Cara Glen Phase 2 Neighbourhood

OCP Amendment + Rezoning Application | Revised

July 2024

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DESIGN + DEVELOPMENT

CONTENTS

The following OCP Amendment + Rezoning Application has been revised from the original March 2024 Rezoning Application. All revised sections are indicated with a red box.

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July 12th, 2024

Ms. Trisa Atwood, Planner Specialist

City of Kelowna
1435 Water Street
Kelowna, BC
V1Y 1J4

Re: Cara Glen Phase 2 | OCP Amendment + Rezoning Application Resubmission

Placemark is pleased to submit the revised Cara Glen Phase 2 OCP Amendment and Rezoning Application for 1490 Cara Glen Way. Staff indicated in the May 15th Technical Review Summary that a **rezoning of the land from RR1 to P3 and subsequent OCP amendment from CNHD to NAT is required** in order to dedicate the intended 5.64 acres of land to the City as Park.

As the proposed neighbourhood concept is compliant with its Core Area Neighbourhood OCP designation, the Application has been revised to include an OCP Amendment for the future park lands specifically.

Please accept this letter and attached documentation as our revised OCP and Rezoning Application submission for Cara Glen Phase 2, legally described as:

Parcel ID: 018-979-289

Legal Description:
LOT L SECTIONS 31 AND 32 TOWNSHIP 26 OSOYOOS DIVISION YALE DISTRICT PLAN KAP53293

The revised Application now includes the addition of the OCP Amendment with updated content to reflect staff comments provided in the Technical Summary Review. For the detailed response to each comment, please refer to the July 12th Technical Review Summary Response Package.

We look forward to continued collaboration with the City of Kelowna through the application process. Should you have any questions over the course of your review, please do not hesitate to contact us.

Placemark Design + Development

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DESIGN RATIONALE

To meet the needs of the community and fulfill the City's OCP goals, the OCP Amendment + Rezoning Application seeks to complete the Core Area Neighbourhood along the southern edge of Knox Mountain Park with a compact, walkable, mixed-use neighbourhood including a significant parkland dedication to the City of Kelowna.

The design provides for a range of mid-density housing from ground-oriented townhomes, to 5-storey apartments adapted to the hillside setting by internalizing retaining within the building foundations.

The proposed neighbourhood-focused commercial node at the corner of Cara Glen Way and Clifton Road serves as a social heart for the larger neighbourhood, while offering opportunities for local commercial to support a more complete community.

The proposed parkland dedication offers the opportunity for an addition to Knox Mountain Park providing new recreational opportunities and expanded ecological conservation of the Knox Mountain landscape.

POLICY CONTEXT

2040 OFFICIAL COMMUNITY PLAN

The 9.32 acres (3.77 ha) site is situated on the northern reaches of Kelowna's core area, between the Downtown and the southern edge of Knox Mountain Park.

With a Core Area Neighbourhood OCP designation, the application proposes ground-oriented and multi-unit residential uses supporting the delivery of diverse housing. A portion of the site requires an OCP amendment from Core Area Neighbourhood to Natural Area to support the dedication of 5.64 acres of land to Knox Mountain Park.

The submission meets the following criteria as outlined in the OCP's **Policy 5.3.3 for Strategic Density for mixed-use in developments not adjacent to Transit Supportive Corridors:**

- The submission has an area of 1 hectare or greater;
- The submission illustrates that the larger buildings will sensitively transition with ground-oriented multi-unit housing towards adjacent neighbourhoods;
- The submission includes a public park;
- The submission includes affordable and/or rental housing component, and;
- The submission does not exceed a FAR of 1.2 over the entire site.

Policy 5.3.8 is also met in support of the sensitive integration of small scale local commercial uses into the Core Area Neighbourhood which promotes services in easy walking distance of residences.

A contribution to the Housing Opportunities Reserve Fund is proposed to satisfy the requirement for a component of affordable and/or rental housing. The submission proposes **a contribution for Sub-Area A as established by Bylaw No. 8593 and using the recommended funds per dwelling unit, detailed in the table below.** Payment is to be made to the City of Kelowna by the applicant prior to Final Adoption. Any future development submissions for the site will not require any affordable and/or rental housing components.

Dwelling Unit	Reserve Funds per Unit	Unit Amount	Total Funds
1 Bed	$2,000	25	$50,000
2 Bed	$4,000	16	$64,000
3 Bed	$8,000	4	$32,000
		Total:	**$146,000**

This submission subsequently completes the unfinished neighbourhood edge along Knox Mountain Park East within the OCP's Core Area Neighbourhood.

EXISTING ZONING

The parcel at 1490 Cara Glen Way is currently zoned **RR1 – Large Lot Rural Residential** permitting country residential and a holding zone where future development could occur subject to the direction of the OCP. The single detached housing permitted within RR1 does not align with the OCP's density targets for the Core Area Neighbourhood.

LAND DEDICATION

The submission **dedicates 60% of the site (5.64 ac) to the City of Kelowna** as an expansion of Knox Mountain Park, in support of the following OCP pillars:

1. Focus Investments in Urban Centres – While not located within an urban centre, the site is located within the Permanent Growth Boundary and the Core Area - approximately 4 km from the Downtown.

2. Promote More Housing Diversity – With a mix of housing types located at the base of Knox Mountain Park, the site provides access to local amenities and active transportation opportunities for a larger diversity of residents.

3. Incorporate Equity into City Building – The active park on Cara Glen Way is to be programmed for users of all ages, while the expansion of Knox Mountain Park will improve recreational trail access and parking opportunities for park users.

4. Protect and Restore Our Environment – The Environmental Assessment report locates the extent of future development within the Moderate (ESA3) land, with minimal impact to High Rated (ESA2) areas, along with planned restoration.

5. Take Action of Climate – The compact development allows for an environmentally conscious and energy-efficient neighbourhood, and with the inclusion of neighbourhood-scale commercial reduces car dependency. Following rezoning, Development and Building Permit applications will ensure that proposed buildings meet the energy step performance as required by the BC Building Code.

The submission supports the **Knox Mountain Park Management Plan 2022 (Section 8) and the following OCP policies:**

- **Policy 10.1.7 -** by proposing 60% of the site as voluntary park dedication beyond minimum requirements;
- **Policy 10.1.3 and 10.1.14 -** by proposing street parking and active usable park space connected to Knox Mountain Park and existing trail network;
- **Policy 10.1.15 -** by proposing the preservation of natural park for habitat and ecosystem conservation with access to the existing trail network and additional new trails; and,
- **Policy 10.1.16 and 10.2.9 -** by proposing reduced impacts to park ecosystems through access management while ensuring pedestrian connectivity and public safety throughout the neighbourhood.

REZONING APPROACH

In support of the City's housing goals, the submission rezones the development portion of the parcel to a Comprehensive Development Zone (**CD29 - Cara Glen Residential)** containing 3 sub-areas **A**, **B**, and **C**. In addition, 5.64 acres of the site is to be rezoned as **P3 - Parks and Open Space** and **dedicated to the City as parkland.**

According to text amendment TA24-0001 - currently under Council consideration - the City of Kelowna is seeking to amend all existing single family zones to allow for Small-Scale Multi-Unit housing. The potential result of this text amendment will allow the properties across Cara Glen Way to develop as multiplexes, providing a further improved transition from the proposed CD29 Cara Glen Neighbourhood.

The following table summarizes the areas to be rezoned:

REZONING SUMMARY				
Zone	**Existing | ac**	**%**	**Proposed | ac**	**%**
RR1	9.32	100	0	0
CD29	0	0	3.68	40
P3	0	0	5.64	60

The proposed CD29 zone for 1490 Cara Glen Way is summarized in the table below:

ZONING ANALYSIS | Bylaw 12375						
BYLAW REGULATIONS	**CD29 ZONE**			**PRELIMINARY CONCEPT**		
Site Details	**CD29 - A**	**CD29 - B**	**CD29 - C**	**A**	**B**	**C**
Lot Area	Min. 1,400 m^2	Min. 900 m^2	Min. 1,400 m^2	4,100m^2	7,500m^2	3,300m^2
Site Width	Min. 30.0 m	Min. 20.0 m	Min. 30.0 m	88m	119m	67m
Site Depth	Min. 30.0 m	Min. 30.0 m	Min. 30.0 m	Irregular geometry. Varies from 34m to 92m		
Site Coverage of Buildings	Max 65%	Max 55%	Max 65%	22%	19%	27%
Site Coverage Building(s), Impermeable Surfaces	Max 85%	Max 80%	Max 85%	43%	30%	48%
Development Regulations						
Building Setbacks						
Front Yard & Flanking Side Yard setback for ground-oriented units	Min 3.0 m	Min 3.0 m	Min 3.0 m	Front 4.5 m (except underground parking 0m) Side 4.5 m		
Front Yard & Flanking Side Yard setback for all buildings	Min 4.5 m	Min 3.0 m	Min 4.5 m	Front 4.5 m (except underground parking 0m) Side 4.5 m		
Min. Building Stepback from Front and Flanking Side Yard	Min 3.0 m (Applies to buildings 5 storeys)	n/a	Min 3.0 m (Applies to buildings 5 storeys)	3.0 m		
Side Yard Setback	Min 3.0 m	3.0 m except 1.2 m from a lane	Min 3.0 m	4.5 m		
Rear Yard	Min 4.5 m except 3.0 m from a rear lane	Min 4.5 m except 0.9 m from a rear lane	Min 4.5 m except 3.0 m from a rear lane	Min. 4.5 m		
Rear Yard Setback for Accessory Buildings Structures	Min 1.5 m or 0.9 m from a lane			n/a		
Min. Separations between detached Principal Buildings	n/a	3.0 m	n/a	Min. 3.0m		
Min. Private & Common Amenity Space	7.5 m^2 per bachelor du 15.0 m^2 per 1-bdrm du 25 m^2 per du with more than 1-bdrm	6.0 m^2 per bachelor du 10.0 m^2 per 1-bdrm du 15 m^2 per du with more than 1-bdrm	7.5 m^2 per bachelor du 15.0 m^2 per 1-bdrm du 25 m^2 per du with more than 1-bdrm	Submission meets the requirements.		

ZONING ANALYSIS | Bylaw 12375							
BYLAW REGULATIONS		**CD29 ZONE**			**PRELIMINARY CONCEPT**		
Development Regulations		**CD29 - A**	**CD29 - B**	**CD29 - C**	**A**	**B**	**C**
Maximum Density (FAR)		2.05 FAR	1.0 FAR	2.05 FAR	1.9 FAR	1.0 FAR	1.7 FAR
Maximum Height		20.0 m & 5-storeys	11.0 m & 3-storeys	20.0 m & 5-storeys	5-storeys for apartment buildings and 3-storeys for townhomes		
Driveway Access Width		6.0 m maximum	n/a	6.0 m maximum	6.0 m		
Max. Base Height for Buildings with Walkout Basements	Front or Flanking Building Elevation	n/a	9.0 m & 3 storeys	n/a	Submission meets the requirements.		
	Rear Building Elevation		12.6 m & 3 storeys				
Landscaping							
Minimum Tree Amount		1 tree per 55 m² of landscape area (front/rear setback area) or 1 tree per 10 lm of landscape area (whichever is greater)	1 tree per 50 m² of landscape area (front/rear setback area) or 1 tree per 12 lm of landscape area (whichever is greater)	1 tree per 55 m² of landscape area (front/rear setback area) or 1 tree per 10 lm of landscape area (whichever is greater)	Submission meets the requirements.		
Parking*							
Parking Stalls per Studio Dwelling Unit		Min 1.0 Max 1.25 stalls			Submission meets the requirements.		
Parking Stalls per 1-bdrm Dwelling Unit		Min 1.2 Max 1.6 stalls					
Parking Stalls per 2-bdrm Dwelling Unit		Min 1.4 Max 2.0 stalls					
Parking Stalls per 3-bdrm Dwelling Unit		Min 1.6 Max 2.2 stalls					
Visitor Parking per Dwelling Unit		Min 0.14 Max 0.2 stalls					

* A 20% reduction to the parking requirement (both base and visitor) can be applied to the development due to the contribution to the City's Housing Opportunities Reserve Fund associated with CD29 rezoning.

ZONING ANALYSIS | Bylaw 12375				
BYLAW REGULATIONS	**CD29 ZONE**			**PRELIMINARY CONCEPT**
Bicycle Parking	**CD29 - A**	**CD29 - B**	**CD29 - C**	
Bicycle Stalls per bachelor, 1-bdrm + 2-bdrm Dwelling Unit	0.75 stalls			0.75 stalls per unit
Bonus Bicycle Stalls per bachelor, 1-bdrm + 2-bdrm Dwelling Unit	1.25 stalls per bachelor and 1-bdrm. 1.5 stalls per 2-bdrm			n/a
Bicycle Stalls per 3-bdrm Dwelling Unit or more	1.0 stalls			1.0 stalls per unit
Bonus Bicycle Stalls per 3-bdrm Dwelling U. or more	2.0 stalls			n/a
Short-term (visitor) Bicycle Parking	6.0 stalls per entrance			6.0 stalls per entrance

Note: The statistics shown in this table are based on the conceptual design only to support OCP Amendment + Rezoning and are subject to change through subdivision and permit process.

The 3 sub-areas proposed in the CD29 zone allow for a sensitive transition in height and massing towards adjacent Core Area Neighbourhood properties by permitting commercial uses on the corner of Cara Glen Way and Clifton Road, ground oriented multiple housing in the centre of the site, and apartment housing with street fronting ground level units on the eastern edge.

CONCLUSION

The submission fulfills the criteria outlined in the OCP's Policy 5.3.3 for Strategic Density for mixed-use developments not adjacent to Transit Supportive Corridors and aligns with Policy 5.3.8 for Local Commercial Integration within the Core Area Neighbourhoods. It completes the Core Area Neighbourhood along the southern edge of Knox Mountain Park with a compact, walkable, mixed-use neighbourhood - including a significant parkland dedication to the City of Kelowna.

We look forward to working with the City towards realizing the neighbourhood vision.

Best regards,

Paul Fenske, Principal
Placemark Design Studio

Theo Finseth, Partner
Placemark Design Studio

Development Planning
1435 Water Street Kelowna, BC
V1Y 1J4
250-469-8626
kelowna.ca

Kelowna is located on the traditional, ancestral, unceded territory of the syilx/Okanagan people

DEVELOPMENT APPLICATION FORM

- ■ Official Community Plan Amendment
- ■ Rezoning
- ☐ Text Amendment
- ☐ Heritage Alteration Permit (Major / Minor)
- ☐ Heritage Revitalization Agreement
- ☐ Other: _____

- ☐ Development Variance Permit
- ☐ Development Permit (Major / Minor)
  - ○ Residential
  - ○ Mixed-Use
  - ○ Commercial
  - ○ Industrial / Health / Institutional
- ☐ Other: _____

APPLICANT

Primary Contact

Name:	
Placemark Design Studio Inc.	
Title:	
Keven Fulmer | Project Manager	
Address:	
300 - 2318 Oak Street, Vancouver, BC V6H 4J1	
Phone:	Cell
780-289-3205	
Email:	
fulmer@placemark.ca	

Professional Consultant

(Architect, Landscape Architect, Heritage Consultant, etc.)

Name:	
Urban Options Planning Corp.	
Title:	
Birte Decloux | Urban Planning Consultant	
Address:	
202-1470 St. Paul Street, Kelowna BC	
Phone	Cell
250-575-6707	
Email:	
birte@urbanoptions.ca	

PROPERTY(IES) DESCRIPTION

Legal Description:	
LOT L SECTIONS 31 AND 32 TOWNSHIP 26 PLAN KAP53293 ODYD	
Civic Address:	
1490 Cara Glen Way	
Current Zoning:	Proposed Zoning (if applicable):
RR1 - Rural Residential 1	Comprehensive Development Zone (CD) P3
Variances (indicate required regulation and proposed variance):	
N/A	
Pre-application meeting? (yes/no) Yes	Name of Planner in Pre-application: Mark Tanner
Dates of Pre-application meeting(s): November 2023	

DEVELOPMENT PROPOSAL

Please briefly describe your development proposal; a supplemental letter of rationale is also required.

A revised application submission to include an OCP amendment component for 1490 Cara Glen Way. File No. TA24-0007 & Z24-0013, originally submitted in March 2024.

OWNER(S)

Name:		Name:	
RUTHERFORD CRESTVIEW DEVELOPMENTS LTD., INC.NO. A0085980			
Title:		Title:	
Land Owner			
Address:		Address:	
#700 - 999 - 8 STREET SW, CALGARY AB			
Phone:	Cell	Phone	Cell
587-390-8816			
Email:		Email:	
randy@lamontland.com			

APPLICANT CONFIRMATION

A. As applicant or approved agent, I confirm that I have read all relevant City of Kelowna bylaws and policies and that this application is in conformance (unless a bylaw amendment or variance forms part of this application.)

I have attached to this application the required plans and specifications of the proposed development in accordance with the application checklist. **I accept responsibility for processing delays caused by incorrect or insufficient submission materials.**

I understand that this application form is a public document and that any and all information contained in it, including personal information as that term is defined in the Freedom of Information and Protection of Privacy Act of B.C., is open for inspection by the public and may be reproduced and distributed to the public as part of a report(s) to Council or for purposes of a public hearing.

I am aware that I am responsible to display and remove the development sign.

I understand that I am responsible for obtaining development authorizations and permissions from Telus, FortisBC Gas & Electric, and Shaw Cable and for providing the File Manager with copies of responses from these utilities.

B. I further acknowledge that **Development Cost Charges (DCC's)** may be payable at the time of subdivision or Building Permit for the construction of new dwelling units, commercial, institutional, or industrial development.

C. The **Lobbyist Registry** came into effect on September 11, 2023. Individuals and organizations who communicate with Council members for the purpose of influencing a Council decision are required to register with the City. Communication includes emails, phone and video calls, or meetings with members of Council. Further information may be found on the Lobbyist Registry webpage and in the Policy.

I am aware that I am responsible for understanding the Policy and are required to register within 5 days of initial communication with a Council member.

Applicant Signature: Keven Fulmer **Date:** July 12th 2024

FEES:

For completion by One Window Staff:

Fees submitted:		Received by:		Date:	

Fees are as per City of Kelowna Development Application Fee Bylaw No. 10560 (kelowna.ca/bylaws). Acceptance of fees does not imply or guarantee application approval.

City of Kelowna

Community Planning
1435 Water Street
Kelowna, BC V1Y 1J4
250-469-8626
kelowna.ca

Development Services
1435 Water Street
Kelowna, BC V1Y 1J4
250-469-8960
24-hour Inspection Line:
250-469-8977

Owner's Authorization Form

Application Number _____

PROPERTY INFORMATION

Municipal Address(es): 1490 Cara Glen Way, Kelowna, BC V1V 2H9

Legal Description(s): LOT L SECTIONS 31 AND 32 TOWNSHIP 26 PLAN KAP53293 ODYD

Project Description: Rezoning Application

Registered Owner Name(s): RUTHERFORD CRESTVIEW DEVELOPMENTS LTD., INC.NO. A0085980

Address: #700 - 999 8 STREET SW

City: CALGARY Province: AB Postal Code T2R 1J5

Telephone: 587-390-8816 E-mail Address: randy@lamontland.com

Please be advised that I/we, the registered owner(s) of the above mentioned property(ies),

(select one)

□ will apply for all applications related to the above mentioned project.

■ authorize the following agent to apply for all applications related to the above mentioned project on my/our behalf:

□ authorize the following agent access to property information related to the above address on my/our behalf

Agent Name:	**Agent Company:**	
Theo Finseth	Placemark Design Studio Inc.	
Mailing Address:		
300 - 2318 Oak Street		
City:	**Prov:**	**Postal Code:**
Vancouver	BC	V6H 4J1
Telephone: 604-365-7574	**Cell:**	
Email Address:		
finseth@placemark.ca		

I/We agree to immediately notify the City of Kelowna, in writing, of any changes regarding this information.

Owner's Name(s) (printed): Randy Sieben

Owner's Signature(s): DocuSigned by: BF482716A0C54FB... Date: 03-08-24

Completed form can be emailed to developmentservicesinfo@kelowna.ca

Revised: March 29, 2017

DUPLICATE

BRITISH COLUMBIA
The Best Place on Earth

Number: A0085980

CERTIFICATE
OF
REGISTRATION

BUSINESS CORPORATIONS ACT

I Hereby Certify that RUTHERFORD CRESTVIEW DEVELOPMENTS LTD. has been registered as an extraprovincial company under the Business Corporations Act on April 18, 2012 at 07:30 AM Pacific Time.

Issued under my hand at Victoria, British Columbia
On April 18, 2012

RON TOWNSHEND
Registrar of Companies
Province of British Columbia
Canada

BRITISH COLUMBIA
The Best Place on Earth

Registry Services

Mailing Address:
PO BOX 9431 Stn Prov Govt.
Victoria BC V8W 9V3
www.corporateonline.gov.bc.ca

Location:
2nd Floor - 940 Blanshard St.
Victoria BC
250 356-8626

Extraprovincial Company Summary

For

RUTHERFORD CRESTVIEW DEVELOPMENTS LTD.

Date and Time of Search: **April 18, 2012 09:11 AM Pacific Time**

Currency Date: February 20, 2012

ACTIVE

Registration Number in BC: A0085980

Name of Extraprovincial Company: RUTHERFORD CRESTVIEW DEVELOPMENTS LTD.

Registration Date and Time: Registered in British Columbia on April 18, 2012 07:30 AM Pacific Time

Last Annual Report Filed: Not Required **Receiver:** No

FOREIGN JURISDICTION INFORMATION

Identifying Number in Foreign Jurisdiction:
2012357584

Name in Foreign Jurisdiction:
RUTHERFORD CRESTVIEW DEVELOPMENTS LTD.

Date of Incorporation, Continuation or Amalgamation in Foreign Jurisdiction:
April 12, 2006

Foreign Jurisdiction:
ALBERTA

HEAD OFFICE INFORMATION

Mailing Address:
201, 20353 - 64TH AVENUE
LANGLEY BC V2Y 1N5
CANADA

Delivery Address:
201, 20353 - 64TH AVENUE
LANGLEY BC V2Y 1N5
CANADA

ATTORNEY INFORMATION

Last Name, First Name, Middle Name:
SAWATZKY, LEE M.

Mailing Address:
201, 20353 64TH AVENUE
LANGLEY BC V2Y 1N5
CANADA

Delivery Address:
201, 20353 64TH AVENUE
LANGLEY BC V2Y 1N5
CANADA

DIRECTOR INFORMATION

Directors are not recorded for extraprovincial registration types. Go to the incorporating jurisdiction for director information.

LAND TITLE OFFICE

STATE OF TITLE CERTIFICATE

Certificate Number: STSR4030521

LAMONT LAND LP
200, 5716 - 1 ST SE
CALGARY AB T2H1H8

A copy of this State of Title Certificate held by the land title office can be viewed for a period of one year at https://apps.ltsa.ca/cert (access code 978450).

I certify this to be an accurate reproduction of title number **CA9316902** at 07:48 this 4th day of July, 2024.

REGISTRAR OF LAND TITLES

THE LAND TITLE & SURVEY AUTHORITY OF BRITISH COLUMBIA
bc Land Title & Survey
THE LAND TITLE OFFICE • KAMLOOPS • NELSON

Land Title District	KAMLOOPS
Land Title Office	KAMLOOPS
Title Number	CA9316902
From Title Number	KH101576
Application Received	2021-08-30
Application Entered	2021-09-01
Registered Owner in Fee Simple	
Registered Owner/Mailing Address:	RUTHERFORD CRESTVIEW DEVELOPMENTS LTD., INC.NO. A0085980 #700, 999 8 STREET SW CALGARY, AB T2R 1J5
Taxation Authority	Kelowna, City of

LAND TITLE OFFICE

STATE OF TITLE CERTIFICATE

Certificate Number: STSR4030521

Description of Land

Parcel Identifier: 018-979-289

Legal Description:

LOT L SECTIONS 31 AND 32 TOWNSHIP 26 OSOYOOS DIVISION YALE DISTRICT
PLAN KAP53293

Legal Notations NONE

Charges, Liens and Interests

Nature:	UNDERSURFACE RIGHTS
Registration Number:	33025E
Registration Date and Time:	1946-03-11 10:03
Registered Owner:	THE DIRECTOR OF SOLDIER SETTLEMENT
Remarks:	INTER ALIA PART FORMER SW 1/4 OF SEC 32 TWP 26 ODYD DD 106119F OTHER THAN THOSE EXCEPTED BY THE CROWN

Nature:	STATUTORY RIGHT OF WAY
Registration Number:	KH101581
Registration Date and Time:	1994-10-18 11:26
Registered Owner:	CITY OF KELOWNA
Remarks:	INTER ALIA

Duplicate Indefeasible Title NONE OUTSTANDING

Transfers NONE

Pending Applications NONE

This certificate is to be read subject to the provisions of section 23(2) of the Land Title Act(R.S.B.C. 1996 Chapter 250) and may be affected by sections 50 and 55-58 of the Land Act (R.S.B.C. 1996 Chapter 245).

Cara Glen Phase 2 | Design Summary

OCP Amendment + Rezoning Application | Revised - July 2024

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DESIGN + DEVELOPMENT

CONTENTS

Section 1

CONTEXT + ANALYSIS

Context

- The Cara Glen lands require Rezoning to reflect the current needs of the community and accommodate the future growth of Kelowna.
- The Neighbourhood Concept aims to realize the vision of the City of Kelowna's Official Community Plan through the development of the lands with a complete mixed-use community that offers neighbourhood-scale commercial and a variety of homes all within the Core Area.
- The Concept follows the residential land use established in the City of Kelowna's OCP, with a collection of homes in townhouse and apartment formats.
- The Neighbourhood observes the slopes of Knox Mountain Park and protects the natural assets of the neighbourhood through:
  - Public Park Dedication;
  - New recreation access + trails, and;
  - Natural hillside retention.

Site History

EARLY DEVELOPMENT

The neighbourhood has attracted residents since the early 1970s. The first subdivision applications started at lower elevations - adjacent to High Road and Glenmore Road. The area is known as "Old Glenmore" and residents take much pride in their neighbourhood. The pattern of subdivisions worked their way up in the early 80s to the east side of Clifton Rd establishing the area known now as 530 Caramillo Ct, 1490 and 1691 Cara Glen Way. The lands west of Clifton Rd were once a pear orchard and have slowly been redeveloped to single-family and multi-family neighbourhoods.

PROTECTION OF KNOX MOUNTAIN PARK

As shown in aerial photos, the rough grade for the extension of Cara Glen Way was created in the 1980s. This portion of Cara Glen Way was envisioned to connect with what became the Wilden Neighbourhood by extending a road through the City owned lands that are now Know Mountain Park East. It was not until the most recent OCP, adopted in 2022, that the road connection was abandoned in favour of the park.

PREVIOUS REZONING APPLICATIONS

The property has been the subject of several development applications. In 1981, there was an application to rezone the land to a Comprehensive Development Zone to support a form of terraced housing. The economic climate at the time did not warrant its proceeding and the application was withdrawn. In the late 1990s, another application was made for a terraced development, but again, that proposal did not proceed.

In 2006, an application was made to rezone the neighbouring property 530 Caramillo Ct. to the RM3- Low Density Multiple Unit Residential zone, which was adopted in 2009.

The approved Development Permit allowed for an apartment development which due to the financial crisis was never constructed. At this time, the OCP future land use designation of "Multiple Unit Residential - low density" was approved for 1490 Cara Glen Way.

The previously issued Development Permits were never acted upon and Building Permits were never requested. The Development Permit and associated Development Variance Permit lapsed after 2 years of inactivity.

It was in the early 2000's that a portion of 530 Caramillo Ct. was zoned to the P3 - Parks and Open Space zone to provide a neighbourhood park area. As part of the 2006 rezoning application for 530 Caramillo Ct. road improvements were identified for Cara Glen Way road right-of-way. However, a servicing agreement was executed, and construction bonding was secured for the construction of Cara Glen Way fronting 530 Caramillo Ct. to an arterial standard, as required by the City Engineers at the time. Today, Cara Glen Way has been revised to a local road standard as it is now only providing access and parking for Knox Mountain Park East in the established right-of-way.

RECENT ACTIVITY

In September of 2023 1691 Cara Glen Way (Phase 1) received rezoning to allow for the development of a 4-storey apartment building and townhomes. Subsequently, road construction of Cara Glen Way was substantially completed in 2023.

Currently, Phase 1 is under Development Permit review.

Applicable Policies

2040 OFFICIAL COMMUNITY PLAN

- The 9.32 acres (3.77 ha) site is situated on the northern reaches of Kelowna's core, north of Downtown and south of Knox Mountain Park.
- In the Core Area Neighbourhood designation, housing variety is the top priority supporting the following residential uses:
    - Single and two-dwelling residential;
    - Ground-oriented multi-unit residential;
    - Small-scale commercial and institutional;
    - Stacked townhouses;
    - Apartment housing, and;
    - Mixed-use development.

The future land use designation Core Area Neighbourhood (C-NHD) as part of its **Policy 5.3.3 for Strategic Density** supports mixed-use buildings in developments not adjacent to Transit Supportive Corridors under the following circumstances:

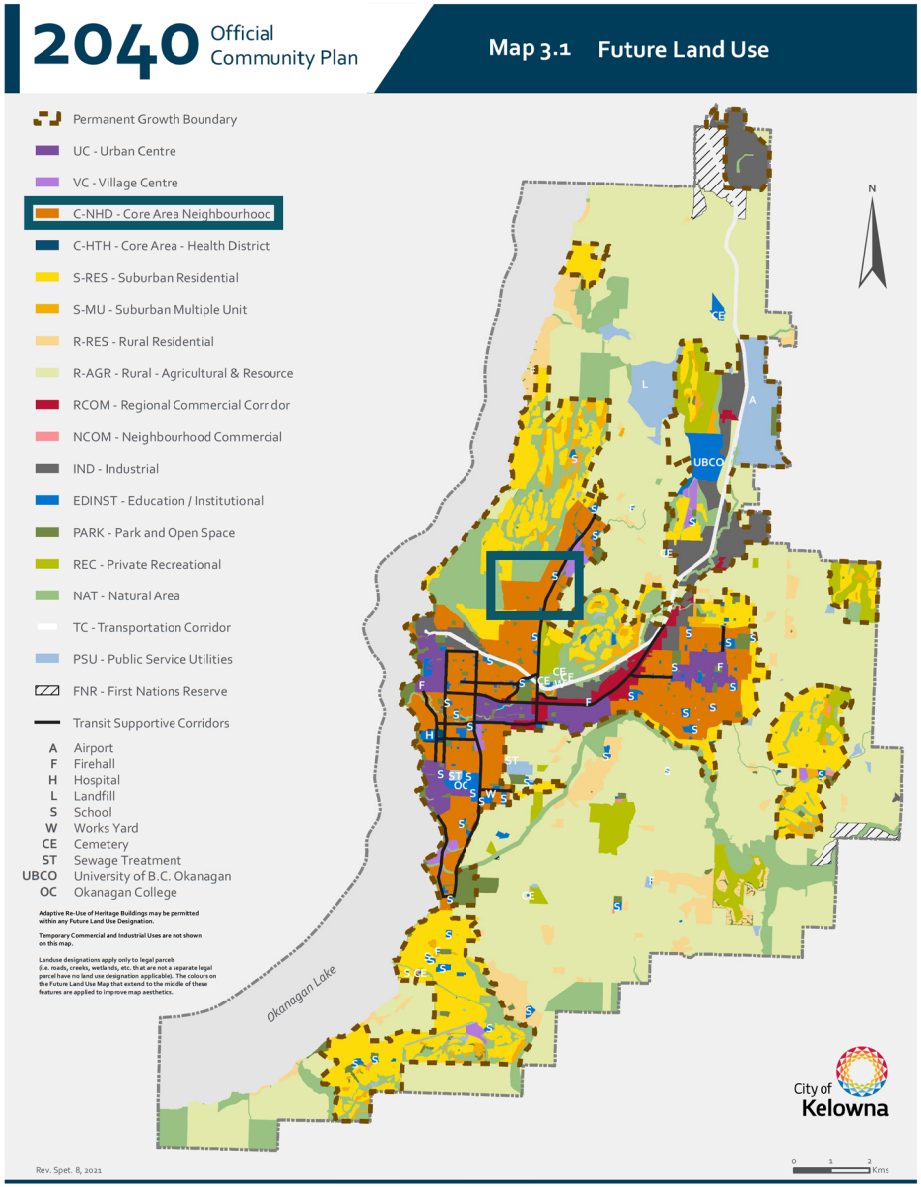
- The property has an area of 1 hectare or greater;
- The submission illustrates that the larger buildings will sensitively transition with ground-oriented multi-unit housing towards adjacent neighbourhoods;
- The submission includes a public park;
- The submission includes affordable and/or rental housing component, and;
- The submission does not exceed a FAR of approximately 1.2 over the entire site.

All of these circumstances are met in the submission and in addition, **Policy 5.3.8** supports the sensitive integration of small scale local commercial uses into the Core Area Neighbourhoods to promote those services in easy walking distance of residents.

AFFORDABLE HOUSING

A contribution to the Housing Opportunities Reserve Fund is proposed to satisfy the requirement for a component of affordable and/or rental housing. The submission proposes **a contribution for Sub-Area A as established by Bylaw No. 8593 and using the recommended funds per dwelling unit, detailed in the table below.** Payment is to be made to the City of Kelowna by the applicant prior to Final Adoption. Any future development submissions for the site will not require any affordable and/or rental housing components.

Dwelling Unit	Reserve Funds per Unit	Unit Amount	Total Funds
1 Bed	$2,000	25	$50,000
2 Bed	$4,000	16	$64,000
3 Bed	$8,000	4	$32,000
		Total:	**$146,000**



Future Land Use Designations

COMPLETING THE NEIGHBOURHOOD

1490 Cara Glen Way is the unfinished neighbourhood edge along the beloved Knox Mountain Park and the second development of the Cara Glen Neighbourhood. The development of the parcel will complete the designated Core Area Neighbourhood.

Aligned with the OCP policies, the future land use line along the edge of the mountain defines the urban containment boundary to the north defining the edge of any future development on the hillside - the Cara Glen Neighbourhood will be the final piece.

FUTURE LAND USE | PROPOSED

- C-NHD - Core Area Neighbrouhood
- S-RES - Suburban Residential
- NAT - Natural Area

Policy Context

EXISTING ZONING

The site is currently zoned:

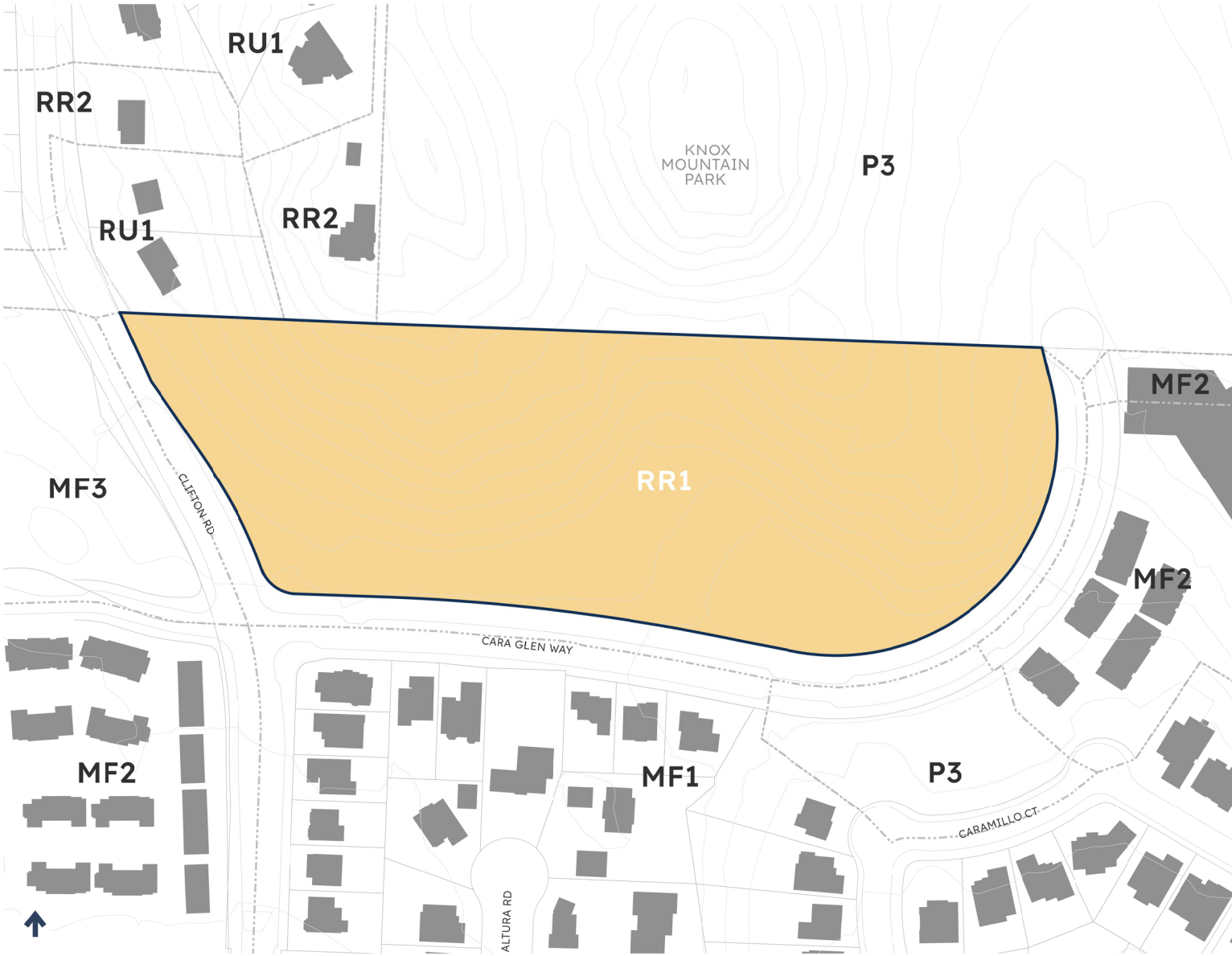
- RR1 - Large Lot Rural Residential

The RR1 provides a zone for country residential development and a holding zone where future development could occur subject to the direction of the OCP.

The residential permitted uses in RR1 is:

- Single Detached Housing.

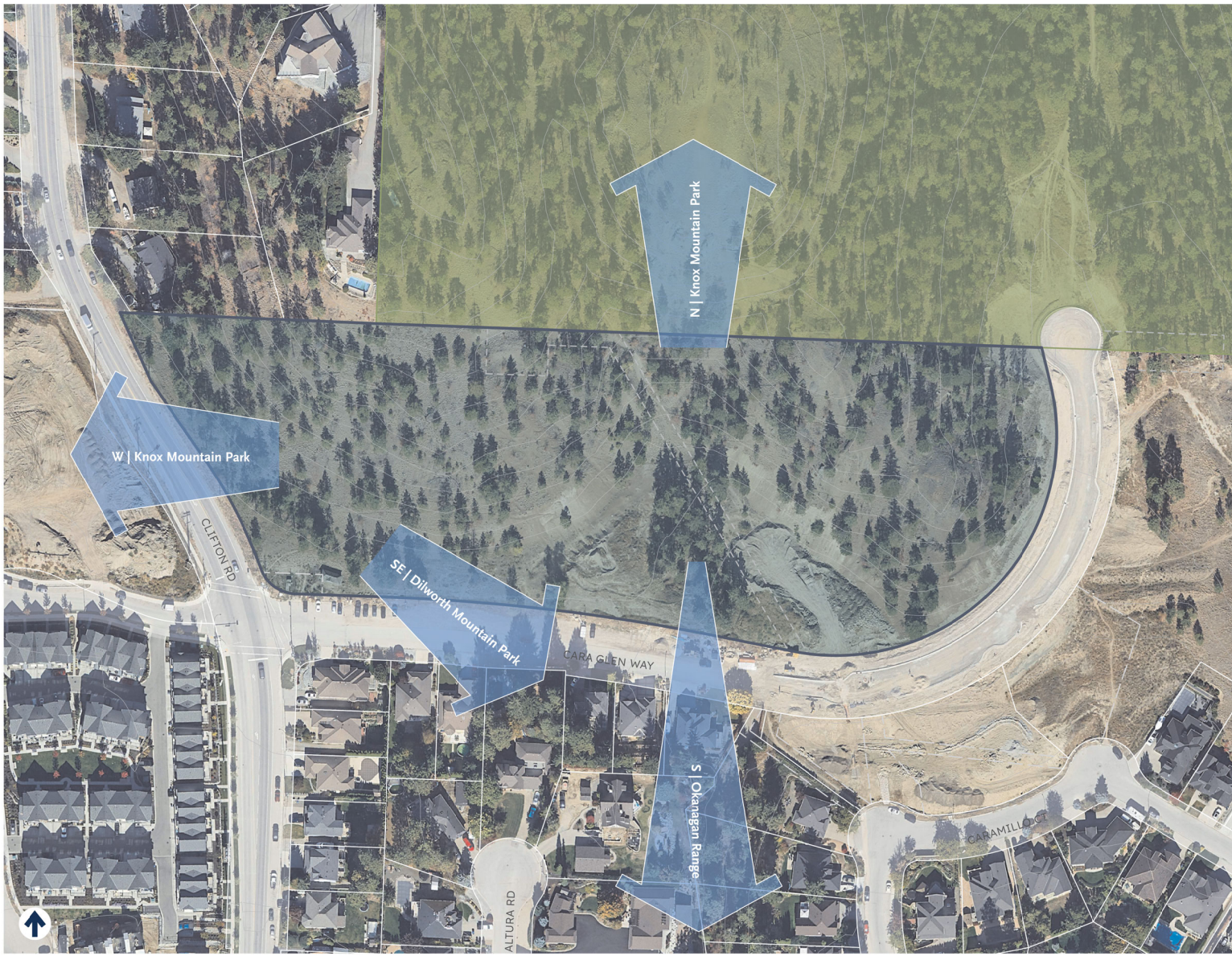
The existing RR1 zone does not clign with the OCP's density targets for the Core Arec Neighbourhood.



Aerial Analysis

GUIDED BY TOPOGRAPHY

- The 9.32 acre (3.77 ha) site is situated within the Core Area of the City of Kelowna adjacent to Knox Mountain Park, ~3.5km north of Downtown Kelowna.
- The site's northern edge is defined by Knox Mountain Park, Kelowna's largest natural area park. The neighbourhood is structured by Cara Glen Way with the western edge defined by Clifton Road.
- With its beautiful hillside setting, the site offers panoramic views of Okanagan Lake and mountain range to the south, Dilworth Mountain Park to the southeast, and Knox Mountain to the north and west.



Landform Analysis

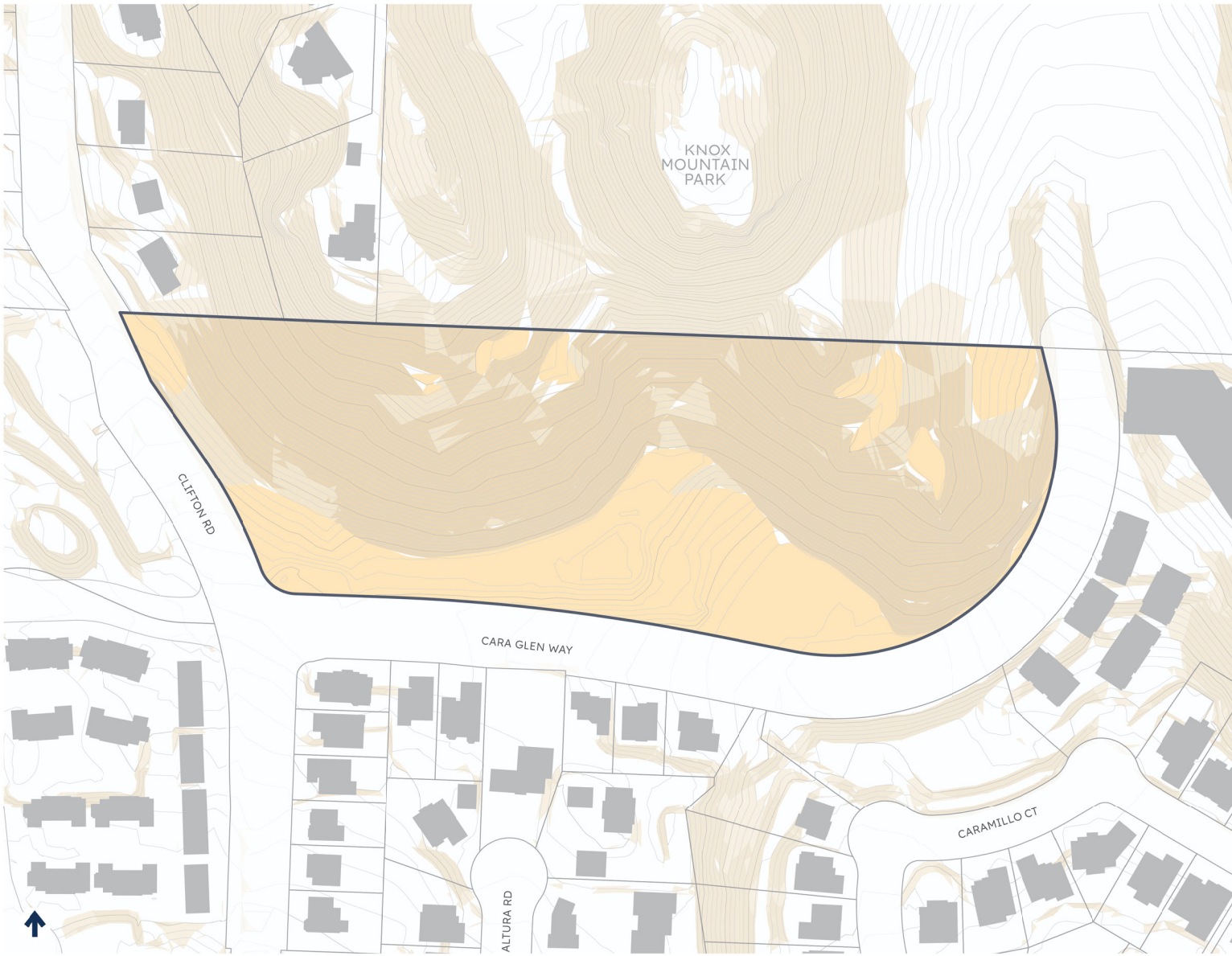
COMPLEX LANDFORM

- The lands are topographically distinct with a complex hillside landform and a series of gentle lower terraces to the south, framed by steep slopes towards Knox Mountain.
- The distinctive landform structure along with the site's natural character provide an opportunity to celebrate the lands natural features, with the future neighbourhood occupying the more gentle terraces and avoiding steep slopes.

Slope Analysis

A HILLSIDE COMMUNITY

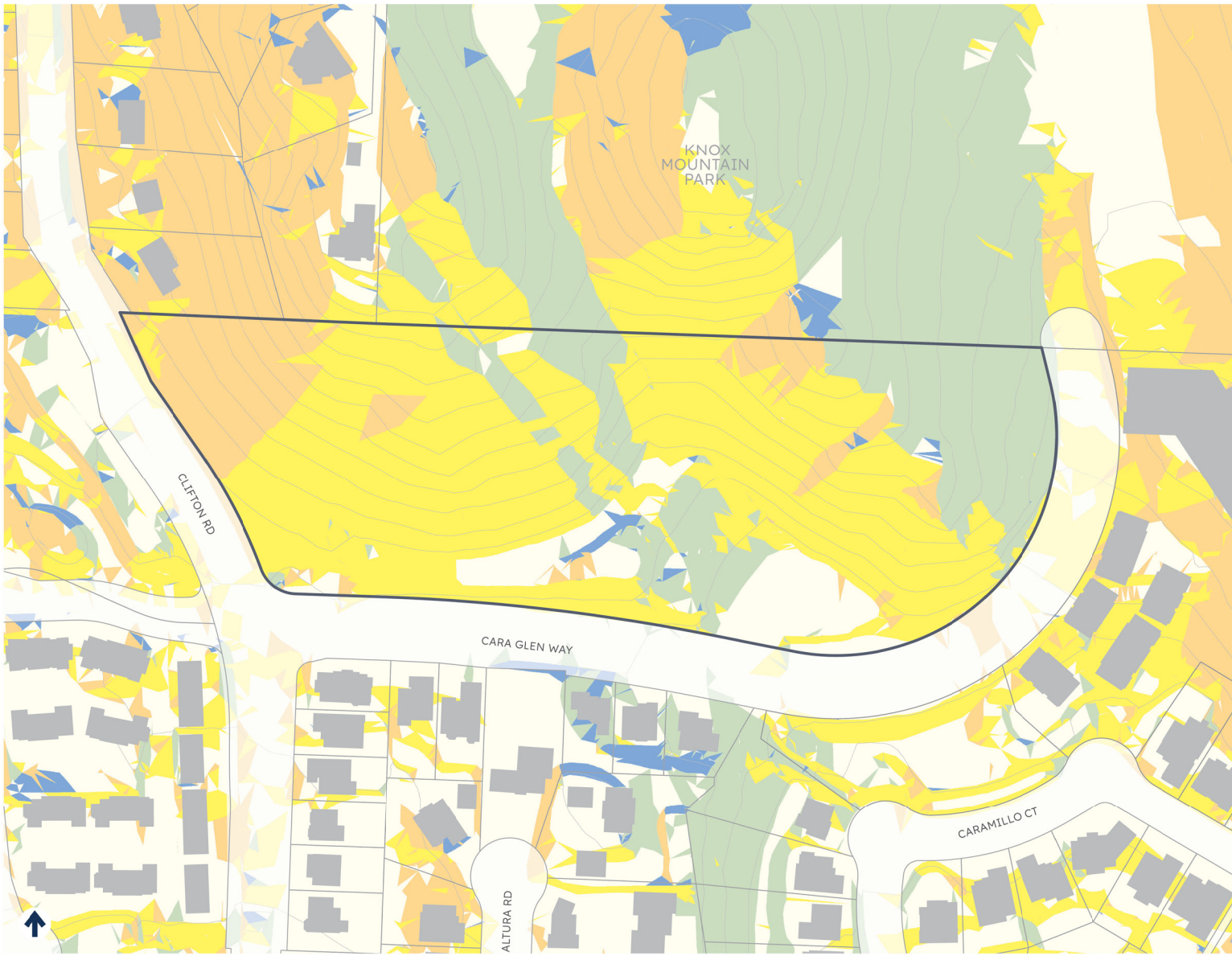
- The land features a generous + dramatic hillside with gentle landings adjacent to Cara Glen Way, which provide unique enclaves suitable for more dense neighbourhood clusters.
- The terrain's natural topography serves as a backdrop for a compact community while creating opportunities for new trails and a significant addition of protected natural areas to Knox Mountain Park.

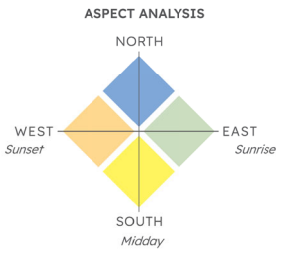


Solar
Aspect Analysis

A BRIGHT HILLSIDE

- The lands offer ample solar access with a predominant south-facing aspect, offering great access to natural sunlight through the day.

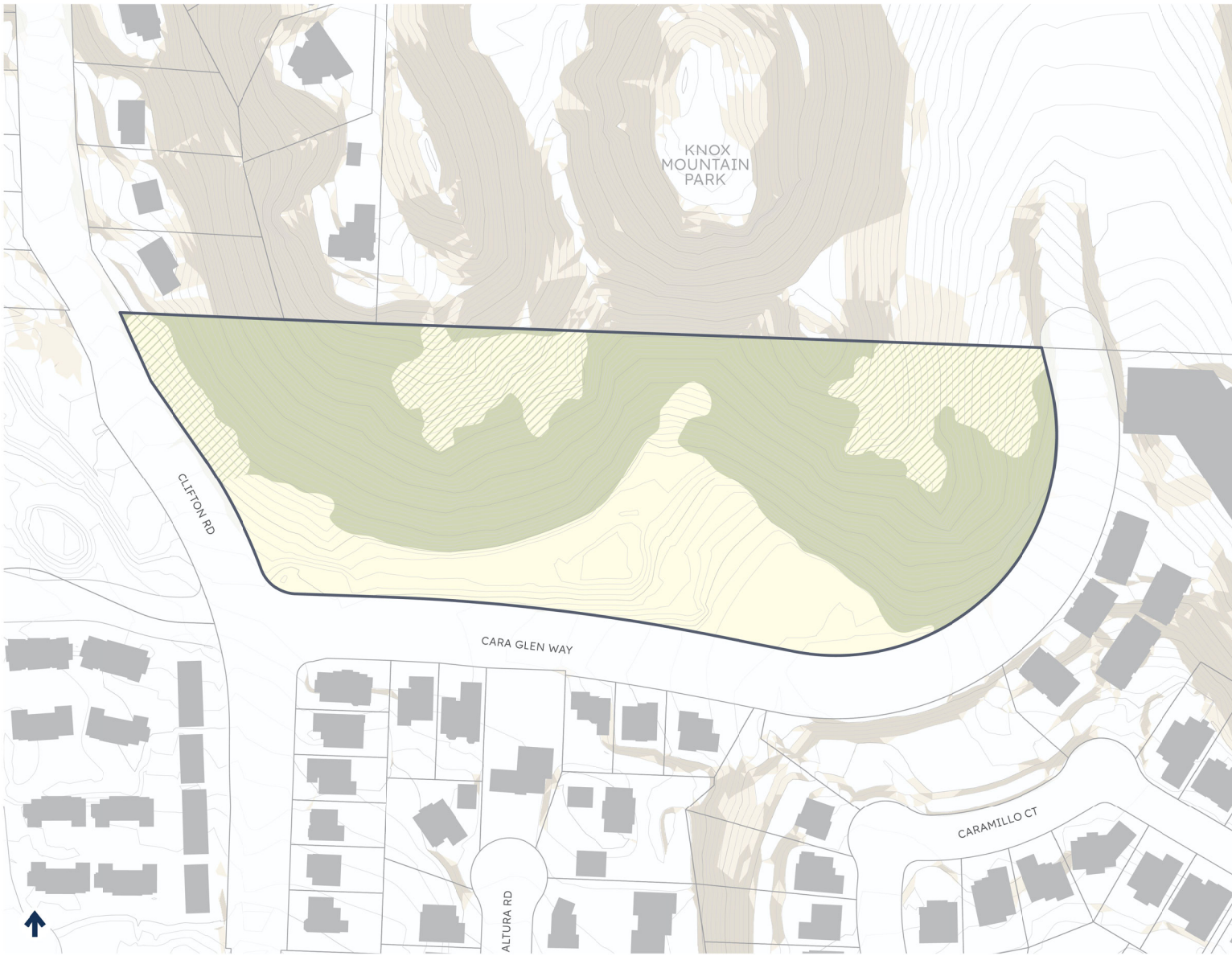




Development Potential

A NEW ENCLAVE

- Considering the site's topography, natural setting, and its convenient location within the City's Core Area, the site provides a rich opportunity for the development of a new mixed-use complete walkable neighbourhood, leveraging the lands views, natural character and surrounding recreation network.
- The Development Potential analysis reflects the land's natural qualities, environmental constraints, and existing infrastructure, with the following results:
    - **28%** of the land as **Low Constraint** - land best suited to accommodate future neighbourhood development;
    - **17%** of the land as **Medium Constraint** - land best suited to accommodate hillside and clustered development, and;
    - **55%** of the land as **High Constraint** - land best suited for protected natural areas and parkland.



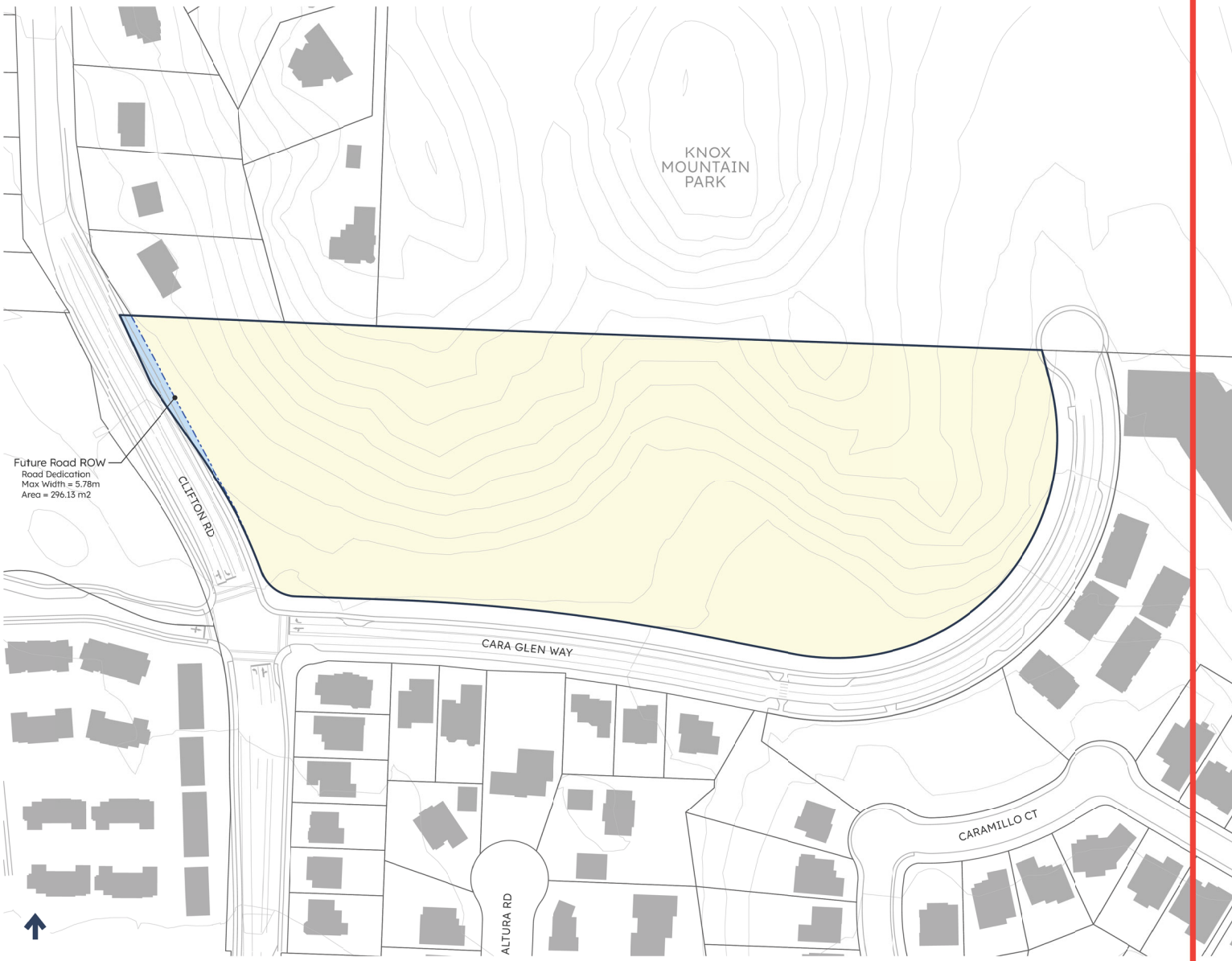
DEVELOPMENT POTENTIAL

28%	Low Constraints	*1.05 ha | 2.59 ac*
17%	Medium Constraints	*0.66 ha | 1.63 ac*
55%	High Constraints	*2.06 ha | 5.09 ac*
100%		*3.77 ha | 9.32 ac*

Road Dedication

A COMPLETED STREET NETWORK

- The site boundary has been adjusted to provide the required Road Dedication for the buildout of Clifton Road ensuring a 12m offset from centreline. This reduced the site area from 9.32 acres to 9.23 acres, dedicating 296.13m² of land for the Clifton Road Right-of-Way.



Site Boundary | Existing *3.77 ha / 9.32 ac*
Legal Property Line
5m Contour
Future Road ROW | Proposed*

ROAD DEDICATION

Adjusted Site Area *3.74 ha / 9.24 ac*
Road Dedication *0.03 ha / 0.07 ac*

* Future Road ROW as proposec by Protech Consulting dated on 2024-04-30

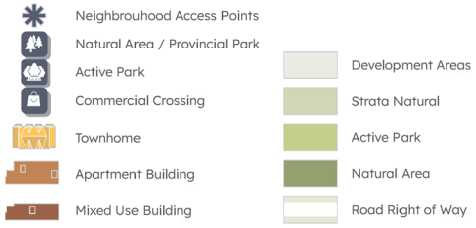
Section 2

CARA GLEN CONCEPT

Cara Glen Neighbourhood

DESIGN FEATURES

1. **Respecting the Landform:** The design preserves the natural surroundings while accommodating community growth + recreational opportunities.
2. **Diversity of Homes:** A combination of Townhomes and Apartments provide homes for a variety of lifestyles, life stages and incomes.
3. **Sustainable Growth:** Providing a variety of new housing types in an urban area where residents live closer to jobs, amenities, transit, and active transportation routes.
4. **Walkable Neighbourhood:** Coherent pattern of strata lanes, sidewalks and trails promote a pedestrian focused neighbourhood for ease of access to the proposed neighbourhood-scale commercial. Ground-level units with front doors addressing the street create a pedestrian oriented experience.
5. **Neighbourhood Commercial:** The plan proposes a mixed-use development on the intersection with Clifton Road that will include commercial spaces to serve the surrounding residents, new and existing, providing walking-distance access to services and shops for everyday needs in a primarily residential area.
6. **Connections to Nature:** The Neighbourhood preserves 60% of the site for Natural Park including a proposed new trail network that will connect to the existing trails within Knox Mountain Park.



Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Cara Glen
Neighbourhood Concept

TOWARDS SUSTAINABILITY

The Cara Glen Neighbourhood concept represents an opportunity to establish a pedestrian oriented, more complete community, guided by the following directives:

LIVING LIGHTLY

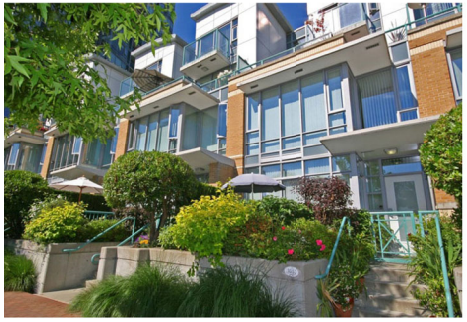
- Design a complete, compact, mixed-use, walkable neighbourhood
- Employ pedestrian oriented street cross sections
- Create a community close to existing amenities and infrastructure.

WORKING WITH NATURE

- Expand and protect Knox Mountain Park
- Create an integrated network of natural spaces, and recreational trails
- Celebrate and respect natural landforms

LIVING LOCAL

- Accommodate a range of lifestyles, life-stages and incomes.
- Create a sense of place that encourages social connections and walkability.
- Provide opportunities for local neighbourhood commercial to support a more complete community.



DESIGN APPROACH

The design of the Cara Glen Neighbourhooc represents an opportunity to work with the land in establishing a compact, mixed-use, walkcble neighbourhood with a diverse range of housing opportunities all on nature's doorstep:

Work with the Land: Leverage the natural topography by employing hillside forms to minimize grading impacts while maximizing access and views.

Preserve Views: Preserve natural landscape where possible while protecting view corridors.

Enhance the Neighbourhood: Walkable streets with homes that address their neighbours, and offer access to the extensive trail network.

Access to Knox Mountain: The extension of Cara Glen Way offers community access to the recreational trails and amenities within Knox Mountain Park.

Variety of Homes: Ensure a diversity of ground-oriented Townhomes on strata pathways serviced by lanes and Apartments with underground parking.

Provide affordability: Includes a contribution to the City's Housing Opportunities Reserve Fund for Sub-Area A.

Establish Parks: Provide a significant addition of natural parkland to Knox Mountain Park, while offering community trails with connections to the park and adjacent neighbourhoods.

Structuring Plan

FITTING THE LAND

- The central challenge involved in envisioning the neighbourhood is to respect and work with its natural topography and landscape features. The Neighbourhood design responds to the land's complex hillside by offering compact housing forms that respect the surrounding steep slopes.
- The site is structured by the extension of Cara Glen Way with access from Clifton Road connecting the neighbourhood with a local road to strata lane ground-oriented homes + low rise apartments with underground parking.
- New and existing public trails provide outdoor recreation opportunities, connecting to the Knox Mountain trail network and beyond.

Active Park

Park / Natural Area

DEVELOPMENT POTENTIAL

28%	Low Constraints	*1.05 ha | 2.59 ac*
17%	Medium Constraints	*0.63 ha | 1.55 ac*
55%	High Constraints	*2.06 ha | 5.09 ac*
100%	*3.74 ha | 9.24 ac*	

STRUCTURING CONCEPT

Street Alignment

Laneway Alignment

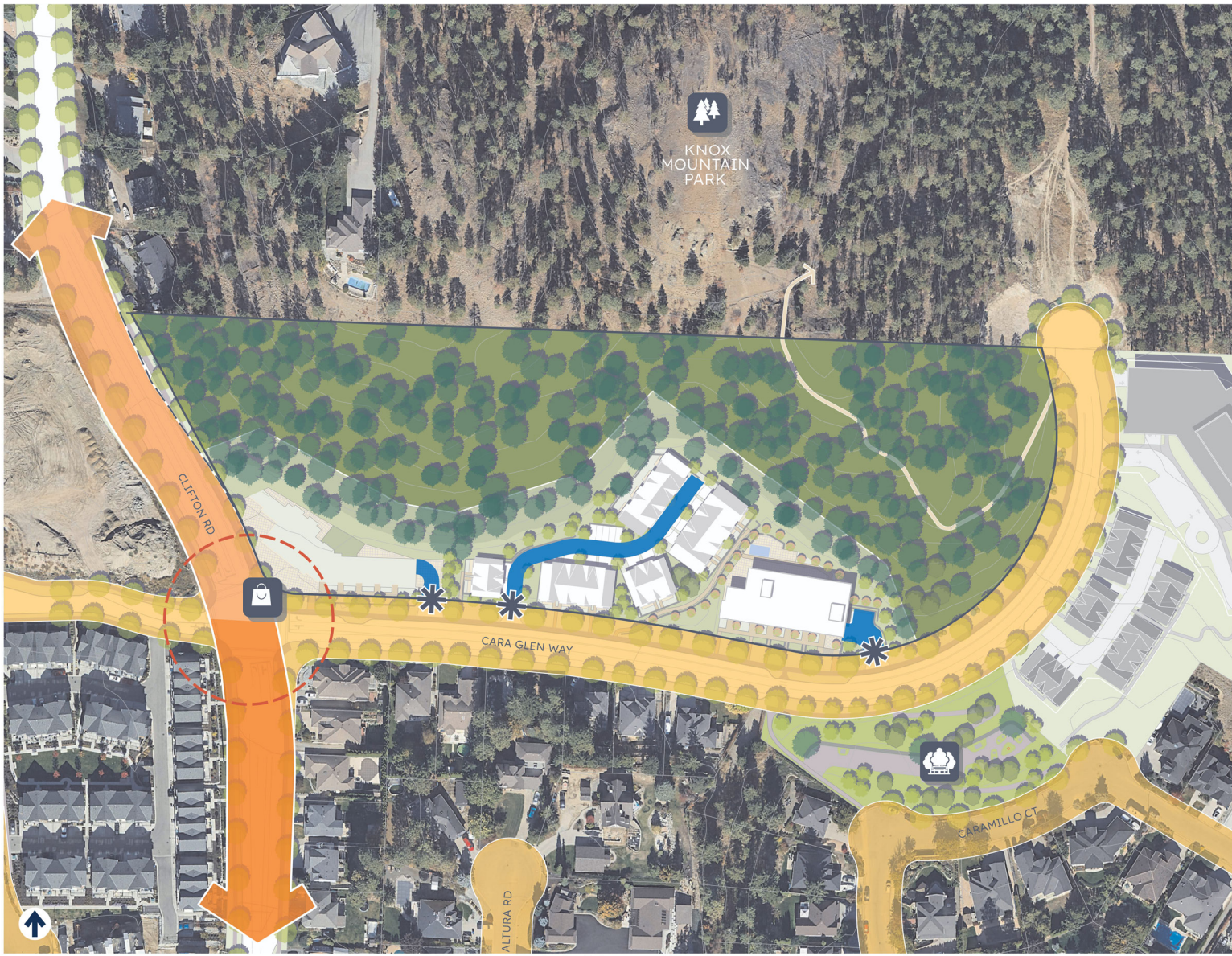
ROW Context

Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Street Hierarchy

NEW CONNECTION

- The new Cara Glen Way extension serves as a local road providing access to the strata lanes and underground parking while providing a new public access and on-street parking for the users of Knox Mountain Park.
- The intersection with Clifton Road, a major arterial in the Core Area, is an existing 4-way controlled intersection that already serves the built portion of Cara Glen Way.



Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Parks + Trails Plan

CONNECTING WITH NATURE

Recognizing and respecting the value of the lands for their recreational significance and landscape features, the neighbourhood design weaves together the new active park on 530 Caramillo, a series of trails and significant dedicated protected natural areas.

The conceptual trail network provides an opportunity to connect with existing trails within Knox Mountain Park while further enhancing park access.

The dedication of natural park land aligns with the Knox Mountain Park Management Plan 2022 and its desire to acquire additional properties to improve connections to Knox Mountain Park for both wildlife and trail systems.

PEDESTRIAN-FOCUSED

Designed to foster pedestrian use and movement, ground-oriented townhomes address the public realm while public sidewalks and front yard mews provide front door access linking the homes to the network of neighbourhood streets and trails.

Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

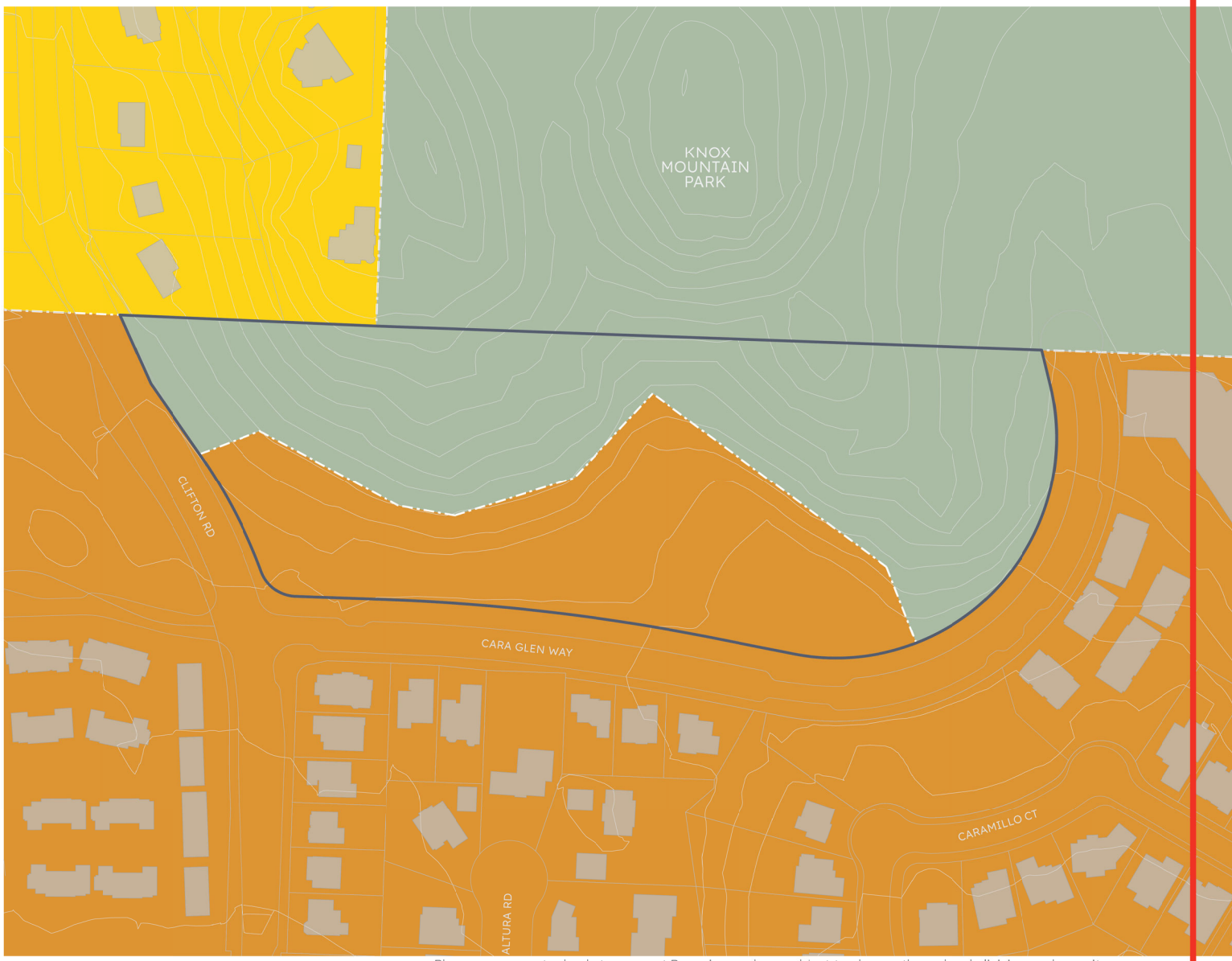
Proposed Land Use Designations

FUTURE LAND USE

- C-NHD - Core Area Neighbourhood, and;
- NAT - Natural Areas.

The proposed amendment to the OCP Future Land Use Plan reflects the proposed development concept and park dedication for Cara Glen Way Phase 2.

LAND USE SUMMARY				
LAND USE	EXISTING (ac)	%	PROPOSED (ac)	%
C-NHD	9.32	100	3.68	40
NAT	-	-	5.64	60



Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Proposed Zoning

ZONES

- CD29 - Cara Glen Neighbourhood, and;
- RR1 - Large Lot Rural Residential.

The proposed CD29 provides a zone primarily for townhomes and apartments with a sensitive transition in height and massing towards adjacent Core Area Neighbourhood properties. In addition, 5.64 acres will be rezoned to P3 - Parks and Open Space and dedicated to the City as public parkland.

REZONING SUMMARY				
ZONE	EXISTING (ac)	%	PROPOSED (ac)	%
RR1	9.32	100	-	-
CD29	-	-	3.68	40
P3	-	-	5.64	60

The proposed development adheres to the OCP requirements - policy 5.3.3 - for supporting mixed use buildings in Core Area Neighbourhoods, meeting the following criteria:

- Has an area of 1 hectare or greater;
- Has sensitive transitions from large buildings to adjacent neighbourhoods with ground-oriented multi-unit housing
- Includes a public park;
- Includes affordable and/or rental housing component
- Does not exceed a FAR of 1.2 over the entire site.

CD29 | Cara Glen Multi-Dwelling

CD29 - A *0.41 ha | 1.01 ac*

CD29 - B *0.75 ha | 1.85 ac*

CD29 - C *0.33 ha | 0.81 ac*

P3 | Park and Open Space

Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Cara Glen Neighbourhood Community Benefits

COMPLETE NEIGHBOURHOOD

MAKING THINGS WALKABLE

- A network of tree-lined public street and strata lanes, provide comfortable pecestrian access to neighbourhood-scale mixed-use commercial, reducing the need for cars and encouraging social connections and walkability.

MAKING THINGS SUSTAINABLE

- With a truly mixed-use neighbourhood the opportunity for viable neighbourhood-focused commercial is possible, with more neighbourhood residents to support local shops and services.

CELEBRATING NATURE

CONNECTING WITH NATURE

- Recognizing and respecting the value of the lands for their recreational and natural significance, the Neighbourhood design weaves together the new active park across the street, a series of active trails and protected natural areas.
- The conceptual trail network offers a neighbourhood destination with an opportunity to connect with existing trails within Knox Mountain Park.

HOUSING DIVERSITY

A HOME FOR EVERYONE

- Supporting the OCP's vision to build healthier neighbourhoods, the plan offers a variety of housing types to support a range of family lifestyles, life stages and incomes that includes:
    - Townhomes of different formats; and,
    - Apartments.

MAKING THINGS AFFORDABLE

- The submission includes a contribution to the City's Housing Opportunities Reserve Fund for Sub-Area A as established by Bylaw No. 8593.

Hillside Responsive

ADAPTING TO THE LAND

The proposed building footprints are within the existing areas that have a slope below 30%.

The compact building footprints at the base of the hillside allow for dedication of 60% of the site for the extension of Knox Mountain park to preserve the scenic beauty and natural character of the hillside, reducing its impact to the urban landscape.

Proposed Grading Limit
Proposed Foundation Wall
Proposed Retaining Wall
Strata Development Area
Strata Landscape Area
Strata Naturalized Area
Strata Lane & Driveway
Road Landscape

DEVELOPMENT YIELD

39%	Development Area CD29 Cara Glen Multi-Dwelling	*1.49 ha | 3.67 ac*
61%	Natural Area P3 Park and Open Space	*2.28 ha | 5.63 ac*

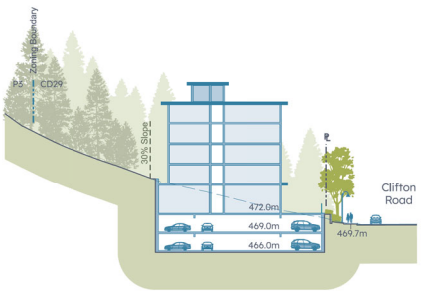
Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Hillside Retention

WORKING WITH THE LAND

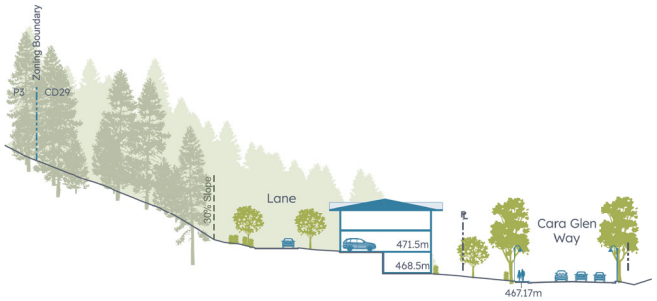
Recognizing and respecting the natural landscape and topography of the site, the neighbourhood design is guided by the following hillside retention directives:

- Minimize site regrading and landscape retaining walls through terracing buildings on the hillside and using basements with daylight walk-out and walk-up conditions;
- Mitigate the impacts to significant trees and vegetation that provide ecological and aesthetic benefits and improve slope stability, and;
- Utilize strata lanes for vehicle access, avoiding driveways and garage doors fronting on the public street.
- Limiting the development to areas with natural grades below 30%

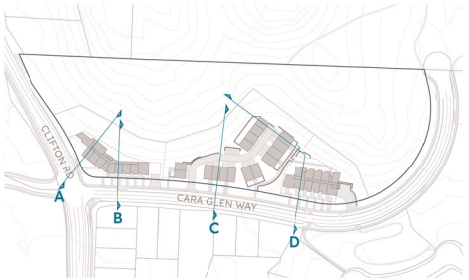


SECTION A | Corner Building

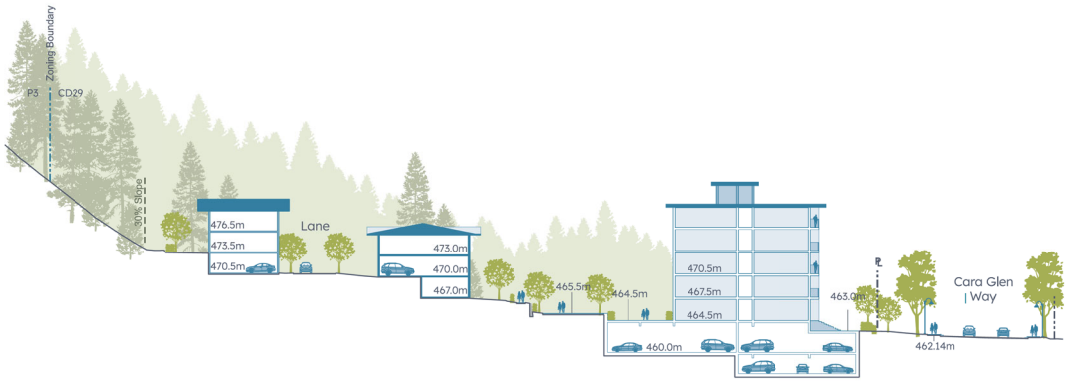
SECTION B | Corner Building



SECTION C | Townhomes



Key Plan



SECTION D | Townhomes + Apartment Building

Plans are conceptual only to support Rezoning and are subject to change through subdivision and permit process.

Project Datasheet

CARA GLEN PHASE 2 | FULL SITE

Building Type	Building Footprint (m^2)	Building Height (storeys)	Gross Floor Area (m^2)	Net Floor Area (m^2)
Apartment Mixed Use*	920	5	4,600	4,140
Townhome	1450	3	4,350	4,350
Apartment*	890	5	4,450	4,005
			TOTAL	**12,495**

** Gross Floor Area excludes parking, and storage and circulations located in the parking level.*
** Net Floor Area considers -10% for all the circulations and common areas above the parking level.*

FAR Calculations

Total Site Area (m^2)	Area Under 30% Slope* (m^2)	Max. Allowable Net Floor Area** (m^2)	Proposed Net Floor Area (m^2)
37,717	11,957	14,348	12,495
		FAR***	FAR
		1.2	1.0

** Includes all areas that have a slope below 30% across the entire site*
*** Only counts areas below 30% slope and a permitted FAR of 1.20*
**** Maximum allowable FAR is 1.2 per the OCP's Strategic Density Policy 5.1.3*
FAR over the entire site including 30% slopes is 0.3.

PROPOSED MIX

Townhome | Walk-out Large	6	Apartment	72
Townhome | Walk-out Mid	4	Apartment	13
Townhome | Walk-up Small	4	Apartment | TH Walk-out	9
Townhome | Duplex Compact	2	Commercial	4

CARA GLEN PHASE 2 | SUB-AREA A

Building Type	Building Footprint (m^2)	Building Height (storeys)	Gross Floor Area (m^2)	Net Floor Area (m^2)
Apartment Mixed Use*	920	5	4,600	4,140
			TOTAL	**4,140**

** Gross Floor Area excludes parking, and storage and circulations located in the parking level.*
** Net Floor Area considers -10% for all the circulations and common areas above the parking level.*

FAR Calculations

Total Site Area (m^2)	Area Under 30% Slope* (m^2)	Max. Allowable Net Floor Area** (m^2)	Proposed Net Floor Area (m^2)
4,128	2,174	4,456	4,140
		FAR***	FAR
		2.05	1.90

** Includes all areas that have a slope below 30% across the entire site*
*** Only counts areas below 30% slope and a permitted FAR of 2.05*
****CD29 max density is 2.05 FAR for Sub-Area A*

CARA GLEN PHASE 2 | SUB-AREA B

Building Type	Building Footprint (m^2)	Building Height (storeys)	Gross Floor Area (m^2)	Net Floor Area (m^2)
Townhome	1,450	3	4,350	4,350
			TOTAL	**4,350**

FAR Calculations

Total Site Area (m^2)	Area Under 30% Slope* (m^2)	Max. Allowable Net Floor Area** (m^2)	Proposed Net Floor Area (m^2)
7,487	4,943	4,943	4,350
		FAR***	FAR
		1.0	0.88

** Includes all areas that have a slope below 30% across the entire site*
*** Only counts areas below 30% slope and a permitted FAR of 2.05*
****CD29 max density is 1.0 FAR for Sub-Area B*

CARA GLEN PHASE 2 | SUB-AREA C

Building Type	Building Footprint (m^2)	Building Height (storeys)	Gross Floor Area (m^2)	Net Floor Area (m^2)
Apartment*	890	5	4,450	4,005
			TOTAL	**4,005**

** Gross Floor Area excludes parking, and storage and circulations located in the parking level.*
** Net Floor Area considers -10% for all the circulations and common areas above the parking level.*

FAR Calculations

Total Site Area (m^2)	Area Under 30% Slope* (m^2)	Max. Allowable Net Floor Area** (m^2)	Proposed Net Floor Area (m^2)
3,278	2,355	4,827	4,005
		FAR***	FAR
		2.05	1.70

** Includes all areas that have a slope below 30% across the entire site*
*** Only counts areas below 30% slope and a permitted FAR of 2.05*
****CD29 max density is 2.05 FAR for Sub-Area C*

APPENDIX

CD29 - Cara Glen Neighbourhood

Property Reports

Environmental Assessment (Ecoscape Environmental Consultants Ltd)

Geotechnical Investigation Report (Geopacific)

Wildfire Hazard Assessment

Archaeology Assessment

15.8 CD29 – Cara Glen Neighbourhood - DRAFT

Section 15.8.1 – Zone Purpose	
Zones	Purpose
CD29 – Cara Glen Multi-Dwelling	The purpose is to provide a mixed commercial and residential zone with townhomes, apartments, and mixed-use commercial with a sensitive transition in height and massing toward adjacent Core Area Neighbourhood properties.

Section 15.8.2 – Sub-Area Purposes		
Zones	Sub-Area	Purpose
CD29 – Cara Glen Multi-Dwelling	CD29 - A	Allows for apartments ranging up to 5 storeys with ground-level mixed-use commercial.
	CD29 - B	Allows for ground-oriented multiple housing (typically townhouse developments) up to 3 storeys.
	CD29 - C	Allows for apartments ranging up to 5 storeys.

Section 15.8.3 – CD29 Permitted Land Uses			
Uses	('P' Principal Use, 'S' Secondary Use, '-' Not Permitted)		
	CD29 - A	CD29 - B	CD29 - C
Accessory Buildings or Structures	S	S	S
Agriculture, Urban	S	S	S
Apartment Housing	P	-	P
Child Care Centre, Major	S	P	S
Child Care Centre, Minor	S	S	S
Cultural and Recreation Services	S .2	-	-
Duplex Housing	-	P	-
Emergency and Protective Services	P	-	-
Food Primary Establishment	S .2	-	-
Group Home	-	P .1	-
Health Services	S .2	-	-
Home-Based Business, Major	-	-	-
Home-Based Business, Minor	S	S	S
Professional Services	S .2	-	-
Participant Recreation Services, Indoor	S	-	-
Personal Service Establishments	S .2	-	-
Retail	S .2	-	-
Semi-Detached Housing	-	P	-
Single Detached Housing	-	P	-
Stacked Townhouses	P	P	P
Townhouses	P	P	P

Section 15.8.3 – CD29 Permitted Land Uses
FOOTNOTES (Section 15.8.3): .1 Group homes are only permitted within a single detached housing, semi-detached housing, or a duplex housing form. .2 These land uses are not permitted above the first storey.

Section 15.8.4 – CD29 Subdivision Regulations

m = metres / m^2 = square metres

		Sub-Zones		
		CD29 - A	CD29 - B	CD29 - C
Min. Lot Width	Regular Lots	30.0 m	20.0 m .1	30.0 m
	Corner Lots			
Min. Lot Area	Regular Lots	1,400 m^2	900 m^2 .1	1,400 m^2
	Corner Lots			
Min. Lot Depth		30.0 m	30.0 m .1	30.0 m

FOOTNOTES (Section 15.8.4):

.1 Townhouse developments may be subdivided into smaller lots than the regulations listed above provided the site is comprehensively developed under a single development permit and a party wall agreement is registered on title: the minimum lot area is 130 m^2, the minimum lot width is 8 m for corner lots, the minimum lot width is 7 m for all other lots, and the minimum building envelope area is 75 m^2.

Section 15.8.5 – CD29 Development Regulations

m = metres / m^2 = square metres

	Sub-Zones		
	CD29 - A	CD29 - B	CD29 - C
Max. Height Max. Density	Section 15.8.6 – Density and Height Development Regulations		
Max. Site Coverage of all Buildings	65%	55%	65%
Max. Site Coverage of all Buildings, Structures, and Impermeable Surfaces	85%	80%	85%
Min. Front Yard and Flanking Side Yard Setback for all portions of a building that are not Ground-Oriented including Accessory Buildings / Structures	4.5 m	3.0 m	4.5 m
Min. Front Yard and Flanking Side Yard Setback for Ground-Oriented, Residential	3.0 m .2	3.0 m .2	3.0 m .2
Min. Front Yard and Flanking Side Yard Setback for Ground-Oriented, Commercial	2.0 m	n/a	n/a
Min. Building Stepback from Front Yard and Flanking Side Yard	3.0 m .3	n/a	3.0 m .3

Section 15.8.5 – CD29 Development Regulations m = metres / m^2 = square metres			
	Sub-Zones		
	CD29 - A	CD29 - B	CD29 - C
Min. Side Yard Setback	3.0 m	3.0 m [.1]	3.0 m
Min. Rear Yard Setback	4.5 m	4.5 m	4.5 m
Min. Rear Yard Setback for Accessory Buildings / Structures	1.5 m	1.5 m	1.5 m
Min. Separation between Detached Principal Buildings	n/a	3.0 m	n/a
Min. Common and Private Amenity Space	7.5 m^2 per bachelor dwelling unit 15.0 m^2 per 1-bedroom dwelling unit 25 m^2 per dwelling unit with more than 1-bedroom [.4, .5]	6.0 m^2 per bachelor dwelling unit 10.0 m^2 per 1-bedroom dwelling unit 15 m^2 per dwelling unit with more than 1-bedroom [.4, .5]	7.5 m^2 per bachelor dwelling unit 15.0 m^2 per 1-bedroom dwelling unit 25 m^2 per dwelling unit with more than 1-bedroom [.4, .5]
Max. Building Frontage	A continuous building frontage shall not exceed 100 m in length. [.6 .7]		

FOOTNOTES (Section 15.8.6):

[.1] Side yards are not required for semi-detached housing or townhouses on a lot line that has a party wall agreement.

[.2] The minimum setback for ground-oriented residential units can be reduced to 2.0 metres if both criteria are met:

a) The maximum height of the first storey floor above the adjacent curb level for ground-oriented residential units are 1.2 m. See example diagram Figure 5.12.

b) The minimum net floor area for ground-oriented residential units on the first floor is 11 m^2. See example diagram Figure 5.13.

[.3] Minimum building stepbacks apply only to buildings 5 storeys and taller. The stepback can occur on any floor above the second storey.

[.4] Common and Private Amenity Space can be devoted to child care centres as long as the child care spaces have direct access to open space and play areas within the lot. The amount of Common and Private Amenity Space dedicated to child care spaces cannot be more than 50% of the total space required.

[.5] A minimum of 4.0 m2 per dwelling unit of the common and private amenity space shall be configured as common area that is accessible to all residents and must not be located within the required setback areas. Common amenity space is not required for fee simple townhouses.

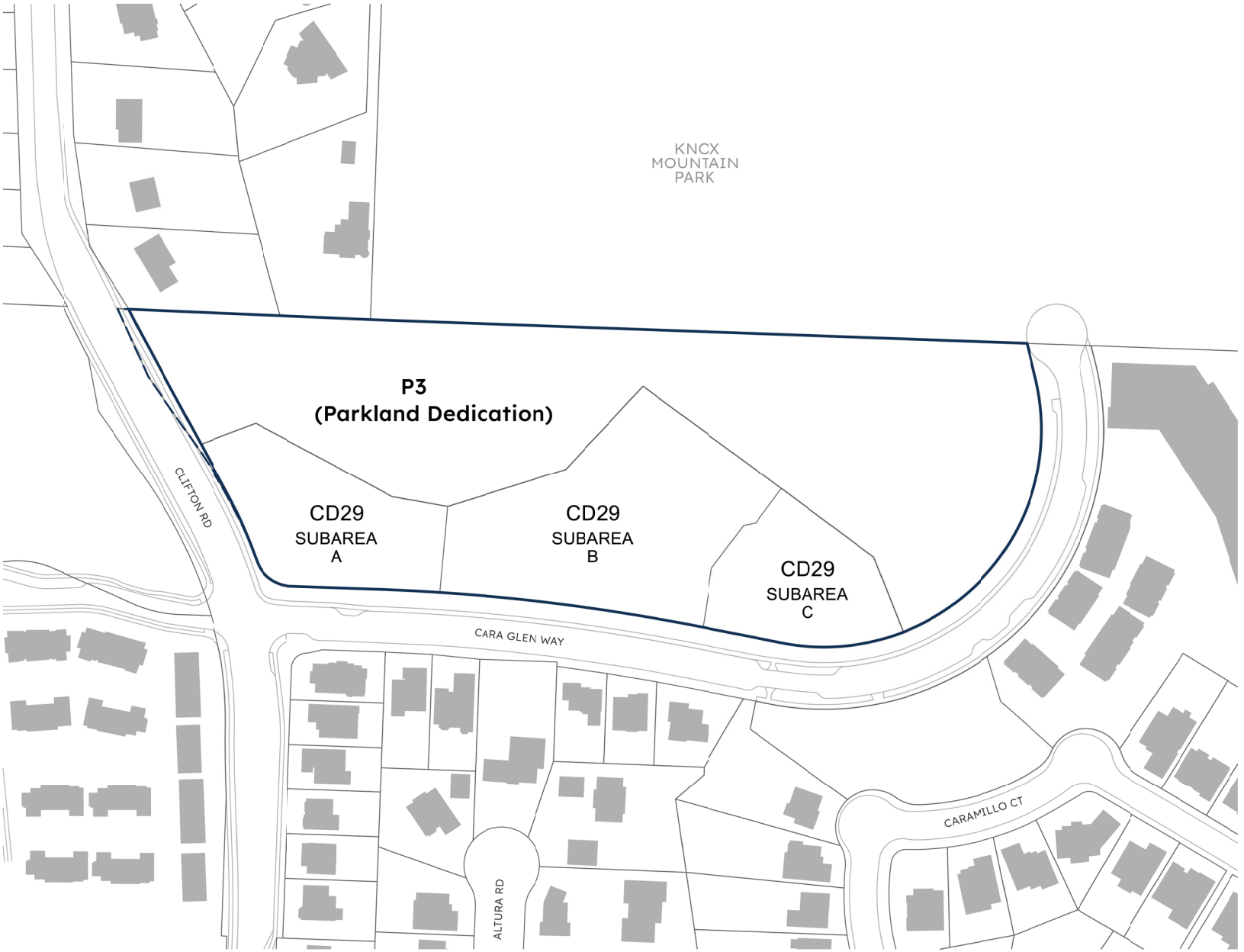
[.6] On the first floor, parkade exposure may be up to 25% of the building frontage.

[.7] Building frontage along Cara Glen Way requires all ground-level units to have front door access to the street to ensure a sensitive transition of height and massing to the neighbouring single-family zoning.

Section 15.8.6 – CD29 –Density and Height Development Regulations m = metres / m^2 = square metres / FAR = floor area ratio / GFA = gross floor area				
		Sub-Zones		
		CD29 - A	CD29 - B	CD29 - C
Max. Density		2.05 FAR .2	1.0 FAR .2	2.05 FAR .2
Max. Height		20.0 m & 5 storeys .1	11.0 m & 3 storeys .3	20.0 m & 5 storeys .1
Max. Height for Buildings with Walkout Basements	Front or Flanking Building Elevation	n/a	9.0 m & 3 storeys	n/a
	Rear Building Elevation		12.6 m & 3 storeys	
FOOTNOTES (Section 15.8.6): .1 If a parkade entrance / exit has a lower finished grade than the surrounding area then this portion of the parkade can be excluded from height calculations.				

CARA GLEN
KELOWNA BC

PROPOSED ZONING + SUBDIVION PLAN



LEGEND — JULY 2024

- Site Boundary | Propcsed — *3.74 ha / 9.24 ac*
- Legal Property Line
- 5m Contour
- Road Dedication Boundary | Proposed
- Zoning + Subdivision Boundary | Proposed

PROPOSED ZONING + SUBDIVISION

- CD29 | Cara Glen Multi-Dwelling — *1.49 ha / 3.67 ac*
  - CD29 - A — *0.41 ha | 1.01 ac*
  - CD29 - B — *0.75 ha | 1.85 ac*
  - CD29 - C — *0.33 ha | 0.81 ac*
- P3 | Park and Open Space — *2.25 ha / 5.57 ac*

SCALE 1:1500

0 15 30 45 60 75m

placemark
DESIGN + DEVELOPMENT

City of Kelowna

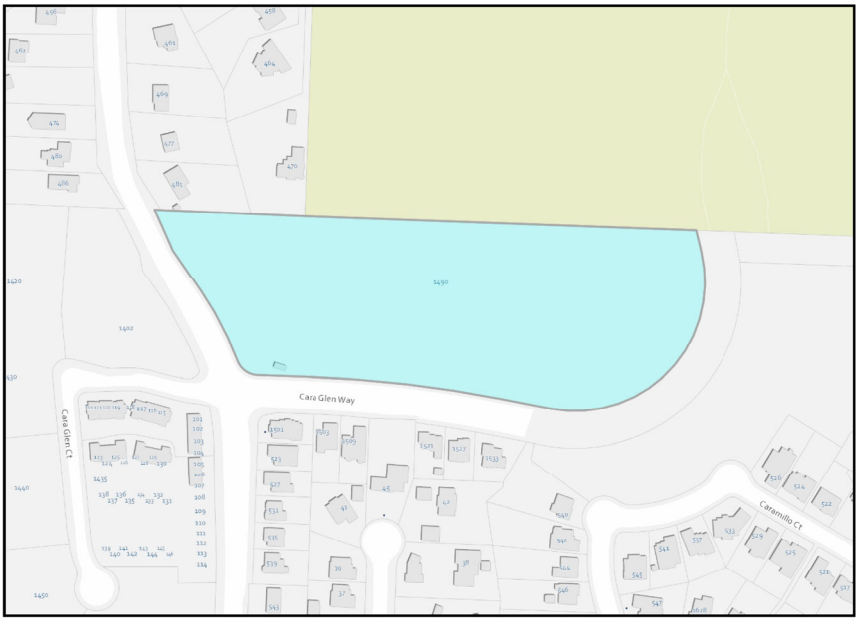
City of Kelowna

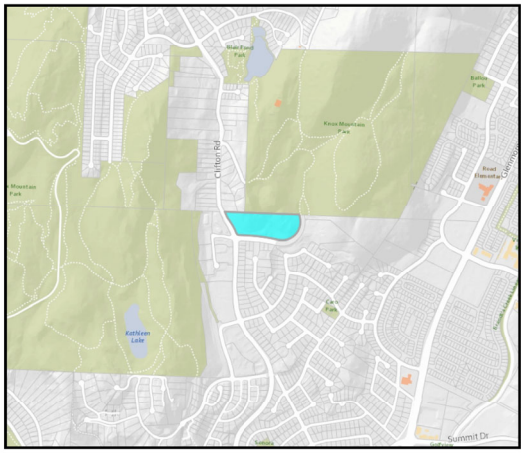
1435 Water St
Kelowna, BC
V1Y 1J4

Property Report

Produced by the City of Kelowna

Report Produced on: Mar 10, 2022





Property highlighted in blue

Property Information

Property Address: 1490 Cara Glen Way **Property Type:** P - Typical Property

KID: 411203 **Plan #:** KAP53293 **Lot#:** L **Block:**

Extra Legal Information:

PLAN KAP53293 LOT L SECTION 32 TOWNSHIP 26

BC Assessment Information

Roll Number:	6496371	**Jurisdiction:**	217
Net Land Value:	$715,100	**PID:**	018-979-289
Net Impr. Value:	$0	**Lot Size:**	9.315
Net Total Value:	$715,100	**Lot Size Unit:**	Acres

Actual Use: 070 2 Acres Or More (Outbuilding)

Land Use Related Information

Zoning Code:	A1	**Inside ALR:**	No
OCP2040 FutureLandUse:	C-NHD	**Water Provider:**	CITY
Land Use Contract:	No		

GEOPACIFIC

250.762.8073
geopacific.ca
1340 St. Paul Street
Kelowna, BC V1Y 2E1

Cara Glen JV
200 – 5716 1st Street SE
Calgary, AB
T2H 1H8

March 13, 2024
File: 20461
REV: 3

Attention: Josh Grenon

Re: Preliminary Geotechnical Investigation Report – Mixed-Use Development
1490 Cara Glen Way, Kelowna, B.C.

1.0 INTRODUCTION

We understand that Cara Glen JV proposes to develop a residential development at the above referenced site. Based on the proposed development and grading plans provided by Placemark Design Studio Inc., dated February 2024, we understand that the southern 40% of the lot will consist of a mixed-use development, and the northern 60% of the lot will consist of a rural residential park dedication. The proposed development will include a multi-use complex at the south-west end of the site, an apartment complex at the south-east end of the site and townhomes dispersed throughout the centre of the site with new roads and services. We anticipate that the townhouse buildings would consist of up to 3 storeys constructed into the existing slopes with the potential for one level basements below grade. We anticipate wood framed construction above grade and reinforced concrete construction for the footings and below grade portions. We anticipate that the apartment buildings would be up to 5 storeys tall and are proposed to be founded over one to three stories of below grade parkade constructed into the slope. We expect reinforced concrete construction for the first 1 to 3 levels and wood frame construction for the levels above. We further understand that the development will require some re-grading of the existing topography to achieve the proposed design grades with cut and fill slopes and wall/reinforced slope systems.

This report provides the results of our field investigation and makes preliminary geotechnical recommendations for the design and construction of the proposed development. This report was prepared exclusively for Cara Glen JV, for their use and the use of others on their development team and the City of Kelowna for use in the development and permitting process, but it remains the property of GeoPacific Consultants Ltd.

2.0 SITE DESCRIPTION

2.1 Location

The property is approximately 9.3 acres in total size and situated at the north and east side of Cara Glen Way in the Glenmore area of Kelowna. The legal lot address is KID 411203 – Plan KAP53293 – Lot L – Section 32 – Township 26. The property is bounded by Cara Glen Way to the south and east, Knox Mountain Park and residential property to the north, and Clifton Road to the west. The area is presently covered with grasses, brush, and isolated trees.

The location of the site relative to existing properties is shown in Drawing No. 20461-01, following the text of this report. The proposed zoning plan provided by Placemark Design Studio Inc., dated February 2024, is presented at the end of the report in Appendix E.

2.2 Sources of Information

The following sources of information were used to prepare this report.

- Aerial photos and property lines from the City of Kelowna GIS site.
- Historical aerial photos from the Regional District of Central Okanagan GIS site (1951, 1959, 1973, 1984, 1995).
- Historical aerial photos from the City of Kelowna GIS site (2000 to 2022).
- Digital elevation models from the 2018-2019 lidar survey for the Okanagan Water Basin Board.
- Lidar point cloud data from the 2018-2019 lidar survey for the Okanagan Water Basin Board.
- Surficial geology map. Paradis, S J. Surficial geology, Kelowna, British Columbia. Geological Survey of Canada, Open File 6146, 2009.
- Bedrock geology map. Okulitch A.V. (comp.) 2013. Geology, Okanagan Watershed, British Columbia; Geological Survey of Canada, Open File 6839, scale 1:100 000.
- Augered boreholes completed on December 19, 2021.
- Test pits excavated on August 4, 2022.
- A site review performed on August 4, 2022.
- Laboratory testing on collected soil samples.

2.3 Topography

The property is located directly south of Knox Mountain Park on moderate to steep slopes trending downwards to the south. The highest elevation is at the northern property line at approximately 519 m geodetic. The lowest elevation is along Cara Glen Way at 460 m.

Some steep slopes and cliff features exist in the centre of the site, directly north of Cara Glen Way. The higher elevations are along the north end of the lot, which slope downwards to the south at a gradient of approximately 1.5H:1V to 2.0H:1V. A cut-and-fill slope has been previously created adjacent to the south property line, and historical excavation work by others into the hillside has left steep slopes with angles of 37° to 39°. A small cut into rock forms the west side of Cara Glen Way as the road goes around a corner and heads north to the Knox Mountain Park boundary.

2.4 Historical Aerial Photos

An aerial photo from 1951 shows a road at the current location of Clifton Road with some logging activity northwest of the site. Small trails through the forest were likely also present in the Cara Glen Way area. By 1959 orchards had been established west of Clifton Road and the forest cover around Cara Glen Way appeared thinned out. The 1973 air photo shows a residential development south of Cara Glen and new roads to the north. In addition, further trail development and disturbance occur at the eastern side of the site. The 1984 air photo shows that earthworks for the houses immediately to the south of Cara Glen Way were underway and a cut for where Cara Glen Way would eventually occur was present. By 1995, additional earthworks had occurred along Cara Glen Way, including the corner and northern uphill road extension. Paving of the western part of Cara Glen Way had also occurred. Many piles of soil appeared along the Cara Glen Way right-of-way in 2012. A series of ramps, jumps, and trails for mountain bikes gradually appeared on the site over the past decade.

3.0 FIELD INVESTIGATION

3.1 2021 Investigation

GeoPacific conducted a subsurface investigation on December 19, 2021, using a track-mounted drill rig supplied and operated by OnTrack Drilling of Langley, B.C. During that time, 11 test holes supplemented with DCPT were completed to depths of up to 6.7 metres below existing grades. The test holes were distributed across the subject site situated north and east of Cara Glen Way (TH21-09 to -11), as well as along the parcel located southeast of Cara Glen Way and north of Caramillo Court (TH21-01 to -08). The test holes were logged and sampled in the field by a geologist from our office. The logs of the test holes specific to the subject site are presented in Appendix A. The approximate test hole locations are shown in Drawing No. 20461-01.

3.2 2022 Investigation

An additional site investigation was completed on August 4, 2022, using the subcontracted services of FirstTracks Excavation of Kelowna, BC. The site investigation focused on the subject lot and consisted of 7 test pits advanced to depths of 4.0 m below existing grades. The soils were logged by a representative of GeoPacific, and samples were collected for laboratory analysis. The test pit logs are presented in Appendix A.

3.3 Site Reconnaissance

On August 4, 2022, a site reconnaissance of the lot was performed. The purpose was to conduct an assessment of potential slope instabilities and any associated geohazards surrounding the proposed development.

Our findings from the site reconnaissance are displayed in Appendix B, which includes photos taken on-site and profiles of the topography generated using Global Mapper.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Profile

The general surficial geology of the region under investigation, according to the Geological Survey of Canada open file map 6416, is described as "Continuous Till Cover" comprising lodgement and ablation facies and "Littoral, Sublittoral Sediments" comprising sand, silt clayey silt.

In general, the soil profile noted from the surface downwards at our test holes consists of isolated fill and topsoil, overlying silty sand and gravel and glacial till to the full depth of our investigation. Some discrete layers of silt were noted at the south and east end of the property.

TOPSOIL/FILL

Most test holes and pits initially encountered a layer of loose topsoil to a depth of 0.15 to 0.9 m below existing grades.

Some silty fill was encountered along the cut and fill bench located on the south-west portion of the lot. A stockpile of fill has been placed on the cut and fill bench. Test pit TP22-05 was completed at the top of this stockpile, which encountered compact/firm sandy silt fill extending from the surface to the maximum depths reached with the excavator of 2.7 m below existing grades. Additional areas of sandy silt fill were noted at test pit locations TP22-06, -07, -08, and -09, which we believe are associated with the previous cut and fill slopes. The silty fill noted in these areas was encountered from the surface down to the maximum test pit depths (3.0 m).

SAND and GRAVEL

The topsoil/fill is generally underlain by a sequence of compact to dense sand to sand and gravel at most test hole and test pit locations, where the bottom of the encountered silty fill is reached. The sand and gravel was generally encountered at 0.3 to 2.4 m below existing site grades, specifically at test pits TH21-09 to -11 and test pits TP22-01 to -04. The sand and gravel is generally brown-grey and slightly moist with subrounded gravels and varying silt contents from trace to silty. DCPT blow counts for the sand and gravel are between 10 and greater than 50, indicating compact to very dense relative density.

The sand and gravel sequence is encountered underlying the silty fill at test pit TP22-06 at a depth of 0.9 m to refusal at 1.8 m below existing grades. The silty fill noted above was encountered to the maximum test pit depths of 3.0 m below existing grades at test pits TP22-07, -08, and -09. A sandy silt and sand layer is encountered underlying the silty fill at the far west end of the site at test pit TP22-09. The sandy silt is firm and the sand is fine to medium-grained and compact.

SAND and GRAVEL (TILL)

Underlying the sand and gravel is very dense silty sand to sand and gravel till. The silty sand to sand and gravel till caused refusal for all test hole augers, excavator buckets, and DCPT's where encountered. The silty sand to sand and gravel till is encountered at various depths depending on elevation, and is generally encountered at shallow depths between 1.6 to 2.5 m below existing grades. The till-like soils extend beyond the depths encountered in our investigation.

Bedrock was not encountered in the test holes, though bedrock outcrops and cliff features are noted north of Cara Glen Way in the centre of the property.

For a more detailed description of the subsurface conditions, refer to the test hole logs in Appendix A.

4.2 Bedrock Geology

The bedrock at the site has been mapped as a volcanic rock (Nimpit Lake Member) consisting of trachyte and trachyandesite. No faults have been mapped near the site. Our experience with volcanic rock from the Nimpit Lake Member suggests this rock can weather and degrade relatively quickly after exposure. Steep cuts in this rock will tend to generate many small rockfalls. Natural rock bluffs are also a source of rockfalls.

4.3 Groundwater Conditions

No groundwater seepage was encountered in our test pits in the silt or till. The static groundwater table is expected to be relatively deep and well below the development grades of the site. The formation of perched groundwater should be expected during the wetter months of the year in any permeable soils overlying natural deposits containing high fines content.

5.0 GEOHAZARD ASSESSMENT

Based on our site reconnaissance, review of historical air photos, and DEM interpretation, there is no visual evidence for landslides in or near the lot. Geohazards such as debris flows and large-scale erosion are considered unlikely. Small surficial slumps in the soil could occur when glacially derived soils overly the bedrock on slopes steeper than ~20° to 30° become over-saturated during periods of extended precipitation.

Two potential geohazards are present: runoff erosion and rockfalls. Channelized runoff and soil erosion could occur during intense rainfall events within two small north-to-south trending ravines. One of these small ravines runs through the middle of the subject lot, and the other ravine follows the northern extension of Cara Glen Way and access trails. The blue lines in Figure 2B indicate the water drainage paths that could cause erosion during intense rainfall. The 2017 air photo shows evidence of overland flow along the Cara Glen Way right-of-way and possible soil erosion along the road/trails heading uphill to the north. The surficial runoff must be handled by civil designed stormwater systems as the development proceeds.

The hillside has natural slopes with angles ranging from 29° to 38° (Figures 3B & 4B) and a few steep bedrock bluff outcrops. Our experience with volcanic rock from the Nimpit Lake Member suggests this rock can weather and degrade relatively quickly after exposure. Steep cuts in this rock will tend to generate many small rockfalls, and the natural rock bluffs are also a source of rockfalls. Since the rock tends to weather relatively quickly, natural rock bluffs are unlikely to generate large-size rockfalls.

Where loose rocks are present in isolated steep areas, they can create rockfall hazards that can result in a rock rolling down the slope. Figure 2B shows some possible source locations for rockfalls, and Figures 5B to 8B show photos of a few of these locations. These consist of either small bedrock outcrops or individual rocks exposed in the colluvium in the over-steepened crest areas of the old cuts into the hillside. The rockfall hazards are limited in area and are typically associated with relatively small rocks (<0.25 m). Portions of the proposed development will lie within a rockfall hazard zone. Rockfall mitigation measures are outlined in Section 7.12.

6.0 DISCUSSION

6.1 General Comments

As noted in Section 1.0 above, the southern 40% of the lot is proposed to consist of a mixed-use development, and the northern 60% of the lot is proposed to consist of a rural residential park dedication. The proposed development will include a multi-use complex at the south-west end of the site, an apartment complex at the south-east end of the site and townhomes dispersed through the middle with new roads and services. We anticipate that the townhouse buildings would consist of up to 3 storeys constructed into the existing slopes with the potential for one level basements below grade. We anticipate that the apartment buildings would be up to 5 storeys tall and are proposed to be founded over one to three stories of below grade parkade constructed into the slope. We understand that the development will require some re-grading of the existing topography to achieve the proposed design grades with cut and fill slopes and wall/reinforced slope systems.

Although structural loading has not been provided at the time of this report, based on our experience with similar sized developments, we anticipate column loads to range between 200 to 600 kN for the townhouses and 800 to 3,000 kN for the mixed-use/apartment buildings.

The existing fills encountered at the south end of the site are consistent and generally compact. Further review of the fills will be required prior to recommending improvements of the in-situ soils, depending on the grading of the site.

We expect that conventional spread and strip footings can support the contemplated structures. We anticipate that the footings will be founded on natural *sand and gravel, very dense glacial till, sound bedrock, or engineered fill.*

We anticipate that some regrading of the property will be completed to accommodate the development. We anticipate that the development will require retaining walls or reinforced slope systems to retain cut and fill slopes required by the site's topography.

Some of the underlying natural soils may be reused, subject to our comments in Section 7.16. The existing layers containing deleterious soils must be stripped from the site before the placement of any new fills or the construction of any roads, utilities, buildings, and retaining walls.

We understand that the seismic portion of the British Columbia Building Code (BCBC) are proposed to be adopted in March 2025, and that seismic design is to proceed in accordance with the 2018 BCBC/2015 NBCC. Thus, the subsurface soils are not considered prone to liquefaction or ground softening under the design earthquake defined under the 2018 BCBC.

Final grading plans should be provided to GeoPacific well before construction to provide further recommendations for the design and construction of the proposed development, if necessary.

From a geotechnical standpoint, we confirm that the proposed development is feasible, provided that the recommendations outlined in Section 6 are incorporated into the overall design.

6.2 Slope Stability

As part of our investigation, a general site reconnaissance was performed to determine the site's suitability for development with respect to slope stability. As described in Section 2.0, the site has moderate to steep slopes at a 3.0H:1V to 1.5H:1V gradient, with much gentler slopes at the middle portion. The topography of the site has some steep slopes and cliff features in the centre of the site, directly north of Cara Glen Way. Higher elevations exist along the north end and slope downwards to the south at a gradient of approximately 1.5H:1V to 2.0H:1V. A west-to-east cut and fill slope has been created inside the southern property line.

The site is generally covered with moderate vegetation consisting of mature trees, shrubs and grasses. Existing single-family homes occupy properties to the south at lower elevations, and there is only one house to the north, above the proposed development. At the time of reconnaissance, no signs of slope instability were noted, such as tension cracks about the crest of slopes, sloughing, seepage, etc.

The development site and region were reviewed using publicly available lidar point cloud data provided by the Province of British Columbia, with processing and analysis performed with the commercially available software, Global Mapper. Slope stability modeling was performed with GeoStudio 2021 Slope/W based on the proposed grades in the preliminary plan provided by Protech Consulting.

The "Professional Practice Guidelines: Landslide Assessments in BC" (Revised March 2023) guideline requires that all new development be assessed for the potential of a landslide occurring in the area and that the risk must be below the jurisdictional requirements established by the governing body approving the development. Our slope stability assessment for determining suitability of the development was undertaken in accordance with the 2024 BCBC and the 2018 BCBC for seismic requirements. The 2475-year return period (2%/50 years) earthquake peak acceleration value of 0.07g, as determined by BCBC 2018, was used in the seismic analysis.

The slope stability model analyses returned a calculated Factors of Safety against deep seated global stability failure impacting the development site, originating on or off site, of greater than 1.5 and 1.0 for static and seismic conditions, respectively. The results of our slope analysis are presented in Appendix C and the location of the slope section is shown in our Drawing No. 20461-02, following the text of this report.

Based on the results of our investigation, topography, site reconnaissance, assessment of the existing bedrock conditions, and slope stability analysis, the possibility of deep-seated slope movements involving sliding through bedrock is relatively remote under both static and seismic conditions. Some shallow surficial slope movements within the soils mantling the rock can be expected over time. Future slope maintenance may be required through regrading and the re-establishment of vegetation.

GeoPacific has considered temperature and precipitation fluctuations with respect to climate change using the Coupled Model Intercomparison Project (CMIP) Phase 5 global climate models, publicly accessible through the Pacific Climate Impacts Consortium (PCIC) database portal. Based on the Canadian Centre for Climate Modelling and Analysis (CanESM2) general circulation model, considering a worst-case end-of century emission scenario (RCP8.5, 2070-2099), the general region of the site will experience 5.3°C in average annual temperature increase and a 0.08 mm/day increase in precipitation. We do not expect these changes would meaningfully affect the static or seismic slope stability impacting the development, as the site is not sensitive to temperature or precipitation changes, and is not meaningfully influenced by changing groundwater elevations, from a geotechnical perspective.

GeoPacific completed a cursory visual review of the adjacent properties and confirmed the proposed development would have no slope stability-related impacts on the adjoining properties based on the anticipated development and provided that our recommendations are followed. GeoPacific accepts no responsibility for slope stability-related impacts on the development property due to activities conducted on adjoining lands. It is the responsibility of neighbouring landowners to maintain their slopes.

It is expected that an adequate factor of safety for slope stability can be achieved after regrading as well, provided that the recommendations stated herein are adhered to during the design process and that our recommendations are followed during construction. We have included the EGBC Landslide Assessment Assurance Statement in Appendix D. Final grading plans must be provided to GeoPacific prior to Building Permit phase to confirm the above analysis.

7.0 RECOMMENDATIONS

7.1 Site Preparation

7.1.1 Site Stripping and Grading

Before the construction of foundations, retaining walls, utilities, grade-supported slabs, and pavement structures, all vegetation, fills, topsoil, soils containing organics, and loose or otherwise disturbed materials should be removed to expose a subgrade of *compact sand and gravel or very dense glacial till.*

Stripping should extend out beyond the building envelope and roads at a distance equal to the thickness of the proposed engineered fill beneath the footings. For example, if 1 metre of engineered fill will underlie a footing then stripping should extend a minimum distance of 1 metre beyond the outer edge of that footing. Stripping is not required in landscaped areas unless the landscape area lies near a footing.

Should grade reinstatement be required, we recommend the use of engineered fill. "Engineered fill" is defined as clean sand to sand and gravel containing silt and clay less than 5% by weight, placed in 300 mm loose lifts, and compacted to a minimum of 95% Modified Proctor maximum dry density at a moisture content that is within 2% of optimum for compaction. During fill placement, benches should be cut into any sloping, stripped subgrade surfaces greater than 20% to key the structural fill into the natural topography. Benches should be a minimum horizontal distance of 1.0 metre before stepping to the next bench.

If a building foundation straddles either the natural overburden or structural fill and the bedrock, then we recommend that the bedrock surface be over-excavated to a minimum of 0.3 m below the foundation elevation and compacted structural fill be placed over the bedrock surface. This will reduce the risk of differential settlement of the foundation.

Stripped subgrades and engineered fill materials and compaction must be reviewed by the geotechnical engineer.

7.1.2 Blasting

We anticipate rock cuts may be required to achieve the final design site grades and we understand blasting may be used to achieve the grades. We recommend that a blasting contractor with extensive experience in blasting in urban neighbourhoods be contracted to complete the work. The blasting contractor should adhere to the principles of the Best Practices Guide for the blasting industry as well as the applicable Bylaws for Kelowna. In order to protect against damage to neighbouring properties, we recommend that the blasting contractor carry out pre-blast surveys of homes near the project. The blasting contractor will determine the exact radius. In addition, we also recommend that the blasting be monitored to record peak particle velocity. Peak particle velocities and frequencies should be kept below the limits established for the project and should be communicated from the blaster to the developer.

7.2 Foundations

Footings on competent *compact sand and gravel or engineered fill* can be designed on the basis of a serviceability limit state (SLS) bearing pressure of 150 kPa for strip or pad footings. Footings on *very dense glacial till or bedrock* can be designed based on an SLS bearing pressure of 250 kPa. Factored ultimate limit state (ULS) bearing pressures may be taken as 1.5 x the SLS bearing pressure provided above.

Settlements will not exceed 25 mm total and 2 mm per metre differential for foundations designed as recommended.

We recommend that all foundations be placed on either undisturbed natural soil, sound bedrock, or engineered structural fill (i.e., avoid cut/fill transition pads or footings half on bedrock and half on natural soil or fill).

Irrespective of the allowable bearing pressures given, pad footings should not be less than 600 mm by 600 mm, and strip footings should not be less than 450 mm in width. Footings should also be buried a minimum of 600 mm below the surface for frost protection.

Adjacent footings should achieve a maximum elevation difference equal to half of their horizontal distance to avoid superimposing the upper foundation loading to the lower foundation. Any footings, either strip or column footings, constructed within a 3.0 metre proximity to the crest of a fill or soil slope should maintain a horizontal distance of 3.0 metres from the face of the slope. This may require that the elevation of the footings be lowered to achieve the 3.0 metre requirement. Footings constructed on bedrock should be offset a minimum of 1.5 metres laterally from the face of the bedrock slope.

Foundation subgrades must be reviewed by the geotechnical engineer prior to footing construction.

7.3 Seismic Design of Foundations

As mentioned in Section 6.1, we understand that the seismic portion of the British Columbia Building Code (BCBC) are proposed to be adopted in March 2025. Thus we have considered the 2018 BCBC design earthquake with a 2% probability of exceedance over a 50-year period which equates to a return period of 1 in 2475 years. Accordingly, we have considered an earthquake having a peak horizontal ground acceleration of 0.07g for this site (Ref. National Resources Canada, Site Coordinates: 49.910 deg. North, 119.462 deg. West).

This site qualifies as "Site Class C" as defined in Table 4.1.8.4.A of the 2018 BCBC.

7.4 Slab-On-Grade Floors

Floor slabs should be underlain by a minimum of 150 mm of a free-draining granular material, such as 19 mm clear crushed gravel (drain rock), compacted to a minimum of 95% Modified Proctor maximum dry density at a moisture content that is within 2% of optimum for compaction. General grade reinstatement or backfill beneath slab-on-grade areas should be done with engineered fill, as described in Section 6.1. The under-slab fill should be hydraulically connected to the perimeter drainage system to facilitate the removal of any water that accumulates under the slab.

Compaction of the slab-on-grade fill must be reviewed by the geotechnical engineer.

7.5 Radon

We recommend that site preparation for the floor slabs include a rough-in for a subfloor depressurization system to protect from soil gas ingress (radon) unless the associated testing is provided and indicates a radon abatement system is not required. Should radon testing not be completed or an abatement system is required, the abatement system is described in detail in Section 9.13.4. of the 2024 BCBC. Accordingly, the 150 mm thick layer of underslab fill required per Section 7.4 of this report can be utilized as a part of the abatement system, and access through the slab should be provided to allow for depressurization for all contiguous areas.

A vapour barrier should be placed between the granular fill and the concrete slab to inhibit the migration of moisture and gas through the slab.

7.6 Foundation Drainage

A perimeter drainage system will be required for below-grade structures (basements/crawlspaces) to prevent the development of water pressure on foundation walls and basement floor slabs. Foundation drainage is not required for any geotechnical purposes if the site is graded away from the buildings at a slope of at least 2% and the slab is at least 150 mm above exterior grades. Surface water should be directed to catch basins and lawn basins directed to the site stormwater system. If these requirements cannot be met then perimeter drainage should be installed.

Where the slab is constructed below existing grades, we recommend that the mechanical designer include a perimeter drainage system as well as under slab drainage to control water pressures. We recommend that a perforated, 100 mm diameter, PVC pipe be used as a perimeter drain (i.e. not Big-O pipe). The PVC pipe should be covered in 25 mm – 50 mm diameter rounded drain rock, and the drain rock should extend a minimum of 0.3 m above the perimeter drain pipe. The drain rock should be wrapped in filter cloth. The remainder of the backfill can be any inorganic, clean, well graded, granular sand and gravel material, with no more than 5% passing the #200 sieve.

7.7 On-Site Drainage

Based on the subsurface conditions, discharging roof leaders and perimeter drainage into rock pits is feasible, provided the rock pits are excavated to a depth to drain into permeable sand to sand and gravel with trace to some silt below the basement elevations.

The infiltration facilities should be provided with an overflow, such that should the facility become overwhelmed, it will prevent backup of the drainage system. This can be achieved using an overflow to the storm system or lawn basin placed over the rock pit, with a rim elevation below the basement slab elevation. We expect that it will not be possible to provide overflows for flatter lots. Where overflows are not possible, the rock pit should be designed such that it can be inspected and maintained over time to prevent backup of the system. This can be achieved either with the use of an infiltration chamber or rock pit, outfitted with a vertical riser pipe.

All infiltration galleries/pit or rock pits must be reviewed by the geotechnical engineer prior and during construction.

7.8 Stormwater Management

Based on our site reconnaissance and our air photo and DEM interpretations, channelized surficial runoff could occur during intense rainfall events within two small north-to-south trending valleys. One of these small draws runs through the middle of the subject lot, and the other draw follows the northern extension of Cara Glen Way and access trails.

The civil designer must consider any surficial runoff from the draw catchment areas.

7.9 Lateral Pressures on Foundation Walls

Earth pressures on foundation walls depend on a number of factors including wall rigidity, backfill material and required degree of compaction, any surcharge loads, backfill slope, the drainage conditions and method and sequence of construction.

The foundation wall is expected to be partially yielding and fully restrained between the parking floor and backfilled with a free draining granular soil. The partial yielding of the wall causes a dilation of the retained soil, which in turn decreases the lateral stress against the foundation wall. The full development of the active condition is expected within the retained soil and can be assumed under these conditions.

Static: 5.0H kPa triangular soil pressure where H is the total height of the wall in metres.

Seismic: 0.5H kPa inverted triangular soil pressure where H is the total height of the wall in metres. Seismic loads should be added to the static loads.

Any additional surcharge loads located near the foundation walls should be added to the earth pressures given. The provided loads are calculated based on unfactored soil parameters. Therefore, the loads should be assumed to be unfactored as well.

7.10 Temporary Excavations & Shoring

We expect that temporary excavations could be up to 12 m in depth and sloped where possible since it is more economical to do so. We would expect that slopes cut to a 1H:1V (1 horizontal to 1 vertical) can be constructed in the existing surficial *topsoil, fill, silty sand to sand and gravel and firm to stiff silt,* while 3H:4V may be constructed in the *very dense glacial till*. Flatter cut slopes may be required in any soft silts or soils with active seepage.

Alternatively, to limit the amount of soil removal and lower the earth pressures on the proposed foundation walls, an anchored shoring wall could be considered. The shoring wall would use conventional shotcrete and anchors for permanent or temporary excavation support. GeoPacific can provide a detailed shoring design once final design drawings are available.

It should be appreciated that temporary cut slopes are only suitable when located a safe distance away from existing structures and/or utilities. Any excavations extending below a 2H:1V projection taken from the base of any adjacent footings or the crown of any pipes should be reviewed by GeoPacific prior to execution on site.

Light to moderate seepage should be expected during the wetter months due to the formation of perched water tables in the surficial fills. We envisage that perched groundwater inflows can generally be controlled with conventional sumps and sump pumps within the surficial soil profile.

Temporary cut slopes in excess of 1.2 m in height must be covered in poly sheeting and require inspection by a professional engineer in accordance with Work Safe B.C. guidelines prior to worker entry.

7.11 Permanent Cut and Fill Slopes

7.11.1 Rock Cuts

Rock cuts on private property pose a risk to all future occupants of the home and neighbouring properties. The rockfall risk must be evaluated at the time of development, and appropriate measures must be taken to reduce the risks to appropriate levels. Such measures may include the inclusion of catchment ditches, the application of a rockfall mesh, such as Deltax from Geobrugg, over the exposed rock face, or the construction of a barrier, such as a chain link fence, limiting access to the rockfall zone and containing rockfall events. Rockfall protection may require a covenant in order that all future property owners are made aware of their obligations.

In general, rock cuts should be designed and constructed with a 0.25H:1V slope where no unfavourable geological structures compromise the slope stability. After each rock cut is exposed by drilling and blasting, evaluate the potential for structurally-controlled failure mechanisms that might require timely installation of rock support.

We recommend that any trees growing along the rock face or within 3 m of the crest of the rock cut shall be removed. The rock cuts shall be visually monitored and maintained by removing trees on an ongoing basis. Future slope maintenance may be required through regrading and the re-establishment of vegetation.

GeoPacific must review all rock cuts on-site during excavation and site grading.

7.11.2 Soil Cuts and Fill Slopes

We recommend that permanent cut slopes in the natural compact silty sand and gravel or glacial till be inclined no steeper than 2(H):1(V).

We recommend that any permanent fill slopes constructed with compacted blast rock be inclined no steeper than 1.75(H):1(V). Should the natural silty sand and gravel material be used to construct the fill embankments, then the slope should be inclined at 2(H):1(V) and compacted to a minimum 100% of Standard Proctor maximum dry density. All fill slopes should be overbuilt during construction and trimmed to grade after fill placement is complete to ensure adequate compaction of the face of the fill slope. Final grading plans must be provided to GeoPacific for our review and comments.
We recommend that both cut and fill slopes are vegetated as soon as possible to minimize the risk of surface erosion.

GeoPacific must review all soil cuts and fill slopes on-site during excavation and site grading.

7.12 Rockfall Mitigation

Portions of the proposed development will likely be within a rockfall shadow hazard zone and thus could be exposed to rockfall hazards. The rockfall hazard is relatively low given the expected small size for rockfalls. The planned extension of the Cara Glen Way runs beside a small rock cut that can also create rockfalls.

The bedrock on-site typically consists of weathered and fractured volcanic rock. Rock ravelling and rockfalls are expected from rock cuts and natural rock bluffs because of weathering (freeze-thaw cycles) and other disturbances. A range of techniques can be used to manage the rockfall risk at this site, as listed below.

- Locate roads beside rock cuts and talus slopes and buildings away from cuts and talus.
- Remove loose rock (manual scaling) from a few rock outcrops indicated in Figure 2B before development activities begin.
- Locate parking areas away from the base of rock cuts and talus slopes. Field evidence indicates that occasional small rocks have rolled or bounced at least 3 m beyond the talus toe.
- Install fences to keep people from the rockfall hazard zone along the base of talus slopes and rock cuts.
- Upgrade the fence to capture and retain small rockfalls, for example, near the talus toe.

The selection of the appropriate rockfall mitigation techniques requires a site-specific analysis by a geotechnical engineer and careful and coordinated site grading plans.

Rocks are unlikely to travel beyond the rockfall shadow zone defined by a 27° line protected downward from the top of a talus slope. The rockfall shadow zone limit should be indicated on site grading plans.

A rockfall catchment area should be constructed between a rock face and the road curb, buildings, or other structures planned as part of the development. For rock cuts, a setback from the curb is recommended with a shallow ditch. The required catchment width increases as the cut height increases and can be determined as final site grading plans are developed using Figure 1 below. The 'ditch' in the catchment should be inclined 4H:1V from the road curb to the base of the cut. If sidewalks are planned between the road and the rock cut, the catchment width shall apply to the sidewalk edge closest to the rock cut instead of the road curb.

Over time rock cuts will weather and degrade and will likely create rockfalls. Debris is expected to accumulate in the rockfall catchment area. The rockfall catchment areas must be maintained. Ongoing maintenance of the rock cuts should include removing the accumulated rockfall debris in the catchment area on an as-needed basis. Scaling may be required as part of the maintenance program and should be evaluated by a geotechnical engineer in the event of significant changes to the condition of the rock face.

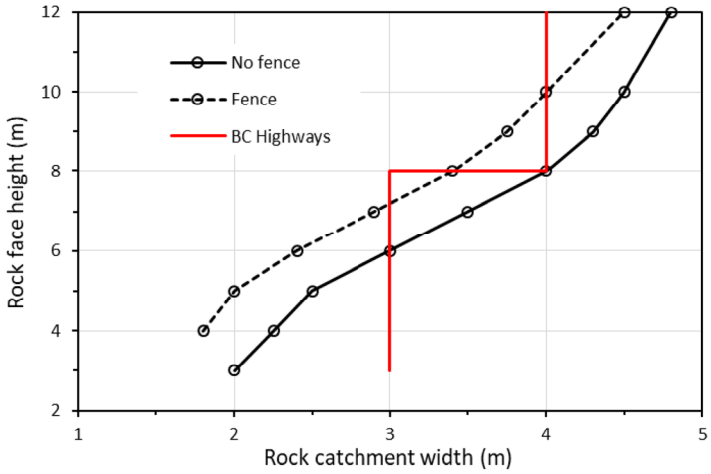


Figure 1: Recommended rockfall catchment width at the base of unprotected rock cuts (0.25H:1V slope); adding a chainlink fence along the edge of the catchment can reduce the width by approximately 0.5 m. Adding a wire mesh drapery can also reduce the catchment width.

7.13 Retaining Walls

We understand that retaining walls will be required throughout the site to achieve final grades. We anticipate that retaining structures utilizing Mechanically Stabilized Earth (MSE) Walls and other retaining structures like Soil Nail Walls with tie-backs will be required for permanent retention. The MSE retaining wall should be founded on a level base course of crushed sand and gravel, a minimum of 0.15 metres thick, and compacted to a minimum of 95% of Modified Proctor maximum dry density, placed over a subgrade, reviewed and approved by GeoPacific. Drainage is critical to the function of a segmental block retaining wall. We recommend that a fully functioning curtain drain of drain rock, a minimum of 0.3 metres thick, be placed immediately behind the facing block. Any seepage collected in the curtain drain should be collected in a drainage system placed at the base of the wall. The drainage system should consist of a 100 mm perforated PVC pipe at the base of the wall, with a curtain drain of drain rock 0.3 metres wide at the back of the wall.

Typically, MSE segmental block wall designs using Facing Block units, such as ValleyStone or Redi-Rock Block have geogrid spaced vertically every 0.4 to 0.6 metres. Fill placed behind the wall should be compacted to a minimum of 95% of Modified Proctor maximum dry density to within 1 metre of the back of wall. Smaller compaction equipment may be required within 1.0 metre of the back of the wall to avoid wall deformation during compaction. The fill should be placed in lifts equal to the height of the block used (typically 0.2 metres). The fill should be tested at each layer of geogrid placed. Should the wall design use Lock Blocks, then the lift thickness should be a maximum of 0.3 metres, and the compaction of the fill should be confirmed with in-situ density tests for every row of block placed. The design of underground utilities should consider the extent of geogrid required for the wall in order that the utilities do not interfere with the grids once in place.

GeoPacific to provide detailed MSE wall designs under a separate cover at the client's request.

7.14 New Pavement Structures

Following the recommended site preparations described above, it is our opinion that the minimum asphalt pavement structure provided in Table 1 below will satisfactorily support light residential vehicles.

Table 1: Recommended Minimum Pavement Structure for New On-site Drive Aisles and Parking

Material	Thickness (mm)	CBR
Asphaltic Concrete	75	N/A
19 mm minus crushed gravel base course	100	80
75 mm minus, well-graded, clean, sand and gravel subbase course	300	20

The asphalt thickness may be reduced to 65 mm in areas occupied by cars and light trucks only.

All base and subbase fills should be compacted to a minimum of 95% Modified Proctor dry density with a moisture content that is within 2% of optimum for compaction. Density testing should be conducted on the base and subbase materials to confirm that they have been compacted to the required standard. The density testing results should be forwarded to the geotechnical engineer for review.

Thickening of the subbase course may be required for pavement structures on the south side, depending on the grading of the site. GeoPacific must be provided with the grading plan well in advance of construction to confirm.

7.15 Utilities

Utilities are expected to be underlain by the stripped subgrade soils as described in Section 6.1 or engineered fill which will provide satisfactory foundation support. For utilities bedded on these materials, settlements are anticipated to be negligible. Heavier groundwater seepage during and following wetter periods may need to be controlled using sumps and large pumps.

We recommend that any trenches be sloped or shored as per the latest Work Safe BC regulations. We recommend that all service trenches be backfilled with clean granular material, which conforms to municipal standards, compacted to 95% "Modified Proctor" dry density (ASTM D1557), with a moisture content within 2% of optimum for compaction.

7.16 Reuse of Existing Soils

The natural silt and sand, sand and gravel, and glacial till deposits may be used as structural fill. However, the silt and glacial till will be moisture sensitive due to the higher fines contents. If these higher-fines soils are overly moist, they will not compact to the required standard. Use of these materials is typically restricted to the warmer and dryer periods of the year.

If soils are to be stockpiled for later use, all topsoil must be removed from under the stockpiles, and any higher fines soils must be completely covered in tarps or poly sheeting. Surficial runoff must also be directed away from the stockpiles. Despite these measures, some moisture ingress into the soil is not uncommon during high humidity conditions, and thus some degradation of the surficial material of the stockpiles is possible.
The compaction requirements outlined Section 7.1.1 are also applicable to these materials.

Blast rock may also be used as engineered fill. However, blast rock should have a maximum particle size of 0.2 m and be free of deleterious soils. Due to the coarse nature of blast rock, in situ density tests cannot be carried out. We, therefore, recommend that the compaction of the blast rock be confirmed by GeoPacific by reviewing field compaction methods and proof rolling lifts of fill with large construction equipment on a regular basis during fill placement.

8.0 DESIGN AND CONSTRUCTION REVIEWS

As required for Municipal "Letters of Assurance", GeoPacific Consultants Ltd. will conduct sufficient field reviews during construction to ensure that the geotechnical design recommendations within this report have been adequately communicated to the design team and to the contractors implementing the design. These field reviews are not carried out for the benefit of the contractors and therefore do not alter the contractors' obligations to perform under the terms of their contract.

It is the contractors' responsibility to advise GeoPacific Consultants Ltd. (a minimum of 48 hours in advance) that a field review is required. Field reviews are normally required at the time of the following activities:

1. Stripping – Review of stripping depth and subgrade
2. Subgrade – Review of subgrade soils prior to foundation construction
3. Excavation/Shoring – Review of slope cuts and excavations greater than 1.2 m deep requiring worker entry
4. Densification – Review of densification work
5. Slab-on-Grade – Review of slab-on-grade subgrade and fill material
6. Engineered Fill – Review of fill material and compaction
7. Pavement Structures – Review of pavement subgrade, sub-base and base materials and compaction.

It is critical that these reviews are carried out to ensure that our intentions have been adequately communicated. It is also critical that contractors working on the site view this document in advance of any work being carried out so that they become familiar with the sensitive aspects of the works proposed.

It is the responsibility of the developer to notify GeoPacific Consultants Ltd. when conditions or situations not outlined within this document are encountered.

9.0 CLOSURE

We are pleased to assist you with this project, and we trust this information is helpful and sufficient for your purposes at this time. However, please do not hesitate to call the undersigned if you should require any clarification or additional details.

For:
GeoPacific Consultants Ltd.

Reviewed by:

Connor Griffin, B.Sc., GIT
Project Geologist

Roberto Avendano, B.Eng., P.Eng.
Principal

LEGEND:

TH#-# – TEST HOLE (TH) LOCATION

TP#-# – TEST PIT (TP) LOCATION

SITE PLAN

*TEST LOCATIONS ARE APPROXIMATE

REFERENCE:
CITY OF KELOWNA GIS

1340 St. Paul Street
Kelowna, B.C. V1Y 2E1

P 250.762.8073

DATE: 04-AUG-2022		
DRAWN BY: CG	APPROVED BY: RA	REVIEWED BY: CG
SCALE: NTS		

MIXED-USE DEVELOPMENT

1490 CARA GLEN WAY, KELOWNA, BC

TEST HOLE SITE PLAN

FILE NO.: 20461

DWG. NO.: 20461-01

REVISIONS:
A.
B.
C.

ORIGINAL PAPER SIZE 8.5"x11"

APPENDIX A – TEST HOLE LOGS

Test Hole Log: TH21-09

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 20 40 60 80	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Topsoil	0.0				
		Sand and Gravel compact-dense silty SAND and GRAVEL, subangular cobbles, brown, slightly moist	0.3	7.2	10, 8, 32, 34, 58, >100		
		Sand and Gravel [TILL] very dense silty SAND and GRAVEL till, fine grained, brown, slightly moist	1.8 2.1				DCPT refusal @ 1.8 m Auger refusal @ 2.1 m
		End of Borehole					No groundwater encountered

Logged: CG
Method: Solid Stem Auger
Date: 12-19-2021

Datum: Ground Elevation
Figure Number: A.09

Test Hole Log: TH21-10

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)
0 / 0		Ground Surface	
		Topsoil	0.0
2 / 0.6		***Sand and Gravel*** compact-dense silty SAND and GRAVEL, subangular cobbles, brown, slightly moist	0.6
8 / 2.4		***Sand and Gravel [TILL]*** very dense silty SAND and GRAVEL till, fine grained, brown, slightly moist	2.4 2.7
		End of Borehole	

Moisture Content (%): 11.4; 7.6

DCPT (blows per foot) 20 40 60 80

Depth (m)	Blows per foot
0.0	5
0.3	7
0.6	14
0.9	24
1.2	37
1.5	37
1.8	47
2.1	62
2.4	>100

Groundwater / Well

Remarks
Auger and DCPT refusal @ 2.7 m
No groundwater encountered

Logged: CG
Method: Solid Stem Auger
Date: 12-19-2021

Datum: Ground Elevation
Figure Number: A.10

Test Hole Log: TH21-11

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)
0 / 0		Ground Surface	
0 / 0		***Topsoil***	0.0
2 / 0.6		***Sand and Gravel*** compact-dense silty SAND and GRAVEL, subangular cobbles, brown, slightly moist	0.6
6 / 1.8		***Sand and Gravel [TILL]*** very dense silty SAND and GRAVEL till, fine grained, brown, slightly moist	1.8
7 / 2.1		End of Borehole	2.1

Moisture Content (%)

DCPT (blows per foot)

Depth (m)	DCPT (blows per foot)
0	6
0.3	8
0.6	15
1.0	38
1.2	32
1.6	65
2.1	>100

Groundwater / Well

Remarks

Auger and DCPT refusal @ 2.1 m

No groundwater encountered

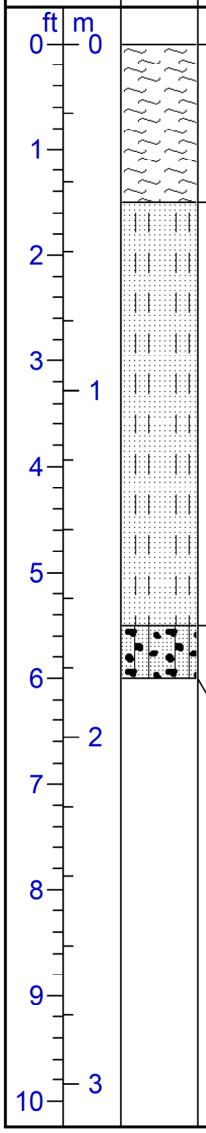
Logged: CG
Method: Solid Stem Auger
Date: 12-19-2021

Datum: Ground Elevation
Figure Number: A.11
Page: 1 of 1

Test Pit Log: TP22-01

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1



INFERRED PROFILE				Moisture Content (%)	Groundwater	Remarks
Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)			
0 / 0		Ground Surface				
0 – 1.5		***Topsoil*** loose TOPSOIL, some roots and organics, black, dry	1.5			
1.5 – 5.5		***Sand*** compact silty-gravelly SAND, fine grained, brown-grey, slightly moist	5.5			
5.5 – 6.0		***Sand and Gravel*** very dense silty SAND and GRAVEL Till, some cobbles, brown-grey, moist	6.0			Excavator refusal @ 1.8 m due to dense gravel and cobbles
6 / 2		End of Test Pit				

Logged: CG
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.01

Test Pit Log: TP22-02

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil loose TOPSOIL, some roots and organics, black, dry	1.0			
		Sand and Gravel compact SAND and GRAVEL, some cobbles, brown, dry	5.0			
		Sand and Gravel very dense silty SAND and GRAVEL Till, some boulders or bedrock, brown, dry	6.0			
		End of Test Pit				Excavator refusal @ 1.8 m due to boulders or bedrock

Logged: CG
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.02

Test Pit Log: TP22-03

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

INFERRED PROFILE

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
0	0		Ground Surface				
0	0		***Topsoil*** loose TOPSOIL, some roots and organics, black, dry	0.5			
1			***Sand and Gravel*** compact-dense silty SAND and GRAVEL, some cobbles, brown, slightly moist				
3	1						
6	2						
8				8.0			
8			***Sand and Gravel*** dense SAND and GRAVEL (till like), some boulders (volcanic rocks), brown, moist	9.0			
9			End of Test Pit				
10	3						

Logged: CG
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.03

Test Pit Log: TP22-04

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
			INFERRED PROFILE				
0	0		Ground Surface				
			Topsoil loose TOPSOIL, some roots and organics, black, dry	1.0			
1			***Sand and Gravel*** compact silty SAND and GRAVEL, brown-grey, dry				
3	1		some cobbles and boulders @ 1.5 m				
				8.5			
9			***Sand and Gravel*** very dense SAND and GRAVEL (till like), brown, slightly moist	9.0			
10	3		End of Test Pit				

Logged: CG
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.04

Test Pit Log: TP22-05

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
0		***Topsoil*** loose TOPSOIL, some roots and organics, black, dry	0.5			
1		***Silt [FILL]*** stiff sandy SILT Fill, some gravel, trace organics, slightly moist				
2						
3 / 1						
4						
5						
6 / 2						
7						
8						
9			9.0			
10 / 3		End of Test Pit				

Logged: KM
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.05

Test Pit Log: TP22-06

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Silt [FILL] firm cobbly SILT Fill, some sand and gravel, trace boulders, beige, dry	3.0			
3 / 1		***Sand and Gravel*** compact SAND and GRAVEL, some silt and cobbles, trace boulders, brown-tan, slightly moist some roots and organics, from 0.9 m - 1.5 m dense after 1.5 m	6.0			
6 / 2		End of Test Pit				Excavator refusal @ 1.8 m due to dense Sand and Gravel
10 / 3						

Logged: KM
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.06

Test Pit Log: TP22-07

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
			INFERRED PROFILE				
0	0		Ground Surface				
0	0		***Topsoil*** loose TOPSOIL, some roots and organics, reddish brown, dry	3.0			
3	1		***Silt [FILL]*** stiff-firm sandy SILT Fill, some clay, gravel and cobbles, olive grey, slightly moist	10.0			
10	3		End of Test Pit				

Logged: KM
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.07

Test Pit Log: TP22-08

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil loose TOPSOIL, some silt, roots and organics, beige-black, dry	0.5			
1		***Silt [FILL]*** stiff-firm sandy SILT Fill, some roots and cobbles, beige, dry some garbage @ 0.6 m				
2						
3 / 1		cobbles and gravel after 1.2 m				
4						
5						
6 / 2		very stiff, soft siltstone after 2.0 m				
7			7.5			
8		End of Test Pit				Excavator refusal @ 2.3 m due to dense material
9						
10 / 3						

Logged: KM
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.08

Test Pit Log: TP22-09

File: 20461
Project: Mixed-Use Development
Client: Cara Glen JV
Site Location: 1490 Cara Glen Way, Kelowna, BC

GEOPACIFIC CONSULTANTS
1340 St. Paul Street, Kelowna, BC, V1Y 2E1

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (ft)	Moisture Content (%)	Groundwater	Remarks
			INFERRED PROFILE				
0	0		Ground Surface				
			Topsoil loose TOPSOIL, some silt, roots and organics, beige-black, dry	0.5			
1			***Sand [FILL]*** compact silty SAND Fill, some roots, garbage and cobbles, beige-tan, dry	2.0			
2			***Silt*** stiff sandy SILT, some cobbles, beige, dry				
3	1						
4							
5							
6	2		volcanic cobbles after 2.1 m				
7			lens of silty sand @ 2.3 m				
8				8.0			
			Sand compact SAND, fine-medium grained, beige-grey, slightly moist				
9				9.5			
10	3		End of Test Pit				
11							

Logged: KM
Method: Excavator
Date: 04-Aug-2022

Datum: Ground Elevation
Figure Number: A.09

APPENDIX B – SITE RECONNAISSANCE PHOTOS AND PROFILES

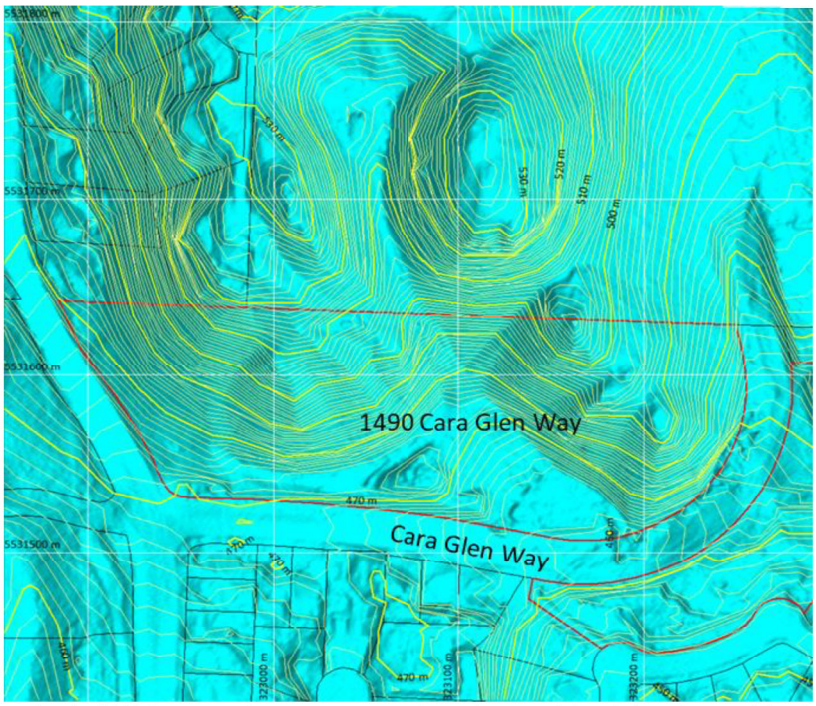


Figure 1B. Shade hillslope and contour map (1 m intervals) of the site and lot boundaries.

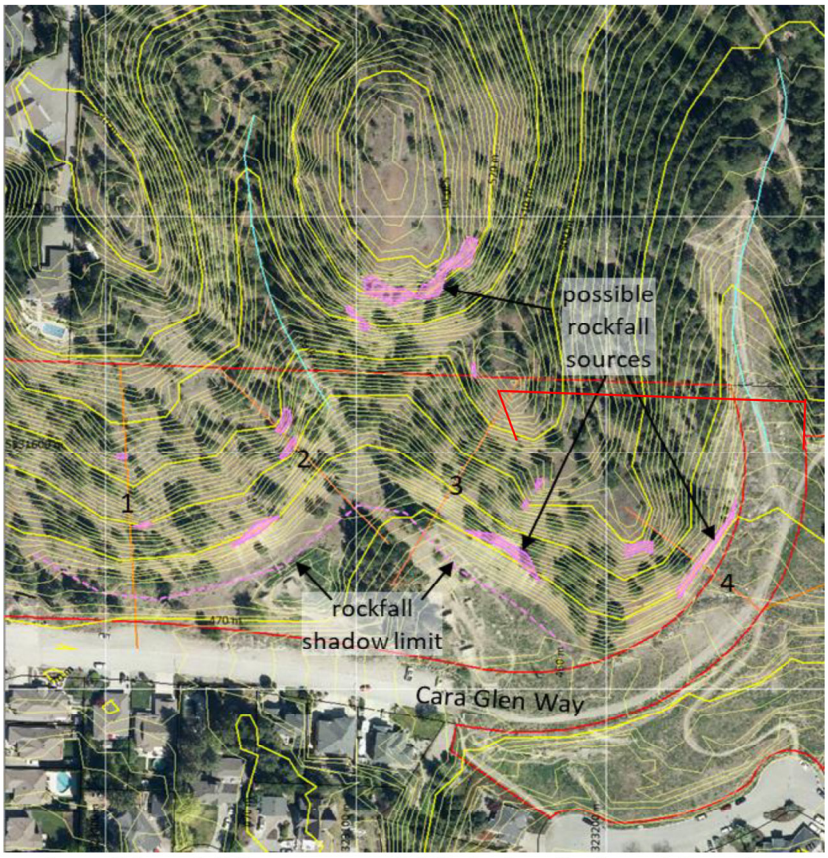


Figure 2B. Locations of possible rockfall sources, rockfall shadow limit, and four slope profile locations.

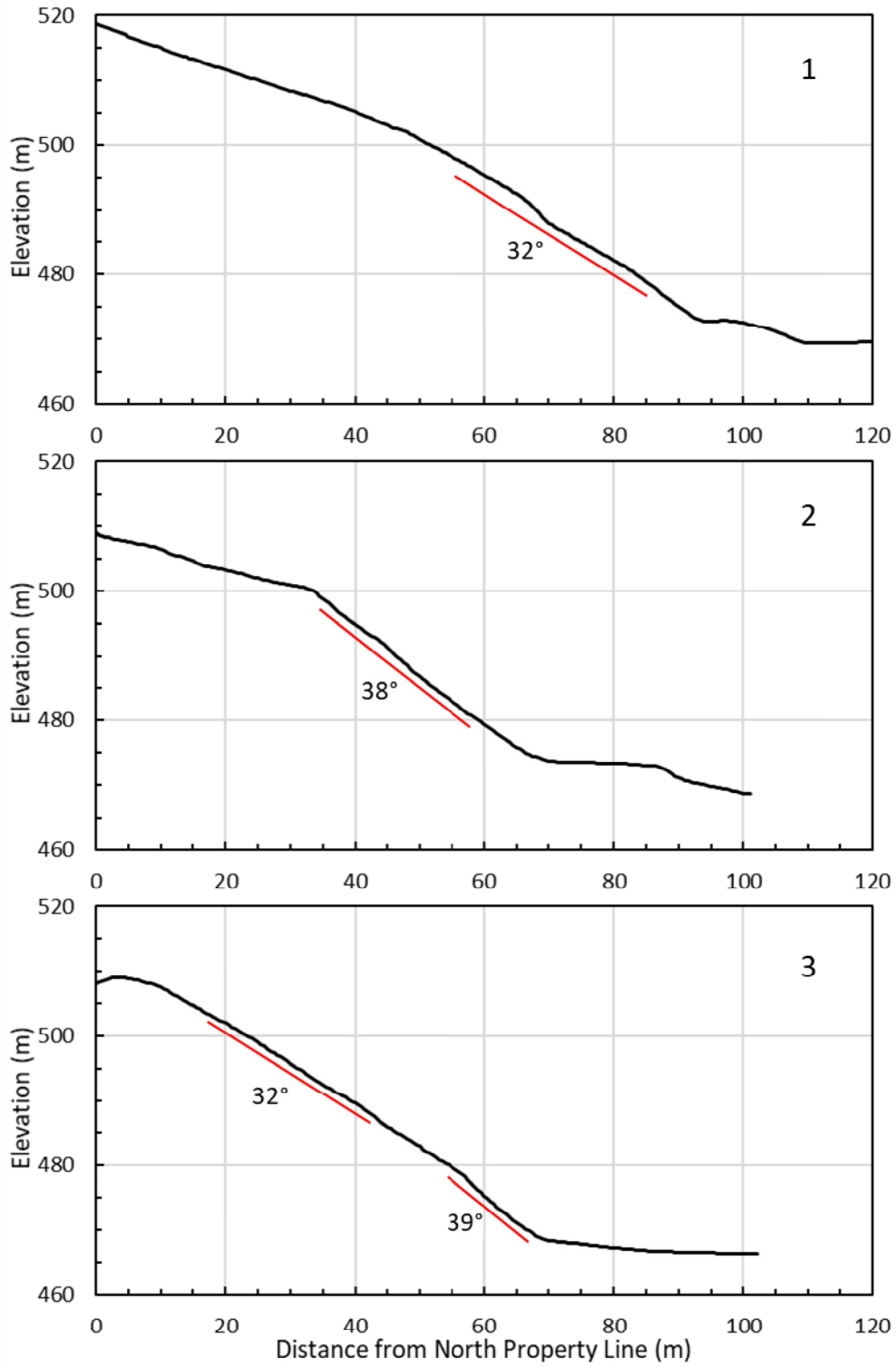


Figure 3B. Three profiles at the steep slope sections north of Cara Glen Way.

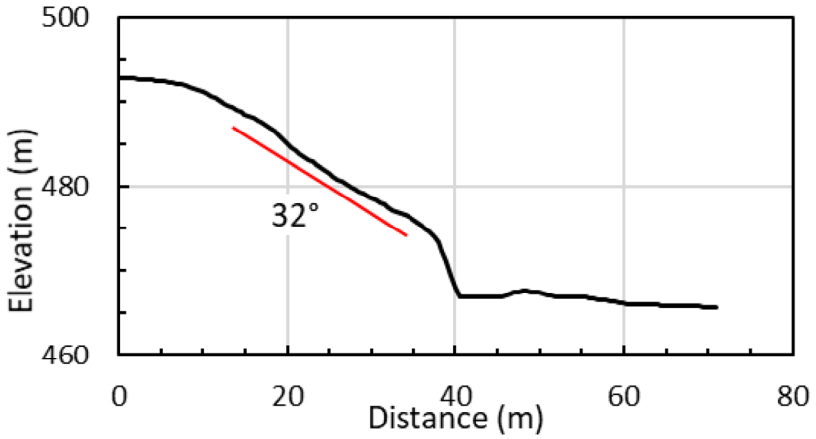


Figure 4B. Slope profile #4 at the rock cut west of the northern extension of Cara Glen Way.

Figure 5B. Loose rock near the centre of 1490 Cara Glen Way.

Figure 6B. Talus below small rock bluffs north of 1490 Cara Glen Way.

Figure 7B. Loose rock near the eastern side of 1490 Cara Glen Way.

Figure 8B. Old rock cut at the eastern side of 1490 Cara Glen Way.

APPENDIX C – SLOPE STABILITY ANALYSIS

LEGEND:

Slope Stability Section

SITE PLAN

*TEST LOCATIONS ARE APPROXIMATE

REFERENCE:

ORIGINAL PAPER SIZE 8.5"x11"

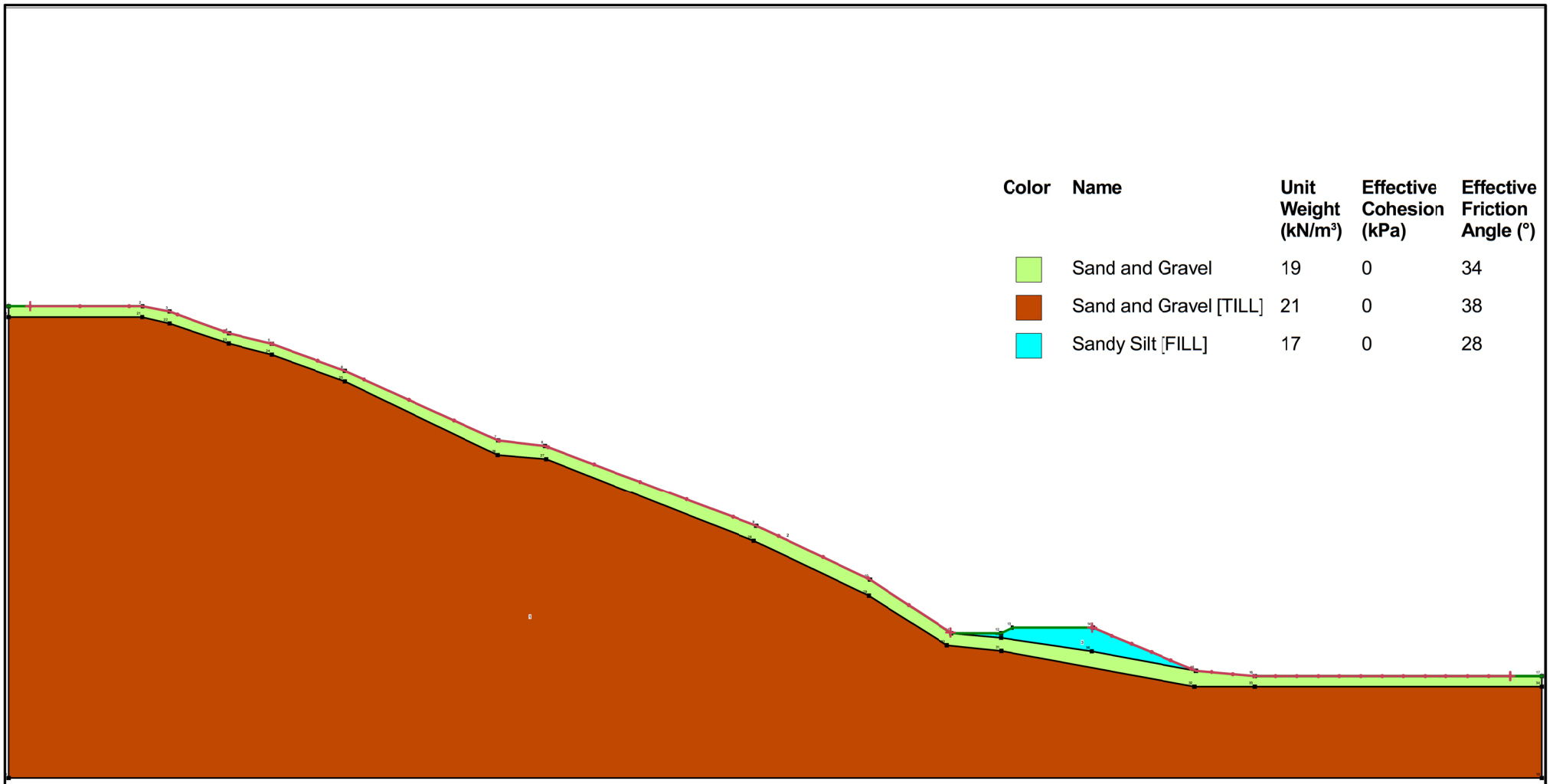
GEOPACIFIC CONSULTANTS
1340 St. Paul Street,
Kelowna, B.C. V1Y 2E1
P 250.762.8073

DATE:	28-FEB-2024	
DRAWN BY: CG	APPROVED BY: RA	REVIEWED BY: CG
SCALE:	NTS	

SLOPE STABILITY
1490 CARA GLEN WAY, KELOWNA, BC
SLOPE STABILITY SECTION SITE PLAN

FILE NO.: 20461
DWG. NO.: 20461-02

REVISIONS:
A.
B.
C.

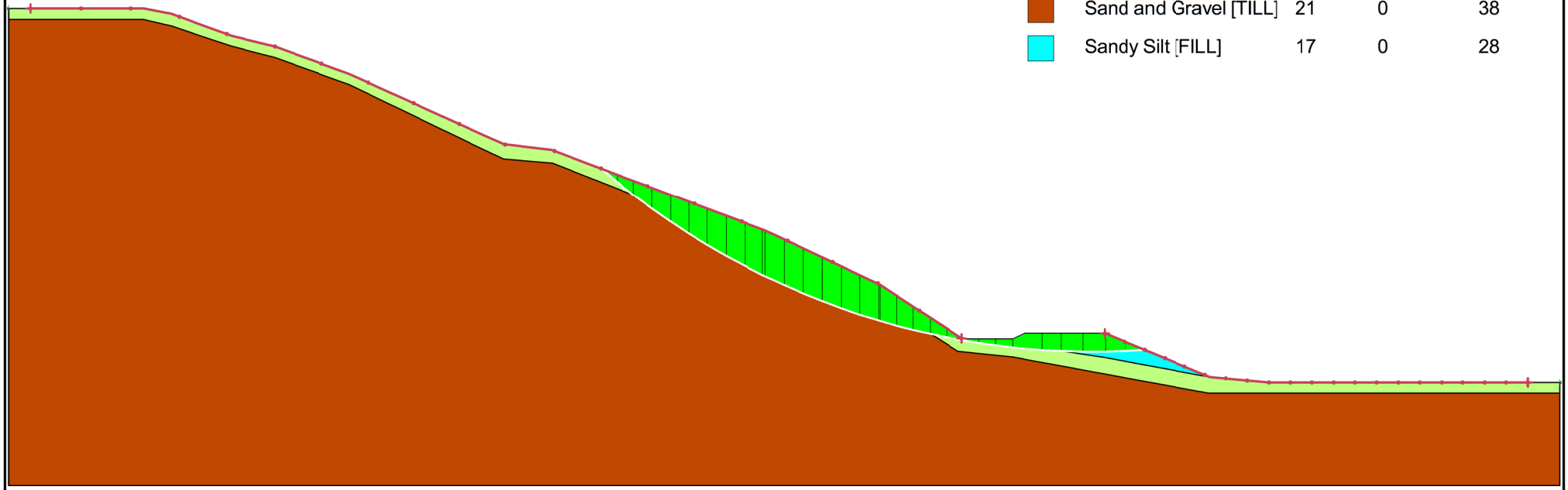


Project: Mixed-Use Development		**Job No.: 20461**
Model: 20461 - Slope Stability Section - Siteplan		Date: February 28, 2024
Method: Morgenstern-Price	Horz Seismic Coef.:	Scale : 1:700
Address: 1490 Cara Glen Way, Kelowna, BC		Analysis by: CG

GEOPACIFIC CONSULTANTS
250.762.3073
1340 St. Paul Street
Kelowna, BC V1Y 2E1

FS: 1.986

Color	Name	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Sand and Gravel	19	0	34
	Sand and Gravel [TILL]	21	0	38
	Sandy Silt [FILL]	17	0	28

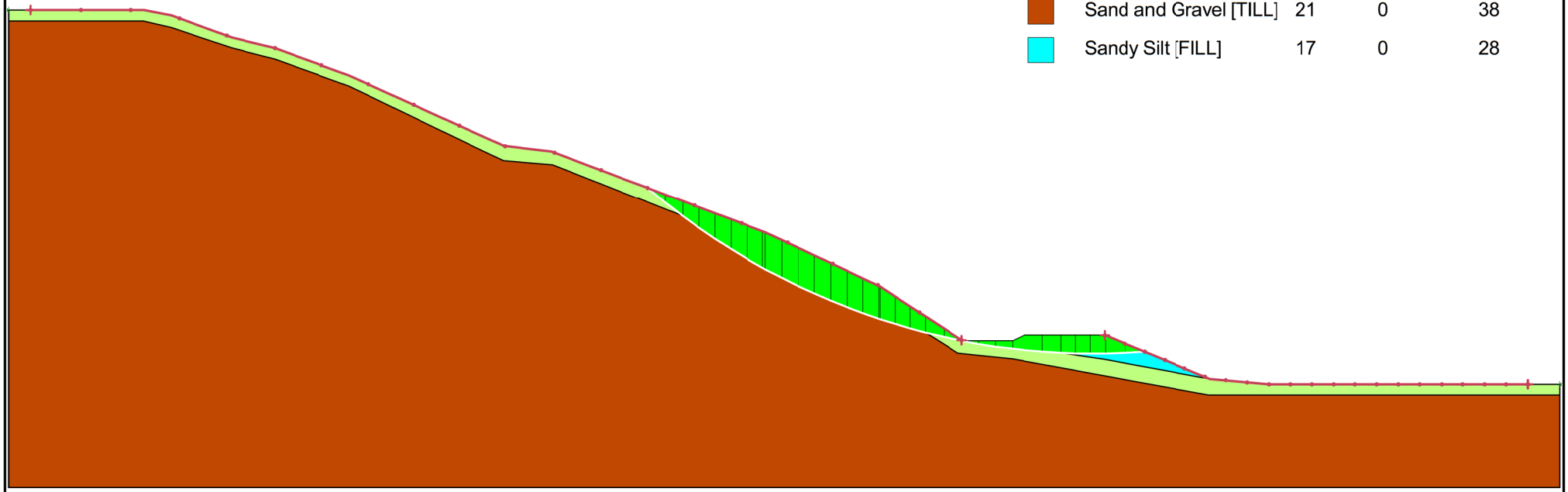


Project: Mixed-Use Development		**Job No.: 20461**
Model: 20461 - Slope Stability Section - Static		Date: February 28, 2024
Method: Morgenstern-Price	Horz Seismic Coef.:	Scale : 1:700
Address: 1490 Cara Glen Way, Kelowna, BC		Analysis by: CG

GEOPACIFIC CONSULTANTS
250.762.3073
1340 St. Paul Street
Kelowna, BC V1Y 2E1

FS: 1.641

Color	Name	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Sand and Gravel	19	0	34
	Sand and Gravel [TILL]	21	0	38
	Sandy Silt [FILL]	17	0	28



Project: Mixed-Use Development		**Job No.: 20461**
Model: 20461 - Slope Stability Section - Seismic		Date: February 28, 2024
Method: Morgenstern-Price	Horz Seismic Coef.: 0.07	Scale : 1:700
Address: 1490 Cara Glen Way, Kelowna, BC		Analysis by: CG

GEOPACIFIC CONSULTANTS
250.762.3073
1340 St. Paul Street
Kelowna, BC V1Y 2E1

APPENDIX D – EGBC LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

Notes: This statement is to be read and completed in conjunction with the Engineers and Geoscientists BC *Professional Practice Guidelines – Landslide Assessments in British Columbia* ("the guidelines") and the current *BC Building Code* (*BCBC*), and is to be provided for Landslide Assessments (not floods or flood controls), particularly those produced for the purposes of the *Land Title Act*, *Community Charter*, or *Local Government Act*. Some jurisdictions (e.g., the Fraser Valley Regional District or the Cowichan Valley Regional District) have developed more comprehensive assurance statements in collaboration with Engineers and Geoscientists BC. Where those exist, the Qualified Professional is to fill out the local version only. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority (or Client) Date: March 13, 2024

City of Kelowna

Jurisdiction/name and address

With reference to (CHECK ONE):

- ☐ A. *Land Title Act* (Section 86) – Subdivision Approval
- ☒ B. *Local Government Act* (Sections 919.1 and 920) – Development Permit
- ☐ C. Community Charter (Section 56) – Building Permit
- ☐ D. Non-legislated assessment

For the following property (the "Property"):

Mixed-Use Development - 1490 Cara Glen Way, Kelowna, BC

Civic address of the Property

The undersigned hereby gives assurance that they are a Qualified Professional and a professional engineer or professional geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, authenticated, and dated, and thereby certified, the attached Landslide Assessment Report on the Property in accordance with the guidelines. That report must be read in conjunction this statement.

In preparing that report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

X 1. Collected and reviewed appropriate background information

X 2. Reviewed the proposed Residential Development or other development on the Property

X 3. Conducted field work on and, if required, beyond the Property

X 4. Reported on the results of the field work on and, if required, beyond the Property

X 5. Considered any changed conditions on and, if required, beyond the Property

6. For a Landslide Hazard analysis or Landslide Risk analysis, I have:

X 6.1 reviewed and characterized, if appropriate, any Landslide that may affect the Property

X 6.2 estimated the Landslide Hazard

X 6.3 identified existing and anticipated future Elements at Risk on and, if required, beyond the Property

X 6.4 estimated the potential Consequences to those Elements at Risk

7. Where the Approving Authority has adopted a Level of Landslide Safety, I have:

X 7.1 compared the Level of Landslide Safety adopted by the Approving Authority with the findings of my investigation

X 7.2 made a finding on the Level of Landslide Safety on the Property based on the comparison

X 7.3 made recommendations to reduce Landslide Hazards and/or Landslide Risks

8. Where the Approving Authority has **not** adopted a Level of Landslide Safety, or where the Landslide Assessment is not produced in response to a legislated requirement, I have:
   ___ 8.1 described the method of Landslide Hazard analysis or Landslide Risk analysis used
   ___ 8.2 referred to an appropriate and identified provincial, national, or international guideline for Level of Landslide Safety
   ___ 8.3 compared those guidelines (per item 8.2) with the findings of my investigation
   ___ 8.4 made a finding on the Level of Landslide Safety on the Property based on the comparison
   ___ 8.5 made recommendations to reduce Landslide Hazards and/or Landslide Risks

_X_ 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections

Based on my comparison between:

[CHECK ONE]

☒ the findings from the investigation and the adopted Level of Landslide Safety (item 7.2 above)
☐ the appropriate and identified provincial, national, or international guideline for Level of Landslide Safety (item 8.4 above)

Where the Landslide Assessment is not produced in response to a legislated requirement, I hereby give my assurance that, based on the conditions[1] contained in the attached Landslide Assessment Report:

A. SUBDIVISION APPROVAL

☐ For subdivision approval, as required by the *Land Title Act* (Section 86), "the land may be used safely for the use intended"
[CHECK ONE]
   ☐ with one or more recommended additional registered Covenants
   ☐ without an additional registered Covenant(s)

B. DEVELOPMENT PERMIT

☒ For a development permit, as required by the *Local Government Act* (Sections 488 and 491), my report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of [Section 491]"
[CHECK ONE]
   ☒ with one or more recommended additional registered Covenants
   ☐ without an additional registered Covenant(s)

C. BUILDING PERMIT

☐ For a building permit, as required by the *Community Charter* (Section 56), "the land may be used safely for the use intended"
[CHECK ONE]
   ☐ with one or more recommended additional registered Covenants
   ☐ without any additional registered Covenant(s)

[1] When seismic slope stability assessments are involved, Level of Landslide Safety is considered to be a "life safety" criteria, as described in Commentary JJJ of the *National Building Code of Canada* (*NBC) 2015*, Structural Commentaries (User's Guide – NBC 2015: part 4 of division B). This states:

> "The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse, nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse."

Roberto Avendano, P.Eng.
Name (print)

March 13, 2024
Date

Geopacific Consultants Ltd.
Address

1340 St. Paul Street, Kelowna, BC V1Y 2E1

250-762-8073
Telephone

avendano@geopacific.ca
Email

(Affix PROFESSIONAL SEAL and signature here)

The Qualified Professional, as a registrant on the roster of a registrant firm, must complete the following:

I am a member of the firm Geopacific Consultants Ltd.
(Print name of firm)

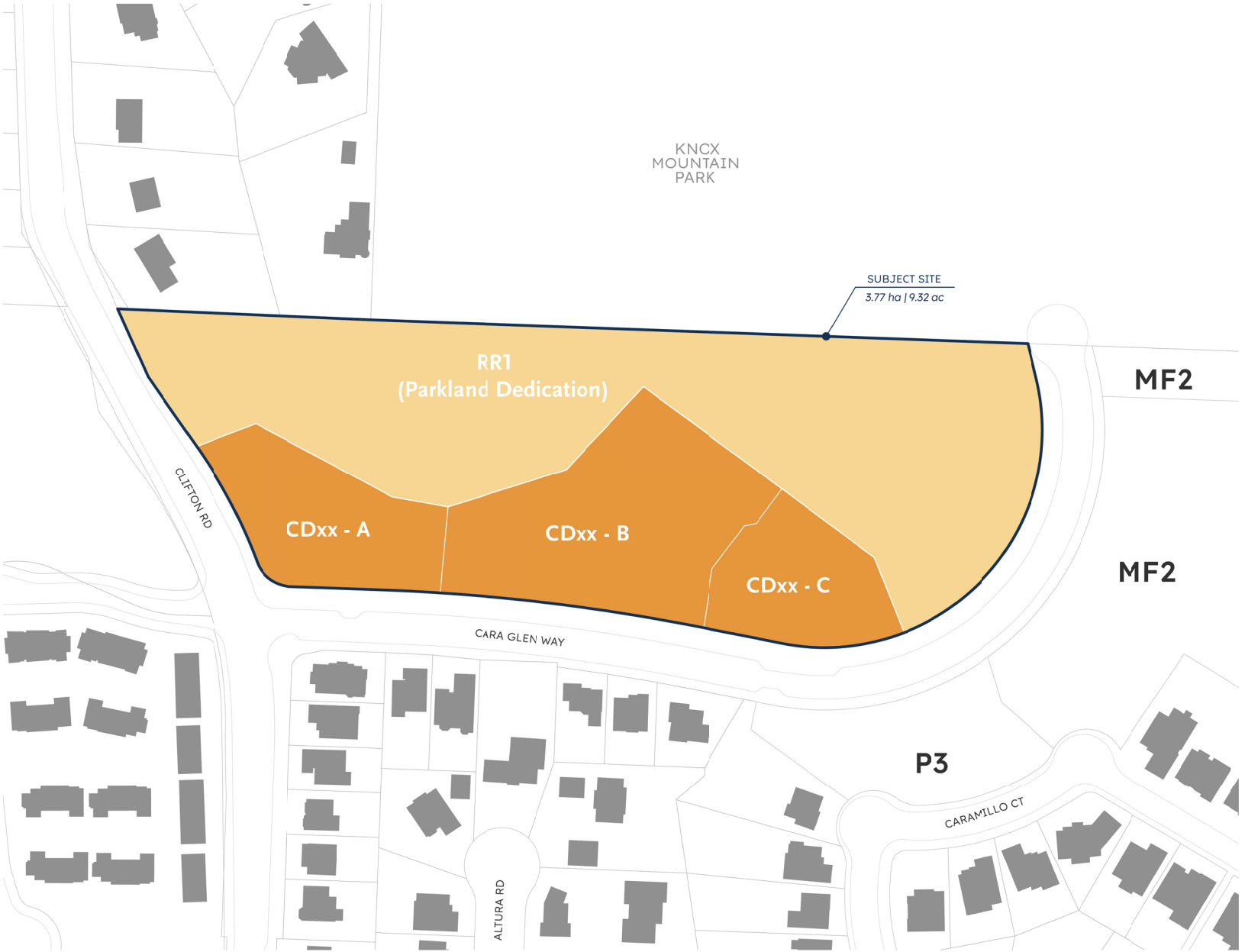
with Permit to Practice Number 1000782
(Print permit to practice number)

and I sign this letter on behalf of the firm.

APPENDIX E – PROPOSED ZONING PLAN

CARA GLEN
KELOWNA BC

PROPOSED ZONING PLAN



LEGEND — FEBRUARY 2024

- Site Boundary
- Zoning Boundary
- Legal Property Line

PROPOSED ZONING

40%	CDxx | Cara Glen Multi-Dwelling	1.49 ha | 3.68 ac
	CDxx - A	0.41 hc | 1.02 ac
	CDxx - B	0.75 hc | 1.85 ac
	CDxx - C	0.33 hc | 0.81 ac
60%	RR1 | Large Lot Rural Residential (Park Dedication)	2.28 ha | 5.65 ac
100%		3.77 ha | 9.32 ac

SCALE 1:1500

0 15 30 45 60 75m

placemark
DESIGN + DEVELOPMENT

SWANSON FORESTRY SERVICES
Richard Swanson, RPF
754 South Crest Drive
Kelowna, BC V1W 4W
rswanson@uniserve.com
Office: 250-764-2820
Cell: 250-718-9637

December 13th, 2022.

Mr. Josh Grenon
Assistant Development Manager
Lamont Land
200, 5716 – 1 Street S.E.,
Calgary, AB
T2H 1H8

Dear Josh:

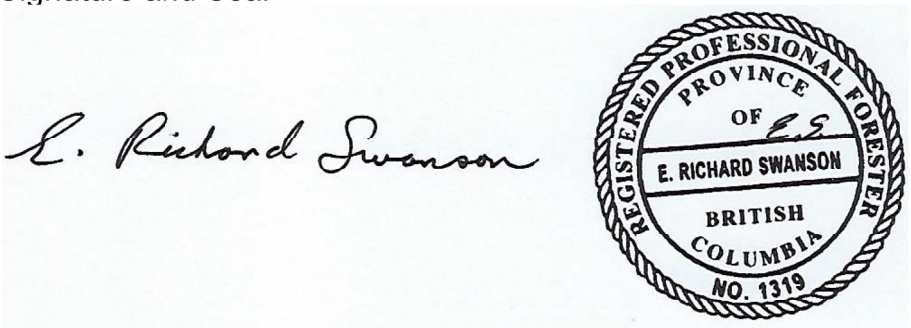
RE: The proposed residential development located on Cara Glen Way, Kelowna- Wildfire Hazard Assessment Report and Mitigation Plan.

As requested, on December 5th, 2022, I carried out a Wildfire Hazard Assessment for the proposed residential development on Cara Glen Way in Kelowna. This assessment, completed using the required Wildfire Threat Assessment Form provided by the City of Kelowna, has established a **Moderate Hazard Rating** for the forest interface areas.

I have included several recommendations to help to maintain the moderate fire hazard risk in the attached report. A completed City of Kelowna Wildfire Hazard Assessment Checklist is also attached.

If any further information or clarification is required, please contact me at 250-718-9637(cell).
Yours truly,

Richard Swanson, RPF #1319
Signature and Seal



Attachment

The Proposed Cara Glen Residential Project, Kelowna- Wildfire Hazard Assessment Report and Mitigation Plan.

Prepared for:

Mr. Josh Grenon
Assistant Development Manager
Lamont Land
200, 5716 – 1 Street S.E.,
Calgary, AB
T2H 1H8

Prepared by:

754 South Crest Drive
Kelowna, BC.
V1W 4W7
Phone: 250-764-2820
Cell: 250-718-9637

December 13th, 2022

Objectives

This report was requested by Josh Grenon, Assistant Development Manager Lamont Land, for the owner of the property. A Wildfire Threat Assessment is required by the City of Kelowna as a condition for the proposed residential development. The project will be made up of three lots and will include townhomes and apartments (see Site Plan in the Appendix).

Legal Information

Civic Address:

1490 Cara Glen Way:
Legal Description:
PLAN KAP53293
LOT L, SECTION 32, TOWNSHIP 26,
ODYD.
PID: 018-979-289
Size: 9.32 Acres (3.77 ha)
Current Zoning: RR1
Future Land Use: C-NHD

1691 Cara Glen Way:
Legal Description:
PLAN KAP60008
LOT 20, SECTION 32, TOWNSHIP 26
EX CEPT PLAN KAP77707 KAP87078 & KAP91641
ODYD.
PID: 023-878-738
Current Zoning: RR1
Future Land Use: C-NHD
Size:8.59 Acres (2.48 ha)

530 Carmillo Ct.
Legal Description:
PLAN KAP91641
LOT 1, SECTION 32, TOWNSHIP 26,
ODYD.
PID: 028-410-025
Current Zoning: RR1
Future Land Use: C-NHD
Size: 6.96 Acres (2.82 ha)

Table of Contents

Registered Owner:

Rutherford Crestview Developments LTD.
Address: 200, 5716 – 1 Street SE,
Calgary, Alberta
T2H1H8

Property Description

The proposed residential development (the Property) is located on Cara Glen Way (see Proposed Site Plan and Overhead View for the Property in the Appendix) and is part of the residential area of the Glenmore Highlands. There is a single-family subdivision to the south and east. The three lots that are included in the multi-family residential project have a combined area of 24.56 acres (10.04 ha). The Property will be zoned MF2 and MF3 as well as the P3 park areas to the north and east. The preliminary development concept will include townhomes, two apartment complexes, and some commercial structures at the base of the west apartment building with new roads and services. The largely undeveloped natural area of Knox Mountain Park is located to the east and immediately north of the subject properties. Photographs of the site and any relevant nearby features have been included in the Appendix. The area has numerous hiking trails and active use as a mountain biking park. The elevation for the Property is between 451 meters at the southern boundary and 527 meters on the northern boundary. The proposed park areas have a predominately southern aspect, and the topography is steep, averaging varying from 30% to > 50% with some steeper, rocky exposures. The steep area to the north of the access road has open rock and talus slopes. The residential area is located on the more moderate slopes of 1490 Cara Glen Way and 530 Caramillo Court. These two lots have mostly open forest cover to the north with open cleared areas along the Cara Glen access and the western half of the Caramillo Court property. There is open forest cover on the eastern half of this lot. The 1691 Cara Glen Way lot has open forest cover and will largely remain undeveloped with the exception of the pan handle along the extension of Cara Glen Way. There are no riparian areas on the Property. An overhead showing the location of the subdivision is shown in the Appendix.

Forest Cover – Overview of Region

This property is within the Okanagan Very Dry Ponderosa Pine (PPxh1) bio-geo-climatic sub-zone. This sub-zone is the hottest and driest forested zone in British Columbia, and is characterized by dry, hot summers with moisture deficits contributing towards a high to extreme fire hazard risk for most of the summer and early fall. The drier sites within this sub-zone have open ponderosa pine (*Pinus ponderosa*) stands on steep, rocky, south-facing slopes. These sites usually lack shrubs and have an open herb layer dominated by the grass red three-awn (*Aristida longiseta*), prickly pear cactus (*Opuntia fragilis*) and yarrow (*Achillea millefolium*). Exposed mineral soil is common. Less extreme slopes contain open grasslands dominated by blue bunch wheat grass (*Agropyron spicatum*) and big sagebrush (*Artemisia tridenta*). The moister sites have open stands composed of ponderosa pine and a minor Douglas-fir (*Pseudotsuga menziesii*) component. The shrub layer is open or absent. Blue bunch wheat grass is the dominant herb, with lesser amounts of arrow-leafed balsamroot (*Balsamorhiza sagittata*), Idaho fescue (*Festuca idahoensis*) and timber milk-vetch (*Aristragalus miser*). Mosses are generally absent. The moistest sites within this sub-zone usually have a northern aspect. The forest cover is made up of young climax stands of Douglas-fir with lesser amounts of ponderosa pine and trembling aspen (*Populus tremuloides*). Here the under storey is made up of tall Oregon grape (*Mahonia aquifolia*), common snowberry (*Symphoricarpus albus*), Nootka rose (*Rosa nutkana*), and Saskatoon (*Amelanchiera alniifolia*) with pine grass (*Calamagrostis rubescens*) as a herb cover (BC Ministry of Forests, 1990).

The Okanagan Valley has historically had fire-maintained ecosystems that would normally have naturally occurring wildfires every 10-20 years. These ecosystems are maintained by wildfire, and the trees and plants found in these ecosystems are all adapted to fire and benefit from these periodic wildfires. Under natural conditions a fire would likely only burn on the ground, consuming ground fuels such as fine grasses, pine needles and small saplings leaving the pine trees larger than 15 cm in diameter at breast height (DBH) intact. The larger trees have thick bark that allows them to withstand a fire. The removal of the smaller trees creates an open forest condition with approximately 150-200 trees/ha on the south aspects and 400-600 trees/ha on the cooler east and north aspects. These forests should have light ground fires that can be more easily controlled by fire crews. Suppression of natural fire has resulted in heavy fuel accumulations that are difficult to control when ignited. The potential for catastrophic wildfires, such as the 2003 Okanagan Mountain Park Fire, and the wildfires occurring in 2017 to the present, especially the summer of 2021, can be the consequences of not treating high fuel loads in our forests.

Forest Cover on Subject Property

The Property falls within the drier site series for this bio-geoclimatic subzone for most of the Property. Due to snow cover, the herb layer description is based on the Environmental Assessment completed by Ecoscape. The herb cover is

dominated by bluebunch wheatgrass, rough fescue, Idaho fescue, and a large amount of arrow-leafed balsamroot. The shrub layer consists of very scattered Saskatoon bushes. The area identified as the western parcel has a few scattered Douglas-fir trees (5% cover) mixed with Ponderosa pine trees (95% cover) on the steep, northern portion of the property. The crown closure is < 40%, semi-open forest (400-600 trees/ha), with open rock and talus slopes. The mature tree height is around 20 meters. The area identified as the eastern parcel has an open Ponderosa pine forest with a mature tree height is also around 20 meters. The crown closure is <10%, open forest (100-200 trees/ha). The tree cover appeared healthy. There was some evidence of Mountain pine beetle attack over 15 years ago with some dead trees found on the ground.

Methodology

Wildland Urban Interface Threat Assessment

In assessing the fire hazard threat, the property boundaries were located, and a traverse through the property determined if there was any variation in fire hazard threat rating. Three plots, representative of site conditions, were established on the property. The Wildland Urban Interface Threat Assessment Worksheets for the plots are included in the Appendix. By establishing these plots, the fire hazard threat rating can be measured. This hazard rating has four classes: low (indicating a low risk of fire, with a low number of points), moderate, high, and extreme. Copies of the Wildfire Threat Assessment plots are attached to the City of Kelowna Wildfire checklist and are provided in the Appendix along with photos. Here is a summary of the data collected at the plots:

Plot 1, 1490 Cara Glen Way:
Fuel:

- The duff layer is thin,1-<2cm in depth
- Flammable surface vegetation has 20-40% cover
- The vegetation fuel is predominately bunch grass
- There is scattered fine coarse woody debris <10%
- Coarse woody debris >7cm is <1% for most of the property
- The Coniferous Crown Closure is 20-40%
- There is no deciduous cover
- The conifer crown base is 1-<2 m
- There are some understory conifers-100-200/ha
- The forested area within 2.0 km is > 100 ha
- Forest Health: the trees on the Property are healthy.

Weather:

- The site is within the Ponderosa Pine subzone
- There have been many wildfires in the Penticton Fire Zone.

Topography:

- The property has a western aspect

- The forested interface terrain has slopes with slopes between 45 and 55%
- The terrain has consistent slopes to the south.

Structural:

- The property is in located in the lower portion of the surrounding forest interface area
- The perimeter forest interface is uphill from the proposed development.
-

Plot 2, 530 Carmillo Ct.

Fuel:

- The duff layer is thin,1-<2cm in depth
- Flammable surface vegetation has 20-40% cover
- The vegetation fuel is predominately bunch grass
- There is scattered fine coarse woody debris <10%
- Coarse woody debris >7cm is <1% for most of the property
- The Coniferous Crown Closure is 20-40%
- There is no deciduous cover
- The conifer crown base is 1-<2 m
- There are some understory conifers <100/ha
- The forested area within 2.0 km is > 100 ha
- Forest Health: the trees on the Property are healthy.

Weather:

- The site is within the Ponderosa Pine subzone
- There have been many wildfires in the Penticton Fire Zone.

Topography:

- The property has a western aspect
- The forested interface terrain has slopes with slopes between 45 and 55%
- The terrain has consistent slopes to the south.

Structural:

- The property is in located in the lower portion of the surrounding forest interface area
- The perimeter forest interface is uphill from the proposed development.

Plot 3, 1691 Cara Glen Way:

Fuel:

- The duff layer is thin,1-<2cm in depth
- Flammable surface vegetation has 20-40% cover
- The vegetation fuel is predominately bunch grass
- There is scattered fine coarse woody debris <10%
- Coarse woody debris >7cm is <1% for most of the property
- The Coniferous Crown Closure is 20-40%
- There is no deciduous cover

- The conifer crown base is 1-<2 m
- There are some understory conifers <100/ha
- The forested area within 2.0 km is > 100 ha
- Forest Health: the trees on the Property are healthy.

Weather:

- The site is within the Ponderosa Pine subzone
- There have been many wildfires in the Penticton Fire Zone.

Topography:

- The property has a western aspect
- The forested interface terrain has slopes with slopes between 45 and 55%
- The terrain has consistent slopes to the south.

Structural:

- The property is in located in the lower portion of the surrounding forest interface area
- The perimeter forest interface is uphill from the proposed development.

The Wildfire Threat Rating is 103-113/210- Moderate Wildfire Behavior Threat Score. Due to the Moderate Wildfire Threat Rating, there are some treatment recommendations for the forested interface.

In the 2003 Okanagan Park Fire, sparks spread by the wind ignited spot fires for over 2 kilometres ahead of the main fire. Embers can spread from wildfire in the forested areas and could be carried to the residential areas by the wind. By following the FireSmart manual recommendations, the odds of buildings surviving a wildfire in a residential area can be increased to 85% (Blackwell and Associates).

Recommendations for Mitigating the Risk from Wildfire for the Proposed Residential Area

Landscaping Recommendations

Due to the risk of fire spreading by sparks from forest interface areas, a 10-meter fuel modified space around homes and buildings is recommended (Priority Zone 1 from the FireSmart Manual). The main objective of vegetation within this space is to create an environment that will not support fire of any kind. Here are the recommendations within 10 meters of homes and buildings:

- Landscaping on the property within 10 meters of a building should not include coniferous shrubs such as junipers, mugo pines or coniferous hedges. Plant low-growing (<0.5 meter tall) shrubs around buildings.
- Deciduous trees and shrubs are favoured for landscaping.
- Space trees so that there is >3 meters between the crowns to limit the spread of wildfire between the tree crowns.

- No additional or new coniferous evergreen trees are to be planted within 10 meters of buildings.
- Watered and mowed lawns are also recommended close to buildings.
- It is recommended that pea gravel, lava rock or other non-combustible material be used as groundcover rather than bark mulch.

For the forest interface areas within the 30-meter space around buildings (Priority Zone 2 from the FireSmart Manual):

- Perform regular maintenance to clean up excessive needle accumulations and ground fuel under the Ponderosa pine trees.
- Space trees so that there is >3 meters between the crowns to limit the spread of wildfire between the tree crowns.
- Remove ladder fuels to a height of 2-3 meters to limit the spread of ground fire to the tree canopy.

Park Areas

Submission of this report by the owners of the property to the City of Kelowna Parks Department is part of the requirements for developing the Property. The natural area identified as natural areas on the Site Plan have a combined area of approximately 16.13 acres (6.53 ha). These areas are proposed as an addition to Knox Mountain Park. The City of Kelowna may require a Fuel Treatment Prescription for the forested interface areas next to the residential area.

Appendix

Overhead Views of the Property

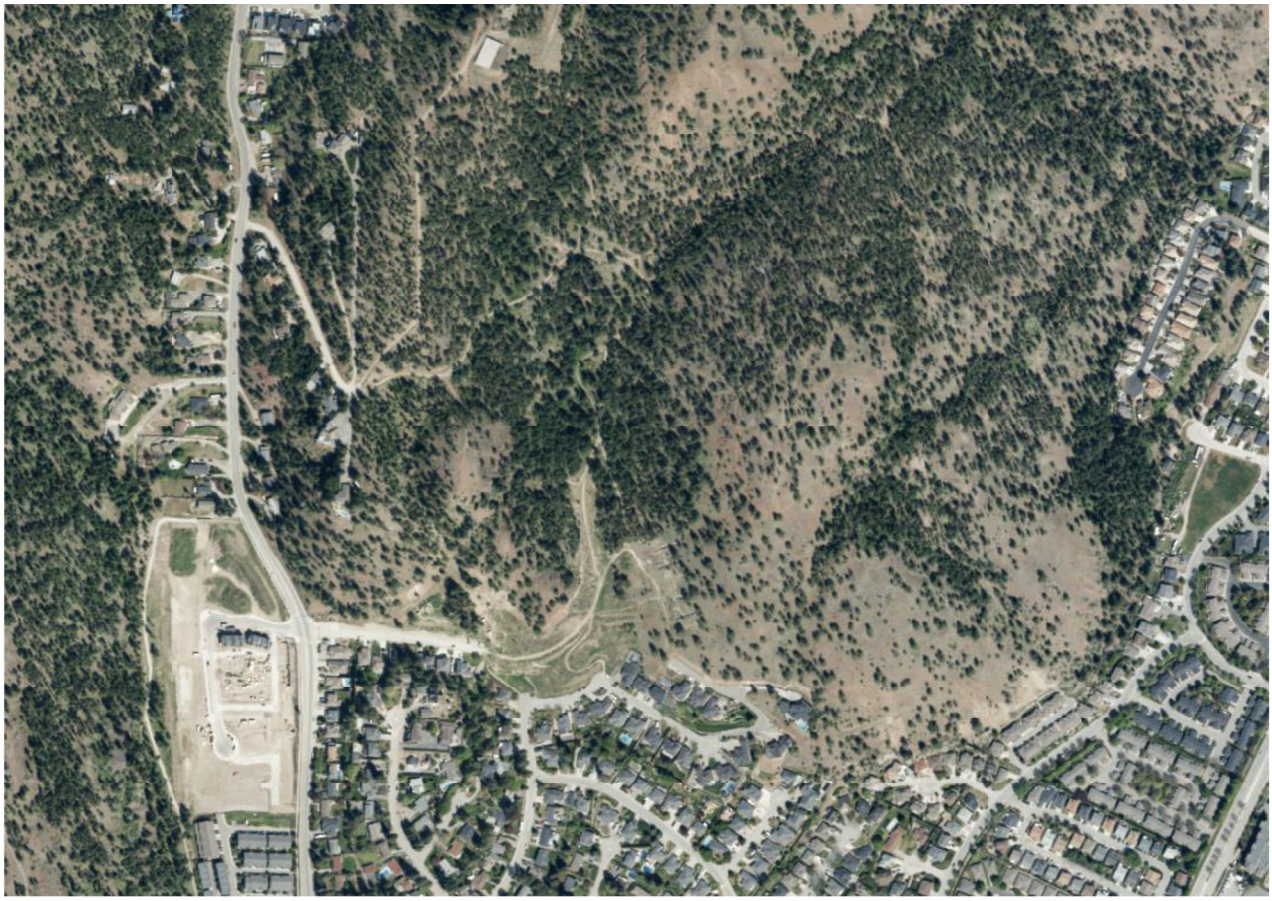
Provided by the City of Kelowna Interactive Map Site

1490 Cara Glen Way

530 Caramillo Ct.

1691 Cara Glen Way

Overhead of the Property from Google Earth.



This overhead shows the forest cover within 2.0 km.

Preliminary Site Plan for the Cara Glen Project

DECEMBER 2022

CARA GLEN
KELOWNA BC

DEVELOPMENT YIELD

LEGEND

- Site Boundary 9.94 ha | 24.56 ac
- Legal Lot Boundary
- Land Use Change
- 5m Contour
- Proposed Retaining Wall
- Proposed Building Foundation Wall
- Road Right of Way
- Road Carriage

DEVELOPMENT AREAS | TOTAL

17%	Development Areas	1.77 ha | 4.37 ac
13%	Strata Green	1.24 ha | 3.07 ac
4%	Public Park	0.40 ha | 1.00 ac
66%	Natural Area	6.53 ha | 16.13 ac
100%		9.94 ha | 24.56 ac

DEVELOPMENT YIELD | EASTERN PARCEL

Townhome | Walk-out ~2,800 sf	8
Townhome | Uphill/Walk-up ~ 2,500 sf	8
Apartment ~ 750 sf average	32
Apartment ~ 950 sf average	44
Apartment | Walk-out ~ 1,600 sf average	11
	103

DEVELOPMENT YIELD | WESTERN PARCEL

Townhome | Walk-out ~2,800 sf	10
Townhome | Uphill/Walk-up ~ 2,500 sf	6
Apartment ~ 750 sf average	39
Apartment ~ 950 sf average	35
Apartment | Walk-out ~ 1,600 sf average	5
Commercial ~ 620 sf	4
	99
Total	202

SCALE 1:2500
0 10 20 50 100m

placemark DESIGN + DEVELOPMENT

Photos of the 1490 Cara Glen Way Property

Photo from the northwest corner looking east.

Looking north above the access road.

WHA Plot 1 in the forest interface above the residential site in the western portion of the property.

The residential area to the south of the Cara Glen Road access.

Photo looking northwest from the western boundary showing rocky areas.

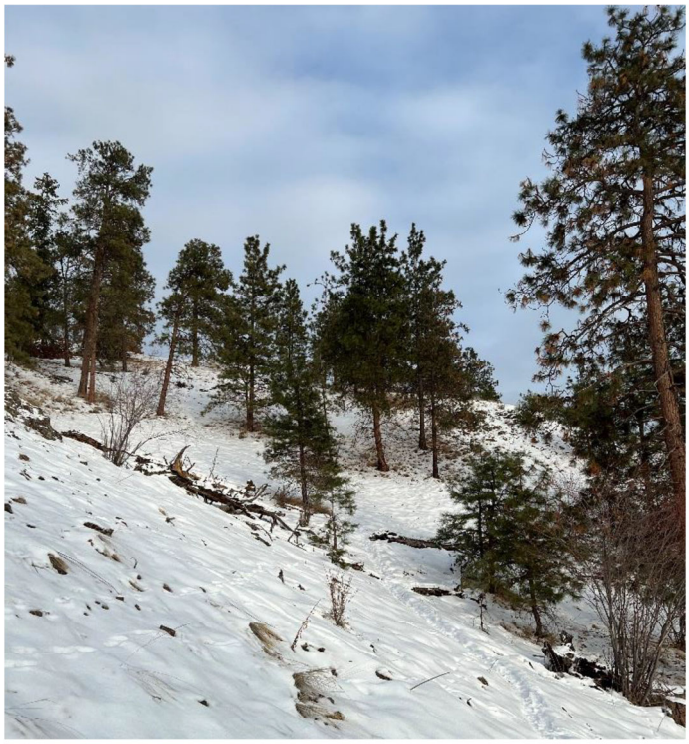
Photo looking north along the eastern boundary.

Photos of the 530 Caramillo Court Property

Looking east from the western boundary.

Plot 2.

Looking southeast from the northwest corner.



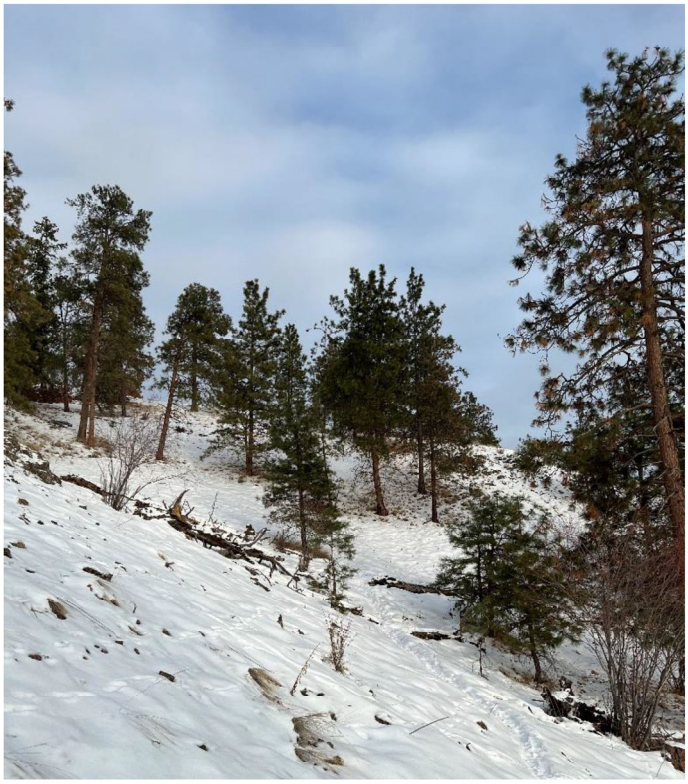
Looking to the east along the eastern boundary.

Looking east from the western boundary.

Looking west from the southeast corner.

Photos of the 1691 Cara Glen Way Property

Looking east from the northeast corner.



Looking northeast form the southwest boundary.

Plot 3.

Looking southwest from the forest interface.

Wildfire Threat Assessment Checklist and Work Sheets

Wildfire Hazard Assessment Checklist

City of Kelowna

Date: December 6th, 2022
Development Proposal: Cara Glen Project
Location: 1490 Cara Glen Way
Registered Professional: R. Swanson, RPF #1319

Please refer to the ***City of Kelowna – Official Community Plan - Chapter 13: Hazardous Condition DP Guidelines - Wildland Fire Interface Area Guidelines*** for details.

Status	Description	Comments
	Contents	
☒	Wildfire Hazard Assessment, Fuel Treatment Prescription & map	
☒	***Wildland Urban Interface Wildfire Worksheets**** or equivalent	
	General	
☒	Report completed by Registered Professional Forester, Registered Forest Technician, Registered Professional Engineer qualified by training or experience in wildfire protection.	
☒	FireSmart Priority Zones identified (10 m, 30m and 100 m from proposed building sites)	
☒	Access and roadway planning for evacuation and fire control should be considered	
☒	Fire hydrant locations optimized to protect forested parks	
☐	Development should be set back a minimum of 10 m from the top of ridgeline, cliffs or ravines.	N.A
☒	Wildfire hazard reduction treatments should support restoring the natural environment	
	Buildings	
☒	Roof covering – Class A or Class B fire resistance	
☒	Cladding of exterior walls fire resistant	
☒	Structural components of decks, balconies and porches must be heavy timber construction or clad with fire resistant materials	
☒	Chimneys constructed for wood burning fireplaces must have spark arrestors	
☒	Windows double paned or tempered	
☐	Manufactured homes skirted with fire resistant materials	N.A.
☐	Deviations from above items (provide more detail)	
	Landscaping	
	Within 10 meters of the proposed buildings	
☒	Use non-combustible landscaping materials	
☒	No trees, limbs or shrubs overhanging roofs or growing under eaves	
☒	Space and maintain trees so the canopy spacing is a minimum of 3.0 meters	
☒	Prune coniferous trees to a height of 2.5 m	

☒	Maintain hedges below a height of 2.0 m	
☒	Landscape using xeriscape principles	
☒	Use native vegetation	
☒	Keep piled debris out of this zone	
☒	Remove surface litter, downed trees and dead/dying trees	
	Within 30 meters of the proposed buildings	
☒	Thin canopy and understory and prune lower branches to 2.5 m	
☒	Space and maintain trees so the canopy spacing is a minimum of 3.0 meters	
☒	Remove dead and dying trees	
☒	Dispose of all slash created by treatments	
☒	Where hazard levels are high as a result of fuel loads or steep topography, fuel management should also be undertaken in the zone between 30 and 100 metres from anticipated building sites.	
	Alternatives	
☐	Where a Registered Professional qualified by training or experience in fire protection, has undertaken an assessment and determined the fire hazard to be **low** provided specific conditions are met, the above requirements may be relaxed.	
Status	**Description**	**Comments**
	Monitoring Program	
☐	Wildfire hazard on forested land was mitigated according to Wildfire Hazard Assessment and Fuel Treatment Prescription.	

Rating Interface Wildfire Threats in British Columbia

WILDLAND URBAN INTERFACE WILDFIRE THREAT WORKSHEET

Plot #: 1	Community: Cara Glen Way
Assessor: R. Swanson, RPF	Geographic Location/Street Name: 1490 Cara Glen Way
Date: Dec, 5th, 2022	GPS/UTM:
Photos: Y X N #:	Land Ownership: ☐ Crown ☒ Private ☐ I.R. Other (specify)

	COMPONENT /Subcomponent	A	B	C	D	E
	Fuel	**LEVELS**				
1	*Duff and Litter Depth (cm)*	1–<2 1 X	2–<5 2	5–<10 3	10–<20 4	20+ 5
2	*Flammable Surface Vegetation Continuity (% cover)*	<20 0	20–40 1 X	41–60 2	61–80 4	>80 5
3	*Vegetation Fuel Composition**	Moss, Herbs, Irrigated Crops 1	Herbs, Decid Shrubs 2	Lichen, Conifer Shrubs 3	Pinegrass, Juniper 4	Sagebrush, Bunchgrass, Antelope Brush, Scotch Broom 5 X
4	*Fine Woody Debris Continuity (≤7cm)*	<1% coverage 1	Scattered, <10% coverage 2 X	10-50% coverage 5	>50% coverage, ≤ 10 cm deep 7	>50% coverage, > 10 cm deep 10
5	*Large Woody Debris Continuity (>7cm)*	<1% coverage 0	Scattered, <10% coverage 2 X	10-25% coverage 3	> 25% coverage, not elevated 4	>25% coverage, partially elevated 5
6	*Coniferous Crown Closure (%)*	<20 2	20–40 5 X	41–60 10	61–80 15	>80 20
7	*Deciduous Crown Closure (%)** N/A	>80 0	61–80 2	41–60 5	20–40 7	<20 10
8	*Conifer Crown Base Height (m)**	5+, 20% Conifers 0	3–5 2	2–<3 5	1–<2 8 X	< 1 10
9	*Suppressed & Understory Conifers (Stems Per Ha)*	<100 1	100–200 2 X	201–400 3	401–600 4	>600 5
10	*Continuous Forest Land (ha)*	<4 1	4–10 2	10.1–50 5	50.1–100 7	>100 10 X
11	*Coniferous Forest Health (% cover of polygon)**	Standing Dead and Down, no foliage < 5% 0 X	Standing Dead and Down, no foliage 5–50% 4	Standing Dead and Down, no foliage >50% foliage <25% 7	Standing Dead and Down with foliage 25–50% 10	Standing Dead and Down with foliage >50% 15
					Sub Total	34/100*

	Weather	A	B	C	D	E
12	*Biogeoclimatic Zone*	SWB, CWH, MH, AT, Irrigated 1	CDF, SBS 5	MS, ESSF, BWBS, SBPS 10	ICH, IDF 15	BG, PP 20 X
13	*Historical Wildfire Occurrence (by MoFR Fire Zone)*	G5, R1, R2, G6, V5, R9, V9, V3, R5, R8, V7 1	G3, G8, R3, R4, V6, G1, G9, V8 5	G7, C5, G4, C4, V1, C1, N6 10	K1, K5, K3, C2, C3, N5, K6, N4, K7, N2 15 X	N7, K4, K2, N1 20
					Sub Total	35/40

	Topography	A	B	C	D	E
14	*Aspect*	North 2	East 5	Flat (South exposure) 10	West 12	South 15 X
15	*Slope (%)*	<15 1	15–29 5	30–44 10	45-54 12 X	55+ 15
16	*Terrain*	Flat 1	Rolling 3	Ridges, shallow gullies 5	Consistent slope, shallow gully(s) 7 X	Consistent slope, deep gullies 10
					Sub Total	34/40

	Structural	A	B	C	D	E
17	*Position of Structure/ Community to Rating Area*	No Developments 0	Bottom of slope 5 X	Mid-slope, benchland 8	Mid-slope, continuous 12	Upper 1/3 of slope 15
18	*Type of Development*	No Structures directly impacted 0	Perimeter Interface, uphill side 5 X	Perimeter Interface, down or side hill 8	Intermix > 1 structure/ha 12	Intermix <1 structure/ha, Infrastructure 15
					Sub Total	10/30

**See important NOTE: in Appendix B of Manual.*

Wildfire Threat Rating (check applicable rating)

Low	<55	☐
Moderate	55–115	☒
High	116–130	☐
Extreme	>130	☐

Wildfire Threat Rating Numerical Total 113

Comments: High use for hiking, south aspect, looks like lots of talus slope.

Crown closure could be reduced with mitigation, removing trees under 15 cm dbh.

Remove ladder fuels to 3.0 m due to side hill slope.

WILDLAND URBAN INTERFACE WILDFIRE THREAT WORKSHEET

Plot #: 2	Community: Cara Glen Way
Assessor: R. Swanson, RPF	Geographic Location/Street Name: 530 Carmillo Ct.
Date: Dec, 5th, 2022	GPS/UTM:
Photos: Y X N #:	Land Ownership: ☐ Crown ☒ Private ☐ I.R. Other (specify)

	COMPONENT /Subcomponent	A	B	C	D	E
	Fuel					
1	*Duff and Litter Depth (cm)*	1–<2 1 X	2–<5 2	5–<10 3	10–<20 4	20+ 5
2	*Flammable Surface Vegetation Continuity (% cover)*	<20 0	20–40 1 X	41–60 2	61–80 4	>80 5
3	*Vegetation Fuel Composition**	Moss, Herbs, Irrigated Crops 1	Herbs, Decid Shrubs 2	Lichen, Conifer Shrubs 3	Pinegrass, Juniper 4	Sagebrush, Bunchgrass, Antelope Brush, Scotch Broom 5 X
4	*Fine Woody Debris Continuity (≤7cm)*	<1% coverage 1	Scattered, <10% coverage 2 X	10-50% coverage 5	>50% coverage, ≤ 10 cm deep 7	>50% coverage, > 10 cm deep 10
5	*Large Woody Debris Continuity (>7cm)*	<1% coverage 0 X	Scattered, <10% coverage 2	10-25% coverage 3	> 25% coverage, not elevated 4	>25% coverage, partially elevated 5
6	*Coniferous Crown Closure (%)*	<20 2 X	20–40 5	41–60 10	61–80 15	>80 20
7	*Deciduous Crown Closure (%)** N/A	>80 0	61–80 2	41–60 5	20–40 7	<20 10
8	*Conifer Crown Base Height (m)**	5+, 20% Conifers 0	3–5 2	2–<3 5	1–<2 8 X	< 1 10
9	*Suppressed & Understory Conifers (Stems Per Ha)*	<100 1 X	100–200 2	201–400 3	401–600 4	>600 5
10	*Continuous Forest Land (ha)*	<4 1	4–10 2	10.1–50 5	50.1–100 7	>100 10 X
11	*Coniferous Forest Health (% cover of polygon)**	Standing Dead and Down, no foliage < 5% 0 X	Standing Dead and Down, no foliage 5–50% 4	Standing Dead and Down, no foliage >50% foliage <25% 7	Standing Dead and Down with foliage 25–50% 10	Standing Dead and Down with foliage >50% 15
					Sub Total	30/100*
	Weather	**A**	**B**	**C**	**D**	**E**
12	*Biogeoclimatic Zone*	SWB, CWH, MH, AT, Irrigated 1	CDF, SBS 5	MS, ESSF, BWBS, SBPS 10	ICH, IDF 15	BG, PP 20 X
13	*Historical Wildfire Occurrence (by MoFR Fire Zone)*	G5, R1, R2, G6, V5, R9, V9, V3, R5, R8, V7 1	G3, G8, R3, R4, V6, G1, G9, V8 5	G7, C5, G4, C4, V1, C1, N6 10	K1, K5, K3, C2, C3, N5, K6, N4, K7, N2 15 X	N7, K4, K2, N1 20
					Sub Total	35/40
	Topography	**A**	**B**	**C**	**D**	**E**
14	*Aspect*	North 2	East 5	Flat (South exposure) 10	West 12	South 15 X
15	*Slope (%)*	<15 1	15–29 5	30–44 10 X	45-54 12	55+ 15
16	*Terrain*	Flat 1	Rolling 3 X	Ridges, shallow gullies 5	Consistent slope, shallow gully(s) 7	Consistent slope, deep gullies 10
					Sub Total	28/40
	Structural	**A**	**B**	**C**	**D**	**E**
17	*Position of Structure/ Community to Rating Area*	No Developments 0	Bottom of slope 5 X	Mid-slope, benchland 8	Mid-slope, continuous 12	Upper 1/3 of slope 15
18	*Type of Development*	No Structures directly impacted 0	Perimeter Interface, uphill side 5 X	Perimeter Interface, down or side hill 8	Intermix > 1 structure/ha 12	Intermix <1 structure/ha, Infrastructure 15
					Sub Total	10/30

*See important NOTE: in Appendix B of Manual.

Wildfire Threat Rating Numerical Total 103

Wildfire Threat Rating (check applicable rating)

Low	<55	☐
Moderate	55–115	☒
High	116–130	☐
Extreme	>130	☐

Comments: High use for hiking, south aspect. Residential area is >50m from forest interface.

Crown closure is open forest, no need for spacing.

Remove ladder fuels to 3.0 m due to side hill slope along hiking trails.

WILDLAND URBAN INTERFACE WILDFIRE THREAT WORKSHEET

Plot #: 3	Community: Cara Glen Way
Assessor: R. Swanson, RPF	Geographic Location/Street Name: 1691 Cara Glen Way
Date: Dec, 5th, 2022	GPS/UTM:
Photos: Y X N #:	Land Ownership: ☐ Crown ☒ Private ☐ I.R. Other (specify)

	COMPONENT /Subcomponent	LEVELS				
	Fuel	**A**	**B**	**C**	**D**	**E**
1	*Duff and Litter Depth (cm)*	1–<2 1 X	2–<5 2	5–<10 3	10–<20 4	20+ 5
2	*Flammable Surface Vegetation Continuity (% cover)*	<20 0	20–40 1 X	41–60 2	61–80 4	>80 5
3	*Vegetation Fuel Composition**	Moss, Herbs, Irrigated Crops 1	Herbs, Decid Shrubs 2	Lichen, Conifer Shrubs 3	Pinegrass, Juniper 4	Sagebrush, Bunchgrass, Antelope Brush, Scotch Broom 5 X
4	*Fine Woody Debris Continuity (≤7cm)*	<1% coverage 1	Scattered, <10% coverage 2 X	10-50% coverage 5	>50% coverage, ≤ 10 cm deep 7	>50% coverage, > 10 cm deep 10
5	*Large Woody Debris Continuity (>7cm)*	<1% coverage 0 X	Scattered, <10% coverage 2	10-25% coverage 3	> 25% coverage, not elevated 4	>25% coverage, partially elevated 5
6	*Coniferous Crown Closure (%)*	<20 2 X	20–40 5	41–60 10	61–80 15	>80 20
7	*Deciduous Crown Closure (%)** N/A	>80 0	61–80 2	41–60 5	20–40 7	<20 10
8	*Conifer Crown Base Height (m)**	5+, 20% Conifers 0	3–5 2	2–<3 5	1–<2 8 X	< 1 10
9	*Suppressed & Understory Conifers (Stems Per Ha)*	<100 1 X	100–200 2	201–400 3	401–600 4	>600 5
10	*Continuous Forest Land (ha)*	<4 1	4–10 2	10.1–50 5	50.1–100 7	>100 10 X
11	*Coniferous Forest Health (% cover of polygon)**	Standing Dead and Down, no foliage < 5% 0 X	Standing Dead and Down, no foliage 5–50% 4	Standing Dead and Down, no foliage >50% foliage <25% 7	Standing Dead and Down with foliage 25–50% 10	Standing Dead and Down with foliage >50% 15
					Sub Total	30/100*
	Weather	**A**	**B**	**C**	**D**	**E**
12	*Biogeoclimatic Zone*	SWB, CWH, MH, AT, Irrigated 1	CDF, SBS 5	MS, ESSF, BWBS, SBPS 10	ICH, IDF 15	BG, PP 20 X
13	*Historical Wildfire Occurrence (by MoFR Fire Zone)*	G5, R1, R2, G6, V5, R9, V9, V3, R5, R8, V7 1	G3, G8, R3, R4, V6, G1, G9, V8 5	G7, C5, G4, C4, V1, C1, N6 10	K1, K5, K3, C2, C3, N5, K6, N4, K7, N2 15 X	N7, K4, K2, N1 20
					Sub Total	35/40
	Topography	**A**	**B**	**C**	**D**	**E**
14	*Aspect*	North 2	East 5	Flat (South exposure) 10	West 12	South 15 X
15	*Slope (%)*	<15 1	15–29 5	30–44 10 X	45-54 12	55+ 15
16	*Terrain*	Flat 1	Rolling 3 X	Ridges, shallow gullies 5	Consistent slope, shallow gully(s) 7	Consistent slope, deep gullies 10
					Sub Total	28/40
	Structural	**A**	**B**	**C**	**D**	**E**
17	*Position of Structure/ Community to Rating Area*	No Developments 0	Bottom of slope 5 X	Mid-slope, benchland 8	Mid-slope, continuous 12	Upper 1/3 of slope 15
18	*Type of Development*	No Structures directly impacted 0	Perimeter Interface, uphill side 5 X	Perimeter Interface, down or side hill 8	Intermix > 1 structure/ha 12	Intermix <1 structure/ha, Infrastructure 15
					Sub Total	10/30

**See important NOTE: in Appendix B of Manual.*

Wildfire Threat Rating Numerical Total 103

Wildfire Threat Rating (check applicable rating)

Low	<55	☐
Moderate	55–115	☒
High	116–130	☐
Extreme	>130	☐

Comments: High use for hiking, south aspect. Residential area is >50m from forest interface.

Crown closure is very open, no need for spacing.

Remove ladder fuels to 3.0 m due to side hill slope along hiking trails.

Table A. Native vegetation suitable for landscaping on dry (xeric) sites in the Kelowna area.

Code*	Common Name	Latin Name	Site Requirements
Preferred Species for Dry Sites			
B	ponderosa pine	*Pinus ponderosa*	Dry, well drained soils
A	black hawthorn	*Crataegus douglasii*	Dry to moist sites
A	Saskatoon	*Amelanchier alnifolia*	Dry to moist, well drained, open areas
A	tall Oregon grape	*Mahonia aquifolium*	Dry to moist sites, open to closed forest
A	Nootka rose	*Rosa nutkana*	Open habitats, tolerates disturbance
C	prickly rose	*Rosa acicularis*	Open habitats, tolerates disturbance
A	common snowberry	*Symphoricarpos albus*	Dry to moist sites
C	shrubby penstemon	*Penstemon fruticosus*	Dry sites, tolerant of rocky conditions
C	yarrow	*Achillea millefolium*	Very dry to moist sites, tolerates disturbance
C	nodding onion	*Allium cernuum*	Dry sites, tolerant of rocky conditions
C	asters	*Aster* spp.	Tolerant of a range of conditions
C	arrow-leaved balsamroot	*Balsamorhiza sagittata*	Dry sites, tolerant of rocky conditions
A	wild strawberry	*Fragaria virginiana*	Roadside or open places, well drained soils
C	daisies	*Erigeron* spp.	Tolerant of a range of conditions
B	mock orange	*Philadelphus lewisii*	Well drained soils
A	kinnikinnick	*Arctostaphylos uva-ursi*	Exposed, well drained soils
C	pearly everlasting	*Anaphalis margaritacea*	Tolerant of a range of conditions
C	giant wild rye	*Elymus cinereus*	Relatively moist sites
C	junegrass	*Koeleria cristata*	Well-drained soils
C	snowbush	*Ceanothus velutinus*	Dry to moist sites, tolerant of rocky conditions
C	common juniper	*Juniperus communis*	Dry sites, tolerant of rocky conditions
C	Rocky Mountain juniper	*Juniperus scopulorum*	Dry sites, tolerant of rocky conditions

* A - species generally available in large quantities, in a range of sizes and from at least three nurseries in British Columbia.
B - Species available in moderate quantities, in a range of sizes and from at least two nurseries in British Columbia.
C - species available in limited numbers and may be offered by only one nursery in British Columbia
Please note that other species may be available from individual specialty native plant nurseries.

Resume for Richard Swanson, RPF

SWANSON FORESTRY SERVICES

Richard Swanson, RPF
754 South Crest Drive
Kelowna, BC V1W 4W

rswanson@uniserve.com
Office: 250-764-2820
Cell: 250-718-9637

EDUCATION AND PROFESSIONAL QUALIFICATIONS

- B.Sc. Forestry (1978), University of British Columbia
- Registered Professional Forester (1980)
- Certified Vegetative Resource Inventory Ground Sampling Timber Cruiser (1998)
- S 215-Fire Operations in the Wildland/Urban Interface (2008)
- Wildlife/Danger Tree Assessor, Parks/Recreation and Silviculture /Harvesting Modules (2009)
- S-100 Basic Fire and Safety Course (2022)
- Accredited Silviculture Surveyor (Reg. No. 2009011)
- Safe Company Certified #3090014

FIELDS OF SPECIALIZATION

- Timber Harvest Planning
- Wildland Interface Wildfire Threat Assessments
- Wildfire Hazard Mitigation Treatment Prescriptions
- Ecosystem Restoration Plans, Prescriptions and Implementation
- Ecosystem Classification
- Stand and Silviculture Surveys
- Project Supervision

SUMMARY OF PAST EXPERIENCE

Timber Harvesting, Planning and Supervision
7 years as a TFL Forester in the interior, and an additional 26 years' experience preparing Timber Sale Licenses for the Ministry of Forests, Lands, Natural Resource Operations and Rural Development and local timber companies including:

- Preparation of Site Plans, Harvest and Silviculture Plans
- Data collection and recommendations for forest inventory, health management recommendations, silviculture strategies, ecological data collection and analysis
- Stream assessments and riparian management
- Species At Risk assessments, migratory bird assessments.

Wildland Interface Fire Hazard Assessments
Conducted Wildland Urban Interface Wildfire Threat Assessments for the Regional Districts of Central Okanagan, North Okanagan, Okanagan – Similkameen (16 communities), Cities of Kelowna, Vernon, Penticton, West Kelowna, Districts of Peachland and Summerland, BC Parks and private developers (1998-2021). These assessments included:

- Mapping and describing the wildfire risk
- Making recommendations for mitigating the wildfire hazard
- Combining recommendations for habitat restoration (if required)
- Using the FireSmart guidelines (after 2004) for the development plans with regards to community bylaws and Official Community Plans.

Habitat Restoration Projects
Clients have included BC Parks, the Fire Maintained Ecosystem Restoration Committee (Boundary Forest District), Penticton and Vernon Forest Districts (2001-2005) and the Regional District of Central Okanagan, including:

- An Inventory of grassland and forest habitat ecosystems
- A fire hazard risk assessment, prescribed burn plans, stand thinning prescriptions and fuel reduction plans to restore the ecosystems
- Timber harvesting to restore habitat for ungulates and endangered species.

Fuel Treatment Projects
Fuel treatment prescriptions have been prepared for developers in Kelowna (2010-2017), Penticton (2008), Summerland (2007, 2017, 2021), Peachland (2020) and BC Parks (Kalamalka Lake Park, and the White Lake Conservation Area 2002, 2003), the Boundary Forest District (2002, 2003), West Kelowna (2019, 2021), Lake country (2021) and Joe Rich (2019). The plans included prescriptions to return forest and grassland ecosystems to more natural conditions for fire-maintained ecosystems and fuel reductions to mitigate the wildfire hazard.

Fuel Treatment Project Supervision- various projects including fuel treatments for the Regional District of Central Okanagan, City of Kelowna.

RECENT EMPLOYMENT HISTORY

Owner, Swanson Forestry Services Ltd., Kelowna, 1998-Present
Projects Manager, Drake Forestry Services, Kelowna, 1997-1998
Forester, Simons, Reid, Collins, Kelowna, 1995-1997

List of Sources

British Columbia Conservation Data Centre, accessed September, 2017. BC Species and Ecosystems Explorer. B.C. Ministry of Environment Victoria, B.C.

Bruce Blackwell, B. A. Blackwell and. Associates Ltd., Vancouver, B.C.

BC Ministry of Forests, February 1990. Guide to Site Identification and Interpretation for the Kamloops Forest Region, Land Management Handbook 23.

Environmental Assessment for 530 Caramillo Court and 1490 Cara Glen Way, City of Kelowna, BC, Ecoscape Environmental Consultants Ltd. #102 – 450 Neave Court Kelowna, B.C. V1V 2M2 December 5, 2022 Version D File No. 21-4041.

Official Community Plan Amendment Project, Wildland Fire Policy Discussion Paper, February 2006, supplied to the Thompson- Nicola Regional District by the TRUE Consulting Group, Pages 4 - 9.

Ministry of Forests, Protection Branch, 2004. The FireSmart Manual, BC Edition, the manual is available from the local fire department and is a helpful source of information to property owners.

Weatherspoon, C.P. and Skinner, C.N. 1996. Landscape-level strategies for forest fuel management. In Sierra Nevada Ecosystem Project: Final reports to Congress II Assessments and scientific basis for management options. pp. 1471-1492.

Wildfire Management Branch of BC Ministry of Forests, Land and Natural Resource Operations, January 2013. Wildland Urban Threat Assessments in BC.

From:	Josh Grenon
To:	Andrea Martinez Alvarez
Subject:	FW: Archelogy response for Cara Glen
Date:	November 1, 2023 10:59:32 AM
Attachments:	image001.png image003.png image004.png image005.png image006.png

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Regards,

Josh Grenon
Assistant Development Manager
LAMONT
RESPECTING LAND & PEOPLE

From: Josh Grenon
Sent: Wednesday, November 1, 2023 12:00 PM
To: Andrea Martinez Alvarez <alvarez@placemarkdesign.ca>
Cc: Randy Sieben <randy@lamontland.com>; Phil Moore <phil@lamontland.com>
Subject: FW: Archelogy response for Cara Glen [Filed 01 Nov 2023 11:59]

Good morning Andrea,

I hope you have been doing well!

Please see below for the comments we have received regarding our Archelogy inquiry for the Phase 2 lands in Cara Glen. Bases off of their response I believe we do not need any more studies conducted regarding this matter

If you have any questions, please let me know.

Regards,

Josh Grenon
Assistant Development Manager
LAMONT
RESPECTING LAND & PEOPLE

From: Birte Decloux <Birte@urbanoptions.ca>
Sent: Wednesday, November 1, 2023 11:50 AM
To: Josh Grenon <josh@lamontland.com>
Cc: Randy Sieben <randy@lamontland.com>
Subject: Archelogy response for Cara Glen

For your records.

Kind regards,

Birte Decloux *RPP MCIP*

URBAN OPTIONS Planning corp.
birte@urbanoptions.ca
250.575.6707
Website: Urbanoptions.ca

From: Jack Pawsey <Jack@urbanoptions.ca>
Sent: Wednesday, November 1, 2023 10:05 AM
To: Birte Decloux <Birte@urbanoptions.ca>
Subject: FW: Data Request: Jack Pawsey - Urban Planner - Urban Options Planning Corp.

Regarding 1490 Cara Glen. No known archeological sites.

From: Partridge, Erin FOR:EX <Erin.Partridge@gov.bc.ca>
Sent: Wednesday, November 1, 2023 9:50 AM
To: Jack Pawsey <Jack@urbanoptions.ca>
Subject: RE: Data Request: Jack Pawsey - Urban Planner - Urban Options Planning Corp.

Hello Jack,

I apologize for the second email; my initial response was missing 1/2 screenshots. Please see the below for an updated archaeological information report regarding 1490 Cara Glen Way, Kelowna, BC, PID 018979289, LOT L SECTIONS 31 AND 32 TOWNSHIP 26 OSOYOOS DIVISION YALE DISTRICT PLAN KAP53293. Please review the screenshot of the property below (outlined in yellow) and notify me immediately if it does not represent the property listed in your information request.

Results of Provincial Archaeological Inventory Search

According to Provincial records, there are no known archaeological sites recorded on the subject property.

Archaeological potential modelling for the area does not indicate a high potential for previously unidentified archaeological sites to be found on the subject property.

Archaeology Branch Advice

The Archaeology Branch does not identify a need for archaeological study or Provincial heritage permit(s) at the time of this information request.

Please notify all individuals (e.g., owners, developers, equipment operators) involved in land-altering activities (e.g., home renovations, property redevelopment, landscaping, service installation) that if archaeological material is encountered during development, they **must stop all activities immediately** and contact the Archaeology Branch for direction at 250-953-3334.

Rationale and Supplemental Information

- Archaeological study and Provincial heritage permit(s) are not required in the absence of an archaeological site.
- There is always a possibility for previously unidentified archaeological sites to exist on the property.

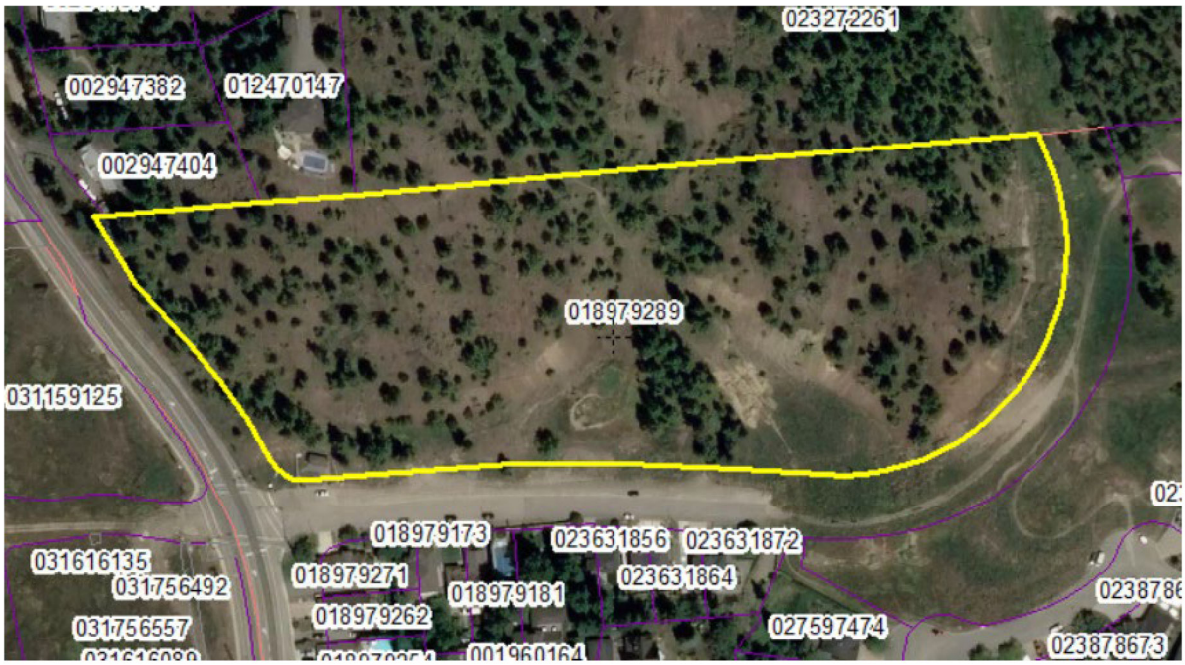
- Archaeological sites are protected under the *Heritage Conservation Act* and must not be damaged or altered without a Provincial heritage permit issued by the Archaeology Branch. This protection applies even when archaeological sites are previously unidentified or disturbed.

Questions?

For questions about the archaeological permitting and assessment process, please contact the Archaeology Branch at 250-953-3334 or archaeology@gov.bc.ca.

For more general information, visit the Archaeology Branch website at www.gov.bc.ca/archaeology.

Best wishes,
Erin



Please note that subject lot boundaries (yellow) and areas of archaeological potential (beige = moderate potential) indicated on the enclosed screenshot are based on information obtained by the Archaeology Branch on the date of this communication and may be subject to error or change. Archaeological site boundaries may not be identical to actual site extent.

BRITISH COLUMBIA
Ministry of Forests

Erin Partridge (they/them)
Archaeological Information Specialist
| Inventory Archaeologist

Archaeology Branch
Ministry of Forests
Erin.Partridge@gov.bc.ca

From: Partridge, Erin FOR:EX
Sent: Wednesday, November 1, 2023 9:44 AM
To: 'Jack Pawsey' <jack@urbanoptions.ca>
Subject: RE: Data Request: Jack Pawsey - Urban Planner - Urban Options Planning Corp.

Good morning Jack,

Thank you for your archaeological information request regarding 1490 Cara Glen Way, Kelowna, BC, PID 018979289, LOT L SECTIONS 31 AND 32 TOWNSHIP 26 OSOYOOS DIVISION YALE DISTRICT PLAN KAP53293. Please review the screenshot of the property below (outlined in yellow) and notify me immediately if it does not represent the property

listed in your information request.

Results of Provincial Archaeological Inventory Search

According to Provincial records, there are no known archaeological sites recorded on the subject property.

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Archaeology Branch Advice

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- There is always a possibility for previously unidentified archaeological sites to exist on the property.
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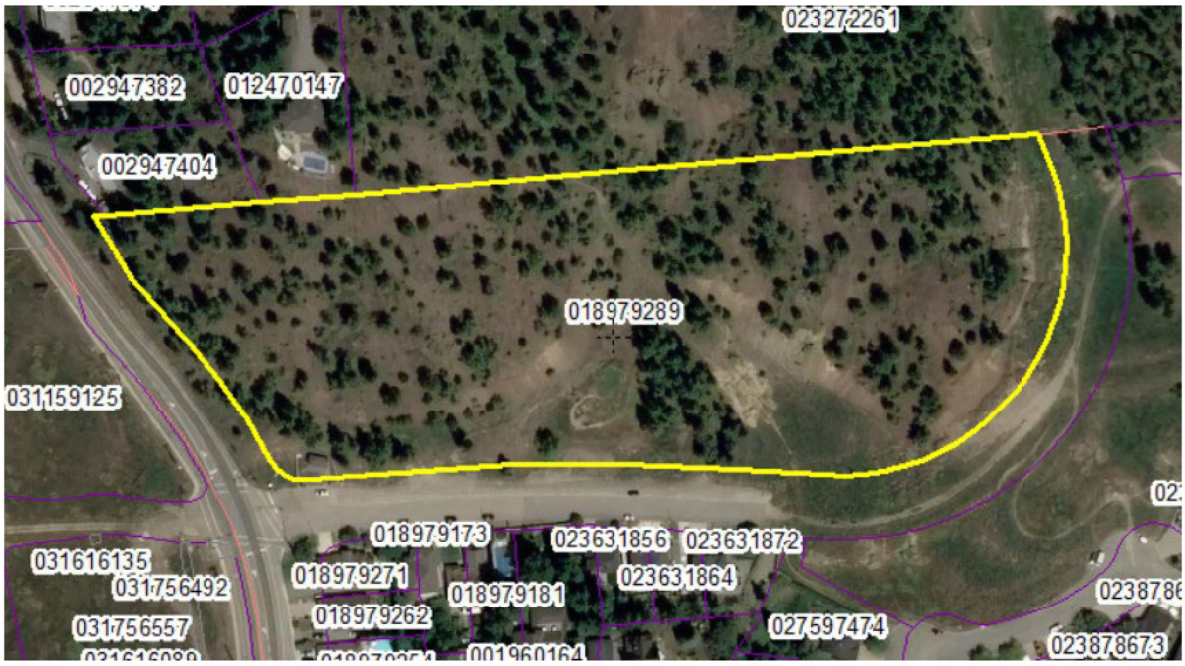
Questions?

For questions about the archaeological permitting and assessment process, please contact the Archaeology Branch at 250-953-3334 or archaeology@gov.bc.ca.

For more general information, visit the Archaeology Branch website at www.gov.bc.ca/archaeology.

Best wishes,
Erin



Please note that subject lot boundaries (yellow) and areas of archaeological potential (beige = moderate potential) indicated on the enclosed screenshot are based on information obtained by the Archaeology Branch on the date of this communication and may be subject to error or change. Archaeological site boundaries may not be identical to actual site extent.

BRITISH COLUMBIA
Ministry of Forests

Erin Partridge (they/them)
Archaeological Information Specialist
| Inventory Archaeologist

Archaeology Branch
Ministry of Forests
Erin.Partridge@gov.bc.ca

From: jack@urbanoptions.ca <jack@urbanoptions.ca> **On Behalf Of** ArchDataRequest@gov.bc.ca
Sent: Wednesday, October 25, 2023 4:01 PM
To: Arch Data Request FOR:EX <ArchDataRequest@gov.bc.ca>
Subject: Data Request: Jack Pawsey - Urban Planner - Urban Options Planning Corp.

Terms and Conditions Accepted	Yes
Name	Jack Pawsey
Email	jack@urbanoptions.ca
I am a	Contractor for Private Property (e.g., engineer, architect)
Affiliation	Urban Planner - Urban Options Planning Corp.
Address	202-1470 St. Paul Street
City	Kelowna
Province	BC
Postal Code	V1Y 2E6

Phone Number	250-402-1159
Information Requested	I request information and advice about archaeological sites on the properties described below (In the text box below, include the Parcel Identifier (PID), street address, and the legal description if available. If you have maps, please upload them to the File Attachments section near the end of the form.): 1490 Cara Glen Way, Kelowna BC PID: 018-979-289
Why Site Information is Required	Other (describe below): Requested by local government
Third Party Access	The following person(s) may have access to this information (Include the person's full name and relationship to you below. If you would like them to be copied on our email reply containing property information, please also include their email address): City of Kelowna Staff
Format Required	PDF
Who Prompted	My local government
File Attachment#1	
File Attachment#2	
File Attachment#3	
File Attachment#4	
File Attachment#5	