



## MEMORANDUM

**DATE:** May 5, 2017  
**TO:** Bruce VanMook, Signal Hill Homes  
**FROM:** Adrien Baudouin, Cascade Environmental Resource Group Ltd.  
**RE:** Environmental assessment of a property along Pemberton Meadows Road.  
**FILE #:** 372-03-01

Cascade Environmental Resource Group Ltd. was retained by Signal Hill Homes to conduct an environmental assessment of a property located along Pemberton Meadows Road in Pemberton, BC (PID: 025-641-620). The proponent wishes to develop the land and asked Cascade to conduct an environmental assessment aiming to identify any potential constraints to the proposed development of a new residential area. A site survey was conducted April 26, 2017 by Adrien Baudouin, M.Sc., R.P.Bio. and Vicki Legris, B.Sc., R.P.Bio., to assess the condition of the subject site. The “Field manual for describing terrestrial ecosystems 2<sup>nd</sup> edition” (BC MOE, 2010) was used to characterize the ecosystem present on the subject property.

### Site characteristic

The site is located within the Coastal Western Hemlock dry subarctic subzone (CWHds1) at an elevation of 217 m. Evidence of site disturbance was observed. A shed and garbage were also observed (Photo 1). Evidence of tree cutting and harvesting was observed (Photo 2). The soil is composed of silty clay. The soil moisture regime is hygric to subhygric and the soil nutrient regime is rich to very rich. The hummus layer was sparse and inexistent in some areas of the site (Photo 3). The water table is likely close to the ground surface during the majority of the year as exposed roots were observed throughout the site (Photo 4). In addition the site is likely inundated during part of the year.

### Vegetation

The site is a medium bench characterized by the site series 10 Act-Willow (Black cottonwood-Willow) (Photo 5 and Photo 6). The stand is a pole/sapling deciduous forest of approximately 20 years old and 15 m height. The successional status is a young climax.

The tree layer accounts for 35% of the ground cover of the site. The dominant tree species is black cottonwood. The codominant species are red alder and paper birch. The shrub layer accounts for 15% of the ground cover. Hardhack and willow constitutes the majority of the shrub layer. Red osier dogwood, red elderberry and thimbleberry were also observed. The herb layer was sparse and accounts for 3% of the ground cover. The dominant species was skunk cabbage. Horsetail and an unidentified species of grass were also observed. *Lamium galeobdolon*, an invasive species of ground covering plant, was observed on the property (Photo 7).

**Table 1: Species identified on the survey site in each layer and their abundance expressed in % for each layer.**

Vegetation Layer	Common name	Latin name	Abundance (%)
Trees	Black cottonwood	<i>Populus trichocarpa</i>	60
	Red alder	<i>Alnus rubra</i>	30



Vegetation Layer	Common name	Latin name	Abundance (%)
	Paper Birch	<i>Betula papyrifera</i>	10
Shrubs	Willow	<i>Salix sp.</i>	35
	Hardhack	<i>Spiraea douglasii</i>	35
	Red-osier dogwood	<i>Cornus stolonifera</i>	15
	Thimbleberry	<i>Rubus parviflorus</i>	5
	Red-elderberry	<i>Sambucus racemose</i>	10
Herbs	Skunk cabbage	<i>Lysichiton americanus</i>	35
	Horsetail	<i>Equisitum sp.</i>	15
	Unidentified grass species	n/a	50

### Wildlife

The subject area appears to be utilized by avian wildlife. A black-capped chickadee was observed nesting. A corvidae nest (Photo 8) and a female mallard duck were also observed. Small and large mammals are also expected to use the subject site.

### Waterbodies

Two ditches were identified on the subject property. One ditch follows the north border of the property and is connected to 2 Mile Creek, which is connected to the Arn Canal, and therefore the ditch is subject to the Riparian Areas Regulation (Photo 9 and Photo 10). The other ditch is located along Prospect Street ditch on the eastern border of the property and is connected to the first ditch for part of the year (Photo 11 and Photo 12). Under the Riparian Areas Regulation, the north ditch has a setback of 6.1 m, and the roadside ditch has a setback of 5 m. A pond was also observed on the north end of the ditch following the north border of the property (Photo 13 and Photo 14).

### Rare and Endangered Wildlife Species

In B.C., there are two bodies involved with the ranking of species and/or ecological communities at risk. At the national level, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) works under the *Species at Risk Act* (SARA), and at the provincial level, the Conservation Data Centre (CDC) manages the B.C. Status List.

The Canadian government created the *Species at Risk Act* (SARA) in 2002 to complement the Accord for the Protection of Species at Risk (a national effort to identify and protect threatened and endangered wildlife and their associated habitats across the country, 1996). The Committee on the Status of Endangered Wildlife in Canada is the scientific body responsible for assigning the status of species at risk under SARA. This ranking system uses the following terminology:

- Extinct (XX)
- Extirpated (XT)
- Endangered (E)
- Threatened (T)
- Special concern (SC)
- Not at risk (NAR)
- Data deficient (DD)

A species that is listed as Endangered, Extirpated or Threatened is included on the legal list under Schedule 1 of the Act and is legally protected under the Act with federal measures to protect and recover these species in effect.

The B.C. CDC designates provincial red or blue list status to animal and plant species, and ecological communities of concern (BC CDC, 2017). The red list includes indigenous species or subspecies considered to be endangered or threatened. Endangered species are facing



imminent extirpation/extinction, whereas threatened groups or species are likely to become endangered if limiting factors are not reversed. The blue list includes taxa considered to be vulnerable because of characteristics that make them particularly sensitive to human activities or natural events. Although blue listed species are at risk, they are not considered endangered or threatened. Yellow listed species are all those not included on the red or blue list and may be species which are declining, increasing, common or uncommon (BC Ministry of Sustainable Resource Management, 2002).

The tables below include CDC listed (i.e. rare and threatened) species that have the potential to occur on the subject property, species protected as SARA Schedule 1. This potential is based on broad habitat preferences delineated by forest district and biogeoclimatic zone. Potential occurrences are then designated as unlikely or possible based upon species specific habitat requirements and an on-site assessment of those habitats. Note that a comprehensive evaluation of the study area for each species was not possible due to time constraints, seasonal migration patterns, and the transient nature of some species.

**Table 2: Rare and endangered wildlife species potentially occurring in the study area**

Scientific Name	English Name	Habitat Requirements	Potential Occurrence	BC CDC List Status	SARA Schedule 1 Status
<i>Accipiter gentilis laingi</i>	Northern Goshawk, <i>laingi</i> subspecies	Extensive forests with large stands of mature trees and dense canopies, but with an open understory.	Unlikely	Red	1-T (Jun 2003)
<i>Anaxyrus boreas</i>	Western Toad	Various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams	<b>Possible</b>	Blue	1-SC (Jan 2005)
<i>Ardea herodias fannini</i>	Great Blue Heron, <i>fannini</i> subspecies	Aquatic areas <0.5 m deep, fish bearing streams and rivers, undisturbed nesting in tall trees.	Unlikely	Blue	1-SC (Feb 2010)
<i>Argia emma</i>	Emma's Dancer	Associated with cool or hot springs	Unlikely	Blue	
<i>Argia vivida</i>	Vivid Dancer	Associated with cool or hot springs	Unlikely	Blue	
<i>Ascaphus truei</i>	Coastal Tailed Frog	Clear, cold swift-moving mountain streams with coarse substrates. Primarily in older forest sites	Unlikely	Blue	1-SC (Jun 2003)
<i>Brachyramphus marmoratus</i>	Marbled Murrelet	Coastal areas, mainly in salt water within 2 km of shore	Unlikely	Blue	1-T (Jun 2003)
<i>Charina bottae</i>	Northern Rubber Boa	Woodlands, forest clearings, patchy chaparral, meadows, and grassy savannas, generally not far from water; also riparian zones in arid canyons and sagebrush in some areas	<b>Possible</b>	Yellow	1-SC (Jan 2005)
<i>Chordeiles minor</i>	Common Nighthawk	Mountains and plains in open and semi-open areas: open coniferous forests, savanna, grasslands, fields, vicinity of cities and towns	Unlikely	Yellow	1-T (Feb 2010)



Scientific Name	English Name	Habitat Requirements	Potential Occurrence	BC CDC List Status	SARA Schedule 1 Status
<i>Cicindela hirticollis</i>	Hairy-necked Tiger Beetle	Beach habitat	Unlikely	Blue	
<i>Contia tenuis</i>	Sharp-tailed Snake	Moist situations in pastures, meadows, oak woodlands, broken chaparral, and the edges of coniferous or hardwood forests.	Unlikely	Red	1-E (Jun 2003)
<i>Contopus cooperi</i>	Olive-sided Flycatcher	Various forest and woodland habitats.	Unlikely	Blue	1-T (Feb 2010)
<i>Cypseloides niger</i>	Black Swift	Aerial; forages over forests and in open areas. Nests behind or next to waterfalls and wet cliffs	Unlikely	Blue	
<i>Dendragapus fuliginosus</i>	Sooty Grouse	Coniferous forest, particularly moist or wet areas.	Unlikely	Blue	
<i>Erynnis propertius</i>	Propertius Duskywing	Open oak or mixed woodlands with the foodplant oaks.	Unlikely	Red	
<i>Danaus plexippus</i>	Monarch	Habitat is a complex issue for this species. In general, breeding areas are virtually all patches of milkweed in North America	Unlikely	Blue	1-SC (Jun 2003)
<i>Enallagma clausum</i>	Alkali Bluet	Lake, pond and open water	Unlikely	Blue	
<i>Euphagus carolinus</i>	Rusty Blackbird	Moist woodland (primarily coniferous), bushy bogs and fens, and wooded edges of water courses and beaver ponds.	Unlikely	Blue	1-SC (Mar 2009)
<i>Euphyes vestris</i>	Dun Skipper	Habitat is hard to characterize. Certainly does use low moist spots in fields, meadows, right of ways, etc. that would not qualify as palustrine.	Unlikely	Red	1-T (Jun 2003)
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	Typically nest on rock cliffs above lakes or river valleys where abundant prey is nearby	Unlikely	Red	1-SC (Jun 2012)
<i>Gulo gulo luscus</i>	Wolverine, <i>luscus</i> subspecies	A range of habitat types from valley bottoms to alpine meadows	Unlikely	Blue	
<i>Hirundo rustica</i>	Barn Swallow	Less frequently in partly open habitats, frequently near water	Unlikely	Blue	
<i>Megascops kennicottii kennicottii</i>	Western Screech-Owl, <i>kennicottii</i> subspecies	Lower elevations in coniferous or mixed forests that are often in riparian zones.	Unlikely	Blue	1-SC (Jan 2005)



Scientific Name	English Name	Habitat Requirements	Potential Occurrence	BC CDC List Status	SARA Schedule 1 Status
<i>Melanerpes lewis</i>	Lewis's Woodpecker	Open forest and woodland, often logged or burned, including oak, coniferous forest (primarily ponderosa pine), riparian woodland and orchards	Unlikely	Red	1-T (Jul 2012)
<i>Myotis keenii</i>	Keen's Myotis	Associated with coastal forest habitat. Mostly, but not restricted to, old growth.	Unlikely	Blue	3 (Mar 2005)
<i>Myotis lucifugus</i>	Little Brown Myotis	These bats use a wide range of habitats and often use human-made structures for resting and maternity sites; they also use caves and hollow trees	<b>Possible</b>	Yellow	1-E (Dec 2014)
<i>Numenius americanus</i>	Long-billed Curlew	Prairies and grassy meadows, generally near water	Unlikely	Blue	1-SC (Jan 2005)
<i>Ophiogomphus occidentis</i>	Sinuuous Snaketail	Lake, streams and rivers	Unlikely	Blue	
<i>Oreamnos americanus</i>	Mountain Goat	Alpine and subalpine habitat	Unlikely	Blue	
<i>Patagioenas fasciata</i>	Band-tailed Pigeon	Coniferous and mixed deciduous lowland forests.	Unlikely	Blue	1-SC (Feb 2011)
<i>Pekania pennanti</i>	Fisher	Low to mid-elevation large tracts (>100 ha) dense forests <2500 m.	Unlikely	Blue	
<i>Podiceps nigricollis</i>	Eared Grebe	Marshes, ponds and lakes	Unlikely	Blue	
<i>Rana aurora</i>	Northern Red-legged Frog	Wetlands, pools, and riparian areas of upland forests. Confirmed occurrences in the Arn Canal.	<b>Possible</b>	Blue	1-SC (Jan 2005)
<i>Sorex bendirii</i>	Pacific Water Shrew	Riparian or marshy habitats below 850 m in coniferous / mixed forests.	Unlikely	Red	1-E (Jun 2003)
<i>Strix occidentalis</i>	Spotted Owl	Old growth, dense, multi-layer canopy coniferous forest with a range of snags and nesting hollows available.	Unlikely	Red	1-E (Jun 2003)
<i>Ursus arctos</i>	Grizzly Bear	Non-forested or partially forested sites with a wide range of foraging behaviours and choice of habitats.	Unlikely	Blue	

Source: Conservation Data Centre for the Squamish Forest District, CWH Biogeoclimatic Zone (BC CDC, 2017)

### Rare and Endangered Plant Species

The species listed in Table 8 below have the potential to occur within the Squamish Forest District within the CWH biogeoclimatic zone based on their habitat requirements as outlined by





the biogeoclimatic classification system. Of the 21 species listed in Table 3, no species is likely to occur in the project area based on the geographic location and site conditions.

**Table 3 Rare and endangered plant species potentially occurring in the study area**

Scientific Name	Common Name	Habitat Requirements	Potential Occurrence	List Status
<i>Allium geyeri</i>	Geyer's Onion	Moist meadows and rocky outcrops	Unlikely	Blue
<i>Bidens amplissima</i>	Vancouver Island beggarticks	Occupies a variety of wetland habitats including ditches, willow wetlands, old riverbeds, pond margins, streamsides, and tidal or non-tidal river edges	Unlikely	Blue
<i>Botrichium symplex</i>	Least moonwort	Moist to wet vernal pools and ephemeral seepages	Unlikely	Blue
<i>Brotherella roellii</i>	Roell's Brotherella	Forms mats on rotten logs, stumps, and bases of trees in cool to moist mixed deciduous and conifer forest, usually at low elevations along valley margins.	Unlikely	Red
<i>Bryum schleicheri</i>		Wet tundra on the coast and in oceanic interior ranges; wet soil or rocks at alpine elevations. Grows on soil/rocks and stream banks.	Unlikely	Blue
<i>Callicladium haldanianum</i>	Beautiful branch moss	Rotten wood and soil	Unlikely	Blue
<i>Ceratophyllum echinatum</i>	Spring hornwort	Fresh water of lakes, ponds, marshes, swamps; shady areas and in more ephemeral sites	Unlikely	Blue
<i>Cicuta maculata</i> var. <i>maculata</i>	Spotted cowbane	Wet sites in the montane zone CWHds1	Unlikely	Red
<i>Claytonia washingtoniana</i>	Washington springbeauty	Moist to mesic moss rock outcrops and forests in the lowland and montane zones	Unlikely	Red
<i>Dryopteris marginalis</i>	Marginal wood fern	Moist woods in the montane zone, rare in SW BC.	Unlikely	Red
<i>Epilobium glaberrimum</i> ssp. <i>fastigiatum</i>	Smooth willowherb	Moist streambanks, scree slopes, and open forests	Unlikely	Blue
<i>Grimmia anomala</i>	Grimmia dry rock moss	Forming small cushions on igneous or serpentine rocks, shaded or in crevices of exposed rocks, 4000-7000 ft elevation	Unlikely	Blue
<i>Hygrohypnum alpinum</i>	Alpine Brook-moss	higher elevation species that depends on cold, clean swiftly running mountain streams	Unlikely	Blue
<i>Myriophyllum ussuriense</i>	Ussurian water-minfoil	Rivers, lakes, ponds, marshes, swamps	Unlikely	Blue
<i>Pinus albicaulis</i>	Whitebark pine	Within montane forests and on thin, rocky, cold soils at or near timberline	Unlikely	Blue
<i>Pleuropogon refractus</i>	Nodding semaphore grass	Bogs, streambanks, lakeshores and wet meadows in the lowland and montane zones	Unlikely	Blue
<i>Pohlia cardotii</i>		Found along hills at 6000-8000 ft	Unlikely	Red
<i>Schoenoplectus americanus</i>	Olney's bulrush	Saline or alkaline wet meadows in the lowland and montane zones	Unlikely	Red
<i>Sphagnum contortum</i>			Unlikely	Blue
<i>Stellaria obtusa</i>	Blunt-sepaled starwort	Riparian/Meadow/Seeps	Unlikely	Blue



Scientific Name	Common Name	Habitat Requirements	Potential Occurrence	List Status
<i>Tripterocladium leucocladulum</i>		Forms dense silky mats on shaded to exposed rocks, cliffs and bark of hardwoods such as Garry oak, tan oak, canyon live oak and bigleaf maple, occurring mostly at low elevations.	Unlikely	Blue

Source: Conservation Data Centre for the Squamish Forest District, CWH Biogeoclimatic Zone (BC CDC, 2017)

**Rare and Endangered Ecological Communities**

The CDC also tracks rare and endangered plant communities for the province of British Columbia. The term "ecological" is a direct reference to the integration of non-biological features such as soil, landform, climate and disturbance factors. The term "community" reflects the interactions of living organisms (plants, animals, fungi, bacteria, etc.), and the relationships that exist between the living and non-living components of the "community". Currently, the most common ecological communities that are known in BC are based on the Vegetation Classification component of the Ministry of Forests and Range Biogeoclimatic Ecosystem Classification, which focuses on the terrestrial plant associations of BC's native plants.

The CDC list primarily applies to large, relatively intact sites with mature and old growth communities. The larger the site, the less edge effect is experienced by the ecological community (the edge of an ecological community is permeable to factors such as light, wind, invasive plants, and predators that can influence the integrity of a given ecological community). The subject property contains forest of structural stage 4 – pole/sapling, and is adjacent to a roads ways and residential areas. Even though the ecosystem present on the site is blue listed, protection is only required when the forest is mature to old growth and undisturbed.

**Table 4 Listed ecological communities for CWHds1**

Scientific Name	English Name	BC List	Biogeoclimatic Units	Potential Occurrence
<i>Populus trichocarpa</i> / <i>Salix</i> spp. Dry Submaritime	black cottonwood / willows Dry Submaritime	Blue	CWHds1/10 CWHds2/10	Present

Source: Conservation Data Centre for the Squamish Forest District, CWH Biogeoclimatic Zone (BC CDC, 2017)

**Archaeological Value**

Harriet VanWart from the Lil'wat Band was consulted in order to determine if any known archaeological site occurred on the subject property. To her knowledge, the subject property does not contain any archaeological site.



### **Conclusions**

This report details the baseline conditions and potential environmental constraints to development of subject property located along Pemberton Meadows Road in Pemberton, BC. Based on the conditions observed during the site reconnaissance, and the research and information reviewed as part of this assessment, there appear to be opportunities for the creation of the proposed development. The main constraints identified within the subject property relate to:

- Riparian area regulations setbacks: the proposed development will have to remain outside of the identified setbacks and a RAR assessment report will have to be submitted.

### **Recommendations**

Based on the information reviewed and site conditions observed, the following recommendations are made to minimize potential negative impacts on the site arising from the development:

1. Development and construction of the stormwater pond should follow guidelines and recommendations outlined in: *Environmental Best Management Practices for Urban and Rural Land Development* (Ministry of Water, Land and Air Protection, 2004). This includes best management recommendations for storm water, pollution prevention and wildlife and ecosystem management.
2. Sediment fencing should be erected around the perimeter of the stormwater pond. This will provide a visual deterrent for encroachment into the surrounding forested area and prevent potential release of sediment into the wetland.
3. Vegetation should be retained wherever possible. Retention of vegetated areas will facilitate wildlife movement through the site and retain breeding and foraging areas. Development should minimize vegetation clearance by proper site planning.
4. Vegetation removed during the nesting bird season (April 1 to September 1) should be surveyed for the presence of active bird nests.
5. Site preparation and construction works should be monitored by a qualified environmental monitor.

### **References**

BC Ministry of Environment. 2010. Field manual for describing terrestrial ecosystems- 2<sup>nd</sup> edition.

BC Ministry of Environment Conservation Data Centre. <http://www.env.gov.bc.ca/cdc/> Accessed on April 28, 2017.

Ministry of Forests. 1994. A field Guide for Site Identification and Interpretation for the Vancouver Forest Region. Land Management handbook 28.

Ministry of Water, Land and Air Protection, 2004. Environmental Best Management Practices for Urban and Rural Land Development. <https://www.for.gov.bc.ca/hfd/library/documents/bib96812.pdf> Accessed on April 28, 2017.





**Photo documentation**



**Photo 1: View of the shed on the subject property. April 26, 2017.**



**Photo 2: Evidence of tree cutting and harvesting. April 26, 2017.**



**Photo 3: View of the ground lacking the hummus layer. April 26, 2017.**



**Photo 4: View of the exposed roots. April 26, 2017.**



**Photo 5: View of the forest type and vegetation on the subject property. April 26, 2017.**



**Photo 6: View of the forest type and vegetation on the subject property. April 26, 2017.**





**Photo 8: View of the corvidae nest. April 26, 2017.**



**Photo 7: View of the lamium present on the subject property. April 26, 2017.**



**Photo 10: View of the ditch present along the north border of the subject property. April 26, 2017.**



**Photo 9: View of the ditch present along the north border of the subject property. April 26, 2017.**



**Photo 12: View of the ditch along Prospect Street. April 26, 2017.**



**Photo 11: View of the ditch along Prospect Street. April 26, 2017.**





**Photo 13: View of the pond on the north end of the ditch following the north border of the property. April 26, 2017.**



**Photo 14: View of the pond on the north end of the ditch following the north border of the property. April 26, 2017.**