CASCADE ENVIRONMENTAL
RESOURCE GROUP LTD

Initial Environmental Review:
9000 Block Highway 99, BC

Prepared by:
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Unit 3 – 1005 Alpha Lake Road
Whistler, BC
V0N 1B1

Prepared for:
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This document should not be construed to be:

- A Phase 1 - Environmental Site Assessment
- A Stage 1 – Preliminary Site Investigation (as per the Contaminated Sites Regulation of the Environmental Management Act)
- An Environmental Impact Assessment

1 Introduction

1.1 Scope

28165 Yukon Inc. proposes to construct rental units and town homes on a property located at 9000 Block, Highway 99, in the Squamish Lillooet Regional District, north of Whistler, BC, and contracted Cascade Environmental Resource Group Ltd. (Cascade) to conduct an Initial Environmental Review of the property. The IER will form part of a rezoning and development permit package to be submitted by to the Squamish Lillooet Regional District (SLRD). The subject property currently consists of undeveloped, forested land adjacent to Highway 99. 28165 Yukon Inc. wishes to construct 36 rental units and 32 townhomes on the property.

This report reviews and assesses the biophysical conditions; ecosystem integrity, habitat potential, species present (plant and animal), and aquatic features on or adjacent to the subject site. It includes a discussion of the environmental regulatory framework that may affect development activities and provides alternatives for mitigation or resolution. Potential constraints and recommendations are provided to inform and facilitate the environmental review and approval process.

1.2 The Project Team

Vicki Legris, B.Sc., E.P., R.P. Bio., Margot Webster, B.Sc., B.I.T. and Oliver Chew, B.Sc., Adv. Dip. conducted the site investigation for the study area. Mapping support was provided by Nicola Church, B.A., M.Sc. (G.I.S.). All project team members have extensive experience in conducting environmental inventories, reviews and assessments.

1.3 Location

The study area is comprised of a 1.6 ha portion of a 120 ha parcel of land located on Highway 99, west of the WedgeWoods residential development in the Squamish Lillooet Regional District (SLRD) Area C. The legal description of the land parcel is District Lot 2247 Group 1 New Westminster District, except firstly part in Plan VAP23216 and secondly part in Plan BCP39086. The subject site is currently undeveloped, forested land.

The study area is bordered to the east by Highway 99 and the WedgeWoods residential development, to the south by Highway 99 and a highway wayside pit, to the west by a BC Hydro right of way and undeveloped forested land on the lower slopes of Cougar Mountain, and to the north by undeveloped forested land and Highway 99. The location of the property can be found in Map 1, and the existing environmental conditions are detailed in Map 2.

1.4 SLRD Bylaw Zoning

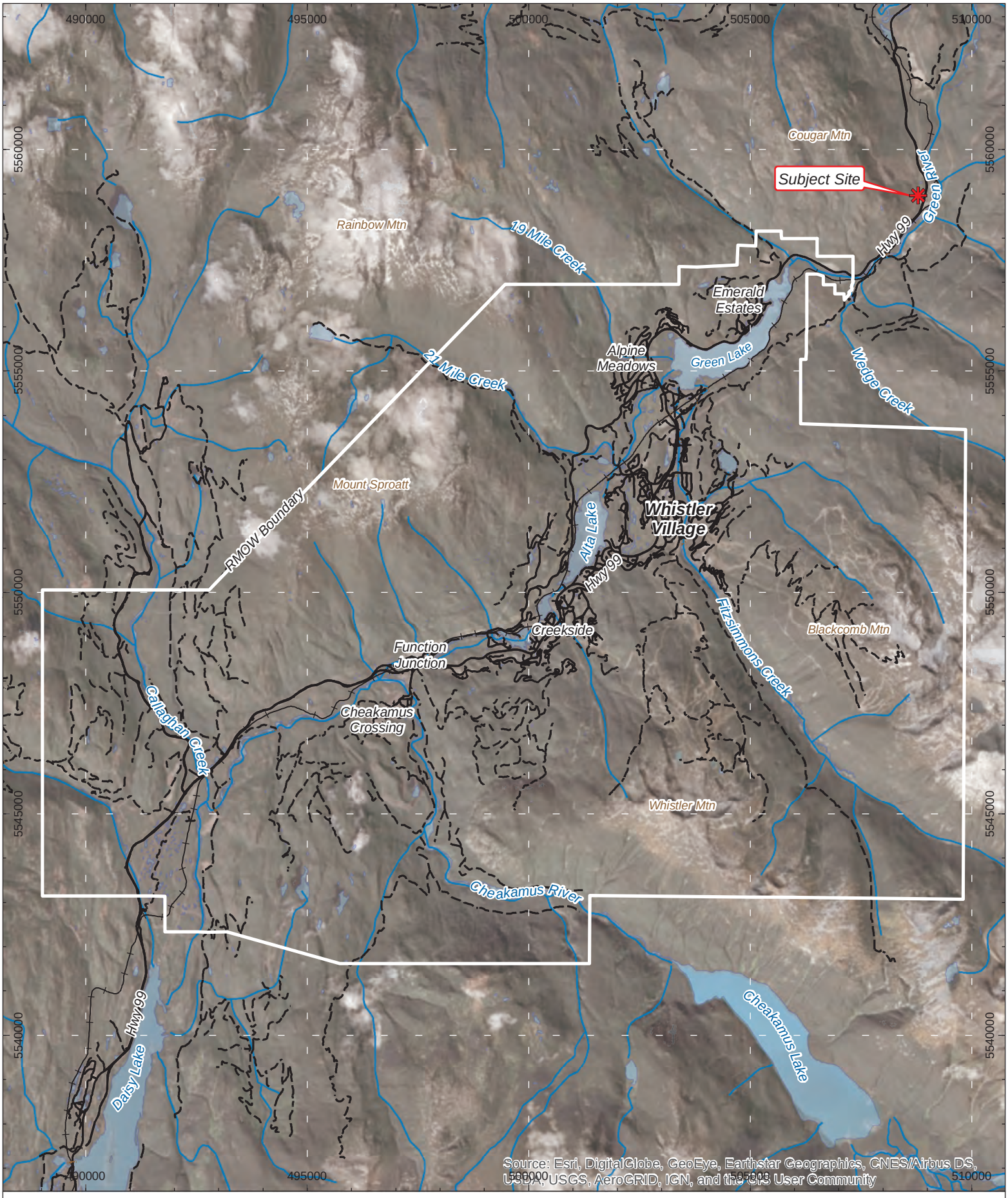
The property is currently zoned CD1 for Comprehensive Development Zone – WedgeWoods Estates. The following uses are permitted:

- private or public water, drainage, telecommunications, power and related utility infrastructure uses (including, without limiting the generality of the foregoing, wells, reservoirs, treatment systems, pumphouses, mains, lines, pipes, culverts, valves, poles, chutes, ducts, wires, roads and other appurtenances, attachments, fittings and equipment associated therewith
- interpretive centre
- nature conservation area uses

1.5 Methodology

On-site reconnaissance of the study area was conducted on July 18, 2019. The ecosystem units present on the subject site were investigated in the field (ground-truthed) using ground inspection methods to confirm the site vegetation, soils, tree mensuration, and geomorphic features of the ecosystem units within the study area. Terrestrial Ecosystem Mapping (TEM) standards (RISC, 1998) were employed to identify and delineate the ecosystem units and define their distribution within the study area.

Vegetation existing on the site was documented and wildlife presence was identified through visual observations, scat, bird songs and feeding signs where present. Potential wildlife for the area's habitats that were not observed during the site visit is described using the BC Conservation Data Centre (CDC), a centralized BC government database of information on species and ecological communities (BC MOE, 2019). Valued ecosystem components such as large woody debris and wildlife trees were also recorded during the site survey.



GIS Cartographer: Nicola Church
Date: July 23, 2019
CERG File#: 965-01-01
Projection: UTM 10N NAD83
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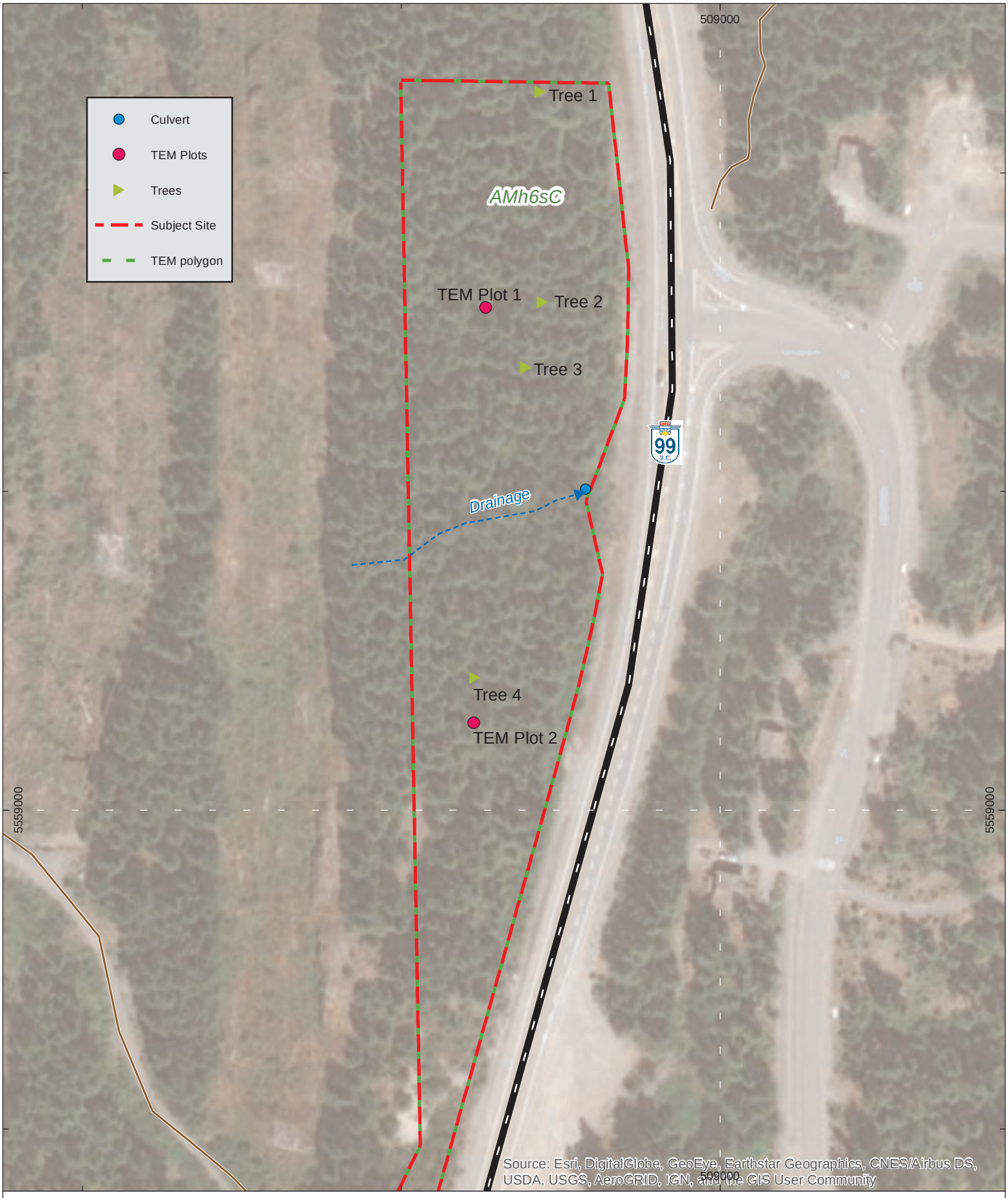
Map 1 - Location

Wedgewood Development Phase II
Wedgemount Creek
Whistler, British Columbia



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CERG File#: 089-05-15
Projection: UTM Zone 10N NAD83

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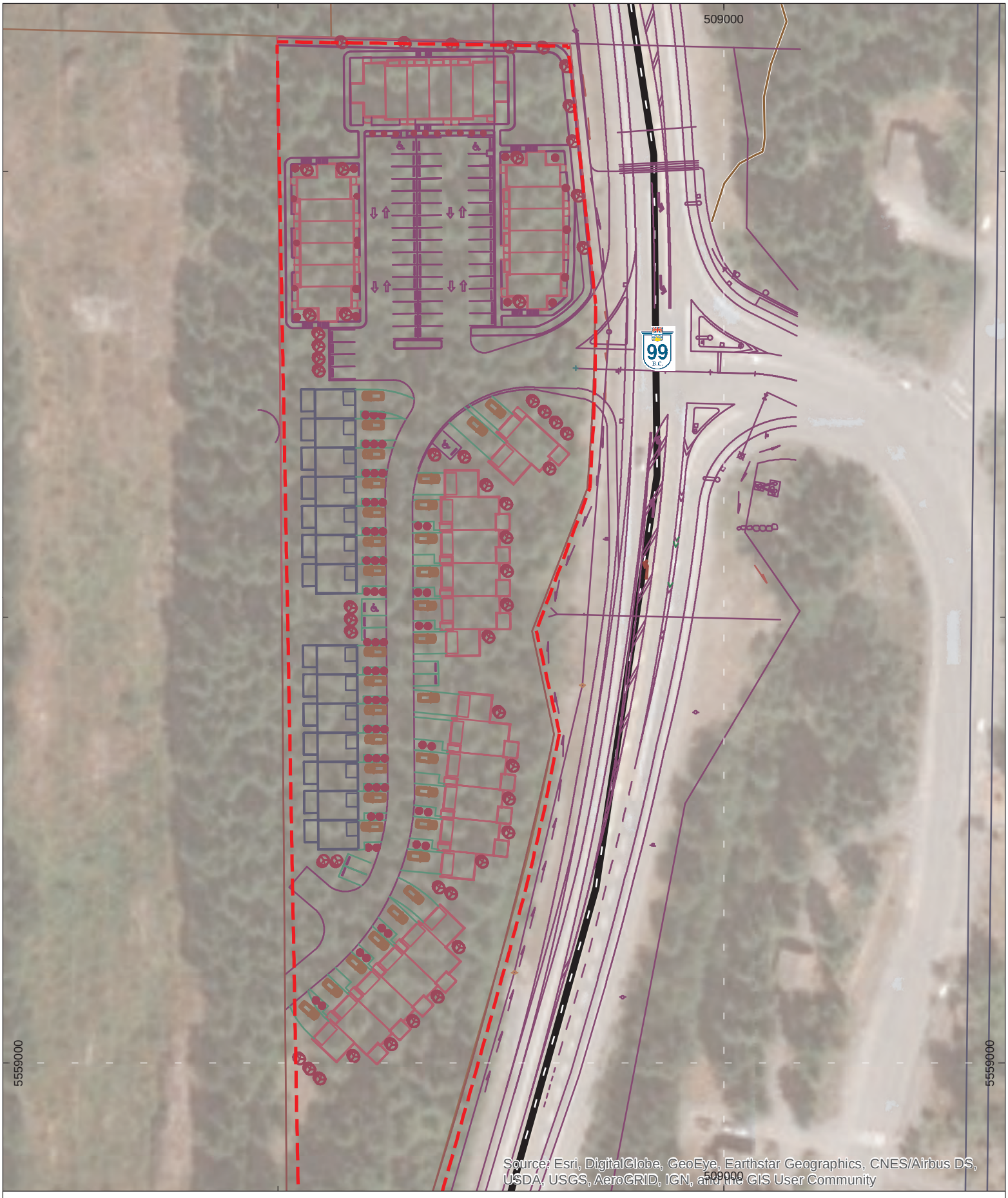
Map 2 - Existing Environmental Conditions

Wedgewood Development Phase II
Wedgemount Creek
Whistler, British Columbia



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Map 3 - Proposed Development

Wedgewood Development Phase II
Wedgemount Creek
Whistler, British Columbia

2 Existing Environmental Conditions

2.1 Historical and Existing Land Use

The subject property is located on the lower slopes of Cougar Mountain. Historical use of the site is mainly connected to the past use of the adjacent lands as a BC Hydro right of way and the Highway 99 right of way. An access road west off Highway 99 just south of the subject site leads to a highway wayside pit and a tank reservoir.

Cascade conducted a Phase 1 Environmental Site Assessment in 2004 and a previous Initial Environmental Review for the land parcel encompassing the subject site in 2005 (Cascade, 2004 and Cascade, 2005). These studies found that the area west of the subject property was selectively logged in the 1980s and 1990s. Recreational activities such as mountain biking and kayaking/rafting on Green River occur in the areas surrounding the subject site, but no watercourses or mountain biking trails occur on the subject site, and no evidence of recreational use was observed during the site visit.

2.2 Physical Environment

2.2.1 Climate

The study area lies within the Eastern Pacific Range Ecosection, within the Coast Mountains Ecoprovince in southern British Columbia (Demarchi, 1996). The climate is principally influenced by frontal systems moving in from the Pacific Ocean and over the Coast Mountains to the Interior. The subject site lies within the Coastal Western Hemlock biogeoclimatic zone in the moist submaritime (ms1) variant. Summers are typically warm and dry and winters cool and moist with significant snowfall (mean annual snowfall is 419 cm, falling from October to May) (Canadian Climate Normals 1981-2010). The growing season is moderately short due to significant snowfall accumulation in the winter months. Mean annual precipitation for this location is 1228 mm (Canadian Climate Normals 1981-2010).

2.2.2 Geology

The area of the subject site is underlain by dioritic intrusive of the late Jurassic to early Cretaceous age of the Mesozoic Era (iMap BC, 2019). This group of rocks is named the Pemberton Diorite Complex, and in general consists of plagioclase (a group of hard crystalline minerals that consist of aluminium silicates of potassium, sodium, calcium or barium) and quartz.

2.2.3 Geomorphology

The site is located on the lower slope of Cougar Mountain, at an elevation of 610 - 620 m. The site is on a level gradient at the toe of the slope, adjacent to Highway 99, and has an irregular, hummocky morphology with occasional boulders (Photo 1).

Photo 1: Boulder on the subject site. July 18, 2019.

2.2.4 Hydrology

No watercourses occur on the subject site. However, during the site visit, a drainage ditch was observed initiating from the BC Hydro right of way west of the site, transecting the site to a screened culvert beneath Highway 99 (Map 2). It is likely that this drainage ditch conveys rainwater only during large storm events; the ditch was observed to by dry during the site visit and no evidence of scouring or mineral alluvium was observed in the ditch.

2.3 Terrestrial Environment

2.3.1 Soils

The general soil type for the Coast Mountain and Islands physiographic region is of the Podzolic Order, residing in the Humo-Ferric Great Group. These soils overlay igneous intrusive rock which is resistant to weathering, thus retarding soil development. Over time however, physical and chemical weathering has produced a coarse textured acidic soil (Luttmerding, 1971).

Two soil pits were dug by Cascade staff on the subject site. The soil was rapidly drained and characterized by a sandy clay texture (Photo 2).

Photo 2: View of the soil profile at Plot 1. July 18, 2019.

2.4 Vegetation

2.4.1 Vegetation Associations

During the ecological survey conducted on July 18, 2019, it was determined that the subject property is characterised by a mature forest (Structural Stage 6), with occasional veteran trees. A description of the structural stages is provided in Table 1. Vegetation identified in Plot 1 and Plot 2 in the subject area is listed in

Table 2.

Table 1: Vegetation Age Class Descriptions

Structural Stage Code	- Interpretation
1 Sparse/Bryoid	- Community is in initial stages of primary and secondary development - Bryophytes and lichens often dominant - Times since disturbance typically <20 years but may be 50-100 + years in areas with little or no soil - Shrub and herb cover <20 % of total area - Tree cover < 10 % of total area
2a/b/c/d Herb	- Early successional stage or edaphic herb community - 2a forb dominated - 2b graminoid dominated, including grasses, sedges, reeds and rushes - 2c aquatic plant dominated, but not 2b plants - 2d dwarf shrub dominated, low growing woody shrubs

Structural Stage Code	- Interpretation
3a/b Shrub	- Shrub dominated communities maintained by environmental conditions or disturbance - 3a low shrub < 2 metres tall - 3b tall shrub < 10 metres tall - Tree cover <10 %
4 Pole/Sapling	- Densely stocked trees - Self-thinning not yet evident - Time since disturbance usually < 40 years
5 Young Forest	- Stocking density persists - Self-thinning not yet evident - Time since disturbance usually 40-80 years
6 Mature Forest	- Trees established after the last disturbance have matured - The second cycle of shade-tolerant trees may have become established - Time since disturbance generally 80–250 years
7 Old Forest	- Structurally complex stands composed mainly of shade-tolerant and regenerating tree species - Snags and coarse woody debris in all stages of decomposition typical - Time since disturbance >250 years
Modifiers: B – Broadleaf C – Coniferous M – Mixed	- Broadleaf stands composed of > 75 % broadleaf tree cover - Coniferous stands composed of > 75 % coniferous tree cover - Mixed stands neither coniferous nor broadleaf compose > 75 % of the total tree cover

Table 2: Vegetation identified within the subject property

Common Name	Scientific Name
Trees	
Douglas-fir	*Pseudotsuga menziesii*
Western hemlock	*Tsuga heterophylla*
Amabilis fir	*Abies amabilis*
Western redcedar	*Thuja plicata*
Shrubs	
Red huckleberry	*Vaccinium parvifolium*
Falsebox	*Paxistima myrsinites*
Black huckleberry	*Vaccinium membranaceum*
Western teaberry	*Gaultheria ovatifolia*
Forbs	

Common Name	Scientific Name
Prince's pine	*Chimaphila umbellata*
Bunchberry	*Cornus canadensis*
Twinflower	*Linnaea borealis*

2.4.2 Biogeoclimactic Zone Classification

A standard method of ecological land classification used in BC is the Biogeoclimatic Ecosystem Classification system (BEC). This system describes the variation in climate, vegetation, and site conditions occurring within ecosections. BEC is also hierarchal, with separate climate and site levels. There are six levels of organization with increasing specificity: zone, subzone, phase, variant, site association, and site series. At the highest level, biogeoclimatic zones are classed based on broad macroclimatic patterns; at the lowest level, site series describes the vegetation potential of the land area based on its ability to support the same climax plant association, and displaying the same soil moisture and nutrient regimes (RISC 1998).

The proposed development area is classified within the Southern variant (1) of the moist submaritime subzone (ms) of the Coastal Western Hemlock Zone (CWH) (Green & Klinka, 1994). Occurring at elevations between 650 and 1200 m, this biogeoclimatic variant includes the eastern portion of the Coast Mountains and the upper Fraser River. Although the elevation of the subject site is 610-620 m, the vegetation on the site was determined to be closer to the CWHms1 subzone, than the CWHds1 subzone.

The CWHms1 has a climate transitional between the coast and interior. Climatic factors, in conjunction with existing soil conditions, result in a productive coastal forest. Typical tree species of this subzone include western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), and amabilis fir (*Abies amabilis)*. Site series classification reflects subtle changes in microclimate and soil conditions, which reflect on the plant species composition within the unit. Generally, site series are further classified into Terrestrial Ecosystem Mapping (TEM) units based on the structural stage of the vegetation and the geomorphology of the site.

2.4.3 Terrestrial Ecosystems

Terrestrial Ecosystem Mapping (TEM) is built on the foundation of the BEC system principles. TEM provides the framework in which biotic and abiotic elements can be integrated to provide information on the spatial distribution of ecological units on the ground. This approach is used to assist in the identification of significant environmental features such as, riparian zones, streams, wetlands, valued ecosystem components (e.g. wildlife trees) and environmentally sensitive areas.

TEM units are derived by combining terrain feature attributes with BEC unit information. Two vegetated TEM units was identified on the subject property: **DF** and **SS.** The remaining of the site was characterized by anthropogenic features and was classified as urban (**UR**). For terrestrial ecosystems, these codes describe all land areas capable of producing the same late seral stage or climax plant community within a biogeoclimatic subzone or variant.

Site series in this classification system describe a 'typical' set of environmental conditions focusing specifically on important site, soils, and terrain characteristics. Site modifiers are used to describe atypical conditions for an ecosystem.

Site series can usually be related to a specified range of soil moisture and nutrient regimes within a subzone or variant, but other factors, such as aspect or disturbance history may influence site series as well. The site series derived from field investigations for this IER are explained below.

Polygon 1 - TEM Code AM –Site Series 01 (HwBa – Step moss)

POLYGON 1 TEM CODE DERIVATION				
Hummocky terrain			Single storied	
AM	**h**	**6**	**s**	**C**
HwBa – Step moss		Mature Forest		Coniferous

Structural stages in Table 3 describe the existing dominant stand appearance or physiognomy for the ecosystem unit. Tree ages are sampled from representative trees with an increment borer.

Table 3: Vegetation structural stage found on subject site

Structural Stage Code	Interpretation
6 Mature Forest	Trees established after the last stand-replacing disturbance have matured; a second cycle of shade-tolerant trees may have become established; shrub and herb understories become well developed as the canopy opens up; time since disturbance is generally 80-250 years.

Site series have assumed situations with respect to landscape position, soils, and moisture regimes. If a site series is atypical for any of the possible conditions, site modifiers are assigned. Table 4 describes the atypical conditions that exist on the site.

Table 4: TEM site modifiers for subject site

Abbreviation	Criteria
h	Hummocky terrain – the site series occurs on hummocky terrain, suggesting a certain amount of variability.

Structural stage modifiers are used to further described the structural stages 3 to 7. These modifiers described the strand structure types base on the relative development of the overstory, intermediate and suppressed crown classes. Table 5 describe the canopy structure on the site.

Table 5: TEM structural stage modifiers

Abbreviation	Interpretation
s	Single storied – closed forest stand dominated by the overstorey crown class (dominant and co-dominant trees); intermediate and suppressed trees account for <20% of all crown classes combined; advance understorey regeneration is generally sparse.

Polygon 1 **AMh6sC** consists of a 1.6 ha forested area adjacent to Highway 99 (Map 2). The topography features a hummocky terrain at the foot of the lower slopes of Cougar Mountain, with occasional small rock outcroppings. The soils are rapidly drained with a sandy clay texture. The forest canopy layer is dominated by western hemlock, with lesser amounts of western cedar, Douglas-fir and amabilis fir. Tree coverage is approximately 50%. The shrub layer constitutes approximately 25% of the ground cover and consists of red huckleberry, black huckleberry, falsebox and western teaberry. The herb layer was approximately 15% of the ground cover and consisted of twinflower, bunchberry and prince's pine. The moss layer was abundant, covering 90% of the ground and consisting of pipecleaner moss, red-stemmed feather moss and broom moss (Photos 3 and 4).

Photo 3: Typical vegetation association within the site series AM on the subject site. July 18, 2019.

Photo 4. Typical vegetation association within the site series AM on the subject site. July 18, 2019.

The forest was estimated to be approximately 128 years old with an average canopy height 20 - 25 m. Some older veteran and wildlife trees were observed in the subject area, along with fallen large woody debris. Trees 1 - 4 (Map 2) are veteran and wildlife trees identified on the subject site. Tree 1 is a veteran western hemlock with a diameter at breast height (DBH) of 52 cm and a height of approximately 26 m. Tree 2 is a veteran Douglas-fir with DBH of 76 cm, approximately 30 m tall. Tree 3 is a western cedar with multiple wildlife holes (Photo 5). Tree 4 is a veteran Douglas-fir with DBH 90 cm, approximately 36 m tall (Photo 6).

Photo 5: Wildlife tree on subject site. July 18, 2019.

Photo 6: Veteran Douglas-fir on subject site. July 18, 2019.

2.4.4 Wildlife and Wildlife Habitats

2.4.4.1 Wildlife

Observation of wildlife and wildlife signs were recorded as part of the ecological site survey conducted on July 18, 2019. The subject site contains potential wildlife habitat due to the presence of:

- Mature coniferous forest
- Occasional veteran and wildlife trees
- Available forage (e.g. berries, conifer cones)

Amphibians and Reptiles

A comprehensive survey for amphibians and reptiles (herpetiles) was not conducted as part of this report. No amphibians or reptiles were observed during site visits. Amphibians typically found in the CWH biogeoclimatic zone include the Northern Pacific treefrog (*Hyla regilla*), northwestern salamander (*Ambystoma gracile*), rough-skinned newt (*Taricha granulose*), and the long-toed salamander (*Ambystoma macrodactylum*). Garter snakes (*Thamnophis* spp.) and alligator lizards (*Elgaria coerulea*) are reptiles commonly found in the region and may use the subject lands for foraging. Amphibian are unlikely to be present on the subject property to due the lack of aquatic habitat.

Birds

The coastal western hemlock ecosystem surrounding the study area is considered to have the greatest diversity and abundance of habitat elements in British Columbia. This habitat diversity results in a broad

diversity of bird species. No nesting birds were observed during the site visit; however, an empty songbird nest was observed (Photo 7). Potential bird species for the subject site are included in Appendix 2.

Mammals

Large mammal species that are known to visit the general area are limited to black bear (*Ursus americanus*). Mid-size mammal species that may utilize the general area include the snowshoe hare (*Lepus americanus*), coyote (*Canis latrans*), and raccoon (*Procyon lotor*). Smaller species include Douglas squirrels (*Tamiasciurus douglasii*) and the yellow-pine chipmunk (*Tamias amoenus*). Signs of Douglas squirrel foraging were observed on site (Photo 8).

Photo 7. Empty songbird nest observed on site. July 18, 2019.

Photo 8. Douglas squirrel foraging debris. July 18, 2019.

2.4.4.2 Rare and Endangered Wildlife Species

In B.C., there are two governing 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 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). COSEWIC is the scientific body responsible for assigning the status of species at risk under SARA. This 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 concerns (BC CDC, 2019). The red list included indigenous species or subspecies considered to be endangered of 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 table below includes CDC listed (i.e. rare and threatened) species that have the potential to occur on the subject site; species designated at SARA Schedule 1 are also noted. 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 6 presents the rare and endangered wildlife species that have the potential to occur on site.

Table 6: Potential Rare and Endangered Wildlife Species

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Northern Goshawk *Accipiter gentilis laingi*	Red	Threatened	Coastal forests of BC, especially central and northern coastal islands. Closest known occurrence is the Gulf Islands	Unlikely-not on the coast.
White-throated swift *Aeronautes saxatalis*	Blue	-	Primarily mountainous areas, especially near cliffs and canyons. Nests in rock crevices in cliffs and canyons. Sometimes nests in buildings and on sea cliffs	Unlikely – no suitable nesting habitat.
Western toad *Anaxyrus boreas*	Yellow	Special Concern	Various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams.	Unlikely-no suitable aquatic habitat on site or nearby
Great blue heron *Aredea herodias fannini*	Blue	Special Concern	Aquatic areas <0.5 m deep, fish bearing streams and rivers, undisturbed nesting in tall trees. Closest known occurrence is Lost Lake.	Unlikely- no suitable aquatic areas on site
Emma's Dancer *Argia emma*	Blue	-	Along rivers, creeks and sometimes wave-washed lake beaches	Unlikely – no suitable aquatic habitat on site
Vivid dancer *Argia vivida*	Blue	-	Associated with cool or hot springs	Unlikely-no suitable aquatic habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Coastal tailed frog *Ascaphus truei*	Yellow	Special Concern	Clear, cold swift-moving mountain streams with coarse substrates. May be found on land during wet weather near water in humid forests or in more open habitat.	Unlikely – no suitable aquatic habitat on site.
Marbled murrelet *Brachyramphus marmoratus*	Blue	Threatened	Coastal areas within 2 km of shore, occasionally on rivers and lakes within 20 km of the ocean in old growth forest. Closest known occurrence is Toba River.	Unlikely- no old growth forest.
Green heron *Butorides virescens*	Blue	-	Aquatic areas, especially slow moving, shallow waters with good riparian cover. Known to occur in the Whistler area.*	Unlikely-no suitable aquatic areas on site
Western pine elfin *Callophrys eryphon sheltonensis*	Blue	-	A variety of pine dominated or at least mixed pine habitats.	Unlikely – no suitable habitat on site
Northern rubber boa *Charina bottae*	Yellow	Special Concern	Habitat includes woodlands, forest clearings, patch chaparral meadows and grassy savannas, generally not far from water.	Unlikely – not near water.
Hairy-necked tiger beetle *Cicindela hirticollis*	Blue	-	Beach habitat	Unlikely - no suitable habitat on site
Common nighthawk *Chordeiles minor*	Yellow	Threatened	Mountains and plains in open coniferous forest, savanna, grassland and towns. Nesting occurs on the ground on a bare site in an open area.	Unlikely - no suitable nesting or foraging habitat.
Evening grosbeak *Coccothraustes vespertinus*	Yellow	Special Concern	Coniferous and mixed coniferous-deciduous woodland, second growth, and occasionally parks.	**Possible** – coniferous woodland on site, commonly observed in Whistler area.
Sharp-tailed snake *Contia tenuis*	Red	Endangered	In British Columbia, the Sharp-tailed Snake occurs in low-elevation woodland habitats dominated by Douglas-fir, arbutus and/or Garry oak. The snakes are often found in small openings on talus rocky outcrops and on warm hillsides	Unlikely - no south facing warm rocky slopes. Nearest confirmed population in Pemberton.
Olive-sided flycatcher *Contopus cooperi*	Blue	Threatened	Mixed coniferous-deciduous forest with old growth snags along forest edges. Known to occur in the Whistler area.*	**Possible** – coniferous forest on site.

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Black swift *Cypseloides niger*	Blue	-	Nests behind or next to waterfalls and wet cliffs, on sea cliffs and in sea caves.	Unlikely - not near ocean or sutitable cliff nesting habitat.
Propertius duskywing *Erynnis propertius*	Red	-	Open oak or mixed woodlands with the foodplant oaks.	Unlikely - No oak on site.
Rusty blackbird *Euphagus carolinus*	Blue	Special Concern	Breeding habitat includes moist woodland (primarily coniferous), bushy bogs and fens, and wooded edges of watercourses and beaver ponds.	Unlikely – no suitable habitat on site.
Dun skipper *Euphyes vestris*	Red	Threatened	Low moist spots in fields, meadows, right of ways*.	Unlikely – no suitable habitat
Prairie falcon *Falco mexicanus*	Red	-	Primarily open situations, especially in mountainous areas, steppe, plains or prairies.	Unlikely – no suitable habitat on subject site.
Peregrine falcon *Falco peregrinus anatum*	Red	Special Concern	Cliff edges near water, interior rivers and wetlands. Known to occur in the Whistler area.*	Unlikely - no cliff edges near water
Prairie fossaria *Galba bulimoides*	Blue	-	Data deficient, wet area with unknown range*	Unlikely - only records are from Vancouver Island, Fraser Valley and Kamloops
Dusky fossaria *Galba dalli*	Blue	-	Data deficient; potentially in wet areas across southern BC.*	Unlikely - no record close to Whistler
Wolverine *Gulo gulo luscus*	Blue	-	A range of habitat types from valley bottoms to alpine meadows, strongly associated with the presence of large ungulate prey.	Unlikely - fragmented area.
Barn swallow *Hirundo rustica*	Blue	-	Open areas, fields, ponds with vertical nesting habitat, especially buildings. Known to occur in the Whistler area.*	Unlikely – no suitable habitat on subject site.
Western screech owl *Megascops kennicottii*	No status	Threatened	Woodland, especially broadleaf (e.g. oak) and riparian woodland, and scrub.	Unlikely – no broadleaf or riparian habitat on site.
Little brown myotis *Myotis lucifugus*	Yellow	Endangered	Wide range of habitats including human-made structures, caves and hollow trees.	Unlikely – no suitable habitat.

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Long-billed curlew *Numenius americanus*	Blue	Special Concern	Prairies and grassy meadows, generally near water.	Unlikely – no suitable habitat.
Sinuous snaketail *Ophiogomphus occidentis*	Blue	-	Streams, rivers and lakes	Unlikely – no suitable habitat.
Star gyro *Gyraulus crista*	Blue	-	Data deficient; eutrophic wet areas in central and northern BC.*	Unlikely - outside of range.
Mountain goat *Oreamnos americanus*	Blue	-	Alpine and subalpine habitat; steep grassy talus slopes, grassy ledges of cliffs, or alpine meadows. Usually at timberline or above. May seek shelter and food in stands of spruce or hemlock in winter.	Unlikely - not above timberline
Clodius Parnassian *Parnassius clodius*	Blue	-	Riparian and moist meadows at low to subalpine elevations	Unlikely - no suitable habitat
Band-tailed pigeon *Patagioenas fasciata*	Blue	Special Concern	Coniferous and mixed deciduous lowland forests. Known to occur in the Whistler area.*	**Possible-** coniferous lowland forest on site
Fisher *Pekania pennanti*	Blue	-	Upland and lowland forests, including dense coniferous or mixed forests and early successional forest with dense overhead cover. Prefer large areas of continuous interior forest.	Unlikely due to fragmented subject site and proximity to Highway 99.
Rocky mountain physa *Physella propinqua*	Blue	-	Wet areas.*	Unlikely- not documented in Whistler.*
Sunset physa *Physella virginea*	Blue	-	Wet areas.*	Unlikely- not documented in Whistler.*
Eared grebe *Podiceps nigricollis*	Blue	-	Marshes, ponds and lakes	Unlikely – no suitable habitat on subject site.
Northern Red-legged Frog *Rana aurora*	Blue	Special Concern	Wetlands, pools, and riparian areas of upland forests	Unlikely- no suitable aquatic habitat on site
Pacific water shrew *Sorex bendirii*	Red	Endangered	Low elevation riparian and wetland habitat.*	Unlikely- no suitable habitat

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Striated fingernailclam *Sphaerium striatinum*	Blue	-	Permanent bodies of water including lakes, ponds and streams	Unlikely- not documented in Whistler.*
Spotted owl *Strix occidentalis*	Red	Endangered	Old-growth forests with coarse woody debris, snags and a high canopy cover	Unlikely – trees on subject site not old/large enough
Grizzly bear *Ursus arctos horribilis*	Blue	-	Non-forested or partially forested sites with a wide range of foraging opportunities and choice of habitats. Closest known occurrence is the Sproatt/Callaghan valley area.	Unlikely – outside of range and close proximity to Highway 99.

All references from CDC explorer (BC MOE 2019) except *references from the Whistler Biodiversity Project (Brett, 2016).

2.4.4.3 Rare and Endangered Plant Species and Ecological Communities

Plant species

The species listed in Table 7 below have the potential to occur within the Squamish Forest District within the CWHms1 biogeoclimatic zone based on their habitat requirements as outlined by the biogeoclimatic classification system.

Table 7: Potential Rare and Endangered Plant Species

Common Name *Scientific name*	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA Status		
Washington springbeauty *Claytonia washingtoniana*	Red	-	Moist to drier, steep mossy rock outcrops and forests in the lowland and montane zones. Closest known occurrence is one mile north of Lizzy Creek, on Port Douglas-Pemberton Road.	Unlikely – out of range and has not been noted in the Whistler Biodiversity Project*
Whitebark pine *Pinus albicaulis*	Blue	1 - E	Montane forests and on thin, rocky, cold soils at or near timberline at an elevation of 1300-3700 m in the sub-alpine to alpine zones.	Unlikely- subject site at elevation of 620 m.

Source: BC Ecosystems Explorer, Ministry of Environment. * source from Whistler Biodiversity Project (Brett, 2016).

Rare and Endangered Ecological Communities

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.

Large tracts of undisturbed plant communities are considered ecologically more important than disturbed/fragmented or second growth communities. Vegetation on the subject lands consists of forest

in a mature structural stage. The subject lands are fragmented by the surrounding BC Hydro right of way and Highway 99. One blue listed, second growth forest ecological community exists within the subject lands and are described in Table 8.

Table 8: Ecological Communities at Risk Occurring on the Subject Site

Site Series Name **Common Name *Scientific name***	**TEM Code**	**Status** **BC List**	**BCG Zone**	**Polygons**	**Structural stage**	**Size of polygon (ha)**
Western hemlock – amabilis fir / queen's cup *Tsuga heterophylla – Abies amabilis / Hylocomium splendens*	AM	Blue	CWHms1/01	1	6	1.6

2.4.4.4 Valued Ecosystem Components

Wildlife Trees

Wildlife trees include significant standing snags, veteran trees, and trees with broken tops. These trees are important as perching areas for raptors such as red-tailed hawk and bald eagle, and foraging / nesting sites for woodpeckers, squirrels, small owls and other cavity nesters such as bats. Trees within the subject property are of structural stage 6 – mature forest; multiple wildlife trees were observed on the subject site during the site visit.

Coarse Woody Debris

Coarse woody debris on the forest floor is an indicator of potential species richness for forested areas. Micro habitats, decay, and nutrient cycling provide a range of life-cycle opportunities for wildlife and vegetation. The natural forest cover of the subject site contains numerous deadfall and fallen branches, and the occasional stump.

Stream, Pond, Riparian Areas

Aquatic habitat and their associated riparian habitats are attractive to numerous bird, mammal, and amphibian species. They are utilized as drinking, cover, movement, forage, breeding, and preening areas for amphibians, fish, waterfowl, and mammals. No streams or wetlands were observed on the subject property.

Wildlife Movement Corridors

Wildlife tends to use routes with particular features when moving across the landscape to forage for food, disperse, find mates, or locate breeding sites. These features can include such things as cover, shade, vegetation or surface characteristics. The subject site contains forested area and provides potential movement corridor habitat from the valley floor to the forested foothills of Cougar Mountain.

2.5 Aquatic Environment

A stream is any watercourse that:

- contains water on a perennial or seasonal basis
- is scoured by water
- contains observable deposits of mineral alluvium
- has a continuous water channel bed including a watercourse that is obscured by overhanging or bridging vegetation or soil mats

- and includes a lake, river, creek, spring, ravine, swamp and gulch.

No watercourses were observed on the subject site. However, during the site visit, a drainage ditch was observed initiating from the BC Hydro right of way west of the site, transecting the site to a screened culvert beneath Highway 99 (Photo 9). It is likely that this drainage ditch conveys rainwater only during large storm events; the ditch was observed to by dry during the site visit and no evidence of scouring or mineral alluvium was observed in the ditch (Photo 10).

Photo 9. Culvert beneath Highway 99. July 18, 2019.

Photo 10. View of drainage depression leading to highway culvert. July 18, 2019.

2.6 Socio-Economic Conditions

2.6.1 Cultural and Heritage Resources

The subject site is within the traditional territories of the Squamish and Lil'wat Nations, as mapped within their respective Land Use Plans. They have historical ties to the land that include utilization of the natural resources of the Green River valley area (Squamish Nation, 2001) (St'át'imc First Nation, 2004).

An archeological investigation was not conducted as part of this study. However an archaeological data request was made to the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations on July 10, 2019. According to Provincial records, there are no known archaeological sites recorded on the subject site, however a previously recorded archaeological site (EbRr-4) is located within the 2247 District Lot parcel that encompasses the subject site. EbRr-4, approximately 1 km south of the subject site, is a lithic site containing stone tools and/or the flakes of stone produced when making or modifying tools (Appendix 1).

2.6.2 Other Undertakings in the Area

2.6.2.1 Mining

An active Conditional Registration Reserve polygon encompasses the subject lands and a large area consisting of the Kelly Lake – Cheekye Transmission Line: Object ID 1496426 (iMap BC, 2019). A reserve may be established for a number of reasons as listed in section 22(2) of the *Mineral Tenure Act* and section 21(2) of the *Coal Act*, but the most common are to either to prohibit registration of a claim or to restrict the rights acquired. A "conditional" reserve stipulates the specific conditions or restrictions which apply to a claim registered within the reserve (BC Gov, 2019).

No current or historical coal, mineral and placer claims exist on the subject property (iMap BC, 2019).

2.6.2.2 Recreation and Tourism

No recreation or tourism uses of the subject property were observed during the site visit. Rafting and kayaking tours take place on Green River east of the subject site, and mountain biking trails occur in the areas surrounding the property, however no mountain biking trails were observed on the subject site.

2.6.2.3 Anthropogenic Features

The subject site lies between a BC Hydro right of way and Highway 99. No anthropogenic features were observed on the subject site.

2.6.2.4 Adjacent Land Use

The subject property is located at 9000 Block Highway 99, BC. The property is bounded by:

- Undeveloped forested land and Highway 99 to the north
- Highway 99 and the WedgeWoods residential development to the east
- Highway 99 and a highway wayside pit to the south
- A BC Hydro right of way and undeveloped forested land on the lower slopes of Cougar Mountain to the west

3 Environmental Constraints

3.1 Physical Environment

3.1.1 Climate

The climate in the study area presents no obvious constraints or concerns with respect to rezoning or development. However, snowfall is considerable in the area and infrastructure will have to be able to withstand considerable snow loads and a snow removal plan for roads will be required.

3.1.2 Geology

The geology of the area presents no obvious constraints or concerns with respect to the proposed rezoning and development.

3.1.3 Geomorphology

The geomorphology of the subject site poses no obvious constraints to rezoning or development.

3.1.4 Hydrology

Hydrology of the site does not pose a constraint to rezoning or development of the site. The ditch present on the subject property is not a stream and does not provide fish habitat, therefore the Riparian Areas Regulation (RAR) of the BC *Fish Protection Act* and the BC *Water Act* does not apply to the ditch.

3.2 Terrestrial Environment

3.2.1 Soils

Assessment of geotechnical conditions of the site is outside the scope of this IER; soils on the subject site will be addressed under a separate geotechnical report if required.

3.2.2 Vegetation

The vegetation on the subject property does not present any obvious constraints or concerns to rezoning or development. The mature coniferous forest of the subject property has ecological value and vegetation removal should be limited to the minimum necessary for development.

3.2.2.1 Rare and Endangered Plant Species

There are no known occurrences of any plant species at risk in the subject property, nor were any observed during the site investigations.

3.2.2.2 Rare and Endangered Ecological Communities

The subject site contains one blue listed ecological community. However, with regards to ecological communities, large tracts of undisturbed plant communities are considered ecologically more important than disturbed / fragmented second growth communities. The value of the ecological community on the subject property is reduced by habitat fragmentation from Highway 99 and the BC Hydro right of way.

The ecological community on the subject site does not pose a constraint to rezoning or development, however it is recommended that vegetation removal should be limited to the minimum necessary for development.

3.2.3 Wildlife and Wildlife Habitat

Trees on the subject property provide potential nesting sites for a range of bird species. The BC *Wildlife Act* states:

A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys

(a) A bird or its egg,

(b) The nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl or,

(c) The nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.

Development on the subject property may be constrained by the Wildlife Act if tree removal occurs during the nesting bird season of April 1 to September 1, or if any raptor nests are found on the site. Should tree removal occur within the nesting bird season, a songbird nesting survey should be conducted in the proposed clearing area to avoid contravention of the *Wildlife Act*.

3.2.3.1 Rare and Endangered Wildlife Species

There are no known occurrences of any wildlife species at risk in the subject property, nor were any observed during the site investigations. The following listed species are identified as potentially occurring on the subject property:

- Evening grosbeak (yellow-listed – SARA species of Special Concern)
- Olive-sided flycatcher (blue-listed)
- Band-tailed pigeon (blue-listed)

Evening Grosbeak

Feeding and nesting habitat for the evening grosbeak exists in the coniferous forest on the subject site. Nests usually occur in dense foliage of deciduous or coniferous trees, 2-21 m above the ground. Should forest clearing occur for development within the breeding and nesting season, April 1 to September 1, a bird nest survey must be conducted by a Qualified Environmental Professional (QEP).

Olive-sided flycatcher

Olive-sided flycatchers breed in various forest and woodland habitats. Most nesting sites contain dead standing trees, which are used and singing and feeding perches. Nests are placed most often in conifers, on horizontal limbs 2-15 m from the ground. The mature coniferous forest of the subject site offers olive-sided flycatcher nesting habitat. Should forest clearing occur for development within the breeding and nesting season, April 1 to September 1, a bird nest survey must be conducted by a Qualified Environmental Professional (QEP).

Band Tailed Pigeon

Breeding and nesting habitat exist for the band-tailed pigeon on the subject site with the presence of mature coniferous forest. This species has been confirmed in the Whistler area, just south of the subject site (Brett, 2016).

The band-tailed pigeon may breed in Whistler and due to the presence of suitable nesting habitat on site may breed on the subject property. Should forest clearing occur for development within the breeding and nesting season, April 1 to September 1, a bird nest survey must be conducted by a Qualified Environmental Professional (QEP).

3.3 Valued Ecosystem Components

3.3.1 Wildlife Trees

Multiple wildlife trees were observed on the subject property (Map 2) and should be retained where possible during development. However, unless wildlife trees on the property contain nesting birds or nests of raptors, as described under the *Wildlife Act*, they are not a constraint to development.

3.3.2 Coarse Woody Debris

CWD on the subject site was limited. The CWD present should be retained where possible within the subject site during development.

3.3.3 Wildlife Movement Corridor

Rezoning and development of the subject site poses no concerns to wildlife movement corridors as it is fragmented by the surrounding BC Hydro and Highway 99 right of ways. Vegetation retention should be considered to maintain small scale wildlife corridors and cover in and around adjacent developments.

3.4 Aquatic Environment

There is no aquatic environment on the subject site to constrain development. The ditch present on the subject property is not a stream and does not provide fish habitat, therefore the Riparian Areas Regulation (RAR) of the BC *Fish Protection Act* and the BC *Water Act* does not apply to the ditch.

3.5 Socio-Economic Conditions

3.5.1 Cultural and Heritage Resources

The archaeological data request revealed that there is a known archaeological site 1 km south of the subject site, which has the potential to extend to other parts of the property (Dianna Cooper, Provincial Archaeology Branch, pers.comm.). Archaeological sites are protected under the *Heritage Conservation Act* and must not be damaged or altered without a Provincial heritage permit. If archaeological material is encountered during development, all activities must stop immediately, and the Archaeological Branch must be contacted at 250-953-3334. The Archaeology Branch strongly recommends engaging an eligible consulting archaeologist prior to any land-altering activities on site (Appendix 1).

3.5.2 Other Undertakings in the Area

3.5.2.1 Timber Harvesting

Timber harvesting presents no obvious constraints or concerns for the rezoning or development of the subject property.

3.5.2.2 Mining

Mining presents no obvious constraints or concerns for rezoning or development of the subject property.

3.5.2.3 Recreation and Tourism

Recreation and tourism present no obvious constraints or concerns for rezoning or development of the subject property.

3.5.2.4 Anthropogenic Features

No known anthropogenic features pose constraints to rezoning or development of the subject property.

3.5.2.5 Adjacent Land Users

Adjacent land use does not restrict development or rezoning within the subject property. Any setbacks from Highway 99 that the SLRD imposes may be constraining to development.

4 Conclusion and Recommendations

This report details the baseline conditions and identifies potential environmental constraints for the rezoning and development for the subject site at 9000 Block, Highway 99 in the Squamish Lillooet Regional District, BC. Based on the conditions observed on the site and the information reviewed the site appears to be suitable for the proposed rezoning and suitable for development subject to the following recommendations:

1. Raptor nests found during clearing are protected year-round. In addition, land clearing activity conducted during the nesting bird season of April 1 to September 1, must comply with Section 34 of the *Wildlife Act*, which forbids the destruction of nests occupied by a bird, its eggs, or its young. If vegetation clearing is to occur between April 1st and September 1st, a raptor and song bird nesting survey of the trees to be cleared must be conducted by a Qualified Environmental Professional (QEP).

2. The survey will identify the location of any raptor or active bird nests including that of the band-tailed pigeon. This bird species at risk identified as having the possibility of nesting on site. Raptor nests and any active birds' nests found during clearing must be adequately protected by a forested buffer as per Section 34 of the *Wildlife Act*.

3. Vegetation removal is limited to the minimum necessary for development to retain the mature forest stand while also considering FireSmart initiatives. Retention of vegetated areas will facilitate wildlife movement through the site and retain breeding and foraging areas.

4. Retain as many pieces of coarse woody debris (CWD) as possible while considering FireSmart initiatives.

5. Avoid impacts to local bear populations by following black bear recommended management plans.

6. Development and construction on the property should follow guidelines and recommendations outlined in: *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (MOE, 2014). This includes best management recommendations for stormwater, pollution prevention and wildlife and ecosystem management.

7. Site preparation and construction works associated with any of the aforementioned mitigation measures should be monitored by a qualified environmental professional (QEP) or environmental monitor.

8. If archaeological material is encountered during development, all activities must stop immediately, and the Archaeological Branch must be contacted at 250-953-3334. The Archaeology Branch strongly recommends engaging an eligible consulting archaeologist prior to any land-altering activities.

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