



February 20, 2006

Reference: 800-284.4

Mr. David Murphy  
S.L. Resort Management Corporation  
Suite 230  
5824 2<sup>nd</sup> Street SW  
Calgary, Alberta  
T2H 0H2

Via e-mail: [dmurphy@foxbridgedevelopment.com](mailto:dmurphy@foxbridgedevelopment.com)

Dear Mr. Murphy:

**Re: Riparian Areas Regulation Assessment for the Phase II Strand Lake Resort Property**

Summit Environmental Consultants Ltd. (Summit) is pleased to provide a letter report to summarize the Riparian Areas Assessment (RAR) conducted on the Phase II Strand Lakeside Resort property. The detailed RAR assessment was conducted by Ms. Rebekka Lindskoog, R.P.Bio. and Ms. Carrie Williamson, B.I.T. on February 3, 2006. In addition, observations from a reconnaissance visit conducted by Mr. Allen Hanson, R.P.Bio. of Summit in August 2005, were considered (i.e., during the growing season).

***Baseline Environment***

The Phase II development property is located northwest of the intersection of Lakeshore Road and Okanagan Landing Road and is fronted by Okanagan Lake. The property contains a wetland in the northwest half of the property which is fed by a stream flowing north from Okanagan Landing Road and a ditch flowing west from Lakeshore Road. The wetland is drained from the north end via a stream which flows into Okanagan Lake (Figure 1). The stream feeding and draining the wetland will be termed “the stream” in this assessment.

As there are no fish barriers present, all waterbodies addressed in this letter are considered fish-bearing or potentially fish-bearing. Twenty-five fish species have been documented in Okanagan Lake (see Attachment 1) of which six are salmonid species.

Riparian vegetation along the shoreline of Okanagan Lake includes native species such as willow, cottonwood, rose, saskatoon, Douglas maple and equisetum (horsetail), as well as non-native species such as Canada thistle. Riparian vegetation surrounding the wetland, the stream and the ditch, consists largely of cattails, rose, saskatoon and a few willows. A detailed map of

the vegetation on the property is provided in Figure 1 and a complete list of the plant species observed during the reconnaissance and the RAR assessment is provided in Attachment 2. The width of riparian vegetation (i.e., trees and shrubs along the shoreline) on the property is variable (5 m to 25 m) with 15 m being the average width from the natural boundary. Most of the large trees present are willows and black cottonwoods with average dbh (diameter at breast height) measurements of 1.0 m and maximum heights ranging from 20 m to 30 m. There is also a grove of mature cottonwood trees near the eastern boundary of the property (approximately 1330 m<sup>2</sup>).

### ***RAR Methodology***

The riparian assessment was based on the assessment methods outlined in the new Riparian Areas Regulation (RAR) of the *Fish Protection Act*. As of this date, the City of Vernon has not adopted the RAR assessment methods; however, these methods will come into effect March 31, 2006, and will be used by Qualified Environmental Professionals (QEPs) to determine setbacks for all lakeside or creekside developments within the City of Vernon. Any development within the setback (termed the streamside protection and enhancement area or SPEA width in the RAR methods) must apply for a variance from Fisheries and Oceans Canada (DFO).

The RAR assessment method determines the setback by assessing three zones of sensitivity (ZOSs) for the features, functions and conditions of the riparian area, which are:

- Large woody debris (LWD), bank and channel stability;
- Shade; and
- Litter fall and insect drop.

In order to determine the setback, the following steps were completed:

- Determined the type of potential vegetation within the property. Under the RAR assessment methods, the default Site Potential Vegetation Type (SPVT) is deciduous or coniferous tree (TR) with a Site Potential Vegetation Height (SPVH) of 30 m. As mature deciduous trees (willow and cottonwood) are currently growing along Okanagan Lake and throughout the property, this default is appropriate;
- Determined the channel morphological type through visual observation;
- Determined the average channel width. This was accomplished by measuring the width of the stream and the west flowing ditch, at the top of bank. The average channel width for each was then calculated;
- Determined the orientation of the shoreline, the stream and the ditch using aerial photographs; and
- Calculated the setback using the above information and the RAR assessment methods (MOE, 2005).

### ***Results***

The results are summarized in Table 1. The average channel width was 4 m for the stream and 2 m for the ditch. The ditch as shown on Figure 1 has been defined using the characteristics provided in the RAR assessment methods (MOE, 2005).

Table 1. Width of Zones of Sensitivity.

<b>Zone of Sensitivity</b>	<b>Stream (Flows S-N)</b>	<b>Ditch (Flows E-W)</b>	<b>Lake/Wetland</b>
LWD, bank and channel stability	12 m from top of bank	5 m	15 m from HWM
Shade	12 m due south	5 m due south	30 m due south from HWM
Litter fall and insect drop	12 m from top of bank	5 m	15m from HWM
<b>Final Setback</b>	<b>12 m</b>	<b>5 m</b>	<b>Defaults to the widest ZOS, from 15 m to 30 m.</b>

**Summary**

The RAR assessment provides the setback required to protect riparian areas. The applicable setback for the property ranges from 5 to 30 m and is illustrated on Figure 1. Any development within the setback must apply for a variance from DFO; therefore, this setback should be considered during the design phase of the resort development on the property.

In addition to this assessment, a detailed environmental impact assessment should also be conducted to determine potential impacts and recommend mitigation measures for the protection of wildlife (specifically the rare and endangered species on the property). Finally, an environmental management plan and a stormwater management plan should be prepared and implemented to minimize impacts during construction of the resort.

We trust this completes our assignment to your satisfaction. Please call if you have any questions.

Yours truly,

**Summit Environmental Consultants Ltd.**

Rebekka Lindskoog, B.Sc., R.P.Bio.  
Biologist

Attachments: Attachment 1 Fish species known to inhabit Okanagan Lake.  
Attachment 2 Plant species identified in the subject property.  
Figure 1



***References:***

- BC Fisheries and Fisheries and Oceans Canada. 2005. Fish Wizard website. <http://pisces.env.gov.bc.ca/>
- Ministry of Environment (MOE). 2005. Environmental Stewardship Division. Riparian Areas Regulation Website. [http://www.env.gov.bc.ca/habitat/fish\\_protection\\_act/riparian/riparian\\_areas.html](http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_areas.html) (methods update from the Participant's Manual. Malaspina University College. October 2005.)



Attachment 1 Fish species known to inhabit Okanagan Lake.

<b>Scientific Name</b>	<b>Common Name</b>
<i>Oncorhynchus mykiss</i>	Steelhead*
<i>Oncorhynchus clarki</i>	Cutthroat trout*
<i>Oncorhynchus nerka</i>	Kokanee*
<i>Salvelinus fontinalis</i>	Brook trout*
<i>Oncorhynchus mykiss</i>	Rainbow trout*
<i>Salvelinus namaycush</i>	Lake trout*
<i>Lota lota</i>	Burbot
<i>Cyprinus carpio ssp.</i>	Carp
<i>Perca flavescens</i>	Yellow perch
<i>Acrocheilus alutaceus</i>	Chiselmouth
<i>Rhinichthys spp.</i>	Dace
<i>Rhinichthys falcatus</i>	Leopard Dace
<i>Rhinichthys cataractae</i>	Longnose Dace
<i>Prosopium williamsoni</i>	Mountain Whitefish
<i>Coregonus clupeaformis</i>	Lake Whitefish
<i>Prosopium coulteri</i>	Pygmy Whitefish
<i>Ptycheilus oregonensis</i>	Northern Pikeminnow
<i>Catostomus spp.</i>	Sucker
<i>Catostomus catostomus</i>	Longnose sucker
<i>Catostomus macrocheilus</i>	Largescale sucker
<i>Mylocheilus caurinus</i>	Peamouth chub
<i>Lepomis gibbosus</i>	Pumpkinseed
<i>Cottus asper</i>	Prickly sculpin
<i>Cottus cognatus</i>	Slimy sculpin
<i>Richardsonius balteatus</i>	Redside shiner

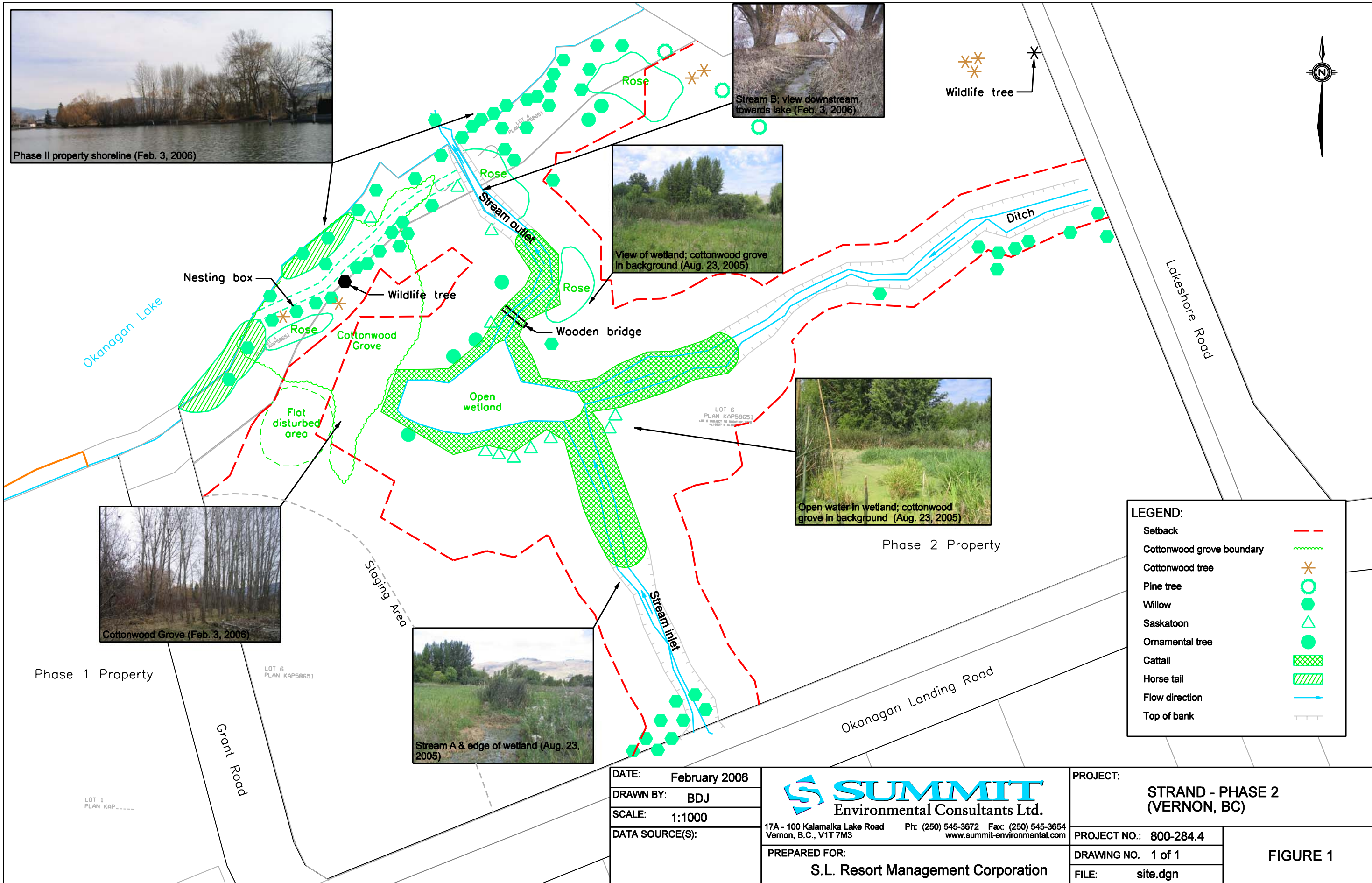
Source: Fisheries BC and DFO, 2005

\* salmonids

Attachment 2 Plant species identified in the subject property.

<b>Common Name</b>	<b>Scientific Name</b>
Alder	<i>Alnus sp.</i>
Black Cottonwood	<i>Populus tricarpa</i>
Boxelder	<i>Acer negundo</i>
Bull Thistle	<i>Cirsium vulgare</i>
Canada thistle	<i>Cirsium arvense</i>
Cattail	<i>Typha latifolia</i>
Common Duckweed	<i>Lemna minor</i>
Common Snowberry	<i>Symphoricarpos albus</i>
Common Toadflax	<i>Linaria vulgaris</i>
Douglas Fir	<i>Pseudotsuga menziesii</i>
Douglas Maple	<i>Acer glabrum</i>
European Bittersweet	<i>Solanum dulcamara</i>
Field Mint	<i>Mentha arvensis</i>
Great Bullrush	<i>Scirpus lacustris</i>
Great Burdock	<i>Arctium lappa</i>
Great Mullien	<i>Verbascum thapsus</i>
Horsetail	<i>Equisetum spp.</i>
Northern Black Currant	<i>Ribes hudsonianum</i>
Pacific Willow	<i>Salix lucida</i>
Pondweed	<i>Potamogeton spp.</i>
Red Osier Dogwood	<i>Cornus stolonifera</i>
Reed Canary Grass	<i>Phalaris aruninacea</i>
Rose	<i>Rosa spp.</i>
Saskatoon	<i>Amelanchier alnifolia</i>
Scouring Rush	<i>Equisetum hyemale</i>
Sedge	<i>Carex sp.</i>
Stinging Nettle	<i>Urtica dioica</i>
Weeping Willow	<i>Salix babylonica</i>
Whorled Water Milfoil	<i>Myriophyllum verticillatum</i>
Willow	<i>Salix sp.</i>





DATE: February 2006  
 DRAWN BY: BDJ  
 SCALE: 1:1000  
 DATA SOURCE(S):

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PREPARED FOR:  
**S.L. Resort Management Corporation**

PROJECT: **STRAND - PHASE 2 (VERNON, BC)**

PROJECT NO.: 800-284.4

DRAWING NO. 1 of 1

FILE: site.dgn

**FIGURE 1**