CITY OF PRINCE GEORGE

Comments on Planning and Land Use Applications

Date Completed: Thursday March 9th 2023 4:22 PM

Reference Number: 2023-03-09-008

First Name *

Joseph and Dianne

Last Name *

Gagne

Address *

6483 Olympia Place

City / Town *

Prince George

Please provide either a valid telephone number or email address for internal use only. *

- (•) Email Address
- ( ) Telephone Number

Telephone Number *

Redacted

Email Address *

For which application would you like to provide comments? (One form per application) *

RZ100763 - Bylaw 9348 (Dawson Road (PID: 015-258-360) - Meeting Date: March 13, 2023

Comments:

Please find attached a letter containing my concerns and a copy of the 2011 Triton Environmental/Drainage assessment.

Provide documents or photos related to your comment. You may attach:

- A maximum of 3 files.
- Files up to 50MB each.

Add Attachment (optional)

File Name
2023 Dawson Road development letter to council.pdf 473.3 KB
Triton drainage assessment 2011.pdf 22.7 MB

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Learn more information about the collection of personal information under the *Freedom of Information and Protection of Privacy Act*.

6483, Olympia Place
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March 7th 2022

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"For inclusion in City Council agenda for March 13th meeting regarding zoning Bylaw 7850 and amendment 9348 ".

Thank you for the opportunity to respond to the proposed zoning bylaw amendments for Dawson Road (PID: 015-258-360).

Historical Information

Ten years ago when this development was originally proposed there was much discontent at the rezoning from Greenbelt. The geographic features and bio diversity of the location is unique within the City of Prince George and the neighbourhood had hoped to see it and the wildlife protected. We failed. Our quality of life is closely linked to our physical environment and natural areas in and around the City. Residents continue to express the great value of the natural environment throughout the my PG Sustainability Plan and OCP review process. Triton never did conduct a wildlife review of this development area which is unfortunate, their Environmental study was primarily in regard to fish.

In 2010-2012 the property was being liquidated as part of the Eron securities fraud by PriceWaterhouseCooper through the Supreme Court of BC. The numbered company 534170BC were involved and were the applicants for the re-zoning. They were actively looking for joint venture partners. Now I see L+M engineering are representing a numbered company 1357316BC Ltd incorporated in April 2022.

Concerns

1. Who are the owners of the 1357316BC Ltd numbered company and how can we be guaranteed that they are reliable?

2. A traffic impact study was and still is a major concern so I am glad this is recommended in the staff report. Dawson road is very narrow and increased traffic from the proposed increased housing density (RT3 and RS2 to RM2) will create a hazard. Issues around snow removal, traffic congestion and the high density of children along these routes need to be addressed by the traffic impact study as well as congestion at East Austin Road and Highway 97. This is particularly important as an optional exit route for the development area via Monterey Road is no longer available due to light industrial development across the right of way.
OCP policy 6.4.69 states that new neighbourhoods should be planned with multiple access points to ensure that emergency responders can attend to all areas of the City even if certain roads become impassable. Consideration needs to be given to emergency exit for local residents also. The Valleyview subdivision exits through East Austin Road too.
Of note is that proposed exits for Valleyview Park, which are an extension of East Austin Road to Shady Valley and of Monterey Road to Highway 97 (that were in the 2012-100 year plan) have both been obstructed by development.

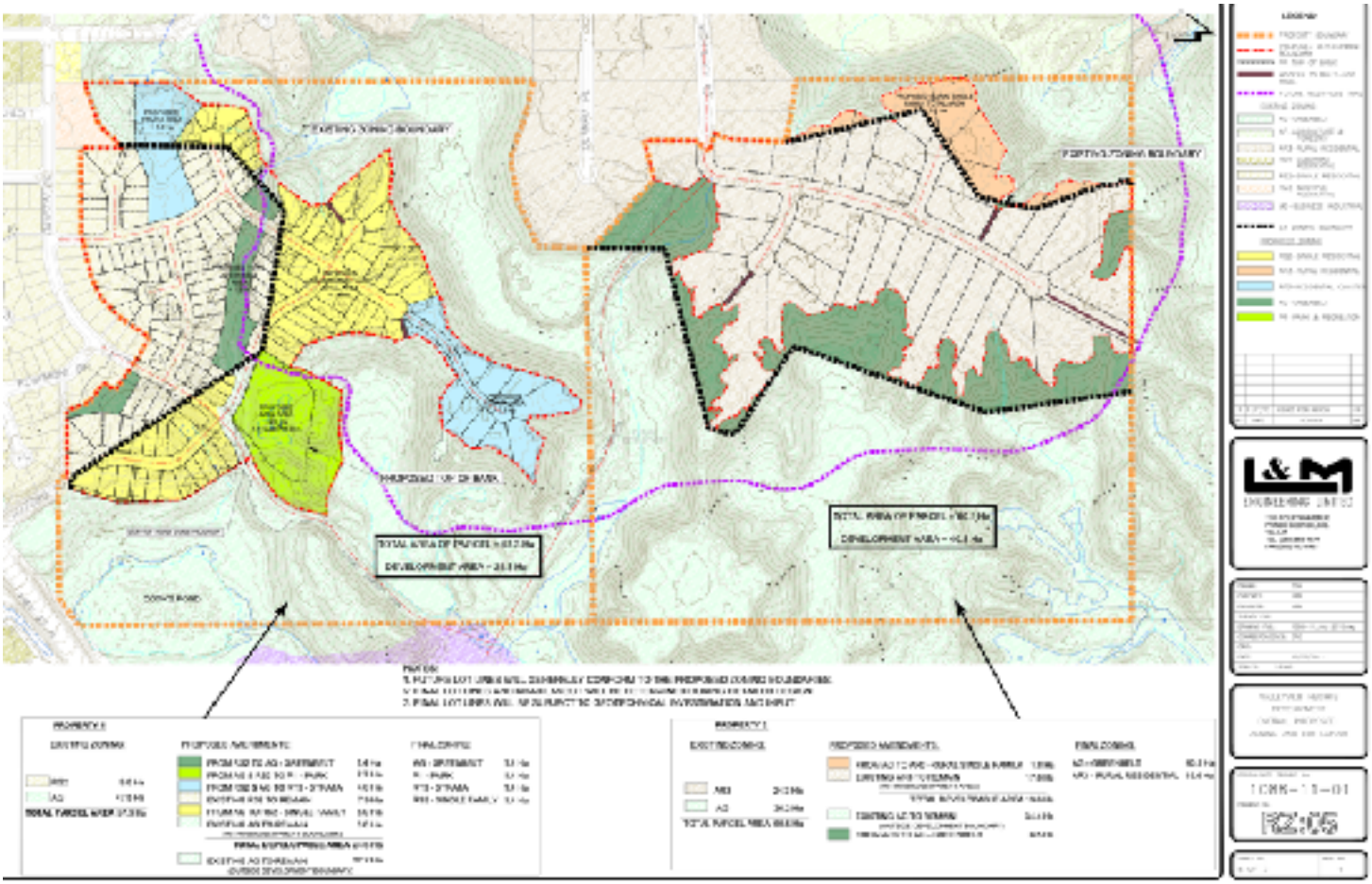
3. Glenview elementary school, servicing the area, is already over capacity. Does further expansion of Glenview school or the construction of a new school need to be addressed before the proposed development changes to the rezoning application are amended? Should school district 57 provide a report prior to final reading?

4. According to the OCP Road, water, sewer and storm sewer infrastructure is now wearing out. The OCP says that detailed servicing studies are required for growth management and have been recommended on the staff report. Minimizing infrastructure costs, helps to keep taxes low (OCP wording). Who will be responsible for the very costly infrastructure renewals and replacements costs associated with the increased housing density? I assume these costs are the responsibility of the developer and not local taxpayers. Should this be addressed?

5. Will a geotechnical assessment be required to address erosion and slope stability concerns? This was recommended in the Triton report of 2011.
The 2011 Triton Environmental report also recommended that the development area be considered a Riparian Protection Area. (I will attach a copy of the Triton report).
Riparian protection is covered by bylaw 8896 in which guideline 8.9.2 states
"Leave strips within riparian protection development permit areas must remain free of development, except in accordance with these guidelines, to ensure that natural features, function and conditions that support fish life processes are preserved, protected, restored or enhanced. Watercourses and water bodies shall have: 15.0 m leave strips

from the top of bank for agricultural, outdoor recreation, and low density (<18 units/ha) residential developments"

This area is formed by a series of Eskers so the development is surrounded by significant slopes greater than 20% and classified as ravine. There are small lakes and creeks in the ravine. Groundwater protection and management is often overlooked, but it is vital that this is maintained. Objective 6.2.2 is to preserve, protect and restore riparian and wetland area to maintain and enhance water quality and quantity and the ecological functions of the watercourse. Clear cut logging in the areas to be developed as presently requested will result in greater runoff and the potential for erosion into the ravine. Here is a topographical map from L+M's 2012 rezoning request



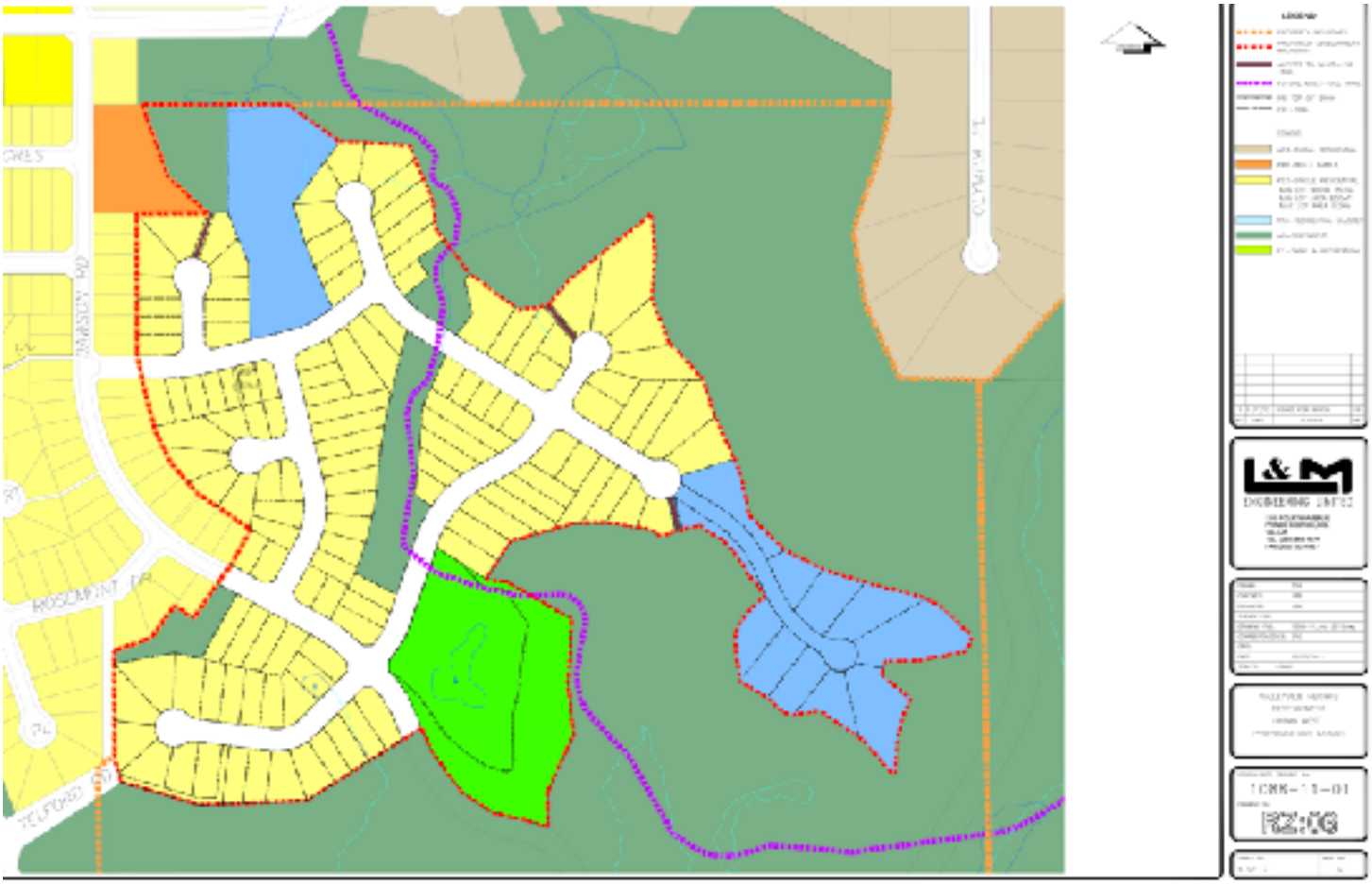
6. OCP policy 7.4.6 Support improvements to trails and green space to enhance and increase connectivity to nature and our rivers throughout the city for all seasons. Schedule B9 of the OCP shows where the existing trail through this area is located. The trail is not identified on Appendix "A" map of the proposed bylaw change and should be noted.

7. Covenants. The L+M application does not refer to the number of units per hectare or to asymmetrical two unit housing. The staff report to council does address this, but the changes to not reflect those required in a Riparian Protection area as noted above in item Number 5. The changes below are significantly different from those required for Riparian protection (15 Metre leave strips and 18 houses per hectare)

RT3 areas that regulate 25 units per hectare with the minimum lot width ion 35.0 m and the minimum lot area of 0.2 ha. would become RM2 which says 60 dwellings per hectare and allows for row housing and apartments. The minimum lot width is 20.0 m, except it is 15.0 m for single detached housing. The minimum lot area is 845 m2, except it is 500 m2 for single detached housing.

RS2 which regulates properties to be larger than 500 m2 would also become RM2 which says 60 dwellings per hectare and allows for row housing and apartments. The minimum lot width is 20.0 m, except it is 15.0 m for single detached housing.The minimum lot area is 845 m2, except it is 500 m2 for single detached housing.

Here is a map of L+M's original 2012 development plan which is much lower density.



8. The requested bylaw amendments only apply to 3.1 hectares. This is approximately 1/6th of the area identified for future development according to the OCP. Multiply the proposed development by 6 as these areas will also undergo bylaw changes to increase density when the time comes. This amount of increased residential occupancy needs to be taken into consideration now and not postponed to a future date.

9. What is an explanation for a "townhome strata development"?

Thank you to City Council members for taking these comments under consideration.

Joseph and Dianne Gagne.

4486/WP2448

VALLEYVIEW REZONING
DRAINAGE ASSESSMENT

Prepared for:

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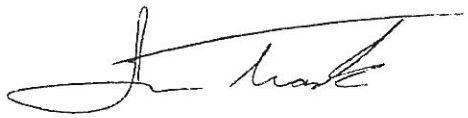

Prepared by:

TRITON
ENVIRONMENTAL CONSULTANTS LTD.

#201 –1157 Fifth Ave., Prince George, BC V2L 3L1

June 2011

Executive Summary

A pre-development drainage and environmental assessment was conducted by Triton Environmental Consultants Limited on behalf of the proponent (534170 BC Ltd.) in support of a proposal for rezoning for residential development. The scope of the assessment was limited to wildlife, fish and fish habitat.

Existing fish sampling information is limited to records of goldfish, which were captured in the unnamed pond on the east side of Highway 97 and it is likely that there was use of portions of connected watercourses that occur within the proposed rezoning area. No other species of fish have been captured in project area streams. No permanent natural barriers to upstream fish passage have been reported or observed during the field surveys for this project, however a series of beaver dams would impede upstream fish passage and seasonally isolate the available habitats from the mainstem of McMillan Creek. Where suitable fish habitat exists in the Project area streams and no permanent barriers were observed, they have been defaulted as fish bearing. Portions of mapped drainages that lack defined stream channels or otherwise do not sustain suitable fish habitat are considered non-fish bearing.

Portions of the subject drainages are identified as sensitive natural features and include both riparian protection development permit areas, and significant slopes as identified within the Official Community Plan for the area (OCP). The OCP discourages development on slopes greater than 20% and riparian areas are subject to Prince George zoning bylaws. This report provides information necessary to facilitate the application review process and includes recommendations to ensure the protection of sensitive natural features identified in the OCP.

The alteration of watercourses and riparian habitats within the proposed rezoning area have the potential to directly or indirectly affect fish in Birchwood and McMillan Creek and as such, contributions of food nutrients, water quality and quantity must be maintained to avoid causing a harmful alteration of fish habitat. As outlined in the federal *Fisheries Act* (see section 3 of this report), the protection of fish habitat includes maintaining:

- Water quality
    - Development must not lead to the introduction of deleterious substances to waters where fish exist.
    - Maintain temperatures and flows
- Food & Nutrient Contribution
    - e.g. maintenance of litter, woody debris, insect inputs

Through engineering design, designation of green space, compliance with urban development guidelines for the maintenance of water quality and quantity at pre-development levels, and the diligent application of environmental best management practices, the potential environmental effects of the proposed development can be fully mitigated.

Disclaimer

This report is rendered solely for the use of the proponent (534170 BC Ltd.) *and The City of Prince George in connection with the Valleyview Rezoning Project, and no person may rely on it for any other purpose without Triton Environmental Consultants Ltd.'s prior written approval. Should a third party use this report without Triton's approval, they may not rely upon it. Triton accepts no responsibility for loss or damages suffered by any third party as a result of decisions made or actions taken based on this report.*

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1.0 INTRODUCTION

The proponent (in this case the property owner, a company numbered 534170 BC Ltd.) retained *Triton Environmental Consultants Limited* (Triton) to conduct an environmental assessment on two development properties within the City of Prince George, BC. The assessments were conducted as part of the due diligence investigations in support of a proposed rezoning application in the Valleyview area east of the John Hart Highway within the City of Prince George. This assessment involved gathering existing fisheries and wildlife information and field surveys to assess the relative value and sensitivity of habitats associated with drainage areas that would be affected by the proposed development. The following document presents the results of the assessment in the context of the regulatory environment and provides recommendations for proceeding with the design and construction phases of the project.

1.1 BACKGROUND

The City of Prince George's Official Community Plan – Bylaw 7281 (OCP) was developed in 2001. The plan outlines the overarching framework and guidelines for future development in Prince George and significant efforts were made to develop and incorporate a comprehensive study for sensitive areas. The OCP identifies *Sensitive Natural Features* (SNF), and *Riparian Protection Development Permit Areas* (RPDPA) on publically available maps (Appendix 1). In addition to these maps several Prince George bylaws are relevant to the proposed Valleyview Rezoning:

- 7850 Zoning sec 8.2 (RPDPAs) and 9.1;
- 8231 (Sensitive Features Section 4 of OCP); and
- 6343 Tree Protection (prevents the cutting of trees on lands zoned greenbelt without a permit).

2.0 STUDY AREA

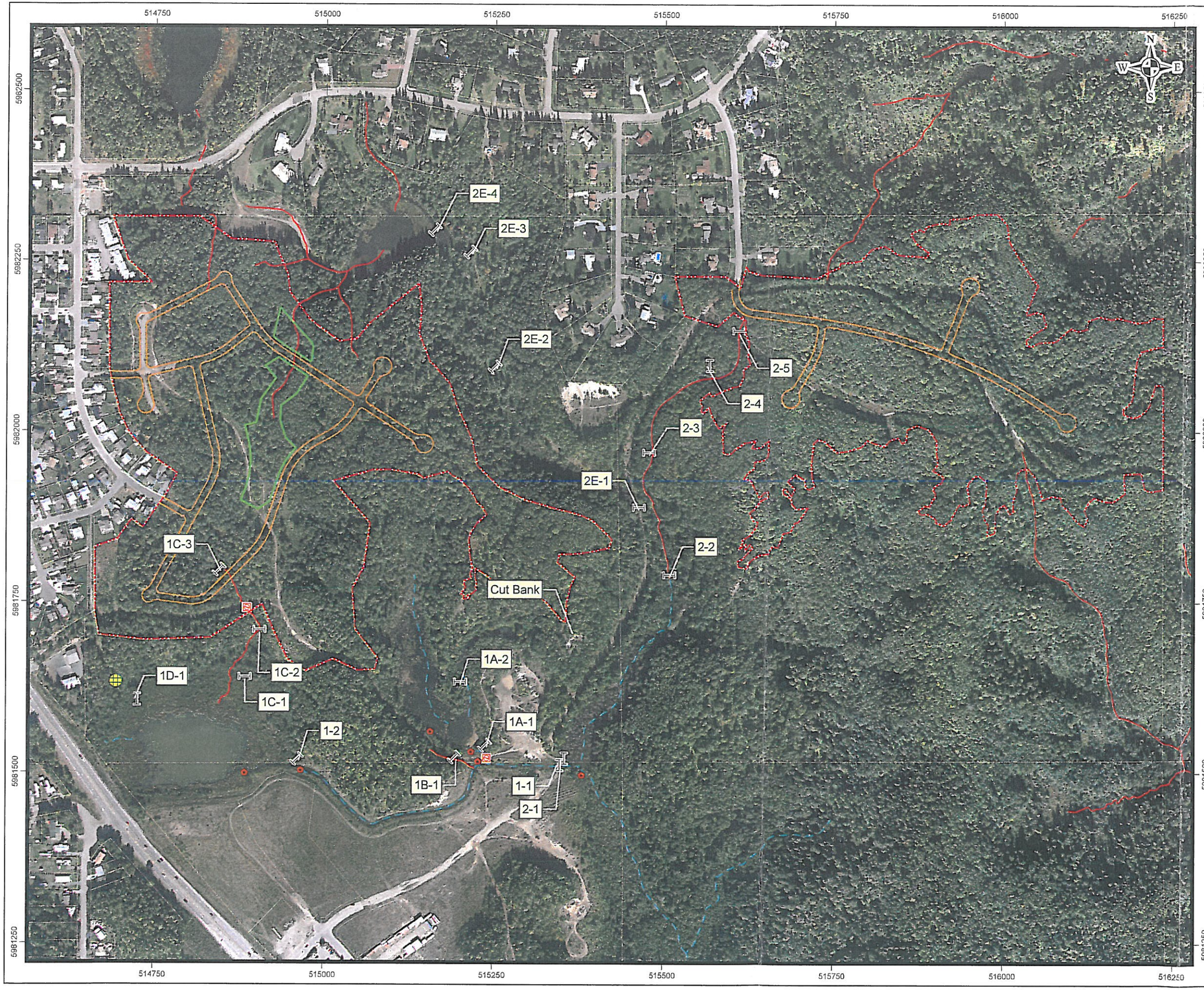
The proposed Valleyview rezoning is located within the City of Prince George. The subject parcels of land are listed by L&M Engineering Limited as follows.

- Southwest ¼ of the Remainder of District Lot 4028 (PID 015-258-360)
- Southeast ¼ of the Remainder of District Lot 4028 (PID 015-258-378)

A preliminary rezoning and lot layout, and location plan created as part of the Valleyview Rezoning application can be found as attachments in Appendix 2.

Drainage 1 (Watershed Code # 180-007200-29500-685000) and drainage 2 (Watershed Code # 180-007200-29500) fall within the land parcels identified above. These two drainages were identified as SNFs and RPDPAs based on mapping found in the OCP (Appendix 1). The subject parcels also contain terminal reaches of other drainages which represent the headwaters of McMillan Creek, these are not identified as RPDPA's (Figure 1).

Figure 1. Assessment Overview



Legend

- Reach Breaks
- Culvert
- Storm Drain Outfall
- Minnow Traps
- Proposed Development Boundary
- Proposed Greenbelt
- Proposed Roads
- Confirmed Non-Fish
- Inferred Fish
- Parcel Boundary

Location Map

NOTE: For display purposes only.
DO NOT USE FOR LEGAL
OR NAVIGATIONAL PURPOSES

0 50 100 200 300 400 Meters

Scale: 1:5,500

NO.	DATE (yyyy/mm/dd)	REVISION	BY
1	2011/07/04	Initial Draft	SA

Basemap Source: Orthophoto	**Map Datum:** UTM NAD 83 Zone 10
Project No: 4486	**File No:** Map# N:\ACTIVE\4486_Valleyview\MXD\Project_map_11x17.mxd
Date: July 4, 2011	TRITON ENVIRONMENTAL CONSULTANTS LTD.

3.0 REGULATORY ENVIRONMENT

Given that environmentally sensitive areas and natural features have been identified within the project area, the primary environmental considerations pertaining to the Valleyview Rezoning are largely associated with the natural watercourses, riparian areas, and associated ravine slopes. The following section outlines the regulatory considerations associated with the management of watercourses within the proposed development area.

Section 8.2 of The City of Prince George Zoning Bylaw No. 7850 outlines Riparian Protection Development Permit Areas and a copy is attached to provide clarity (Appendix 3).

The *Water Act* (RSBC 1996) current to August 2010;

> *A stream is defined as:*
>
> *...including natural watercourses or sources of water supply, whether usually containing water or not, and a lake, river, creek, spring, ravine, swamp and gulch; Stream channel means the bed of a stream and the banks of a stream, whether above or below the natural boundary and whether usually containing water or not, including all side channels.*

The City of Prince George Zoning Bylaw No. 7850 (City of Prince George 2007) identifies a watercourse as;

> *Watercourse includes any of the following that provides fish habitat:*
> *a) a watercourse, whether it usually contains water or not;*
> *b) a pond, lake, river, creek or brook;*
> *c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph a) or b).*

Top of bank and top of ravine are defined by:

> ***Top of Bank**: the points closest to the boundary of the active floodplain of a watercourse or water body where a break in the slope of the land occurs such that the grade beyond the break is flatter than 3 (horizontal) to 1 (vertical) at any point* for a minimum distance of 15.0 meters measured perpendicularly from the break. Where banks are not well defined (as determined by a qualified professional) the top of bank is equivalent to the high water mark. *Minor variations in elevation may be discounted where slope change greater than 3 (horizontal) to 1 (vertical) results in less than 1.0 metre elevation gain between the points where the slope is less than 3 (horizontal) to 1 (vertical).*
>
> ***Top of Ravine Bank**: the first significant break in a ravine slope where the break occurs such that the grade beyond the break is flatter than 3 (horizontal) to 1 (vertical) at any point* for a minimum distance of 15 meters measured perpendicularly from the break, and the break does not include a bench within the ravine that could be developed. *Minor variations in elevation within the 15.0 meters may be discounted where slope change greater than 3 (horizontal) to 1*

(vertical) results in less than 1.0 metre elevation gain between the points where the slope is less than 3 (horizontal) to 1 (vertical).

***Ravine**: a narrow, steep-sided valley that is commonly eroded by running water and has a slope grade greater than 3 (horizontal) to 1 (vertical).*

The Forest Practices Code (FPC) – Fish Stream Identification Guidebook BC Ministry of Forests and BC Environment (MOF and MOE 1998) defines a stream as:

Streams are defined by:

... the presence of a continuous channel bed. If a continuous channel bed exists, then either one of two other key features must be present demonstrating fluvial processes; that is, where flowing water has:

1. *scoured the channel bed, or*
2. *deposited any amount of mineral alluvium within the channel. Water flow in the channel may be perennial, ephemeral (seasonal), or intermittent (spatially discontinuous)...*

*Non-Classified Drainages (**NCD**) are defined as:*

...Small watercourses with organic beds but no observable deposits of mineral alluvium, or no scour in their beds down to mineral soil, are not included under the definition of stream. Watercourses with organic beds may:

1. *consist of accumulated detrital materials such as decomposed and (or) whole leaves, roots, twigs and moss;*
2. *contain mixed silt/organic mud deposits which may be covered in living hydrophytic vegetation (e.g., brown moss, Sphagnum)...*

*Watercourses which do not... meet the criteria for the definition of stream in section 1 of the Operational Planning Regulation, are to be designated as **non-classified drainages (NCDs)**.*

Streams are fish streams unless:

A. the stream is located upstream of a known barrier to fish passage, identified on a fish and fish habitat inventory map;
B. all reaches upstream of the barrier are simultaneously dry at any time of the year, and
C. no perennial fish habitats exist upstream of the barrier.

The Department of Fisheries and Oceans *Federal Fisheries Act* (DFO 2010):

Fish Habitat

Section 34(1): ..."fish habitat" means spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Damage to Fish Habitat

Section 35(1): No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.

Pollution

Section 36(3): Subject to subsection 36(4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Deleterious Substance

Section 34(1): For the purposes of sections 35 to 43, "deleterious substance" mean...

a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or

b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, and without limiting the generality of the foregoing includes

c) any substance or class of substances prescribed pursuant to paragraph (2)(a),

d) any water that contains any substance or class of substances in a quantity or concentration that is equal to or in excess of a quantity or concentration prescribed in respect of that substance or class of substances pursuant to paragraph (2)(b), and

e) any water that has been subjected to a treatment, process or change prescribed pursuant to paragraph (2)(c).

City Of Prince George Bylaw No. 8231 Amendment to the Prince George OCP Bylaw 7281 Appendix A Section 4.4 and 4.5 (City of Prince George 2009);

Section 4.4.1 Design With Nature; A Community Plan Based on Natural Landscape:

The lands indicated on Map 2– Sensitive Natural Features (Appendix 1) – *will generally remain undeveloped or in a very low-density form of development to preserve the key environmental qualities. Lands shown on this map have generally been excluded from the urban development areas, although principal parks and park reserves are illustrated for context.*
Sensitive Natural Areas Include:

- *Significant slopes over 20%*
- *Rivers, streams, lakes and other watercourses including wetland and ground water recharge areas*
- *Agricultural lands (designated as Agricultural Land Reserve or ALR by the provincial government)*
- *Important fish and wildlife habitat*

Section 4.4.2...Watercourses and Wetlands
All new rezoning will be set back an adequate distance from all rivers, streams, wetlands and other watercourses to ensure a natural leave strip is maintained...

Section 4.4.5...Protection of Steep Slopes and Cutbanks
New development shall minimize disturbance to the prominent cut banks and steeply sloped areas indicated on Map 2 (Appendix 1). *These are highly valued landscape features and are to remain in their natural state. Any new development plans must indicate how the natural terrain will be retained and protected as part of the approval process. Many of these steeply sloped areas are subject to the Tree Protection Bylaw to ensure preservation of trees in greenbelt zones.*

Section 4.4.6...Fish and Wildlife Habitat
Map 2 (Appendix 1) *indicates significant habitat areas. In general, these areas are not designated for urban development, with the exception of some lands west of the Airport, and portions of the Harper Valley/North Nechako future development areas.*

Section 4.5...Natural Environment Development Permit Areas
The areas on Schedule B-2 (Appendix 1) *are designated riparian protection development permit areas.*

Section 4.5.2 Objective
The City wishes to protect riparian areas from inappropriate development so that they may provide natural features, functions and conditions that support fish life processes. In addition, these areas balance water flow, stabilize stream banks, and act as wildlife corridors, thereby protecting the City's natural environment, ecosystems and biological diversity...

City of Prince George Tree Protection Bylaw No. 6343 (City of Prince George 1995)

Section 4.0 Protected Areas

Section 4.1 Unless otherwise exempt in section 5 of this Bylaw, no person shall cut down, or allow to be cut down, a tree in an area defined as:

a) AG: Greenbelt as shown on Schedule "A" of the Zoning Bylaw, unless a permit has been issued according to section 6. of this Bylaw;

b) A Riparian Protection Development Permit Area as designated in the Official Community Plan; unless a permit has been issued according to section 6. of this Bylaw.

Section 5.3 In Development Permit Areas, identified in subsection 4.1(b), this bylaw applies only to trees that are located within:

a) 15.0 m from the top of bank for agricultural, outdoor recreation, and low density (17 units/ha) residential rezoning;

e) Lesser areas shall be considered where the size is determined on the basis of an assessment report provided by a qualified environmental professional in respect of a development proposal.

4.0 METHODOLOGY

Portions of the Valleyview Rezoning area were found to include sensitive natural features (SNFs) and riparian protection development permit areas (RPDPAs) identified in sections 4.4 or 4.5 of Prince George Bylaw 8231 (2009).

Given that RPDPAs apply to streams, several published sources were used to provide direction for separating streams from non-classified drainages (NCDs). The *Water Act* of BC (RSBC 1996) takes a broad approach to defining streams, including NCDs (MOF and MOE 1998) and watercourses (City of Prince George 2007) from provincial and municipal definitions. Prior to field investigations it was determined that some systems present within the Valleyview Rezoning were likely to fall within the *Water Act* definition of a stream. It was determined necessary to distinguish between streams versus non-streams, NCDs (see section 3.0 Regulatory Framework for definitions) and their reaches to provide appropriate management prescriptions. Definitions and terminology in the Forest Practices Code (MOF and MOE 1998) have been used for this purpose and are found in Section 3.0 of this report.

The field assessments of Drainages 1 and 2 were conducted on May 19th , 20th, and 23rd, 2011. Drainages were broken into reaches based on significant changes in the drainage morphology and sequentialy identified by number in an upstream manner (e.g. 1,2,3, etc.). As drainage 1 and 2 included tributaries each was assigned individual letter codes (i.e. A-E). Tributaries were further seperated into reaches which were numbered sequentially (e.g. 1,2,3, etc.).

Reaches within inferred fish-bearing drainages were surveyed and a combination of hip chain, GPS waypoints, and photographs were used to reference channel and habitat features, as well as identify reach breaks. Information gathered was collected in accordance with the Resources Inventory Standards Committee (RISC) Reconnaissance (1:20,000) Fish and Fish Habitat Inventory standards and procedures. This information included general characteristics of stream channels and the overall quality of fish habitat. Photos depicting overall site conditions within the two identified drainages and their respective reaches are referenced throughout this report and are presented at the end of the document.

Since substantial ponded areas were encountered during the field assessment and previous surveys, and historic sampling efforts suggest a population of goldfish occupies the Birchwood Creek drainage, a follow-up visit was planned and fish sampling was conducted employing the use of baited gee-style minnow traps on June 8th and 9th, 2011.

Field investigations of wildlife were limited to the observation of wildlife sign during the drainage assessments. Wildlife assessment results are presented for the entire area, rather than by drainage and tributary reach and were conducted to identify areas of significant wildlife importance.

5.0 FISH AND FISH HABITAT ASSESSMENT RESULTS

5.1 *Overview Assessment*

Information provided on PGMAP (City of Prince George 2011) suggests that both inferred fish streams and non-fish streams occupy the proposed development area (Figure 1). Several terminal non-fish bearing watercourses with north and westerly aspects represent the headwaters of McMillan Creek, while the south flowing Birchwood Creek (itself a major tributary of McMillan Creek) possesses a default fish bearing status. This information was affirmed by cross referencing McMillan Creek (WSC: 180-007200) and Birchwood Creek (WSC:180-007200-29500) using the Fish Habitat Wizard (MOE 2011). Consequently, all drainages associated with Birchwood Creek are included within the RPDPA's identified by the City of Prince George's OCP (PGMAP 2011).

Background information pertaining to the assessed drainages was relatively limited. However, the on-line fisheries information data queries (FIDQ) suggests that other relevant literature for the study area might include: a document entitled Birchwood Pond survey (MELP 1970), an inventory of McMillan Creek conducted my MELP in 1977 (Gunville 1977), the 1994 McMillan Creek rainbow trout study by Triton Environmental Consultants Ltd (Triton 1995), the 2004 fish inventory within the City of Prince George (EDI 2004), and a 2006 McMillan Creek monitoring project (MOE 2006).

The capture of goldfish (an introduced species) during the Birchwood Pond survey conducted in 1970 (MELP 1970) provided the only substantiated claims that the upper reaches of the Birchwood Creek system supports a fish population. The fish and fish habitat assessment conducted on the McMillan Creek catchment area (Triton 1994) provided some relevant information as it included a habitat description and fish sampling information for Birchwood Creek. No fish were captured with minnow trapping of Birchwood Lake reported (Triton 1995). Fish sampling of the moderate value rearing habitat within the lower reaches of Birchwood Creek in 2004 failed to produce fish, however flows were noted as low and the report suggests that rearing habitat would improve under higher flows (EDI 2004). Due to the inferred fish bearing status of the Birchwood Creek drainage network further ground based sampling was deemed necessary to document whether or not the terminal reaches provide suitable fish habitat.

A review of relevent literature and orthophotography suggests that fish habitats of McMillan Creek upstream of Noranda Road are capable of supporting relatively high densities of resident rainbow trout. As well, these reports suggest that the first order reaches of the McMillan Creek drainages outlined on PGMAP within the development area are likley disconnected from mainstem fish habitats. The non-fish bearing classification of these terminal reaches is therefore reasonable, as such they were not included in ground based reconissance.

5.2 *Field Assessment*

A summary of the findings associated with the examination of drainage 1 (WSC: 180-007200-29500-685000), drainage 2 (WSC: 180-007200-29500), and tributary E (Figure 1) can be found in Table 1.

Table 1: Summary of stream characteristics in the Valleyview Rezoning area.

Reach	Bankfull Width Wb (m)	Wetted Width (m)	Bankful Depth (m)	Substrate Type (Dominant/Sub-Dominant)	Average Channel/ Drainage Gradient (%)
Drainage 1 Reach 1	10.00	8.50	> 1.5	Fines	1%
Drainage 1 Reach 2	Small Lake ~ 3 ha		> 2.0	Fine/Organics	0%
Drainage 1 Trib A	Beaver Pond ~ 2 ha		> 1.0	Organics	< 1%
Drainage 1 Trib B	Not Applicable – Non-Classified Drainage (NCD)				5%
Drainage 1 Trib C Reach 1	Not Applicable – Non-Classified Drainage (NCD)				2%
Drainage 1 Trib C Reach 2	Not Applicable – Non-Classified Drainage (NCD)				15-20%
Drainage 1 Trib C Reach 3	Not Applicable – Non-Classified Drainage (NCD)				1%
Drainage 1 Trib D	1.20	0.25	0.40	Fines / Organics	2%
Drainage 2 Reach 1	Beaver Pond ~ 1 ha		> 1	Fines / Organics	1%
Drainage 2 Reach 2	Not Applicable – Non-Classified Drainage (NCD)				3%
Drainage 2 Reach 3	Not Applicable – Non-Classified Drainage (NCD)				8-10%
Drainage 2 Reach 4	Not Applicable – Non-Classified Drainage (NCD)				>15%
Trib E Reach 1	Seasonally Flooded Area ~ 1.5 ha		> 1	Organics	<2%
Trib E Reach 2	Not Applicable – Non-Classified Drainage (NCD)				2%
Trib E Reach 3	0.60	0.55	0.25	Fines/Organics	<3%
Trib E Reach 4	Beaver Pond ~ 2 ha		> 1	Organics	1%

5.2.1 Drainage 1 (WSC:180-007200-29500-685000)

Drainage 1 (Figure 1) was examined directly upstream of its confluence with drainage 2, which occurs at approximately (10U 515437 5981308). A large beaver dam (25 m long x 1 m high) exists downstream of the confluence of drainage 1 and 2 such that both drainages experience a backwatering effect as they are connected to one another by a large beaver pond.

Reach 1 consists of a low gradient (1%) channel composed of clay and muck. The channel was walked upstream for 450 m. Habitats are homogenous along this reach, the 8.5 m wetted width was >1 m deep at the time of the assessment, and on average the bankfull channel width measured 10 m (Plate 1); note the width is excessive due to ponding. The channel is occasionally confined by the steep slopes on its left (north) bank, a portion of this sandy bank exhibits signs of active erosion and the stream is therefore considered to be partially coupled by this feature. Two channel spanning beaver dams were noted along this reach, which likely present seasonal barriers at times when discharge is low.

Two mapped drainages (PGMAP 2011) were encountered in reach 1. The first (Tributary A) is connected through a backwatered CMP crossing of a dirt road grade. A beaver dam complex was observed immediately upstream of the culvert inlet which creates a 2 ha beaver pond that has flooded the broad (>150 m wide) steep sided ravine to a depth exceeding 1 m (Plate 2). The second (Tributary B) consists of a roadside drainage ditch which lacks a defined channel and possesses an NCD classification (Plate 3; see attached non-fish bearing status report). This ditch is confined by the road grade and adjacent steep vegetated slope.

Reach 2 consists of a 3 ha lake (known locally as Birchwood Lake) with an average maximum depth exceeding 2 m (Plate 4). The northern perimeter (shoreline) was walked for 200 m. The wetted perimeter of the pond is rimmed with cattail and other emergent aquatic vegetation. The substrates consist of a thick organic layer. The shoreline is inconspicuous as it lacks definition with the surrounding organic soils. Ponding is generally confined to the north by steep slopes and to the west by the embankment of the Hart Highway. A stormwater outfall is located on the north side and discharges to the lake. This lake provides the most significant perennial habitat within the subject drainages.

Both mapped and unmapped drainages (PGMAP 2011) were encountered in reach 2, which is tributary to Birchwood Lake. The mapped drainage (Tributary C) possesses an NCD classification (Plate 5-7; see attached non-fish bearing status report). The unmapped (Tributary D) consists of a 1.2 m stream channel of 2% gradient with a bed of fines and organics. The stream originates at a storm drain outfall 44 m upstream of the wetted perimeter of the lake which presents a permanent barrier to fish passage. Flows were discontinuous in the channel at the time of the survey. However, a 4 m x 2 m x 0.3 m deep pool is retained by a riprap weir at the outlet which is likely seasonally connected to the lake by surface flow (Plate 8). Additional watercourses on PGMAP consist of drainage from the adjacent highway ditch and associated culverts. No distinct channels were found in these areas.

5.2.2 Drainage 2 (WSC:180-007200-29500)

Drainage 2 (Figure 1) was examined directly upstream of a large beaver dam (25 m long x 1 m high) which exists downstream of the confluence of drainage 1 and 2 such that both drainages experience a backwatering effect as they are connected to one another by a large beaver pond.

Reach 1 consists of a 1 ha beaver pond. The margin was walked upstream for 300 m, an average slope of 1% was observed. A beaver pond had flooded the broad (>50 m wide) steep sided ravine to a depth exceeding 1 m. The pond is seasonally inundated, as evidenced by mature birch and alder which were found to be abundant in the wetted perimeter (Plate 9). Habitats are homogenous along this reach with thick fine organic substrates observed. No permanent barriers to fish passage were noted along this reach.

Reach 2 is 180 m in length, lacks a defined channel and supports an NCD classification. The seasonal drainage possessed a consistent 3% gradient and occurs within a broad (>50 m wide) ravine. No defined channel was observable in the organic layer which dominated the ravine bottom, though subsurface flow is likely, however no perennial fish habitat was observed within or upslope of this reach (Plate 10; see attached non-fish bearing status report).

Reach 3 extends 160 m along a >60 m wide ravine. The gradient of the seasonal drainage ranges from 8-10% as it ascends the ravine (Plate 11). This reach lacks a defined channel and possesses an NCD classification.

Reach 4 extends 70 m along a well-defined narrow ravine. The gradient of the seasonal drainage is approximately 15% as it ascends the ravine (Plate 12). This reach lacks a defined channel and possesses an NCD classification. This reach terminates at a road crossing which lacks a drainage structure.

At Reach 5 the drainage shallows and loses definition such that it is no longer a ravine upslope of the road where the slopes eases from 5% to 0% at a saddle of land approximately 60 m upslope of the road (Plate 13). This reach lacks a defined channel and possesses an NCD classification.

5.2.3 Tributary E (unmapped)

One unmapped drainage (PGMAP 2011) was encountered in reach 2 of drainage 2. This drainage (Tributary E) is cut off from drainage 2 by a dirt road grade which lacks a drainage structure. A non-fish bearing status report was prepared for this drainage based on the fact that it is disconnected from Birchwood Creek and contains no perennial fish habitat (Plate 14 and 15). Furthermore, the drainage is already recognized as non-fish bearing (PGMAP 2011).

Tributary E is in fact mapped (Habitat Wizard) as the headwater extent of Birchwood Creek (WSC:180-007200-29500). Subsequent review of orthophotography and field investigation suggests this drainage was once connected to Birchwood Creek prior to road construction at this location. In its present state Tributary E provides seasonal groundwater recharge to drainage 2.

6.0 SIGNIFICANT SLOPES

6.1 Field Assessment

Runoff from significant slopes adjacent to watercourses and natural drainages that are connected to the continuous stream network may contribute food and nutrients, or alternatively, deliver sediment to downstream fish habitats as a result of slope failures. As such, the protection of fish habitat should consider the potential contributions and risks associated with adjacent slopes, particularly where they are steep and adjacent to defined streams. The following table summarizes general side slope information gathered from surveyed reaches within the two identified drainage areas. Slope significance was determined based on the definition provided in Bylaw 8231 section 4.4 (City of Prince George 2009).

Table 2. Summary of significant slopes within the proposed Valleyview Rezoning.

Reach	Average side slope length (m)	Average Side Slope Gradient (%)	Slope Status	Drainage Classification
Drainage 1 Reach 1	75	> 50	Significant	stream
Drainage 1 Reach 2	50 m (north shore of lake)	> 33	Significant	lake
Drainage 1 Trib A	> 50	> 33	Significant	stream
Drainage 1 Trib B	> 50	> 50	Significant	NCD
Drainage 1 Trib C Reach 1	30	> 33	Significant	NCD
Drainage 1 Trib C Reach 2	20	> 33	Significant	NCD
Drainage 1 Trib C Reach 3	40	> 25	Significant	NCD
Drainage 1 Trib D	> 100	< 5	Not Significant	stream
Drainage 2 Reach 1	> 50	> 33	Significant	pond
Drainage 2 Reach 2	> 50	> 33	Significant	NCD
Drainage 2 Reach 3	50	> 50	Significant	NCD
Drainage 2 Reach 4	20	>50	Significant	NCD
Drainage 2 Reach 5	> 60	< 10	Not Significant	NCD

Overall, significant slopes (> 20 % grade) were encountered frequently in the survey areas. The majority of slopes (Table 2) associated with the surveyed drainages could be considered as ravines based on slope criteria (> 33 1/3 %), however several drainages are not commonly eroded by water as they were classed as NCD based on a lack of scour or alluvium deposition.

7.0 WILDLIFE ASSESSMENT RESULTS

7.1 Overview Assessment

The BC Species and ecosystems explorer suggests the following 15 vertebrate species of management concern (11 Blue, 2 Red, and 3 yellow) have the potential to reside near the area.

Table 3. Potential for wildlife within the proposed Valleyview Rezoning.

Species	COSEWIC	BC Status	Identified Wildlife	SARA	Occurrence in study area	Potential effects
American Bittern	No	Blue	No	No	Unlikely; preferred habitats not present.	None anticipated.
Barn Swallow	No	Blue	No	No	Unlikely; preferred habitats not present.	None anticipated.
Black bear	NAR (1999)	Yellow	No	No	Resident in area.	Displacement.
Bull Trout	No	Blue	Y (Jun 2006)	No	Not present	None anticipated.
Common nighthawk	T (2007)	Yellow	No	1-T (2010)	Unlikely; preferred habitats not present.	None anticipated.
Great Blue Heron, *herodias* subspecies	No	Blue	Y (Jun 2006)	No	Unlikely; preferred habitats not present.	None anticipated.
Grizzly Bear	SC (May 2002)	Blue	Y (May 2004)	No	Potential to occur.	None anticipated.
Long-billed Curlew	SC (Nov 2002)	Blue	Y (May 2004)	1	Unlikely; preferred habitats not present.	None anticipated.
Moose	No	Yellow	No	No	Resident in area.	Displacement.
Olive-sided fly catcher	T (2007)	Blue	No	No	Potential to occur.	None anticipated.
Rusty blackbird	SC (2006)	Blue	No	No	Unlikely; preferred habitats not present	None anticipated.
Short-eared Owl	SC (May 1994)	Blue	Y (May 2004)	3	Unlikely; preferred habitats not present.	None anticipated.
Western toad	SC (2002)	Blue	No	1-SC (2005)	Potential to occur.	None anticipated.
White Sturgeon (Nechako River population)	E (2003)	Red	No	1-E (2006)	Not present.	None anticipated.
White Sturgeon (Upper Fraser River population)	E (Nov 2003)	Red	No	1-E (2006)	Not present.	None anticipated.
Wolverine, *luscus* subspecies	SC (May 2003)	Blue	Y (May 2004)	No	Unlikely; preferred habitats not present.	None anticipated.

7.1.1 Fish Species

White sturgeon are only associated with mainstem rivers and the lower reaches of large tributaries. The preferred habitat for bull trout includes mountain streams characterized by clean, cool summer flows, moderate gradients, cascade-pool morphology, and cobble/boulder substrates. These conditions are not present and as such, it is very unlikely that these species would be affected by the proposed development.

7.1.2 Amphibians

Western toads occur at moderate to high densities in most terrestrial and aquatic habitats. Western toads are observed in wetland habitats, valley bottom forests, and riparian habitats. The biggest threat to toads in B.C., as in all amphibians, is habitat loss and fragmentation. The draining and elimination of wetlands has removed breeding sites, and the fragmentation of natural ranges by roads and other barriers prevents re-establishment of depleted or extirpated populations.

There is a strong likelihood of Western toad occurring within the wetland and riparian habitat of the project area. Yearling toads were identified along the margins of Birchwood Lake and the beaver pond associated with Tributary E.

7.1.3 Bird Species

The six listed bird species are migratory and/or occur at low densities on the landscape in association with particular habitat types. The American Bittern is an uncommon visitor in BC's northern interior and is typically associated with lentic water habitats (Campbell *et al.*, 1990a). Great Blue Herons are arboreal nesters, and colonies typically seek mature forests near suitable foraging areas along the margins of lakes, slow-moving rivers, sloughs, or marshy lakes and wetlands that are relatively free of disturbance from human activities (Campbell *et al.*, 1990a). The available pond and wetland habitats provide limited suitable habitat, however frequent disturbance would likely discourage their use by heron or bittern.

Long-billed Curlew and Short-eared Owl prefer large, open grassland areas, but will sometimes utilize agricultural areas (Campbell *et al.*, 1990b). Given that preferred aquatic and/or natural grassland habitats are not found within or adjacent to the project area, it is unlikely that these species are present. Barn Swallow are not widespread in areas of dense forest habitats (Campbell et al. 1997) and therefore are not anticipated to be resident in the immediate area. The common nighthawk occurs in a wide variety of open habitats, including urban areas, where it may nest on gravel-topped building roofs close to outdoor lights, which provide prime foraging sites and therefore likely does not occur within the proposed project area.

The olive-sided flycatcher most commonly occurs and nests in coniferous forests although they can also occupy a variety of forest, woodland, and open areas with scattered trees, especially where tall dead snags are present (NatureServe 2009). Like other flycatchers, they utilize edges and forest openings where they hawk for insects from snags or the tops of the tallest trees. The Project area habitats that most closely approximate those preferred by the olive-sided flycatcher include the more productive forest types and shoreline riparian area of the wetlands and the

productive forest types occur throughout the valley bottom corridors. Habitats that are important to the olive-sided flycatcher such as shoreline and productive forest types, and habitat elements such as large trees are found within and immediately adjacent to the Project area. Although the habitats within the Project area are not limiting on the landscape, a decrease in potential nest sites and the potential for increased nest predation present limited risks to this species should they occur within the project area.

7.1.4 Mammal Species

Wolverine and grizzly bear, due to their low densities and large home range sizes, are typically treated under an umbrella approach where key habitats or habitat elements are management targets for groups of species. Wolverine tend to spend more time in spruce forests in the winter whereas in the summer they are more common in the alpine tundra (Weir 2004). Radio-tagged individuals were found to frequently select for late-successional stands and occasionally select for mid-successional stands (Krebs and Lewis 2000). Females were found to use early-successional stands at high elevations during the rearing season, but early-successional stands are otherwise avoided (Weir 2004). Grizzly bears utilize a wide range of habitats and generally only congregate in areas where there is an abundant food supply (CDC 2009i). Given the close proximity to the city and preferred habitats of grizzly bear, it is unlikely grizzly bears will utilize or otherwise require habitats in the project area.

Moose and black bear are well known to reside within the city limits of Prince George and the project area exhibits high habitat values for both species. Moose and bear sign is abundant and indicative to be well used, in particular the valley bottom along the riparian / wetlands occur and deciduous timber stands. The confluence of the Nechako and Fraser Rivers and the surrounding forested areas, natural ravines, creeks, and greenbelts all provide wildlife corridors for bears.

7.2 Field Assessment

During field assessments moose and deer sign including tracks, trails, browse and pellets, were observed. This sign within portions of the two drainages indicate the area is likely used as a corridor for moose during portions of the year. Deer tracks were less common than moose sign, although fresh tracks were observed throughout the assessment area. Several piles of scavenged ungulate bones (likely moose) were encountered along the drainages, suggesting the area provides biomass and use by scavengers. As well, the drainage areas support foraging opportunities for black bear, and both sign and animals were encountered during the assessment visits. Beaver dams were encountered in both drainages, though the only beaver sighting occurred in Tributary E.

Several mature cottonwood trees associated with the drainages provide suitable nesting habitat for a variety of bird species. As well, the wetland features were used by a variety of waterfowl and other bird species. A cutbank feature at (10U 515341.5981727) contains several hollow cavities of various diameters, some of which may have been excavated or used by bank swallows, that provide potential bird and mammal habitat (Plate 16).

8.0 CONCLUSIONS / RECOMMENDATIONS

Both subject drainages are considered default fish bearing streams as described by the Fish Stream Identification Guidebook (MOF and MOE 1998) definitions in section 3.0 of this report. It is reasonable to assume that the 2.5 km network of beaver ponds and channels of Birchwood Creek are seasonally or periodically connected to McMillan Creek. No obvious permanent barriers were found at mapped crossings of the mainstream habitats, however several of the mapped first order tributaries within the survey area were observed to lack defined stream channels or fish habitat and should be managed as non-fish bearing watercourses (Table 4). The non-fish bearing status of these reaches is rationalized in section 11 of this report.

Table 4. Watercourse designations and riparian setback requirements.

Reach	Stream Channel Present	Fish Habitat Present	Riparian Buffer required
Drainage 1 Reach 1	**Yes**	**Yes**	**Yes**
Drainage 1 Reach 2	**No**	**Yes**	**Yes**
Drainage 1 Trib A	**Yes**	**Yes**	**Yes**
Drainage 1 Trib B	No	No	No
Drainage 1 Trib C Reach 1	No	No	No
Drainage 1 Trib C Reach 2	No	No	No
Drainage 1 Trib C Reach 3	No	No	No
Drainage 1 Trib D	**Yes**	**Yes**	**Yes**
Drainage 2 Reach 1	**No**	**Yes**	**Yes**
Drainage 2 Reach 2	No	No	No
Drainage 2 Reach 3	No	No	No
Drainage 2 Reach 4	No	No	No
Drainage 2 Reach 5	No	No	No
Drainage 2 Trib E (all)	No	No	No

Generally, the development boundaries as outlined in the proposed lay out (Appendix 2) appear adequately removed from the default fish bearing streams and any associated significant ravines found within the survey area. A GIS buffering exercise was performed which utilized a steep slope (33%) buffer to represent potential ravines, and 15 m buffer applied to mapped watercourses within the survey area. The resulting figure is provided for management interpretation and the application of appropriate leave strips (Figure 2). While the majority of footprint boundaries respect the riparian setbacks for fish bearing streams, several locations are in close proximity to the steeply sloping ravine features which are prevalent along the project perimeter.

Areas of concern that are evident through this (i.e. Figure 2) graphical interpretation include;

- Development boundaries within property 1 and 2 encroach on the 33% slope breaks that represent the tops of ravines. In these areas, it is anticipated that subsequent design phases will require a geotechnical assessment to establish appropriate setbacks.
- Drainage 1, tributary C, reach 2 and 3, development area overlaps watercourse (non-stream) and associated ravine. In these areas careful planning will be required to ensure the watercourse is not adversely impacted by development.

The subject drainages are identified in the OCP's sensitive natural features as riparian protection development permit areas (RPDPAs) and both are identified as containing steep slope areas. While both drainages directly contribute to Birchwood Creek, they provide marginal rearing habitat for native fish species. Several of the stream reaches were found to be seasonal, small, and likely make insignificant contributions to fish productivity considering the receiving environment. The most significant perennial habitat (that of Birchwood Lake) has questionable overwintering potential. Nonetheless, The alteration of watercourses and riparian habitats present within the subject parcels have the potential to directly or indirectly affect fish in McMillan Creek and as such the contributions of water quality and quantity must be maintained to avoid causing a harmful alteration of fish habitat. As outlined in the federal *Fisheries Act* found in section 3 of this report, the protection of fish habitat includes maintaining:

- Water quality
    - Development must not lead to the introduction of deleterious substances to waters where fish exist.
    - Maintain temperatures and flows
- Food & Nutrient Contribution
    - e.g. maintenance of litter, woody debris, insect inputs

As the subject drainages are part of the continuous stream network of Birchwood Creek and the proposed development has the potential to affect water quality and quantity, which could in turn affect downstream fish habitat we recommend that special provisions and management applications be implemented for the protection of these watercourses.

Overall, Triton recommends that the development makes provision for the maintenance of water quality and quantity, and nutrient inputs similar to pre-development levels for both drainages within the development area. The maintenance of these natural functions will ensure compliance with the applicable regulatory requirements and reduce the potential for cumulative effects to

further degrade aquatic resource values at the watershed level. Recommendations to achieve environmental objectives include:

1. Maintaining adequate leave strips (riparian vegetation) along all watercourses classified as fish bearing (Table 4).
2. Maintaining adequate leave strips along significant slopes or otherwise limit the types and intensity of development along upper slope breaks to ensure long term slope stability, as guided by geotechnical assessments (Table 2).
3. Disturbance to significant slopes should be avoided or alternatively, engineering designs should address erosion and slope stability concerns.
4. Adequate setbacks around cutbanks should be considered as part of the development plans to minimize the disturbance to these unique features.
5. Maintain post-development flows at predevelopment levels (e.g. assess the need for detention ponds).
6. Development should be timed to conduct works when drainages are dry.

Rare and endangered wildlife habitats were not identified during the course of the survey. However, large trees (live and dead standing) are important habitat features should be left in place wherever practical. Trees will continue to help maintain the hydrology and (slope) stability of the drainage area and will provide future food and nutrient inputs to the system. Dead trees can supply a variety of birds and animals with cavity nests and food while contributing to the complexity of the system.

Figure 2. Results of the GIS Buffering Exercise for the Valleyview Rezoning

Legend

- Minnow Traps
- Reach Breaks
- Culvert
- Storm Drain Outfall
- Proposed Development Boundary
- Proposed Greenbelt
- Proposed Roads
- Confirmed Non-Fish
- Inferred Fish
- Parcel Boundary
- 15m Buffer of Streams
- Slopes > 33%

Location Map

NOTE: For display purposes only.
DO NOT USE FOR LEGAL
OR NAVIGATIONAL PURPOSES

0 50 100 200 300 400 Meters

Scale: 1:5,500

NO.	DATE (yyyy/mm/dd)	REVISION	BY
1	2011/07/04	Initial Draft	SA

Basemap Source: Orthophoto

Map Datum: UTM NAD 83 Zone 10

Project No: 4486

File No. Map# N:\ACTIVE\4486_Valleyview\mxd\.MXD \Slope_Map11x17.mxd

Date: July 4, 2011

TRITON ENVIRONMENTAL CONSULTANTS LTD.

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10.0 PHOTOGRAPHS

The following photographs are intended to depict the average drainage morphology. All photos were acquired during field visits which were conducted from May 19th, 20th, and 23rd, 2011. This period coincided with spring freshet conditions seen in the photographs:

Plate 1. Drainage 1, reach 1: Upstream view. The 10 m wet width is exaggerated due to the ditching and ponding. Riparian vegetation is lacking along the right bank throughout.

Plate 2. Tributary A, reach 1: Upstream view from above backwatered culvert inlet. Wide beaver pond in broad ravine upstream of the road grade.

Plate 3. Tributary B, reach 1: View down ditchline toward main channel of drainage 1. An ATV ford descends the grassy slope at >30% down the embankment which forms a barrier.

Plate 4. Drainage 1, reach 2: View upstream, channel narrows toward Birchwood Lake (~3 ha). Dense cattail surrounds the wetted perimeter of this feature which is greater than 2 m deep.

Plate 5. Tributary C, reach 1: View up drainage. A NCD classification based on no defined channel and subsurface flows through thick vegetation rooted in 100% organic soils.

Plate 6. Tributary C, reach 2: View up drainage toward collapsed and plugged steel culvert. A NCD classification based on no defined channel. This seasonal drainage has a gradient exceeding 15% through this reach with embankment slopes exceeding 33%.

Plate 7. Tributary C, reach 3: Small (0.06 ha) ephemeral pond represents the terminal reach of this seasonal drainage. Thick rooted vegetation occupies the drainage basin with side slopes exceeding 20%. A NCD wetland classification is considered appropriate.

Plate 8. Tributary D, reach 1: Riprap controlled pools at outlet of storm drain pipe which forms a barrier approximately 44 m upstream of Birchwood Lake.

Plate 9. Drainage 2, reach 1: Lower end of Beaver Pond (~1 ha). Dense alder and birch suggest the margins are seasonally flooded.

Plate 10. Drainage 2 reach 1 and 2: Cross section view shows gradient increase and loss of channel definition. Flows were subsurface of organic soils and perennial habitats are non-existent upstream of this location. As such, the drainage through reach 2 was classed as NCD.

Plate 11. Drainage 2, reach 3: The gradient of this seasonal drainage ranges from 8-10% as it ascends the ravine. The entire drainage is NCD beyond this reach

Plate 12. Drainage 2, reach 4: Overview of site. Ravine narrows, side slopes increase, and gradient increases to >15 %. No defined channel in this seasonal drainage.

Plate 13. Drainage 2 reach 5: Overview of site. Ravine loses definition, side slopes decrease, and gradient eases to 5 % upslope of the road which lacks a drainage structure.

Plate 14. Tributary F, reach 3: Location where 0.6 m wide by 75 m long channel disappears as it flows subsurface into the organic substrates. No perennial habitat observed within this reach.

Plate 15. Tributary E, reach 4: Large beaver pond (~2 ha) confined to the steep walled ravine which is considered non-fish bearing, supplies groundwater recharge to the drainage, and forms a sediment sink for headwater drainages.

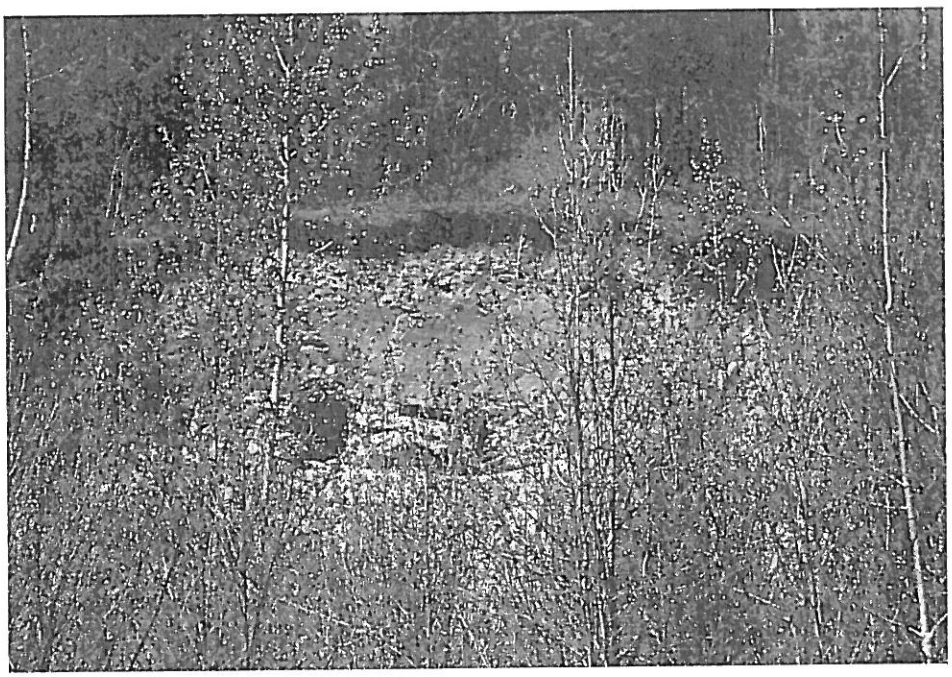


Plate 16. Exposed cutbank observed at (10U 515341.5981727) along the future Monterey Rd connector. The upper portion of this feature contains suitable nesting cavities. Upslope to the north is a proposed lot zoned as strata.

11.0 NON-FISH BEARING STATUS REPORTS

Watercourses within drainage 1 and drainage 2 of the subject properties which were deemed to be non-fish bearing are as follows:

Drainage 1:

- Tributary B; entire drainage
- Tributary C; entire drainage from reach 1 to reach 3

Drainage 2:

- Reach 2 to reach 5

Tributary E:

- Reach 1 to reach 4

The following non-fish bearing status reports were prepared based on an assessment of the channel characteristics found at the time of the field survey:

NON-FISH BEARING STATUS REPORT

UTM: 10U 515195.5981520
Site #: Tributary B
Date Sampled: May 19, 2011
Sample Method(s): Not sampled – insufficient habitat

Reach: 1
Mapsheet: 93G.015
Length surveyed: 50 m
Sampling Effort: N/A

Stream Conditions:
Flow Stage: None present
Conductivity: N/A

Water Temperature: N/A
Turbidity: N/A

Habitat Conditions:
Average Channel Width: No visible channel
Average Site Gradient: 5 %
Comments: No fish habitat present within ditch. No channel or scour was observed suggesting flows are infrequent and inadequate to provide perennial habitat. ATV's have forded Birchwood Creek in this location which has impacted the natural drainage pattern (Plate 3).

Supporting Evidence:
Upstream / Downstream Fish: First order tributary. Approximately 50 m of NCD conditions with no mapped or field identified tributary drainages. No plausible surface connection to Birchwood Creek was found. Insufficient flow inhibits fish sampling.

Availability of Overwintering Habitat: No overwintering habitat present.

Barriers: A grass covered >30% embankment slope over 3 m high is present where this drainage would discharge to Birchwood Creek.

Comments: Since the ditch lacks discharge (even during freshet when the survey was conducted), and no flow or channel were observed, no perennial habitat exists. As such, Tributary B should be managed as a non-fish bearing watercouse.

NON-FISH BEARING STATUS REPORT

UTM: 10U 514884.5981636
Site #: Tributary C
Date Sampled: May 19, 2011
Sample Method(s): Not sampled – insufficient habitat

Reach: 1, 2, and 3
Mapsheet: 93G.015
Length surveyed: 200 m
Sampling Effort: N/A

Stream Conditions:
Flow Stage: Only subsurface flows present
Conductivity: N/A

Water Temperature: N/A
Turbidity: N/A

Habitat Conditions:
Average Channel Width: No visible channel
Average Site Gradient: Reach 1 = 2%. Reach 2 = 20%. Reach 3 = 1%
Comments: No fish habitat present within this seasonal drainage. No channel or scour was observed suggesting flows are seasonal and inadequate to provide perennial habitat. Reach 1 and 2 possess an NCD classification (Plates 5 and 6). Reach 3 consists of an ephemeral pond less than 0.5 m deep which supplies the drainage seasonally (Plate 7).

Supporting Evidence:
Upstream / Downstream Fish: First order tributary. Approximately 200 m of NCD with no mapped or field identified tributary drainages. Insufficient flow < 20 cm deep on June 8 inhibits minnow trapping. No plausible surface connection to Birchwood Lake was found.

Availability of Overwintering Habitat: Ephemeral pond (0.06 ha) in terminal reach (reach 3) lacks sufficiently deep pools and discharge to provide overwintering, it is isolated by the 200 m of NCD reaches (reach 1 and 2) downslope of the pond, and a barrier (noted below) further isolates this drainage. The nearest potential overwintering habitat is located in Birchwood Lake which is isolated from this drainage by a lack of surface flows in reach 1 and 2 (even during freshet when the survey was conducted).

Barriers: A collapsed and plugged steel culvert at (10U 514887.5981741) where the 15% gradient drainage crosses an old road grade presents an impassable barrier (Plate 6).

Comments: The lack of scour, alluvium and surface flow, and the occasional observation of puddled water throughout the NCD section preclude fish access to this seasonal drainage. No perennial habitat was observed in this drainage. Minnow trapping of Birchwood Lake (closest potential habitat) on June 8 resulted in NFC. As such, Tributary C should be managed as non-fish bearing watercourse.

NON-FISH BEARING STATUS REPORT

UTM: 10U 515508.5981786
Site #: Drainage 2
Date Sampled: May 23, 2011
Sample Method(s): Not sampled – insufficient habitat

Reach: 2, 3, 4, and 5
Mapsheet: 93G.015
Length surveyed: 420 m
Sampling Effort: N/A

Stream Conditions:
Flow Stage: None present
Conductivity: N/A

Water Temperature: N/A
Turbidity: N/A

Habitat Conditions:
Average Channel Width: No visible channel
Average Site Gradient: Reach 2 = 3 %, Reach 3 = 10%, Reach 4 = >15%, Reach 5 = <5 %

Comments: This seasonal drainage lacks a defined channel and possesses an NCD classification. No defined channel was observable in the organic layer which dominated the ravine bottom from reach 2 to reach 5 (Plates 10-13).

Supporting Evidence:
Upstream / Downstream Fish: No perennial fish habitat was observed within or upslope of reach 2, since no defined channel or evidence of surface flows were observed. A beaver pond in reach 1 forms the nearest potential fish rearing habitat (Plate 9). Minnow trapping failed to produce fish within this reach.

Availability of Overwintering Habitat: No overwintering habitat observed within the drainage of reach 2 to reach 5. Inundated riparian vegetation in reach 1 suggests that beaver ponding is seasonal, and depths are insufficient to provide overwintering habitat.

Barriers: The terminal 60 m of this drainage is isolated from Birchwood Creek by an old road grade which lacks a drainage structure.

Comments: The gradient of this seasonal drainage increases progressively from reach 2. The lack of scour, alluvium and surface flow through the NCD section preclude fish access to this stream reach. As such, reach 2 through 5 of Drainage 1 should be managed as a non-fish bearing watercourse.

NON-FISH BEARING STATUS REPORT

UTM: 10U 515462.5981885
Site #: Tributary E
Date Sampled: May 23, 2011
Sample Method(s): Not sampled – insufficient habitat

Reach: 1, 2, 3, and 4
Mapsheet: 93G.015
Length surveyed: 530 m
Sampling Effort: N/A

Stream Conditions:
Flow Stage: Low
Conductivity: 142 µS/cm

Water Temperature: 12.4 °C
Turbidity: Moderate

Habitat Conditions:
Average Channel Width: Reach 3 = 0.6 m
Average Site Gradient: Reach 1 = <2 %, Reach 2 = 2%, Reach 3 = <3 %, Reach 4 = 1 %
Comments: This drainage is isolated from Birchwood Creek by an old road grade which lacks a drainage structure. In reach 1, a seasonally flooded area of 1.5 ha was observed within a broad (>50 m wide) steep sided ravine. Reach 2 of this drainage which extends 170 m lacks a defined channel and possesses an NCD classification. Reach 3 consists of a 75 m long by 0.6 m wide stream channel of 3 % gradient (Plate 14) . Reach 4 is composed of a 2 ha beaver pond which is confined to a broad (>100 m wide) steep walled ravine (Plate 15).

Supporting Evidence:
Upstream / Downstream Fish: This seasonal drainage is isolated from Birchwood Creek by an old road grade which lacks a drainage structure. Perennial fish habitat is lacking upstream of this barrier, with the exception of a beaver pond at the headwater of the drainage.

Availability of Overwintering Habitat: The only potential perennial habitat is located in the headwater beaver pond (Reach 4; Plate 15). Review of mapping information (PGMAP 2011) suggests this headwater pond carries a non-fish bearing classification and receives several drainages with NCD conditions. The pond was estimated to be approximately 1 m deep at the time of assessment, though substantial drawdown was observed as the pond surface was found 15 cm below the top of a beaver dam (60 m long x 1.5 m high). The short shallow channel of reach 3 downstream of the pond is insufficient to provide overwintering (Plate 14).

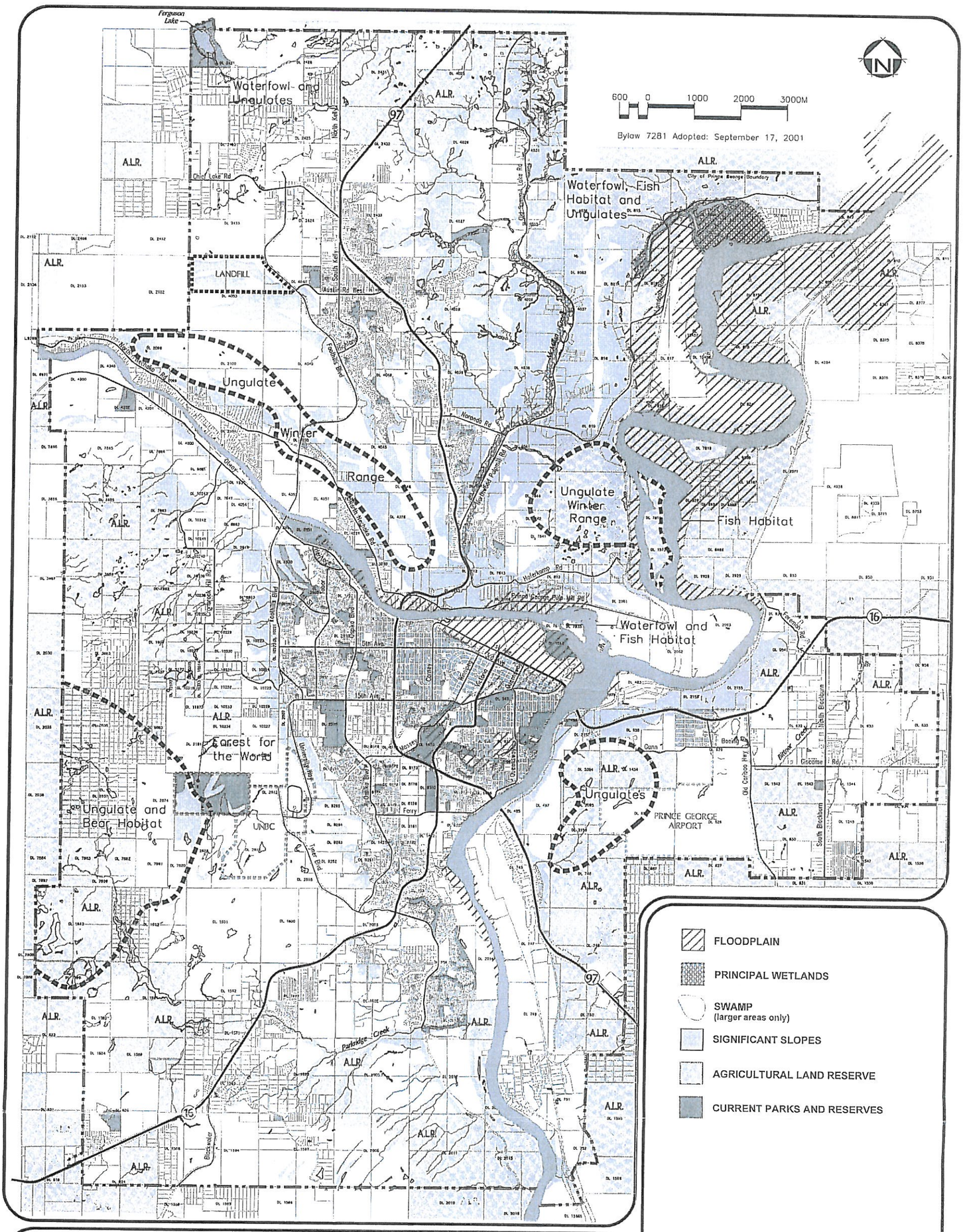
Barriers: This drainage is isolated from Birchwood Creek by an old road grade which lacks a drainage structure.

Comments: Due to the small catchment area of the headwater pond it does not have an adequate discharge to maintain sufficient depth to be considered perennial fish habitat. However, the drainage does convey subsurface flows seasonally, providing groundwater recharge for downstream habitats. It was felt that additional sampling of low quality beaver pond habitat with minnow traps would be of limited value. As such, the drainage of Tributary E should continue to be managed as a non-fish bearing watercourse.

APPENDIX 1

BACKGROUND DOCUMENT MAPS

Maps acquired from the City of Prince George's OCP.

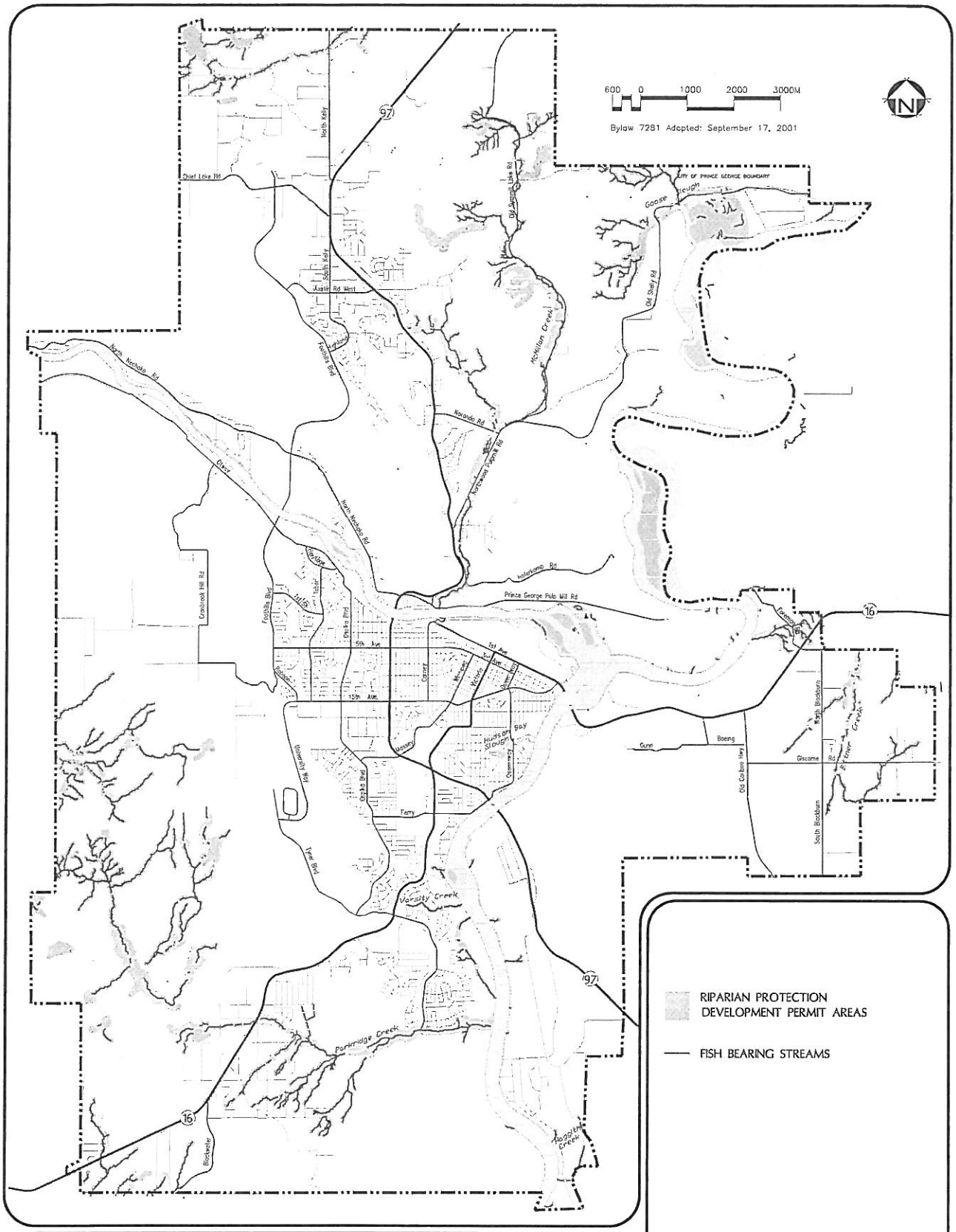


City of Prince George
OFFICIAL COMMUNITY PLAN

Map 2: SENSITIVE NATURAL FEATURES

Notes: Features are illustrated both in the City and in the immediate surroundings.
Smaller parcel subdivision pattern illustrates lands substantially developed.

CITY OF PRINCE GEORGE



City of Prince George

OFFICIAL COMMUNITY PLAN

Schedule B-2

RIPARIAN PROTECTION DEVELOPMENT PERMIT AREAS

Bylaw 7856 Amended: April 30, 2007

CITY OF PRINCE GEORGE

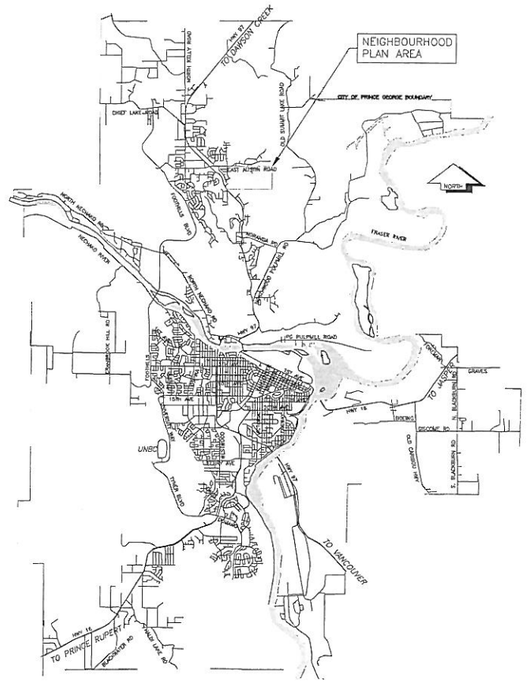
APPENDIX 2

PRELIMINARY ZONING AND LOT LAYOUT MAPS

Maps provided by L&M Engineering Ltd..

DRAWING INDEX

Dwg No.	Rev.	Description
RZ:01	0	AERIAL PHOTO AND LOCATION PLAN
RZ:04	0	OVERALL PROPOSED ZONING AND LOT LAYOUT
RZ:05	0	URBAN WEST: PROPOSED LOT LAYOUT
RZ:06	0	RURAL EAST: PROPOSED LOT LAYOUT



LOCATION MAP
NTS

AERIAL PHOTO
SCALE 1:5000

LEGEND

PROPERTY BOUNDARY

PROPERTY 1
LEGAL DESCRIPTION
PID: 015258360
DL: 4026REM SE4
ZONING AG, SR2

PROPERTY 2
LEGAL DESCRIPTION
PID: 015258378
DL: 4026REM SE4
ZONING AG, AR3

NO.	DATE	REVISION	DR.

CITY OF
PRINCE GEORGE
Development Services

DRAWN:	DDA
CHECKED:	JRB
ENGINEER:	JRB
SURVEY FILE:	
DRAWING FILE:	C3D11-1088-10BASE dwg
CORRESPONDENCE:	CPG
GRID:	
DATE:	15/03/2011
SCALES:	AS NOTED

STEVE DIMOND
VALLEYVIEW
AERIAL PHOTO &
LOCATION PLAN

CONSULTANTS PROJECT No.
1088-11-01
DRAWING No.
RZ:01

SHEET No.	REV. No.
1 OF 4	0

L&M ENGINEERING LIMITED
1210 FOURTH AVENUE
PRINCE GEORGE, B.C.
V2L 3J4
TEL (250) 562-1977
FAX (250) 562-1987

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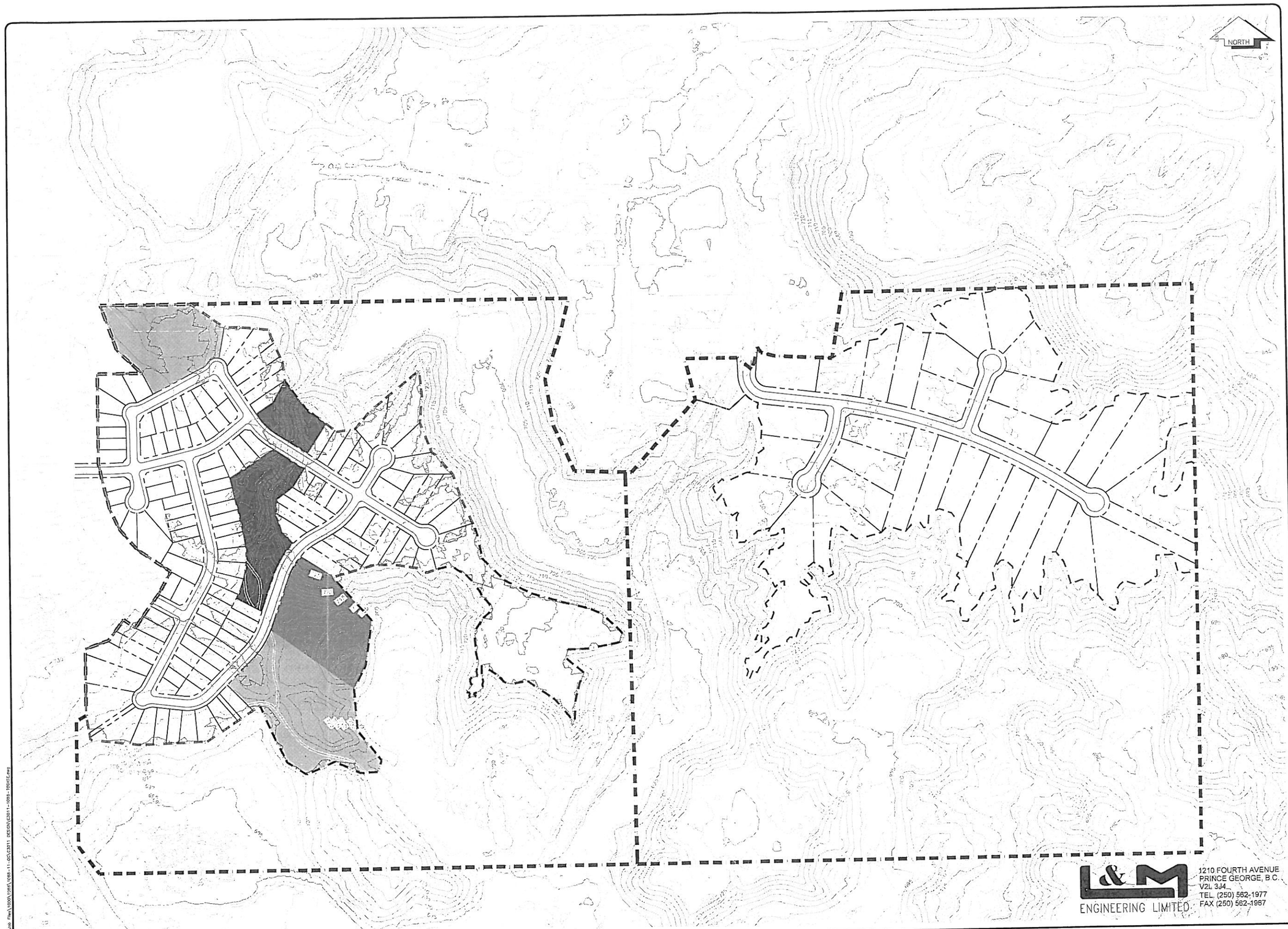

LEGEND

- RROPERTY BOUNDARY
- POTENTIAL DEVELOPMENT BOUNDARY
- MULTI FAMILY
- URBAN SINGLE FAMILY
- RURAL SINGLE FAMILY
- GREEN BELT
- PARK/PUBLIC
- STRATA

NO.	DATE	REVISION	DR.

CITY OF
PRINCE GEORGE
Development Services

DRAWN:	DDA
CHECKED:	JRB
ENGINEER:	JRB
SURVEY FILE:	
DRAWING FILE:	C3011-1088-10BASE.dwg
CORRESPONDENCE:	CPG
GRID:	
DATE:	15/03/2011
SCALES:	HORZ. 1:2500

STEVE DIMOND
VALLEYVIEW
OVERALL PROPOSED
ZONING AND LOT LAYOUT

CONSULTANTS PROJECT No.
1088-11-01
DRAWING No.
RZ:04

SHEET No.	REV. No.
2 OF 4	0

L&M ENGINEERING LIMITED
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APPENDIX 3

SECTION 8.2 OF PRINCE GEORGE ZONING BYLAW NO. 7850 - RIPARIAN PROTECTION DEVELOPMENT PERMIT AREAS

8.2 Riparian Protection Development Permit Areas

Exemptions

8.2.1 A riparian protection development permit is not required for the following development:

a) subdivision involving only the moving of an interior lot line, where no additional lots are created;
b) temporary buildings and structures in accordance with Section 5.14 of this *Bylaw*, construction trailers, temporary hoarding or scaffolding, temporary structures associated with a sidewalk/parking lot sale or café, and buildings and structures permitted by a Temporary Commercial or Industrial Use Permit;
c) alteration of land, or construction of, addition to or alteration of a building or structure by the City, or the federal or provincial governments, to prevent, control, or reduce flooding, erosion or other immediate threats;
d) alteration of land necessary for emergency removal of dangerous or hazardous trees or tree limbs in accordance with the *Tree Protection Bylaw*;
e) alteration of land to restore or create the natural features, functions, or conditions of a watercourse in accordance with a plan previously approved by the City, or federal or provincial governments;
f) alteration of land, or construction of, addition to or alteration of a building or structure by the City, the federal or provincial governments, or their agents for surveying, construction, or maintenance of access or works;
g) renovation or repair of a building or structure only to the extent that the renovation or repair would, when complete, involve no further contravention to the riparian protection area guidelines of this *Bylaw* than existing at the time the renovation or repair was started; or
h) construction or alteration of a boat launch or boat lift where such a facility complies with this *Bylaw* and has been approved by relevant provincial agencies.

Guidelines

Bylaw 8025

8.2.2 Leave strips within riparian protection development permit areas must remain free of development, except in accordance with these guidelines, to ensure that natural features, function and conditions that support fish life processes are preserved, protected, restored or enhanced.
Watercourses and water bodies shall have:

a) 15.0 m leave strips from the top of bank for agricultural, outdoor recreation, and low density (<18 units/ha) residential developments;

b) 30.0 m leave strips from the top of bank for commercial, industrial and institutional developments;

c) notwithstanding sub-section 8.2.2 a), 30.0 m leave strips from the top of bank of the Fraser River and Nechako River, except 50.0 m leave strips are required where the leave strip area is devoid of trees and there is evidence of active bank erosion;

d) notwithstanding sub-sections 8.2.2 a), b), and c), 10.0 m leave strips from the top of ravine bank for ravines that are 60.0 m wide or greater; and

e) Lesser leave strips shall be considered where the size is determined on the basis of an assessment report provided by a qualified professional in respect of a development proposal.

8.2.3 Development within a leave strip shall not result in harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes.

8.2.4 Subject to section 8.2.3, development within a leave strip may include onsite sewage disposal systems, access, vegetation and trees, and training works or protection measures in accordance with these guidelines.

8.2.5 Natural features, functions and conditions that support fish life processes are to be preserved, protected, restored or enhanced within leave strip areas determined under section 8.2.2.

8.2.6 Natural watercourses shall be dedicated if such dedication is to ensure that natural features, functions and conditions that support fish life processes are preserved, protected, restored or enhanced.

8.2.7 Training works shall be required, including their ongoing maintenance or repair, to preserve, protect, restore or enhance the natural features, functions, and conditions that support fish life processes.

8.2.8 Protection measures, including the installation of a fence in agricultural, commercial, industrial, institutional and multiple-family residential zones, and the planting or retention of vegetation and trees, may be required to preserve, protect, restore, or enhance riparian protection development permit areas, control drainage, or control erosion or protect banks.

8.2.9 Bylaw provisions under Divisions 7 and 11 of Part 26 of the *Local Government Act* may be varied or supplemented to ensure that natural features, functions and conditions that support fish life processes are preserved, protected, restored or enhanced within the riparian protection development permit area.

8.2.10 The sequence and timing of development approved by the permit may be specified in the permit to reduce the potential for harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes.