerns. Surface and air movement of dust during project activities can be mitigated through preventive measures and design criteria.

- Exposed soils should be watered as required to suppress dust. Sediment-laden runoff must not be conveyed to adjacent watercourses or surface water drainages. Oil and other petroleum products should not be used for dust suppression. Alternative dust suppressants should be approved by the EM prior to application;
- Road surfaces should be kept clean and free of fine materials (i.e., swept) regularly to prevent the increase of airborne particulate matter;
- Idle time of construction equipment and contractor vehicles should be kept to a minimum to reduce the release of greenhouse gases. The contractor should inform and educate employees and sub-contractors on the importance of minimizing idling time and develop guidelines to direct the practice of reducing unnecessary idling. In general, contractor vehicles and equipment will be turned off when not in use; and,
- Works will generally be permitted from 7:00AM to 7:00PM, Monday to Saturday.

8.12 Site Cleanup

Upon substantial completion of construction activities:

- Silt fencing, snow fence and other temporary mitigation features must be removed if the risk of surface erosion and sediment transport has been adequately mitigated with other permanent measures; and,
- All equipment, supplies, waste, and other materials must be removed from the site.

8.13 Environmental Monitoring

An environmental monitor (EM) should be retained to document compliance with proposed mitigation measures and to provide guidance during construction works. In the event that greater disturbance occurs due to unforeseen circumstances, the EM should recommend further measures

to protect/restore the natural integrity of the site. The EM should be an appropriately Qualified Environmental Professional (QEP).

The EM's duties and schedule will include, as a minimum, the following:

- A pre-construction meeting prior to the implementation of works. During this visit, best management practices and erosion and sediment control measures will be reviewed;
- Visits should be conducted during construction and will target higher-risk activities. The EM should be notified prior to high-risk activities so they can schedule site visits accordingly;
- EM reports will be generated for each visit and submitted to the client; and,
- Following completion of the project, a substantial completion report will be prepared.

9.0 RESTORATION AND COMPENSATION PLAN

Based on the results of the impact assessment, the environmental setting, disturbance footprint, and potential for long-term impacts, the following wetland and riparian enhancement measures have been developed. The restoration plans outlined are subject to change depending on the site conditions observed during the proposed development and restoration activities. Detailed designs for the wetland restoration plan will be provided as per the COV's Development Permit process, *Fisheries Act* Authorization, RAPR assessment approved by the Province and/or a WSA Section 11 permit(s). The proposed enhancements provide a summary of the total area that will be constructed to mitigate habitat impacts, where specific details will adhere to the design criteria and information in this report.

The restoration and compensation plan is based on the following best management practices for wetland construction and restoration:

- Standards and Best Practices for Instream Works: Habitat Enhancement & Restoration (BC MoWLAP, 2004);
- Recovery Strategy for the Great Basin Spadefoot (*Spea intermontane*) in Canada (Environment and Climate Change Canada, 2017);
- Riparian Revegetation (BC MoELP & DFO);
- Restoring Wetlands in Washington (Stevens and Vanbianchi, 1993); and,
- Provincial Mitigation and Compensation Policy (BC MoE, 2014).

9.1 Offsetting Plan

The proposed development is anticipated to result in lost SPEA and disturbed wetland areas, that will be compensated for through an estimated total riparian restoration area of 21,308 m^2 and wetland compensation area of 2,337 m^2. **Table 8** and **Figure 6** display the areas lost to development and the total compensation/enhancement areas are displayed in **Figure 7**.

Table 9 displays the relative habitat value of the SPEA pre-development and post- development. A Relative Habitat Value (RHV) of 0 has an inherent low relative habitat value whereas a RHV of 1.0 has an inherent high value. It is anticipated that once the riparian enhancements prescribed have been undertaken that there will be a net gain in RHV at a 3:1 ratio. The SPEA areas that are proposed to be given to the development are largely coded as cultivated field and rural areas (**Figure 3**) and were dominated by non-native and invasive species such as reed canary grass. Considering the condition of the SPEA in these areas, a RHV of 0.30 was given because the relative values are lower than a natural wetland, which would have a value of 1. The areas just beyond the SPEA that are to be given back as riparian habitat are either in similarly disturbed areas described as rural or cultivated fields, or in the Red-listed Cottonwood – Snowberry - Rose, broadleaf ecosystem. This valuable ecosystem is situated beyond the SPEA and will be protected and enhanced as part of the proposed development. Considering the opportunities for enhancement in the areas to be given back via native riparian planting in order to establish/restore a black cottonwood/ red-osier dogwood flood bench community as well as a willow red-osier dogwood low flood bench, the creation of Great Basin spadefoot burrows, invasive species management, and the permanent protection of a Red-listed ecosystem, the RHV of the areas to be given back post development were given a RHV of 0.90 considering the temporal factors in restoration. However, we anticipate that given time to fully establish these areas will have an RHV of 1.0. In addition, it is anticipated that following wetland offsetting measures that the benefits the wetland currently provides such as runoff retention, sediment trapping and water quality management will be enhanced post-development.

A detailed analysis of the specific wetland areas will be completed as part of detailed design, allowing us to further elaborate on potential risks and values. This analysis would be needed to obtain any other approvals required, such as a Federal *Fisheries Act* Authorization or to work with the Provincial *Riparian Areas Protection Regulation*. During these works, refinement of the habitat values with more detailed assessment and better quantification of possible habitat gains will occur.

A wetland scoresheet developed by Ecoscape for the BC Wildlife Federation Wetlands Education Program (Hawes, 2018; **Appendix E**) was used to characterize the existing relative biodiversity values and the relative biodiversity value following the proposed wetland compensation work (**Table 10**). It is anticipated that the relative biodiversity score for the wetland following the construction of the proposed 0.2436 ha of wetland habitat will result in an overall increase in biodiversity in the area as displayed in **Table 11**.

TABLE 8. Habitat Balance

	Total Area Lost to Proposed Development (m^2)	Compensation Ratio	Total Area to be Returned/Restored (m^2)
SPEA	3,626	1:1 – area to be returned 1: approximately 6	3,626 – returned 21,308 – restored
Wetland	812	3:1	2,436

TABLE 9. Relative Habitat Value Change in Lost SPEA Pre- and Post- Development

Total Area Lost and Returned/Restored (m^2)	RHV Pre-Development Area to be Lost	Total Area (m^2) to be Lost x RHV Pre-Development	RHV Post-Development of Areas to be Given Back	Total Area ($m^{2)}$ to be given back x RHV Post- Development
3,626	0.30	1,087.8	0.90	3,263.4

TABLE 10. Wetland Scoresheet – Biodiversity sub-category.

Category	Options	Score	Existing Wetland Score	Proposed Wetland Compensation Score	Proposed - Existing Wetland Score
Number of Wetland Classes in Unit (Marsh, Swamp, Fen, Bog)	1	9	9	20	+11
	2	13			
	3	20			
	4	30			
	5	45			
	>6	60			
Diversity of Surrounding Habitat	Low: 1-2 Types	1	5	5	No Change
	Mod: 3-5 Types	2			
	High: 6-10 Types	5			
	Very High: 11-15 Types	7			
Wetland Vegetation Community Diversity	Vegetation Communities primarily with 1-3 forms	6	6	15	+9
	Vegetation Communities primarily with 4-5 forms	15			
	Vegetation Communities primarily with 6 or more forms	30			
Interspersion	Type 1 – Low (simple community edge)	6	6	15	+9
	Type 2 – Moderate (Regular to slightly irregular community edge)	15			
	Type 3 – High (Irregular to complex community edge)	21			
	Type 4 – Very High (Complex community edge)	30			

Open Water Type	Type 1 – <5% wetland area	8	0	14	+14
	Type 2 – 5-25% wetland area occurring in central area	10			
	Type 3 – 5-25% wetland area interspersed as multiple ponds of various sizes	14			
	Type 4 – 26-75% wetland area occurring in central area	20			
	Type 5 – 26-75% wetland area as multiple ponds and embayments	30			
	Type 6 – 75-95% wetland area occurring in central area with vegetated fringe	8			
	Type 7 – 76-95% with vegetation occurring as diffuse open stands within	14			
	Type 8 – Open water >95% of wetland area	3			
	Type 9 – No open water	0			
Proximity to Other Wetlands	Type 1 – Hydrologically connected to different wetland type within 1.5 km	8	8	8	No Change
	Type 2 – Hydrologically connected to same wetland type within 0.5 km	8			
	Type 3 – Hydrologically connected to different wetland type 1.5 – 4 km	5			
	Type 4 – Hydrologically connected to same wetland type 0.5-1.5 km	5			
	Type 5 – Within 750 m to another wetland of different wetland type but not hydrologically connected	5			
	Type 6 – Within 1 km of other wetland (same type) but not hydrologically connected	2			
	Type 7 – No wetland within 1 km	0			
	TOTAL	**/165**	**34**	**77**	**+43**

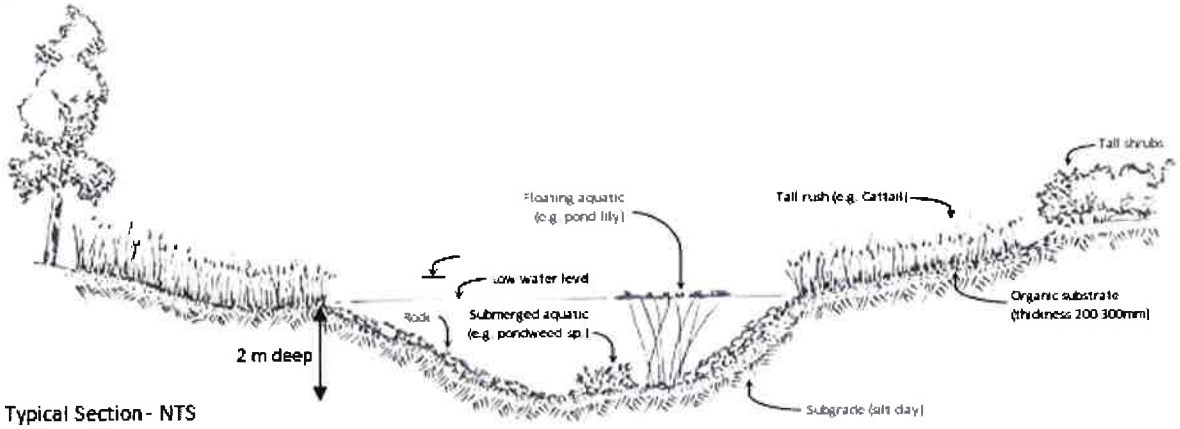
TABLE 11. Biodiversity scores pre- and post- wetland removal/restoration, scaled by area.

Existing Disturbed Wetland Lost (Area x Existing Biodiversity Score)	Proposed Wetland Compensation (Area x Proposed Biodiversity Score)
0.0812 ha x 34 = **2.76**	0.2436 ha x 77 = **18.76**

9.2 Wetland Construction and Restoration

The loss of 812 m^2 of wetland will be compensated for by extending and enhancing (increase the scaled biodiversity score by 16 following the proposed compensation; **Table 11**) the wetland area by a total of 2,436 m^2 on the east side of Lakeshore Road (**Figure 6**). The wetland will be constructed using standard techniques and design criteria, described below. However, the wetland construction will take place on-site under the direction of the EM.

- Native wetland plants and organic materials within the proposed wetland compensation area will be stripped and stockpiled prior to clearing. Invasive vegetation will be removed from the site;
- The wetland basin will be approximately 1.5 m deep and will be dug within the footprint of the proposed wetland compensation area (**Figure 6**). The wetland perimeter and wetland bottom will be irregularly shaped in order to create a diversity of micro-habitats and a variety of water depths; with an emphasis on sufficient shallow areas for Great Basin spadefoot tadpoles and eggs (<30 cm deep). The wetland basin will be constructed in a field fit manner with the EM and contractor;
- An oil and grit separator will be required (Bylaw 3842 Schedule F);
- The basin will be designed with deep water in the center and shallow benches along the edges to facilitate greater structural complexity with the establishment of robust emergent vegetation (e.g. cattail, sedges, rushes, and grasses), submerged and floating aquatic vegetation, as well as sticks, rocks and other debris to provide egg attachment surfaces for spadefoots;
- A typical cross-section illustrating the proposed wetland basin is provided below:



Typical Section - NTS

- The existing subsoil conditions, soil saturation, water depth, and duration and frequency of inundation of the wetland are considered to fluctuate year-round, with water depth fluctuations being less than 1 vertical meter. In general, it is our belief that the proposed wetland is wetted on a year-round basis and detailed design will need to consider water elevations when designing the wetland extension;
- If required, a pond liner of either clay, bentonite, or a geogrid style, will be installed to retain waters within the basin. If soils are suitable for water retention (i.e., impermeable layer), then pond liners may not be required. This will ensure that proposed works do not create a potential water loss, and result in water retention properties similar to the existing conditions;
- Approximately 20-30 cm of organic material excavated from the basin footprint will be placed throughout over the liner or impermeable layer. The organic layer will support beneficial microbes that will provide water quality benefits;
- Once the subgrade of the basin and benches have been excavated, a coarse rocky substrate will be placed on the pond floor in shallower areas and along the pond margins to provide some structure to the banks;
- Native wetland plants that were stockpiled during the initial clearing stage will be re-planted along the perimeter of the new wetland basin;
- Native vegetation, including trees, shrubs, and groundcover, will be retained to mitigate the establishment of invasive plants and to maintain the existing ecological value. Standing dead trees (snags) and coarse woody debris will also be retained for the wildlife habitat value they provide;

- Large woody debris salvaged from the site will be placed along the banks extending into the deeper parts of the basin to provide potential basking habitat for turtles and other amphibians and to increase structural diversity of the habitat that will benefit reptiles and amphibians;
- Bank slopes should be varied to control water depth and hydroperiod.

9.2.1 Hydrology and Stormwater Management

It is anticipated that following the proposed development there will be no negative impacts to the hydrological and geotechnical conditions of the subject property and/or surrounding areas. At this stage, a formal stormwater management has not been prepared and will be prepared at the detail design phase. In the interim, WSP has prepared a Preliminary Stormwater Management Memo and Drawings (**Appendix D**). The memo identifies anticipated drainage modifications to facilitate herptile crossings and ability to convey Q100 flows, how the existing wetland and proposed wetland enhancement areas will function as a detention system (if deemed necessary during the design process), and anticipated drainage plans for the proposed development. A detailed design of the stormwater management system will be provided as the development proceeds and following further liaison with the COV, Department of Fisheries and Oceans, and/or the Province based upon modelling for a specific development plan. The current challenge with proceeding with this project is determining the developable areas that will be acceptable to the COV. It is challenging to provide explicit detail until there is agreement that the proposed development areas are appropriate to the COV. Once this occurs, further refinement and consideration of details more typical of detailed design can occur.

9.3 Wildlife Habitat Remediation/Creation

As part of the restoration and compensation plan, it will be necessary to install burrows at a variety of depths and widths to encourage use by rodents and amphibians. It is not known exactly what depth Great Basin Spadefoots prefer for over-wintering; however, it must be below the frost line. Other species of spadefoot have been found to utilize burrows averaging around 54 cm deep and approximately 5 cm wide (COSEWIC, 2007a). An inventory of existing burrows in areas that will be lost to the development will be conducted to determine the approximate density of existing over-wintering habitat. Burrows lost to the development will be compensated for at a 3:1 ratio. It will be important that the man-made burrows are not compacted to a point where further excavation by wildlife cannot be conducted.

9.4 Riparian Enhancement

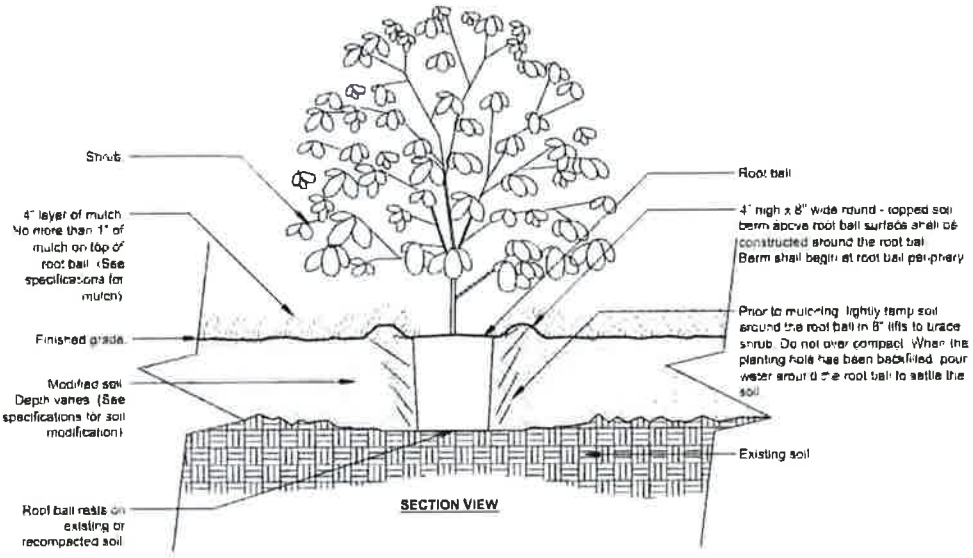
Ecoscape has provided a riparian enhancement plan to address the 3,626 m^2 of SPEA that will be given to the development but given back at a 1:1 area ratio and at a 3:1 in RHV in other areas on the subject property (**Figure 6**). Post development, it is proposed that the existing SPEA and areas to be given back to the SPEA will result in a total riparian enhancement area of 21,308 m^2 (**Figure 7**). This equates to an approximate 1:6 ratio for SPEA area lost to SPEA area being returned and enhanced.

At this stage, it is understood that a formal landscape plan has not been prepared for the subject property. Habitat restoration is required to address the DD2 requirements of the COV and RAPR for development occurring within the SPEA. If a formal landscape plan is prepared for the subject property, it must be reviewed and approved by Ecoscape and reviewed by the COV prior to implementation. The total area within the SPEA that will be disturbed by the proposed development is 3,626 m^2, however it is proposed that this area will be given back in other areas on the subject property and the relative habitat value will increase three-fold for a total riparian enhancement area of 21,308 m^2. Ecoscape recommends native trees, tall and low shrubs and grass plantings to prevent invasive species from becoming established in this area. Recommended plantings are provided in **Table 12** and recommended grass seed mix is provided in **Table 13**. Restoration planting shall take place within the SPEA, give back areas and wetland compensation area, as shown in **Figure 7**.

TABLE 12. Recommended plantings and quantities for riparian enhancement

Common Name	Scientific Name	Min Size	Quantity
Trees			
Black Cottonwood	*Populus balsamifera*	2 gal	
Interior Douglas-fir	*Pseudotsuga menziesii*	2 gal	
Trembling Aspen	*Populus tremuloides*	2 gal	
Water Birch	*Betula occidentalis*	2 gal	
		Subtotal	**150**
Tall Shrubs			
Douglas Maple	*Acer glabrum*	1 gal	
Sandbar Willow	*Salix interior*	1 gal	
Low Shrubs			
Common Snowberry	*Symphoricarpos albus*	1 gal	
Red-osier Dogwood	*Cornus stolonifera*	1 gal	
Nootka Rose	*Rosa nutkana*	1 gal	
Tall Oregon-grape	*Mahonia aquifolium*	1 gal	
		Subtotal	**3,000**
		Total	**3,150**

- Plants should be installed as shown in the typical drawing below. In general, the top of the root ball will be installed level with existing ground and the surrounding area covered with 5 to 10 cm of mulch. The excavation for the plant roots must be at least twice the width of the root ball and backfilled with excavated soil along with appropriate soil amendment (compost or mulch), if required. Hydroseed will be applied to all exposed soils and areas between plantings. The EM will review the plants, planting installation procedures, and condition following planting works.



Notes:
1- Shrubs shall be of quality prescribed in the root observations detail and specifications.

2- See specifications for further requirements related to this detail.

P-X SHRUB - MODIFIED SOIL

Source:http://www.isa-arbor.com/

- Planting should occur in spring between April and June or fall between September and October when temperatures are cooler and many plants are dormant, to ensure greater planting success;
- Trees are to be planted at a density of 7 m^2, tall shrubs every 3 m^2, and low shrubs every 1.0 m^2;
- Plants should be installed in groups or clusters and make use of suitable micro-climates, such as moisture-receiving areas, coarse woody debris, and remnant patches of natural areas. This will help prevent plant mortality by limiting competition with invasive species. Planting should not be completed in an evenly distributed, grid-like pattern;
- Plantings should target depressions to capture local moisture from rain or runoff. Woody debris/wood fiber mulch spread around the base of plantings may help to deter establishment of and competition from invasive plant species;
- Flagging of native plants will be helpful for future monitoring purposes; flagging must not be tied around the main stem such that girdling of the plant will occur as it grows;
- Seed and plant material must be sourced from within the southern interior to avoid complications associated with transplanting coastal species or northern species into dry southern interior conditions;

- To promote germination and establishment of vegetation, temporary irrigation should be supplied for at least the first two growing seasons. If no irrigation is proposed for restoration areas, it is recommended that regular maintenance is conducted to improve planting survival. This may include: additional fertilizing, routine watering and/or replanting, and the removal of invasive species. Poor growth, elevated erosion problems, and/or animal intrusion should be mitigated to promote plant growth; and,
- The contractor completing the restoration works should inspect plants monthly during the growing season, replacing any dead or diseased plants.
- A target of 80% plant survival is recommended after three years.

Disturbed areas surrounding the riparian plantings must be re-vegetated using an appropriate riparian grass seed mix immediately following the completion of the riparian plantings to minimize establishment of invasive plant species, erosion, and to restore the area to early successional conditions.

- Grass seed mixes must be approved by the EM before purchase and use. Restoration grass mixes cannot include species considered invasive within BC. An example of a suitable riparian grass seed mix is provided in **Table 12**;
- All seed mixes will be submitted to a certified seed testing laboratory for germination and purity analysis. Seed analysis certificates are to be provided prior to purchase;
- Grass seed should be broadcast at a minimum rate of 40 kg/ha (i.e., 35 lbs/acre). Seeding should occur in optimal weather conditions, ideally during cool, overcast weather. Additional seeding may be required in subsequent growing seasons to meet the recommended coverage requirement and reduce competition by invasive plant species. Grass seed should be at sufficient density that no more than 50% of surface soil is visible when rough cut areas are mown to a height of 100 mm; and,
- Grass seed mixes should be suitable for the environmental conditions (Okanagan riparian). These conditions may be given to a seed provider to determine the most appropriate species to provide.

TABLE 13. Recommended grass seed mix for riparian areas.

Common Name	Scientific Name
Bluejoint Reedgrass	*Calamagrostis canadensis*
Tufted Hairgrass	*Deschampsia cespitosa*
Alkaligrass	*Puccinellia nuttalliana*
Prairie Cordgrass	*Spartina pectinata*
Beaked Sedge	*Carex rostrata*
Green Sedge	*Carex viridula*
Canada Goldenrod	*Solidago canadensis*
Baneberry	*Actaea rubra*
Fireweed	*Epilobium angustifolium*
Red Fescue	*Festuca rubra*
Meadow Barley	*Hordeum brachyantherum*
Dagger Leaf Rush	*Juncus ensifolius*
Common Spikerush	*Eleocharis macrostachya*

9.5 Invasive Species Management

- Identification of existing weed populations and prevention of spread is the most efficient form of weed management. To this end, the EM will employ the following weed management plan measures:
    - The EM will identify and delineate any existing species and populations of weeds present within the work site;
    - The EM will inform and educate the contractor about the weed species and locations onsite. If necessary, weed infested areas will be delineated with flagging tape or snow fencing to prevent access;
    - Where feasible, the existing weeds will be removed (by hand pulling) and dispose of offsite at an appropriate landfill; and,
    - Areas where weed populations have been identified will not be used for excavation and placement of fill. If excavation of weed infested areas is required, the soils will be disposed of offsite.
    - Pesticides, herbicides, or other chemical control measures will not be used.
- Prevention of the spread of invasive plant species can be achieved by limiting disturbance to soils and native vegetation;
- Equipment used onsite must arrive with tracks free of soil and vegetation fragments to minimize addition and spread of invasive plant species to the project area;
- Contractor clothing should also be inspected daily for signs of weed seeds. If found, weed seeds should be disposed of in a contained refuse bin for offsite disposal;

- Pesticides, herbicides, or other chemical control measures must not be used due to close proximity to wetlands. Invasive species are to be pulled by hand or mowed regularly;
- Invasive species removal should occur before peak flowering times to avoid seed distribution and further spread of invasive species; and
- Invasive species should be disposed of offsite at an appropriate landfill; however, invasive species material must not be composted in the yard waste section of the landfill. Invasive plant species must not be transported to or deposited in other natural areas.

9.6 Trail Network Connections

The COV has prepared a 25 Year Master Transportation Plan (MTP) that includes a proposed connector pedestrian path along the foreshore of Okanagan Lake just beyond the subject properties (Figure 6c of the MTP). This figure also delineates desired trail connectors from Okanagan Landing Road and Lakeshore Road through the subject properties. These trail connectors will be incorporated into the greenspace plans on the subject properties. Approximate locations of the trail connectors have been provided in **Figure 7**. The exact locations will be determined at the design phase based upon detailed design and coordination with other agencies as needed to facilitate approval of the proposed development.

9.7 Maintenance Plan

The developer will be providing a 2 year maintenance plan to ensure success of the restoration and compensation works which will include, at a minimum, 80% survival of planting, successful colonization of desirable grasses, and control of noxious and invasive plant species. Key components of the recommended maintenance plan to help achieve these goals are provided below.

- Minimum target survival for all plantings will be 80% survivorship after 2-years. Maintenance and monitoring should be conducted at the end of each season (i.e., late summer or early fall) over the 2-year period to determine the condition of the restoration works and to ensure restoration objectives are being met. A suitably qualified environmental professional should be responsible for monitoring plant success and recommending supplemental plantings or other maintenance to help ensure the 80% survivorship is met; and,
- To help meet the 80% survivorship objective, routine watering will be required during periods of heat and/or drought over the 2-year maintenance period. The contractor responsible for maintenance should budget for at least 3 visits per year for weed control activities (i.e., pulling, bagging, and disposal) and watering.

9.8 Bonding

Performance bonding may be required by COV to ensure that the recommended mitigation measures are adhered to and any restoration is completed as required. Bonding in the amount of 125% of the estimated value of the prescribed works (i.e. monitoring, erosion and sediment control) and is generally required to ensure faithful performance and that all mitigation measures are completed and function as intended. Security deposits shall remain in effect until the COV has been notified, in writing by the EM that the objectives have been met and substantial completion of the restoration works has been achieved.

Ecoscape estimates that the total cost for habitat restoration works (not inclusive of proposed development) will be approximately $122,898.50, not including GST. The bonding is estimated to be $153,626.13 (125% of cost), as shown in **Table 14**.

TABLE 14. Cost estimate for bonding

Item	Quantity	Cost per Unit	Material Cost	Installed Cost
Trees (2 gal)	150	$15.00	$2,250.00	$6,750.00
Shrubs (1 gal)	3000	$10.00	$30,000.00	$90,000.00
Grass Seed (kg)	55	$0.90	$49.50	$148.50
Habitat Feature Installation (large woody debris, etc..)				$1,000.00
Invasive Species Management (hand-pulling, mowing, etc.)				$1,000.00
Environmental protection (erosion control etc.)				$1,000.00
Environmental monitoring* (includes substantial and total completion reports)				$23,000.00
			Total**	$122,898.50
			Bond amount (125% of Total)	**$153,623.13**

*The above estimate for environmental monitoring is over the maintenance phase only.

**Costs provided are estimates for bonding purposes only. These costs may vary depending upon site conditions.

10.0 CONCLUSION

The proposed works are limited to the construction of a mixed-use development, disturbed wetland relocation and compensation, and restoration landscaping. As per the requirements of the COV, this report identifies potential environmental impacts and appropriate mitigation measures to protect the natural integrity of both terrestrial and aquatic communities. Provided that mitigation measures within this report are adhered to, impacts to the aquatic, riparian and terrestrial communities should be avoided.

11.0 CLOSURE

This report has been prepared for the exclusive use of Mr. Dustin Berube of Avillia Developments Ltd. Ecoscape has prepared this assessment with the understanding that all available information on the present and proposed condition of the site has been disclosed. The client has acknowledged that in order for Ecoscape to properly provide its professional service, Ecoscape is relying upon full disclosure and accuracy of this information.

If you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted,
ECOSCAPE Environmental Consultants Ltd.

Prepared by:

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FIGURES

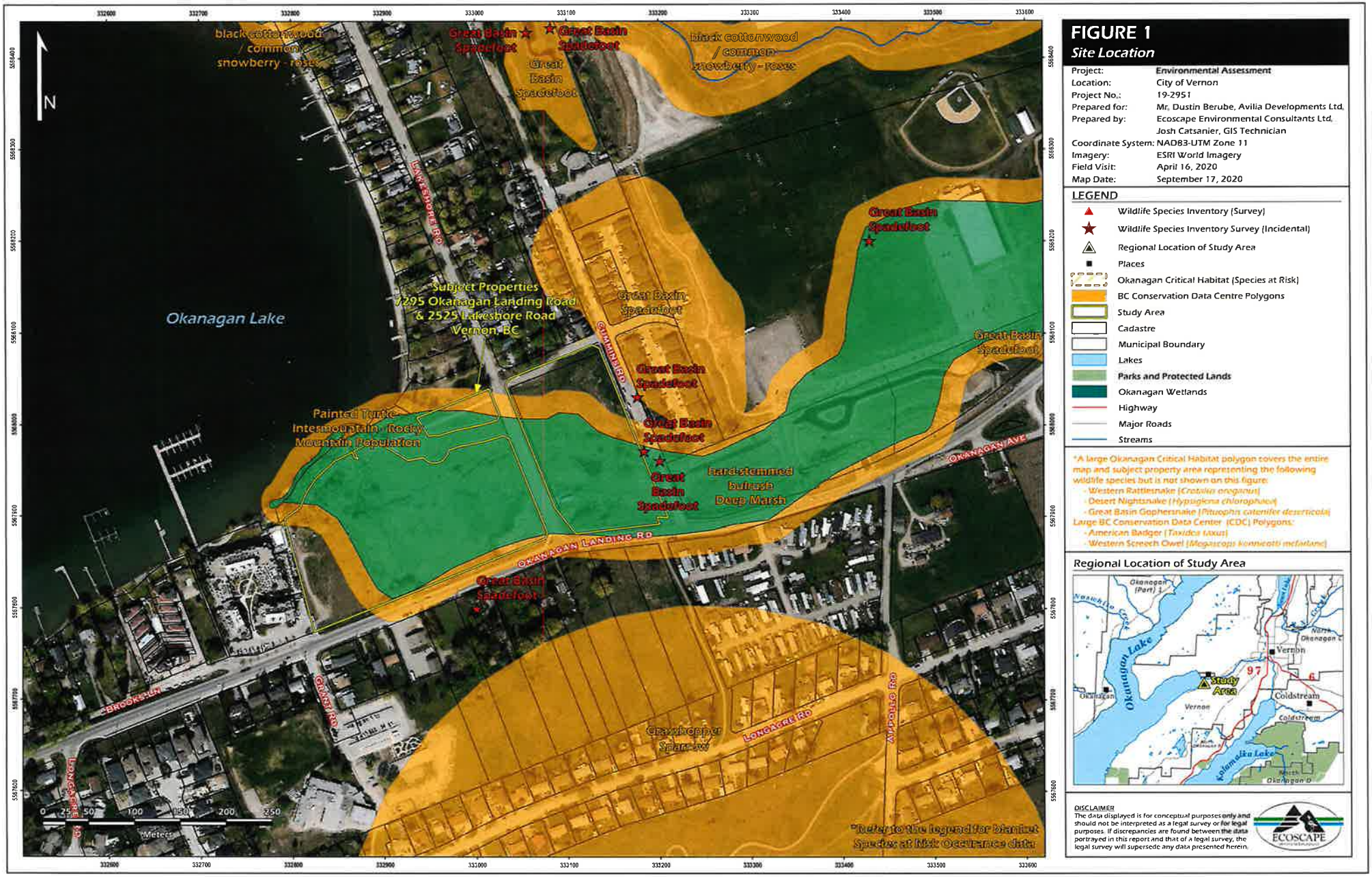

FIGURE 1
Site Location

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Josh Catsanier, GIS Technician
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	September 17, 2020

LEGEND

- Wildlife Species Inventory (Survey)
- Wildlife Species Inventory Survey (Incidental)
- Regional Location of Study Area
- Places
- Okanagan Critical Habitat (Species at Risk)
- BC Conservation Data Centre Polygons
- Study Area
- Cadastre
- Municipal Boundary
- Lakes
- Parks and Protected Lands
- Okanagan Wetlands
- Highway
- Major Roads
- Streams

*A large Okanagan Critical Habitat polygon covers the entire map and subject property area representing the following wildlife species but is not shown on this figure:
- Western Rattlesnake (*Crotalus oreganus*)
- Desert Nightsnake (*Hypsiglena chlorophaea*)
- Great Basin Gophersnake (*Pituophis catenifer deserticola*)

Large BC Conservation Data Center (CDC) Polygons:
- American Badger (*Taxidea taxus*)
- Western Screech Owl (*Megascops kennicottii macfarlanei*)

Regional Location of Study Area

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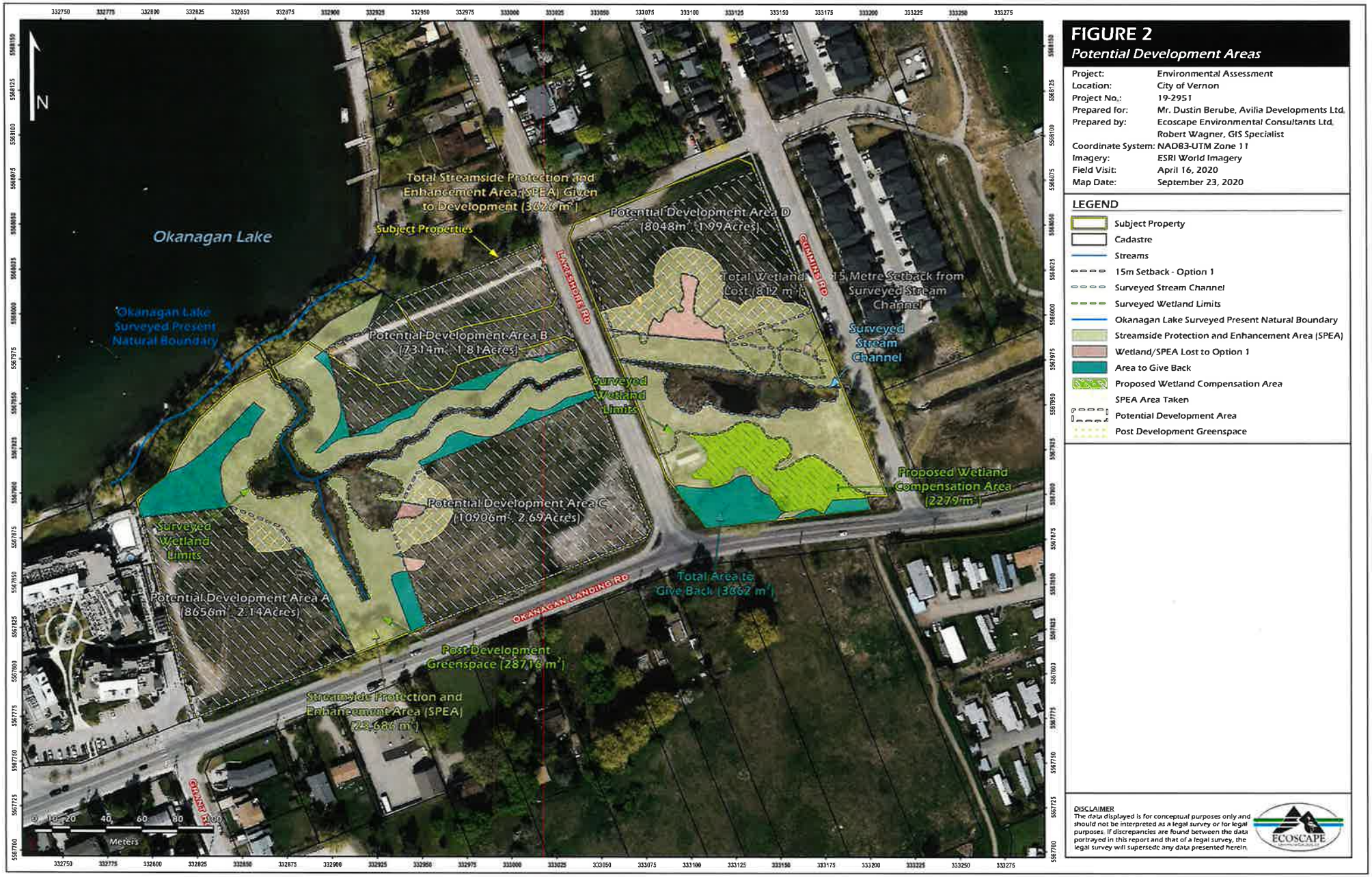

FIGURE 2

Potential Development Areas

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Robert Wagner, GIS Specialist
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	September 23, 2020

LEGEND

- Subject Property
- Cadastre
- Streams
- 15m Setback - Option 1
- Surveyed Stream Channel
- Surveyed Wetland Limits
- Okanagan Lake Surveyed Present Natural Boundary
- Streamside Protection and Enhancement Area (SPEA)
- Wetland/SPEA Lost to Option 1
- Area to Give Back
- Proposed Wetland Compensation Area
- SPEA Area Taken
- Potential Development Area
- Post Development Greenspace

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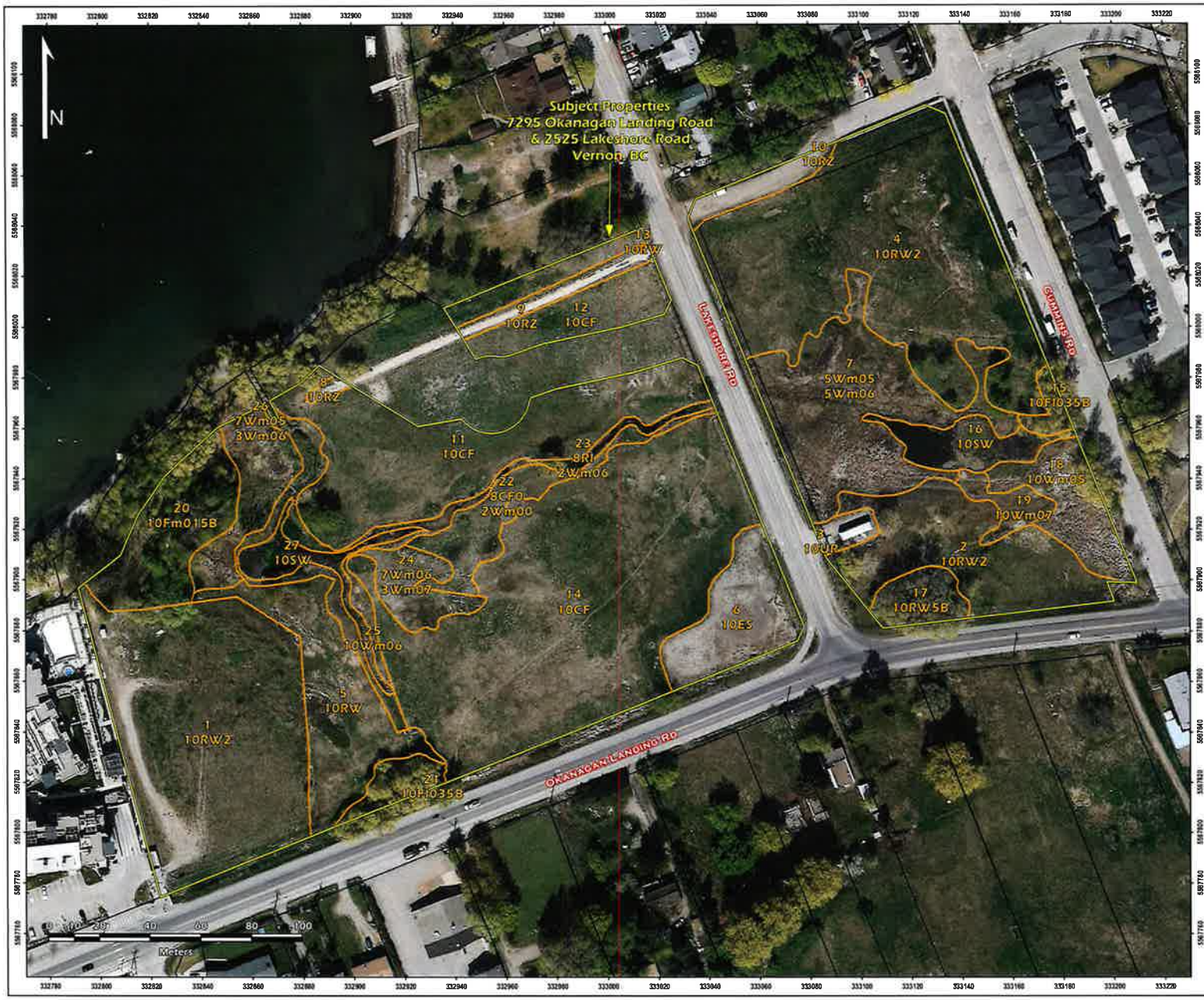

FIGURE 3

Ecosystem Polygons

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Josh Castanier, GIS Technician
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	September 21, 2020

LEGEND

- Subject Properties
- Cadastre
- Streams
- Ecosystem Polygons

Ecosystem Polygon Key

Ecosystem Units

CF	Cultivated Field
ES	Exposed Soil
Fm01	Cottonwood - Snowberry - Rose, Broadleaf
RW	Rural
RZ	Road Surface
RI	River
SW	Shallow Water
UR	Urban
Wm00	Reed Canarygrass
Wm05	Cattail Marsh
Wm06	Great Bulrush Marsh
Wm07	Baltic Rush Saline Meadow/marsh

Site Modifiers

c	coarse textured soils
k	cool aspect (slope >25%)
s	shallow soils (20-100 cm to bedrock)
v	very shallow (< 20 cm to bedrock)
w	warm aspect (slope > 25%)

Structural Stage

1	Sparce/bryoid
2b	Herb - Graminoid-dominated
3a	Shrub/Herb - Low Shrub
3b	Shrub/Herb - Tall Shrub
4	Pole Sapling
5	Young Forest
6	Mature Forest
7	Old Forest

Seral Stage/Weed Modifiers

kc	knapweed - cheatgrass
wk	bluebunch wheatgrass - knapweed

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FIGURE 4
Environmental Sensitivity Analysis

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Josh Castanier, GIS Technician
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	September 21, 2020

LEGEND

- 99 Ecosystem Polygon Number
- Approximate High Water Level (343.0 m.a.s.l.)
- Surveyed Wetland Limits
- Surveyed Stream Boundary
- Subject Property
- Cadastre
- Streams and Rivers
- Setbacks

Environmental Sensitivity Rating

- Very High (ESA 1)
- High (ESA 2)
- Moderate (ESA 3)
- Low (ESA 4)

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FIGURE 5

Riparian Areas Regulation Assessment

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Robert Wagner, GIS Specialist
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	September 16, 2020

LEGEND

- Subject Property
- Cadastre
- Streams
- Surveyed Stream Channel
- Surveyed Wetland Limits
- 30 Metre Riparian Assessment Regulation Area
- Okanagan Lake Surveyed Present Natural Boundary
- Zone of Sensitivity - Large Woody Debris
- Zone of Sensitivity - Litterfall
- Zone of Sensitivity - Shade
- Streamside Protection and Enhancement Area (SPEA)

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FIGURE 6

Proposed Habitat Balance

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Rob Wagner, GIS Specialist
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	February 12, 2021

LEGEND

- Subject Property
- Cadastre
- Streams
- 15m Setback - Option 1
- Surveyed Stream Channel
- Surveyed Wetland Limits
- 30 Metre Riparian Assessment Regulation Area
- Okanagan Lake Surveyed Present Natural Boundary
- Zone of Sensitivity - Large Woody Debris
- Zone of Sensitivity - Litterfall
- Zone of Sensitivity - Shade
- Streamside Protection and Enhancement Area (SPEA)
- Wetland/SPEA Lost
- Area to Give Back
- SPEA Area Taken
- Proposed Wetland Compensation Area

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FIGURE 7

Restoration Area

Project:	Environmental Assessment
Location:	City of Vernon
Project No.:	19-2951
Prepared for:	Mr. Dustin Berube, Avilia Developments Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Josh Castanier, GIS Technician
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Field Visit:	April 16, 2020
Map Date:	February 12, 2021

LEGEND

- Connecting Trail
- Streams
- 15m Setback - Option 1
- Surveyed Stream Channel
- Surveyed Wetland Limits
- Okanagan Lake Surveyed Present Natural Boundary
- Restoration Area
- Proposed Wetland Compensation Area
- Subject Property
- Cadastre

ECOSCAPE

CITY OF Vernon

nhc
northwest hydraulic consultants
600 - 255 1st Avenue
Kamloops, B.C. V2C 0J4
Canada
Office: 250 851 9262
Fax: 604 980 9264
www.nhcweb.com

- FLOW DIRECTION
- CITY OF VERNON
- FIRST NATIONS RESERVE
- BRIDGE
- CULVERT
- MAJOR CONTOUR AT 5 METRE INTERVAL *Labelled with elevation in metres*
- MINOR CONTOUR AT 1 METRE
- 2019 ORTHOPHOTO EXTENT
- RAILWAY LINE
- ROAD
- STREAM
- 123.4 (121.4) FLOOD CONSTRUCTION LEVEL (FCL) *Labelled with FCL in metres CGVD2013 (FCL in CGVD28)*
- LIMIT OF MAPPING

INUNDATION EXTENT: DESIGN EVENT WITH FREEBOARD

- FLOODWAY *15 m top of bank setback*
- FLOODWAY *30 m left bank and 15 m right bank top of bank setback*
- FLOODWAY *30 m top of bank setback*
- FLOOD FRINGE
- OKANAGAN LAKE SHORELINE ZONE *Due to wave effects an FCL of 345.5 m CGVD2013(or 345.2 m CGVD28) should be applied to this area*

PLEASE REFER TO NOTES ON SHEET INDEX

SCALE - 1:4,000
0 100 200 M
N

Coordinate System: NAD 1983 CSRS UTM ZONE 11
Units: METRES; Vertical Datum: CGVD2013

Engineer	GIS	Reviewer
VCCM	RLM	JWT/DH
Job Number	Date	
3005032	18-AUG-2021	

CITY OF VERNON
FLOOD MAPPING
B.X. CREEK & VERNON CREEK
FLOODPLAIN
SHEET 4 OF 6

Attachment 13

Ursus Heritage Consulting

11500 Coldstream Creek Road, Coldstream, BC, V1B 1E3 T: 250-938-4662 ian@ursus-heritage.ca
www.ursus-heritage.ca

December 14, 2020

Rudy Roopnarine
Port Okanagan Development LP
Suite 328, 14127 23rd Avenue NW
Edmonton, Alberta T6R 0G4

RE: Archaeological Overview Assessment and Preliminary Field Reconnaissance of proposed Okanagan Lake Mixed-Use Development at 7295 Okanagan Landing Road and 2525 Lakeshore Road in Vernon, B.C.

This letter report presents the findings of the Archaeological Overview Assessment (AOA) for the proposed Okanagan Lake Mixed-Use Development at 7295 Okanagan Landing Road and 2525 Lakeshore Road (the Project) in Vernon, B.C. (Figure 1). Ursus Heritage Consulting Ltd. (Ursus) was requested by Rudy Roopnarine of Port Okanagan Development LP (the proponent) to conduct an AOA of the project location at 7295 Okanagan Landing Road and 2525 Lakeshore Road in Vernon, B.C. (PID: 030-532-736, Lot A, Plan EPP57999, Regional District of North Okanagan; PID: 023-690-101, Lot 5, Plan KAP58651, Regional District of North Okanagan; PID: 023-690-089, Lot 4, Plan KAP58651, Regional District of North Okanagan; and Statutory Right-of-Way, Plan EPP58000, Regional District of North Okanagan). The assessment included a Preliminary Field Reconnaissance (PFR) in order to supplement and ground-truth the AOA findings. Ursus archaeologist Rhory Gillies and Okanagan Indian Band (OKIB) archaeological technician Matt Soares conducted the PFR component of the AOA on December 11th, 2020.

The objectives of the AOA are to:

- Identify and evaluate any areas of archaeological potential within the project area that warrant detailed archaeological investigations;
- Provide recommendations regarding the need and appropriate scope of further archaeological studies prior to any proposed construction.

Archaeological sites can be defined as physical evidence of past human use of an area that, in the subject region, is typically represented by artifacts, lithic debitage (by-products of stone tool production), faunal remains, fire altered rock, hearth/fire pit features, habitation and subsistence features, quarry sites (for obtaining lithic raw materials), and ceremonial rock art sites (pictographs).

This AOA is concerned with identification of archaeological potential and archaeological sites within the identified project area. It does not address potential for traditional use sites within the subject project area. It is not the intent of this report to document First Nations' interest in the land. The study was conducted without prejudice to First Nations' treaty negotiations, Aboriginal rights, or Aboriginal title. The following paragraphs provide an overview of the AOA study area, background research, methodology, and the results of the PFR field study.

Project Description

The study area is defined by the proposed properties to be developed located within the Okanagan Landing neighborhood of Vernon, B.C. (Figure 1). The proposed project area is a 6.47 Ha parcel of land situated within the Southern Interior of B.C., approximately 8.3 km southwest of Swan Lake, 4.6 km west-northwest of Kalamalka Lake, along the southern shoreline of Okanagan Lake (East Arm) within the city limits of Vernon.

Currently there are no detailed plans for the proposed project area; however, plans include a significant development of the area which will include residential and commercial buildings, public park space, and improved public access along the Okanagan Lake shore (Figure 2). Photo 1 provides a view of the project area.

Photo 1. View west of proposed project area along the western side of Lakeshore Road. Note the level terrain adjacent to Okanagan Lake which is left of frame

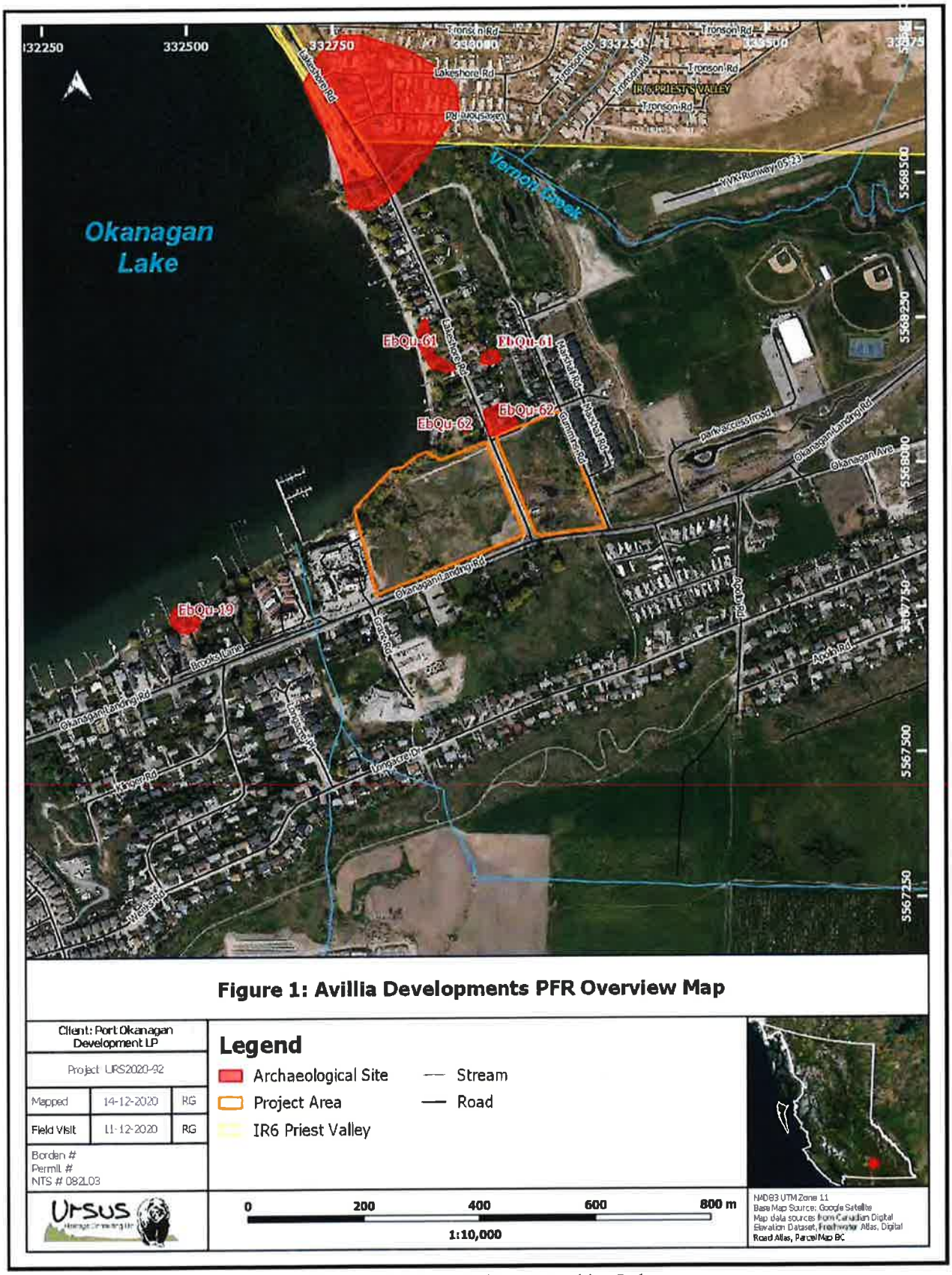

Figure 1: Avillia Developments PFR Overview Map

Figure 2: Avillia Developments PFR Development Map with Client Provided Drawing

Project Setting

The project area is encompassed within one biogeoclimatic zone, the Interior Douglas-fir, very dry hot subzone, Okanagan variant (IDFxh1) as defined by the biogeoclimatic classificatory system utilized by the Ministry of Forests (see Meidinger and Pojar 1991). The Interior Douglas Fir zone (IDF) typically occurs at low to mid elevations, along valley areas of the Interior Plateau with an elevation range of 100 to 1200 m. The IDF zone is characterized as a dry forested zone where the winters are cool, and the summers are warm and dry. Within the IDF zone Douglas fir is the most common species with lodgepole pine, ponderosa pine, and deciduous forests occurring along riparian corridors. Shrub and herb layers include pinegrass, shrubby pentemon, Saskatoon berry, bluebunch wheatgrass, snowberry, soopolallie, and black gooseberry. (Lloyd et al. 1990). The IDF zone has a wide range of habitat niches for wildlife and attract many animals including mule deer, white-tailed deer, bighorn sheep, and Rocky Mountain elk. These forests also support a diverse number of birds including the pileated nutcracker, northern flicker, red-breasted nuthatch, golden eagle, and red-tailed hawk (see Meidinger and Pojar 1991).

Pre-Field Archaeological Potential Assessment

The BC Remote Access to Archaeological Data (RAAD) online application administered by the BC Archaeology Branch was queried and revealed that the project area is located within a polygon of high archaeological potential as modelled by the Okanagan Timber Supply Area Archaeology Overview Assessment (Arcas 1997). Additionally, a review of the Provincial site records was undertaken to establish the location and details of previously recorded sites in the area. Ten (n=10) previously recorded archaeological sites have been identified within 4 km of the proposed development areas (Figure 1). These sites consist of surface and subsurface lithics, cultural depression sites, an ancestral remains site, and a historic shipwreck. The details of the archaeology sites are summarized in Table 1 below.

Table 1 Recorded archaeological sites within 5 km of the project areas. Archaeological sites are ordered nearest to farthest from the proposed development.

Borden Name	Site Type	Distance/Direction from Project Area	Year Initially Recorded	Permit	Recorder
EbQu-62	Subsurface Lithics and Fauna	3 m north	2019	2019-0415	Ursus Heritage Consulting Ltd.
EbQu-61	Subsurface Lithics and Fauna	124 m north	2018	2018-0103	Ursus Heritage Consulting Ltd.
				2019-0415	Ursus Heritage Consulting Ltd.
				2020-0259	Ursus Heritage Consulting Ltd.
EbQt-19	Ancestral Remains	305 m west-southwest	1988	1988-0001	Mark Skinner and Ron Thacker
EbQu-6	Surface Lithics	448 m north	1952	1952: Non-Permit	Warren William Caldwell
				1973-0028	Michael Robinson and Paul St. Pierre
				2020-0259	Ursus Heritage Consulting Ltd.
EbQu-4	Cultural Depression (Function unassigned)	861 m southwest	1952	1952: Non-Permit	Warren William Caldwell
EbQt-144	Surface Lithics	1163 m east	2018	2018: Non-Permit	Stantec Consulting Ltd.
EbQu-49	Historic Shipwreck	1228 m west-southwest	2006	2006: Non-Permit	UASBC
EbQu-19	Surface Lithics	2160 m northeast	1973	1973: Non-Permit	Provincial Museum
EbQu-18	Cultural Depression (Function unassigned)	2374 m southwest	1973	1973-0028	Michael Robinson and Paul St. Pierre
				1978-0008	Ann Mohs

EbQu-2	Surface Lithics; Cultural Depression (Housepit)	3638 m southwest	1952	1952: Non-Permit	Warren William Caldwell

PFR Methodology

The PFR consisted of the archaeological field crew traversing the entirety of the proposed developments. Pedestrian visual surface inspection was employed for the purpose of locating, recording, and evaluating archaeological resources within the proposed development footprint. Full pedestrian visual surface inspection was conducted within the proposed development footprint, and evidence of cultural materials on the surface were sought, including but not limited to stone, bone, antler, or other artifacts; fire-altered rock; cultural features (e.g., depressions or cairns); and historic cultural remains and debris. Existing subsurface exposures were examined for evidence of cultural deposits. Landforms, vegetation, aspect, and sources of potable water were recorded in field notes.

PFR Results

The project area was subject to PFR by Rhory Gillies (Ursus) and Matt Soares (OKIB) on December 11th, 2020. The entirety of the project area was examined with a focus on level terrain adjacent to the water sources.

The in-field observations revealed that most of the proposed project area is situated on level terrain along the southern shoreline of Okanagan Lake (East Arm). A non-classified drainage and low-lying wetland trends east-west through the centre of the development originating from Vernon Creek to the east and emptying into Okanagan Lake to the northwest. Throughout the project area it was observed that a variable amount of ground disturbances has occurred including some minor levelling and clearing throughout, construction of a beach access gravel path; large piles of imported fill have been deposited in the northeast corner, up to 1.5 m of preload construction aggregate has been placed in the southwest corner, and a small building has been constructed in the eastern half of the project off of Lakeshore Rd.

No new archaeological resources were identified during the PFR of the proposed project area; however, one (1) archaeological site, EbQu-62, is located adjacent to the northern boundary of the project area and five (5) areas within the development are assessed with high potential for the presence of archaeological sites. The high potential rating is based on the presence of level terrain which is located adjacent to a small non-classified drainage and wetland, the location of the proposed project along the southern shoreline of Okanagan Lake (East Arm), and the proximity of the project to several previously recorded archaeological sites. The southwestern corner of the project area could not be fully assessed because of the placement of the preload construction aggregate; nevertheless, the underlying terrain is assumed to have high archaeological potential for the same reasons mentioned above. The remainder of the project area is a low-lying wetland and is considered to have low potential for archaeological resources. Figure 3 outlines the areas of high archaeological potential within the property. Photos 2 - 5 provide views of the areas of archaeological potential.

Figure 3: Avillia Developments PFR Results Map with Client Provided Drawing

Client: Port Okanagan Development LP		
Project: URS2020-92		
Mapped	14-12-2020	RG
Field Visit	11-12-2020	RG
Borden # Permit # NTS # 082L03		

Legend

- Archaeological Site
- Area of Potential
- Cadastral
- Construction Aggregate Location
- Proposed Building and Parking Space
- Proposed Roads and Paths
- Proposed Public Beach
- Road

0 50 100 150 200 250 m

1:3,000

NAD83 UTM Zone 11
Base Map Source: Google Satellite
Map data sources: from Canadian Digital Elevation Data, Freshwater Atlas, Digital Road Atlas, Parcel Map BC

Photo 2. View northwest towards AOPs 1-3 which are level terrain adjacent to a non-classified drainage and wetland south of Okanagan Lake.

Photo 3. View east along the Okanagan Lake shoreline at the northern end of AOP 2.

Photo 4. View west of AOP 1. Note the preload construction aggregate is seen left of frame and is currently overgrown with weeds and wild grasses.

Photo 5. View east of the non-classified drainage and wetland on the eastern half of the project.

Recommendations

As a result of the AOA and PFR, five (5) areas of archaeological potential were located within the development project area. As such, any ground disturbance or development proposed within the areas of archaeological potential should be subject to an archaeological Impact assessment (AIA) under a S12.2 Heritage Inspection Permit. For the areas within the property assessed with low potential it is the authors' opinion that no further archaeological work is warranted for these portions of the project area.

The objectives of an AIA are to:

- Identify and evaluate archaeological sites;
- Identify and assess potential impacts to these sites as a result of the proposed development; and
- Recommend alternatives for managing adverse impacts.

An AIA requires a Heritage Inspection Permit issued by the Archaeology Branch, MFLNRORD pursuant to Section 12.2 of the *HCA*. Based upon the results of the AIA, additional archaeological work may be required, including, but not limited to:

- Site conservation through avoidance by project redesign: this is the preferred archaeological site management tool, a cost-effective strategy recommended for long-term protection of significant sites or portions of sites threatened with destruction. This could entail, for example, relocating a proposed building to avoid identified archaeological sites;

- Mitigative data recovery: archaeological salvage excavations may be recommended for significant archaeological or historic sites or portions of sites threatened by the project development which cannot be protected by project redesign;

- Archaeological monitoring: this may be recommended to ensure that appropriate emergency impact management actions are available if unanticipated important archaeological materials or features, such as human burials, are encountered.

Users of this report should be aware that even the most thorough investigation may fail to reveal all archaeological remains, including sites protected by the BC *Heritage Conservation Act*, that exist in an area. All users of this report should also be aware that: (1) archaeological remains in BC are protected from disturbance, intentional or inadvertent, by the *Heritage Conservation Act*; (2) in the event that archaeological remains are encountered, all ground disturbance in the immediate vicinity must be suspended at once; (3) it is the individual's responsibility to inform the Archaeology Branch, and appropriate First Nations as soon as possible, about the location of the archaeological remains and the nature of the disturbance; and (4) the *Heritage Conservation Act* may incur heavy fines and imprisonment for failing to comply with these requirements.

It is also recommended that the proponent inform their personnel and all contractors that archaeological remains are protected by the *Heritage Conservation Act*, and may not be altered, damaged, moved, excavated in, or desecrated in any way without a permit issued under Section 12.2 or 12.4 of the *Heritage Conservation Act*.

The AOA/PFR is concerned with identification of archaeological potential and archaeological sites within the proposed Okanagan Lake Mixed-Use Development at 7295 Okanagan Landing and 2525 Lakeshore Road in Vernon, B.C. It does not address potential for traditional use sites within the subject property. It is

not the intent of this report to document First Nations' interest in the land. The study was conducted without prejudice to First Nations' treaty negotiations, Aboriginal rights, or Aboriginal title.

For more information on this review of archaeological potential, please contact Ursus Heritage Consulting Ltd.

With respect,

Rhory Gillies

Rhory Gillies, MA
Archaeologist
Ursus Heritage Consulting Ltd.

Reviewed by:

Ian Cameron

Ian Cameron, MSc, RPCA
Senior Archaeologist, Director
Ursus Heritage Consulting Ltd.

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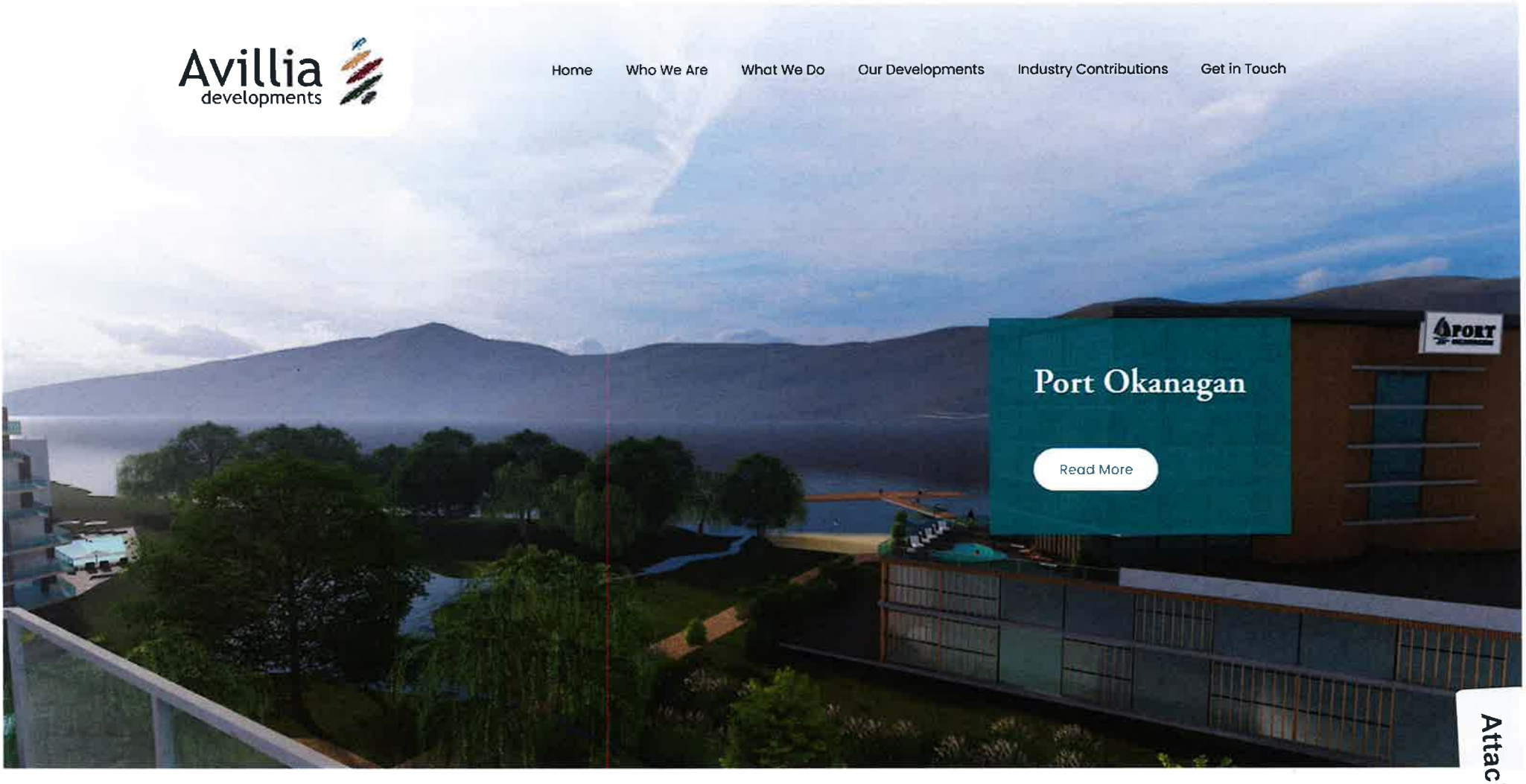

Attachment 15

THE CORPORATION OF THE CITY OF VERNON
3400 – 30th Street, Vernon, B.C. V1T 5E6
Telephone: (250) 545-1361 Fax: (250) 545-4048
website: www.vernon.ca

Corporate Policy

Section:	Planning and Building Services	
Sub-Section:		
Title:	OCP Amendment Applications	

RELATED POLICIES

Number	Title

APPROVALS

POLICY APPROVAL:	AMENDMENT APPROVAL:	SECTION AMENDED
Approved by: *"WAYNE LIPPERT"*	Amendment Approved by:	• Exceptions to Annual Review added
Mayor	Mayor	
Date: February 9, 2009	Date: September 12, 2011	

POLICY

In order to ensure that the intent of the Official Community Plan (OCP) 2008 is not eroded, and to enhance public awareness of proposed changes to the OCP, OCP amendment applications will be reviewed on an annual basis, with the exception of amendments that result in significant public amenities and community benefit. All OCP amendment applications will be reviewed subject to the criteria identified below.

DEFINITIONS

PROCEDURES

1. Pursuant to Section 895(2)(a) of the *Local Government Act*, a local government must consider every application for an amendment to an OCP. Further, pursuant to Section 895(1) of the *Local Government Act,* the City's *Development Application Procedure Bylaw Number 4103, 1995*, specifies the process for applications for OCP amendments. Council may, upon receipt of the required report specified in Section 6A of that bylaw, proceed with an amendment bylaw or reject the application.

2. Applications for OCP amendments will be processed annually. All complete applications received on or before March 01 will be considered during that calendar year.

3. The report to Council on the amendment application will assess whether that application is contrary to any of the Guiding Principles of the OCP 2008, as follows:

    Protect and preserve green spaces and sensitive areas
    Ensure housing meets the needs of the whole community
    Create a culture of sustainability
    Protect agricultural land
    Create strong, compact and complete neighbourhoods
    Provide alternative transportation
    Revitalize the Downtown
    Ensure development pays for itself
    Create a youth friendly city

    Applications which are contrary to the Guiding Principles will receive a negative recommendation by staff.

4. A public open house will be hosted by the City of Vernon, in addition to the legislated official Public Hearing process, to provide community residents with an additional opportunity to consider the amendment applications.

5. The following OCP amendments will be considered at any time during the year, as approved by Council:

a) Neighbourhood Plan reviews;
b) Minor amendments in adopted neighbourhood plan areas that do not result in a change to Land Use Designations except where the Parks and Open Space Designation is being created or reallocated;
c) Amendments resulting in significant public amenities and community benefit.