



Watercourse Setback Assessment at
2000 Wolfe Street, City of North Vancouver, BC

For: Streamside Protection & Enhancement Development Permit

March 22, 2022, Version 1.0
Project No. 21.0069

Client:
Great Owl Estates Ltd.

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Executive Summary

This report was prepared for the Client, Great Owl Estates, who are proposing to redevelop 2000 Wolfe Street in the City of North Vancouver (CNV). The property is within CNV's Streamside Development Permit area.

The property is encumbered by one watercourse: Thain Creek (alias Mission Creek) flowing through a ravine in Mahon Park on the east side of the site. Thain Creek is a permanent, fish bearing watercourse. The ravine in Mahon Park is greater than 60 m across at top-of-bank (TOB).

It was found that in accordance with guidelines CNV provides in the Streamside Protection & Enhancement Development Permit (SPEDP) application, the Client's proposed development layout conforms to a 10 m setback from TOB. Recommendations for protection and enhancement of the streamside protection area are provided in the text below.

1 Introduction

Barsanti Environmental Services Ltd. (Barsanti Environmental) has been retained by Great Owl Estates Ltd. (the Client) to provide the services of a Qualified Environmental Professional (QEP) to assess a watercourse on their project site at 2000 Wolfe Street, in the City of North Vancouver (CNV), BC (the Site, Figure 1). This report provides the information required for a Streamside Protection & Enhancement Development Permit (SPEDP) application.

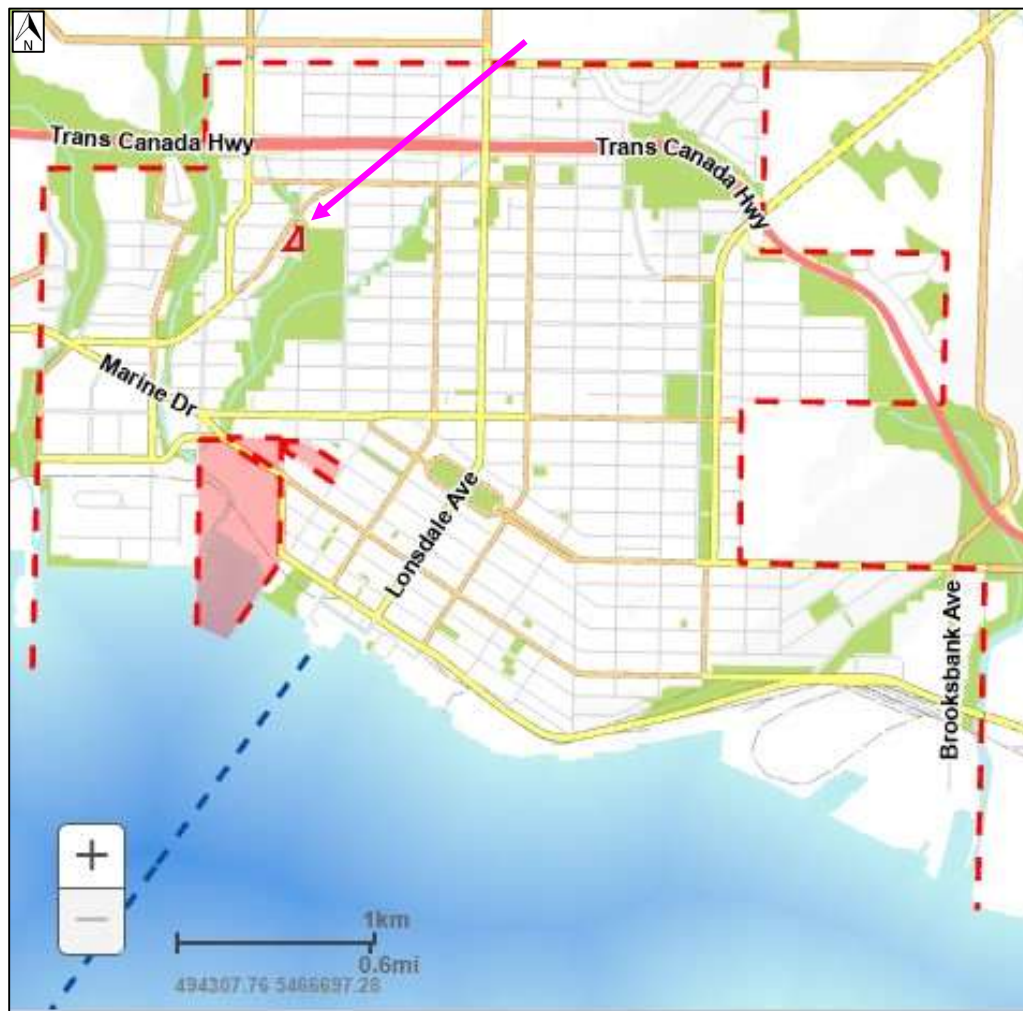


Figure 1. Project location: 2000 Wolfe St. City of North Vancouver.

2 Project Overview and Proposed Works

The subject property is presently developed with one single-family home plus accessory buildings. The Client is proposing to redevelop the site into a five-lot subdivision for new single-family housing. Twain Creek (alias, Mission Creek) flows through a ravine in Mahon Park abutting the east boundary of the property (Figure 2). The proximity of the watercourse triggers CNV's requirement for an SPEDP permit application.



Figure 2. Overview mapping of the subject property and the surrounding neighbourhood.

3 Objective

The objective of this project is to assess the existing biological and physical conditions on and near the site to identify environmental values and to make recommendations to help inform development decisions to protect those values.

4 Contributing Professionals

Jason Barsanti, R.P.Bio. is the Principal of Barsanti Environmental Services Ltd. who prepared the Fish and Wildlife Habitat Assessment for Ecosystem Development Plan. Jason is a registered professional with the College of Applied Biology (CAB). Mr. Barsanti is a qualified environmental professional (QEP) with 16 years' experience working on wildlife, fisheries and wetland habitat assessments including surveys for rare and endangered plants, small mammals, amphibians, conducting surveys for songbird breeding habitat, developing habitat restoration plans, and conducting fish, amphibian, and wildlife salvages for works in environmentally sensitive areas.

4.1 External Contributing Professionals

- Troy Issigonis, P.Eng. Terrane Engineering Group Ltd. (Terrane) Geotechnical and Slope Hazard Assessment.
- Mike Fadum and Associates Ltd. (Fadum), Arborist Services.

5 Methodology

Background research on the Site and surrounding area was conducted prior to undertaking fieldwork. The CNV online mapping system was referenced for baseline site information. Habitat Wizard was referred to for background information on fish, plants, and wildlife. I conducted a site visit on October 5 and December 3, 2021, with unrestricted access to the entire property and the park. Observations were recorded with corresponding pictures and fieldnotes. The Riparian Areas Protection Regulation (RAPR) methodology was referenced for riparian area assessment procedures and CNV's *Streamside Protection & Enhancement Development Permit Guidelines*, Attachment 1 of Bylaw No. 7759 (the *Guidelines*), was referred to for municipal streamside protection regulations.

The subject property was surveyed by a British Columbia Land Surveyor (BCLS). BCLS supplied topographical survey data and Terrane confirmed top-of-bank and slope stability. Fadum confirmed tree and root protection measures.

6 Property Description

Table 1. Summary of Site Information

Address	2000 Wolfe Street, City of North Vancouver BC, V7M 2Z9
PID	014-603-136
Legal Description	Lot:11; Block:2; DL:547; Plan:1476
Site Area	4,741.84 m ² / 0.47 hectares
Zoning	RS-1
Lat; Long	49.32767; -123.08490
Permit Area (DPA)	Streamside Development Permit Area

7 Pertinent Development Regulations

8 Watercourse Protection

Watercourse and riparian area protection regulations in British Columbia are derived from the *Fish Protection Act* and administered through *Riparian Areas Protection Regulation* (RAPR). The RAPR is a joint undertaking by Federal, Provincial and Local Government. Definitions and Assessment Methodology are prescribed in the RAPR for use in determining the Streamside Protection and Enhancement Area (SPEA) to protect the riparian area adjacent to all watercourses.

The RAPR provides for devolution of streamside protection to local government on the condition that local bylaws “meet or beat” SPEA prescriptions defined by the RAPR. The CNV has determined to make watercourse protection a local responsibility and has developed a set of guidelines that are supported by Fisheries and Oceans Canada (DFO).

The following is a summary of CNV’s General Guidelines for development near permanent watercourses and wetlands¹:

- 9.2.1 Avoid the net loss of riparian habitat within 15 metres of the top of the watercourse bank or edge of the wetland or within 10m of the top of a ravine bank.
- 9.2.2 Within 15 metres of the top of the watercourse bank or edge of wetland (10m for ravines), the applicant shall locate new buildings, structures and impervious / semi-impervious surfaces at least as far from the watercourse, wetland or top of ravine bank as any existing development.
- 9.2.3 Keep the area within 5 metres of the top of the watercourse bank, edge of wetland or top of ravine bank free of all new buildings, structures and impervious / semi-impervious surfaces.
- 9.2.4 Where necessary, zoning variances, including reduced building setbacks, may be considered in order to prevent the loss of habitat within 15 metres of the top of the watercourse bank or edge of the wetland or within 10m of the top of the ravine bank.
- 9.2.5 Where it is not practical to avoid net loss of riparian habitat within 15 metres of the top of the watercourse bank or edge of the wetland (within 10m of top of bank for ravines), provide mitigation as approved by the City of North Vancouver to achieve an overall no net loss of riparian habitat.

¹ SPEDP Guidelines. Accessed on March 14, 2022. Accessed at > <https://www.cnv.org/Property-and-Development/Building-and-Development/Development-Applications/Development-Permits/Streamside-Development-Permit-Areas><

10 Description of the Study Area

Thain Creek (alias Mission Creek) flows south on the east side of the property in a wide, deep and steep-sided ravine. Wagg Creek flows into Thain Creek from the east bank of the ravine (Figure 3). The streamside protection area of Wagg Creek does not encumber the subject property and is not discussed further in this report.

The ravine of Thain Creek is a landmark feature in the study area; the ravine is an undeveloped greenfield, composed of very-mature second-growth forest (Figure 4). Outwards from top-of-bank the site is wholly altered, the terrain is flat and largely composed of turf-grass. One single-family home is present with one large out-building and a small shed and lean-to.

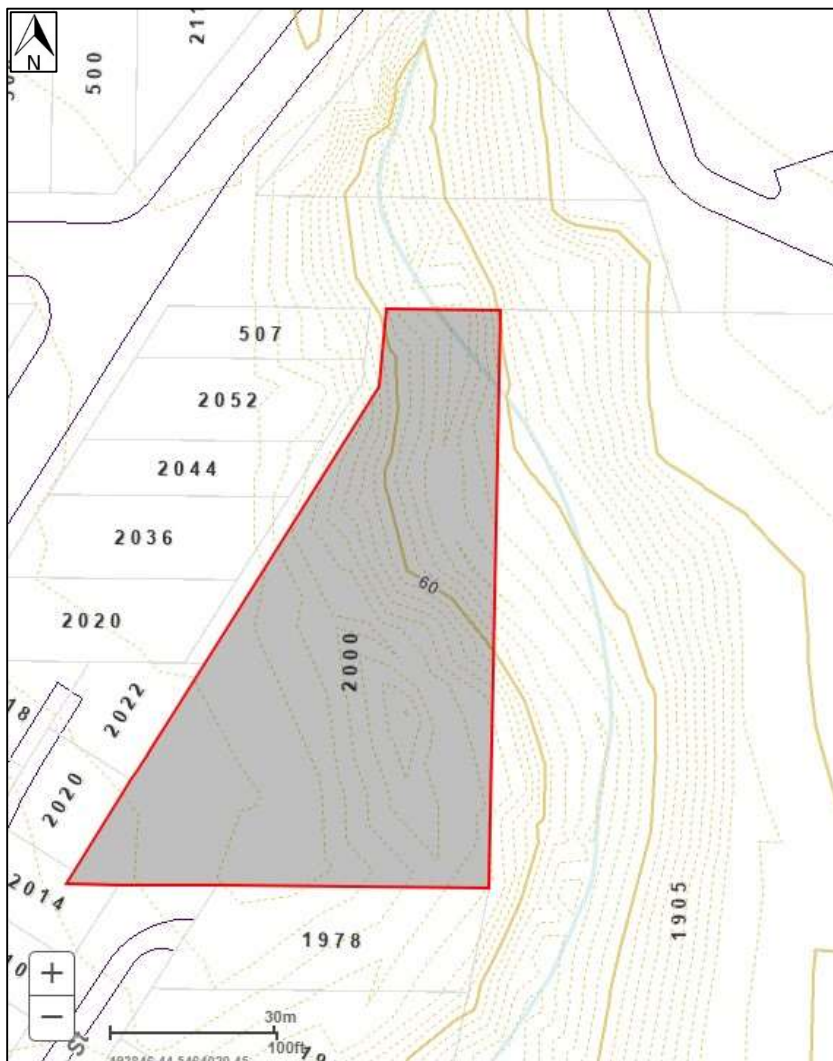


Figure 3. This is an overview map of the study area illustrating the presence of Thain Creek and the ravine. Obtained from CNV Webmap, 2022-03-11.



Figure 4. The subject property is highlighted in this 2021 air photo which shows the ravine forest canopy adjacent to the site. CNV Webmap, 2022-03-11.

10.1 Watercourse Information: Thain Creek

The site is approximately 1200 m (channel length) upstream from the confluence of Mosquito Creek, Mosquito Creek flows into Burrard Inlet. The headwaters of Thain Creek are approximately 772 m upstream of the site.

Thain Creek is a permanent stream (flows more than six months of the year).

Fisheries Information Data Queries (FIDQ) lists the following important commercial and recreational fish species present in Thain Creek: Coho Salmon, Cutthroat Trout.

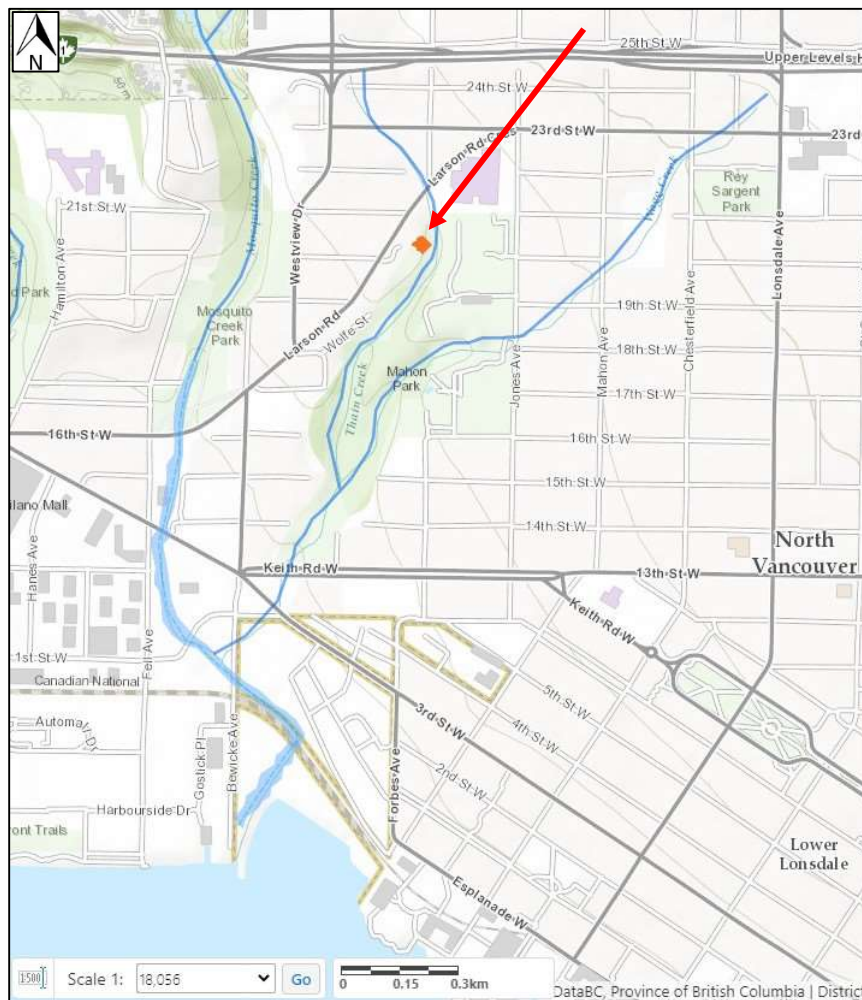


Figure 5. Watercourse mapping illustrating the headwaters and confluence with Mosquito Creek and Burrard Inlet. Obtained from Habitat Wizard, 2022-03-11.

11 Field Assessment

11.1 Thain Creek

The subject reach of Thain Creek flows through a deep ravine; the difference in elevation between the streambed and TOB is approximately 10 m with the average ravine bank slope being 35 percent (west bank).

The average channel width is 4.4 m at bank-full width and the channel gradient on the subject reach is approximately 13.5 percent². The channel bed is primarily composed of gravel and small cobble with medium-cobble and boulder, and sand in the proportion of 60:30:10.

The reach provides high value spawning and rearing habitat. No salmonids were observed during field work.

Riparian vegetation is dominated by western redcedar with bigleaf maple, red alder and vine maple. Sword fern and salmonberry are the dominant native plants in the understory.

11.2 Invasive Plants

Understory vegetation is widely overgrown with ivy species and yellow archangel with a small amount of Himalayan blackberry, all are common invasive plant species.

A knotweed species was observed on the west bank of the ravine. The observation is not on the subject property (Figure 6, Photo 3).

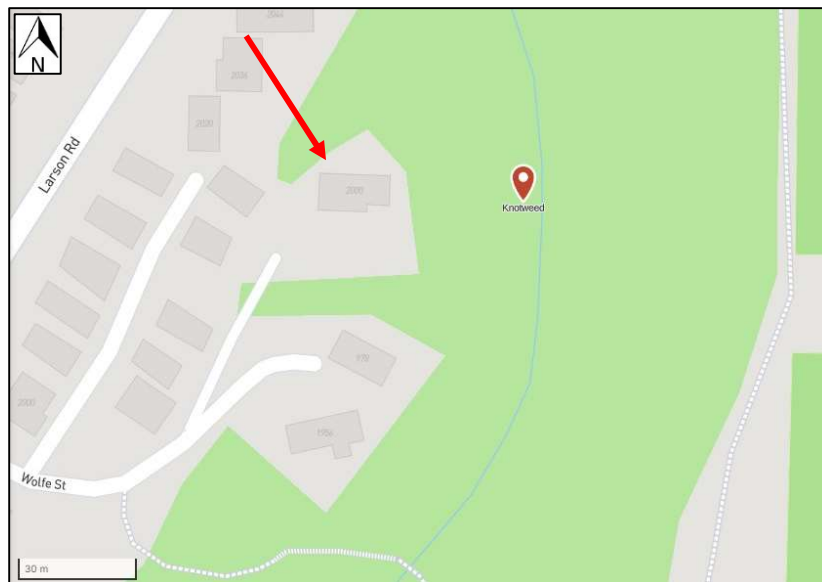


Figure 6. Knotweed species observation recorded by GPS: 49.32763, -123.08444

² Width and gradient were determined using procedural guidelines in RAPR Detailed Assessment Methodology.

12 Site Photos

The following pictures were taken on October 5, 2021.



Photo 1. Viewing current developments on the site and riparian vegetation near the top of ravine bank on the right-hand side of the frame.



Photo 2. Viewing Thain Creek and riparian vegetation.



Photo 3. Viewing knotweed observed in the riparian zone of Thain Creek.

13 Project Analysis

13.1 RAPR Streamside Protection Areas

The SPEA on Thain Creek was determined by applying the Detailed Assessment Methodology provided in the RAPR. Results are presented in Table 3.

The SPEA, based on stream classification of Step-Pool is 13.2 m from HWM. The subject reach of Thain Creek flows through a ravine and therefore, according to Measures outlined in the RAPR for the protection of Slope Stability it was determined that an assessment by a secondary QEP was necessary to consider the integrity of the SPEA.

Terrane assessed a setback of 10 meters from TOB for slope protection. Please refer to reporting by Terrane and provided by the Client for more detailed discussion.

The SPEA on Thain Creek per the RAPR assessment methods is 10 meters from TOB.

Table 2. Summary of RAPR Stream and SPEA Classification Elements

Element	Factor	Comment
Average Width	4.4 m	
Average Slope	13 percent	
Reach Type	Step-Pool	
Site Potential Vegetation	Tree	
Zones of Sensitivity		
Large Woody Debris (LWD)	10 m	
Litter Fall and Insect Drop	13.2 m	
Shade	13.2 m	Not on south bank.
SPEA	13.2 m (basic)	Measured outwards from the high-water mark.
SPEA with Slope Stability Measures	10 m from TOB	Per RAPR measures for slope protection.

13.2 SPEDP Guidelines for Watercourse Protection

Thain Creek is a permanent watercourse.

Thain Creek flows through a ravine with TOB spanning more than 60 m (confirmed by BCLS).

Per Section 9.2.1 of the Guidelines, no new development may occur within 10 m of the TOB.

14 Discussion

It is understood that the Terrane report recommends a setback of 10 m from TOB for slope stability and geotechnical considerations.

Tree root protection measures assessed by Fadum on two trees extend beyond 10 m from TOB. The trees are Number C1, and Number 5593. Please refer to Fadum's tree report for more

details. Trees emerging inside the streamside protection area must be protected and there, the permanent boundary of the streamside protection area must include the root zone identified in the Fadum report.

On the subject property, CNV SPEDP Guidelines meet the SPEA derived from the Detailed Methodology of the RAPR.

It is understood that the Client has developed a layout that meets the objectives of the SPEDP and the discussion in this report.

15 Recommendations for Streamside Protection Area

The following measures are recommended to meet the SPEDP Guidelines for the Streamside Development Permit Area and enhance the environmentally sensitive area:

1. A buffer area of a minimum of 1.0 m should be added to the 10 m setback to ensure the integrity of the entire setback area and to protect it from future encroachment.
2. Any existing developments within 10 m of TOB should be removed.
3. Permanent fencing is necessary to identify and reduce encroachment into streamside protection area; to prevent encroachment during construction and by future users of the site. Fencing should be installed at the boundary of the streamside protection area.
4. Signage indicating "Environmentally Sensitive Area" should be installed at 15 m intervals on all fencing.
5. Prior to approval of the subdivision a habitat enhancement and restoration plan should be prepared by a QEP to restore natural woody vegetation, including trees, shrubs, and ferns, throughout any areas inside the SPEA on the site that are presently developed, or composed of turf-grass or non-native plants.

Noxious Weeds: CNV should act on the management and remediation of the knotweed occurrence in Mahon Park to as soon as possible.

16 Closing

Should clarification on any part of this report be required please feel free contact me.

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