Kwìkwèxwelhp Healing Village Environmental Effects Evaluation Access Road Repairs, Regrading and Culvert Upgrades

Prepared for:

Public Services and Procurement Canada
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Project No. 103523-01

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1.0 INTRODUCTION

The Kwìkwèxwelhp (KWI) Healing Village, operated by Correctional Services Canada (CSC), is located approximately 10 kilometers from Harrison Mills adjacent to Agassiz, BC, and near the Sts'ailes Nation community (CSC 2017). The KWI Healing Village, formerly known as the Elbow Lake Institution, has been in operation since 1975 (CSC 2016). The village can be accessed via two roads: one from the west via the Chehalis Forest Service Road; and, one from the east via the Morris Valley Road.

The eastern access road (between the KWI Healing Village at 10 U 575540 m E, 5460175 m N and Morris Valley Road at 10 U 576805 m E, 5460600 m N) is an approximately three kilometre long gravel road that was constructed using cut and fill techniques. Localized areas of slope instability occur along portions of this road, with the erosion potential increasing following periods of rainfall and snowmelt. Large volumes of water discharging over localized areas of this access road has also led to historic gravel washouts along the road. To address slope instability and concerns over gravel washouts, road improvements via re-grading, re-profiling and increased stormwater control is proposed along this eastern access road (the "Project", **Figure 1-1**). The Project is anticipated to commence in the spring/summer of 2020.

Activities associated with this Project include:

- Cutting and filling of the road subgrade to design elevations;
- Placement of imported granular fill and road capping in accordance with design drawings and contract specifications;
- Replacement, and installation of multiple road culverts to improve drainage;
- Re-profiling of roadside ditches;
- Installation of erosion protection barriers; and
- Removal and post-construction replacement of existing roadside traffic safety barriers.

The Project is located on federal land, including land granted to CSC under the terms of a special use permit from the Province of British Columbia (CSC 2017). Due to the location of the Project, within 30 m of identified watercourses, an Environmental Effects Evaluation (EEE) is required to be conducted under Section 67 of the *Canadian Environmental Assessment Act*, 2012. The following EEE has been prepared by Hemmera Envirochem Inc. (Hemmera), on behalf of Public Services and Procurement Canada (PSPC) and CSC to understand the existing environmental conditions, potential impacts to biological receptors, and recommendations for mitigation and protection during construction to minimize or prevent these potential effects. The focus of the EEE is on aquatic and riparian habitat (including fish and fish habitat, wildlife and wildlife habitat, and at-risk species) within and directly adjacent to the Project footprint.

KWI Healing Village
KWI Healing Village

Project Area and Regional Setting

Legend

- KWI Healing Village Eastern Access Road

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a “stand-alone” document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Contains information licensed under the Open Government Licence(s) - British Columbia
- Basemap: ESRI World Topographic Map

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Metres

NAD 1983 UTM Zone 10N

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103523-01	Production Date: May 23, 2019	Figure 1-1

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2.0 METHODS

2.1 Desktop Review

A review of available literature and provincial and federal databases was undertaken to determine habitat values within the Project study area. Hemmera assessed three receptors (i.e., fish and fish habitat, wildlife and wildlife habitat, and at-risk species) for potential Project-related effects. Background information on the existing environment was obtained from available online resources, including:

- BC Species and Ecosystem Explorer (BC CDC 2019);
- E-Fauna BC (Klinkenberg 2019) and E-Flora BC (Klinkenberg 2019);
- Fisheries Inventory Data Queries (MOE 2019);
- iMapBC (DataBC 2019); and
- Species at Risk Public Registry (Government of Canada 2019).

2.1.1 Species of Regulatory or Conservation Concern

A search of the BC Conservation Data Centre's (CDC's) Species and Ecosystem Explorer was conducted to identify federally listed plant and wildlife at-risk species[1] with potential to occur within the aquatic and riparian areas identified in the Project study area (BC CDC 2019, DataBC 2019). A one-kilometre buffer was used to determine locations of known at-risk species occurrences, critical habitats, and the location of any mapped raptor nests. The list was then refined based on the habitat conditions identified during the field assessment, and known habitat associations for each species (i.e., nil, low, medium, or high). An assessment of the potential for Project interactions to occur with species identified as having low, medium, or high potential for presence in the Project study area was also undertaken.

2.2 Field Assessment

Two Hemmera biologists conducted a field reconnaissance of the Project study area on February 1, 2019 to evaluate habitat values within the Project footprint. The reconnaissance was undertaken during wet conditions (a total of 39.8 mm of rain was recorded on the assessment day, with 15.2 mm recorded for the previous day in Agassiz),[2] focused on areas located within 30 m of identified watercourses. Potential fish presence within the watercourses was assessed based on existing background information and an assessment of average gradient,[3] and flow.

1 For the purposes of this report, species at risk are defined as Red- or Blue- listed species as defined by the British Columbia Conservation Data Centre; Special Concern, Threatened or Endangered species as defined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); and all species protected under Schedule 1 of the *Species at Risk Act*.

2 Agassiz Station rainfall data from: http://climate.weather.gc.ca/historical_data/search_historic_data_e.html.

3 Generally streams with an average gradient equal to, or exceeding, 20% can be classified as non-fish stream (MOF 1995).

3.0 EXISTING CONDITIONS

3.1 Vegetation

The Project is located within the Coastal Western Hemlock Dry Maritime subzone (CWHdm), which is characterized by warm, dry summers and moist, mild winters with relatively little snowfall (Pojar, et al. 1991). On average, the CWH is the rainiest biogeoclimatic zone in BC, characterized by cool summers (with hot spells) and mild winters. Representative native plant species of the CWHdm subzone include western hemlock (*Tsuga heterophylla*), western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), dull Oregon-grape (*Mahonia nervosa*), salal (*Gaultheria shallon*), and red huckleberry (*Vaccinium parvifolium*). A well developed moss layer is also typical with forested areas within this subzone (Pojar et al. 1991).

Vegetation along the road is typical of the region. Dominant tree species include western redcedar, Douglas-fir, and western hemlock, with red alder (*Alnus rubra*) common along the road edges (**Photo 3-1**). Yellow-cedar (*Xanthocyparis nootkatensis)* is present at higher elevations. The shrub layer contained salmonberry (*Rubus spectabilis*), trailing blackberry (*R. ursinus*), salal, dull Oregon-grape, and scattered invasive species including Himalayan blackberry (*R. armeniacus*), and Scotch broom (*Cytisus scoparius*). Hardhack (*Spiraea douglasii*) and willows (*Salix* spp.) were present in wetter areas. The herb layer included sword fern (*Polystichum munitum*), deer fern (*Pteridium aquilinum*), common plantain (*Plantago major*), buttercup (*Ranunculus* spp.) and common weedy species.

Photo 3-1 Overview of typical vegetation communities adjacent to road

Vegetation communities varied from young trees and shrubs in recently disturbed areas and road edges, to mature forests within 20 m of the road edge. No at-risk ecosystems or wetlands were present along the road alignment.

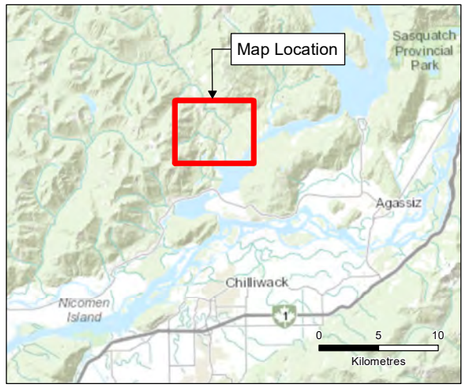
3.2 Fish and Fish Habitat

All watercourses in the Project area provide flow input to the Chehalis River. The Chehalis River drains an approximate 21,562 ha area and flows southeast from the Coast Mountains through Statlu and Chehalis lakes before draining into the Harrison River. The Harrison River has been identified as one of North America's most ecologically significant salmon watersheds, and one of the most productive salmon ecosystems along the Pacific coast (CMN 2018). The Chehalis River, one of the largest tributaries of the Harrison River, has been documented to support all Pacific salmon species that occur within British Columbia. Salmon numbers are also enhanced via fish releases from the Chehalis River Hatchery, located opposite the access road entrance at Morris Valley Road. The hatchery produces coho (*Oncorhynchus kisutch*), chinook (*O. tshawytscha*), chum (*O. keta*) and pink (*O. gorbuscha*) salmon, as well as steelhead (*O. mykiss*) and sea-going cutthroat trout (*O. clarkii clarkii*) which are released into the Chehalis and Harrison rivers (DFO 2015).

The eastern access road is mapped as crossing five surveyed watercourses, and additional roadside drainages within the Chehalis River watershed. The location and road crossing structures of these watercourses (relative to the October 26, 2018 survey drawings), and the distance of the crossings from the Morris Valley Road entrance, is provided in **Table 3-1** and shown in **Figure 3-1**. It should be noted that one of the watercourses (Pretty Tributary 1), was not easily discernable in the field and appeared to consist primarily of stormwater run-off along the north side of the access road. A road crossing for this watercourse was not observed during the site inspection on February 1, 2019; however, flow is likely conveyed south (downslope) via a drainage culvert located near crossing location 1+360.

KWI Healing Village
KWI Healing Village

Critical Habitat



Legend

- Water Crossing
- KWI Healing Village Road
- Watercourse within Project
- 30 Metre Buffer
- Critical Habitat
- Species Occurance

Notes

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Table 3-1 Watercourses Crossing the KWI Access Road

Approximate Crossing Location	Distance from Morris Valley Road	Watercourse Name	Existing Road Crossing Structure
0+820	3.1 km	Pretty Creek	Clear-span Bridge
1+360	2.6 km	Pretty Tributary 1	600 mm CSP*
1+440	2.5 km	Pretty Tributary 2	1,200 mm CSP
2+355	1.6 km	Chehalis Tributary 1	600 mm CSP
3+055	0.9 km	Chehalis Tributary 2	600 mm CSP
3+420	0.5 km	Chehalis Tributary 2	900 mm CSP

*Based on survey drawings provided for the Project. However, this watercourse was not easily discernable during the site inspection on February 1, 2019.

3.2.1 Pretty Creek and Tributaries

Pretty Creek is a third order stream that flows into the Chehalis River approximately 1.5 km downstream of the access road (**Photo 3-2**). An approximately 6 m high impassable waterfall (Pretty Falls) is located approximately 450 m upstream from its mouth at the Chehalis River (SRS 1997). Throughout 1995 and 1996, fish assessments were undertaken in Pretty Creek by Scott Resources Services Inc. (SRS) to characterize the upstream limits of fish presence, and to assess impacts to fish habitat within the Chehalis River watershed. Pretty Creek was assessed from the mouth of the creek to 3,200 m upstream. Sampling upstream of Pretty Falls, including the reach crossing through the eastern access road, did not yield any fish, including resident species (SRS 1997). Based on the sampling and observations undertaken during this time, the lower 450 m of the creek (below Pretty Falls) supports anadromous and resident fish species including coho salmon, chum salmon, cutthroat trout, rainbow trout (*O. mykiss*), and sculpins (*Cottus* spp.) (SRS 1997) (**Photo 3-3**). Additional sampling undertaken in 2011 confirmed the presence of coho salmon and cutthroat trout, with longnose dace (*Rhinichthys cataractae*) and slimy sculpin (*C. cognatus*) also reported (EBA 2011). While spawning chum salmon were observed in 1995, this lower reach of the creek was reported to support a limited amount of spawning habitat due to high bedload movement and scouring, with higher quality rearing habitat limited by high seasonal water fluctuations in the summer and winter (SRS 1997).

Pretty Creek near the road crossing is approximately 10 m wide, and upstream of the crossing is approximately 5.6 km long. Available contour mapping (1:20,000), indicates that the average gradient of the Pretty Creek mainstem between Pretty Falls and the eastern access road crossing is approximately 9%. The substrate in the creek at the crossing consists primarily of large substrates (i.e., boulders and cobbles).

Photo 3-2 Upstream-facing View of the Pretty Creek Crossing of the Access Road at 0+820

Photo 3-3 Upstream-facing View of Pretty Creek at the Morris Valley Road Crossing Approximately 1.3 km Downstream of the Eastern Access Road Crossing of Pretty Creek

While the gradient in this reach of Pretty Creek alone would not preclude the potential for resident fish presence, previous sampling upstream of this barrier in the mid-90s did not yield any fish, suggesting that this reach is non-fish bearing. Despite the limited potential for fish presence upstream of Pretty Falls, this reach does provide valuable food and nutrient contributions to downstream fish-bearing portions of the creek.

In addition to a bridge crossing of Pretty Creek, the access road also crosses two small surveyed first order tributaries of Pretty Creek: Pretty Tributary 1 and Pretty Tributary 2. Both of these watercourses are mapped as discharging into Pretty Creek upstream of Pretty Falls, an identified fish migration barrier.

3.2.1.1 Pretty Tributary 1

Pretty Tributary 1 is mapped as being approximately 290 m long upstream of the access road, with an average gradient of 10%. Based on municipal mapping, the gradient downstream of the access road to its confluence with Pretty Creek is approximately 25%. At the time of the assessment, during a significant rain event, the Pretty Tributary 1 channel was not identifiable (**Photo 3-4**); however, based on the steep gradient, and short length of the watercourse, the channel width is anticipated to be less than 1 m. This watercourse is likely ephemeral and non fish-bearing due to its relatively low flows, lack of perennial fish habitat, steep gradient, and lack of direct connection to known downstream fish-bearing habitat.

Photo 3-4 Road Run-off Observed Downslope of the Mapped Location of Pretty Tributary 1

3.2.1.2 Pretty Tributary 2

Pretty Tributary 2 crosses the eastern access road near 1+440. The stream originates from a small wetted area located approximately 950 m upstream of the access road. The channel width of Pretty Tributary 2 near the road crossing ranges between approximately 1.5 to 3 m (**Photo 3-5**). Available contour mapping (1:20,000), indicates that the average gradient of the Pretty Tributary 2 upstream of the road crossing is approximately 7%, with an approximate 25% gradient downstream between the access road and the confluence with the Pretty Creek mainstem. At the road crossing the creek substrate consisted of a mixture of cobble, gravel, and sand. Downstream of the crossing the watercourse is confined within ravine banks (**Photo 3-6**). This watercourse may be ephemeral and is likely non fish-bearing due to its steep gradient preventing fish access, lack of residual deep pool habitat (e.g., to sustain resident fish populations), and its lack of direct connection to known downstream fish-bearing habitat.

Photo 3-5 Upstream-facing View of Pretty Tributary 2 Culvert Inlet at 1+360

Photo 3-6 View of the Pretty Tributary 2 Culvert Outlet at 1+360

3.2.2 First Order Tributaries of the Chehalis River

There are two relatively small first order tributaries to the Chehalis River that cross the access road. Chehalis Tributary 1 crosses the access road near the centre of the Project area, while Chehalis Tributary 2 crosses the access road in two locations near the eastern end of the Project area.

3.2.2.1 Chehalis Tributary 1

Chehalis Tributary 1 crosses the eastern access road near 2+355 (**Photo 3-7** and **Photo 3-8**). Chehalis Tributary 1 near the road crossing is approximately 1 m wide, and upstream of the crossing is approximately 330 m long. Available contour mapping (1:20,000), indicates that the average gradient of the watercourse upstream of the road crossing is approximately 12%, while the gradient downstream of the crossing to the Morris Valley Road crossing is close to 40%. The substrate in the creek at the crossing consists primarily of cobbles and gravels with some organics observed near the upstream end of the crossing. Based on conditions observed on site, this watercourse is likely ephemeral in nature and is likely non fish-bearing due to its very steep gradient acting as a barrier to fish access, and lack of residual deep pool habitat.

Photo 3-7 View of the Existing Culvert Inlet for Chehalis Tributary 1 at 2+355

Photo 3-8 Downstream-facing View of Chehalis Tributary 1 at 2+355

3.2.2.2 Chehalis Tributary 2

Chehalis Tributary 2 crosses the eastern access road at two locations, near 3+055 and 3+420. Chehalis Tributary 2 near the access road crossings ranges between approximately 1 to 2 m wide, upstream of each crossing is approximately 920 m long (for the 3+055 crossing) and 1,300 m long (for the 3+420 crossing), respectively. Available contour mapping (1:20,000), indicates that the average gradient of the watercourse upstream of the first crossing is approximately 9%, while the average gradient between the first (higher) crossing and the second (lower) crossing steepens to approximately 16%. Based on field observations, the gradient downstream of the lowest crossing is steep and appears to be in excess of 20% in some areas. The substrate in the creek consists primarily of cobbles and gravels, although some organic materials were observed near the upstream crossing at 3+055 (**Photo 3-9** and **Photo 3-10**). The downstream crossing at 3+420, shows evidence of gravel road base migration into the active channel (**Photo 3-11** and **Photo 3-12**). Based on conditions observed on site, this watercourse is likely ephemeral in nature and is likely non fish-bearing due to its steep gradient, and lack of residual deep perennial fish habitat (e.g., deep pools).

Photo 3-9 Upstream-facing view of the Chehalis Tributary 2 Crossing at 3+055

Photo 3-10 Downstream-facing view of the Chehalis Tributary 2 Crossing at 3+055

Photo 3-11 Upstream-facing View of the Chehalis Tributary 2 Crossing at 3+420

Photo 3-12 Downstream-facing View of the Chehalis Tributary 2 Crossing at 3+420

3.3 Wildlife and Wildlife Habitat

Although not directly overlapping with the Project footprint, some wetland habitat areas were identified during the desktop assessment. While this habitat may not be directly in the Project footprint, the watercourses overlapping the Project site may serve as a means of habitat connectivity between wetlands for wildlife (e.g., for Pretty Tributary 2 which appears to be fed by a wetland). These wetland areas likely support several amphibian species.

The shrubby and forested areas adjacent to the road likely support a variety of mammal and bird species. At the time of assessment, few bird species were observed including black-caped chickadees (*Poecile atricapillus*) and northwestern crow (*Corvus caurinus*), however more species would be expected to occur during the breeding season. In addition, species such as black-tailed deer (*Odocoileus hemionus columbianus),* black bear (*Ursus americanus*), and coyote (*Canis latrans*), as well as several small mammal species, would likely use the surrounding habitats.

3.4 Species of Regulatory and Conservation Concern

A search of the BC Conservation Data Centre's (CDC) Species and Ecosystem Explorer was conducted to identify federally- and provincially-listed aquatic and riparian at-risk species[4] with the potential to occur in within the Project study area (BC CDC 2017, DataBC 2017). The list was then refined based on the habitat conditions identified during the field assessment, and known habitat associations for each species (i.e., nil, low, medium, or high). Species that were determined to have a low, medium, or high potential for presence or interaction are summarized in the table below (**Table 3-2**). Of these, only aquatic species and species listed under the *Species at Risk Act,* with a moderate or high potential to occur in the Project study area and potential to interact with the Project are described further in this report.

Table 3-2 Semi-Aquatic Species of Regulatory or Conservation Concern with Potential to Occur within the Project Study Area

English Name	Scientific Name	SARA Schedule[1]	COSEWIC[2]	BC List[3]	Potential to Occur in the Project Study Area[4]	Potential to Interact with Project[5]
Fish						
Bull trout – South Coast population	*Salvelinus confluentus*	-	SC (2012)	Blue	Nil to Low	Low
Coastal cutthroat trout	*Oncorhynchus clarkii clarkii*	-	-	Blue	Nil to Low	Low
Plants						
Phantom orchid	*Cephalanthera austiniae*	E (2014)	1-T (2003)	Red	Nil to Low	Nil
Roell's brotherella	*Brotherella roellii*	E (2010)	1-E (2018)	Red	High	Low
Silver hair moss	*Fabronia pusilla*	E (2012)	1-E (2005)	Red	Moderate	Low
Tall bugbane	*Actaea elata var. elata*	E (2018)	1-E (2003)	Red	Low	Low
Whitebark pine	*Pinus albicaulis*	E (2010)	1-E (2012)	Blue	Nil	Nil
Amphibians						
Northern red-legged frog	*Rana aurora*	1-SC (Jan 2005)	SC (May 2015)	Blue	Moderate	Low
Oregon spotted frog	*Rana pretiosa*	1-E (Jun 2003)	E (May 2011)	Red	Moderate	Low
Western toad	*Anaxyrus boreas*	1-SC (Jan 2005)	SC (Nov 2012)	Yellow	Moderate	Low

[4] For the purposes of this report, species at risk are defined as Red- or Blue- listed species as defined by the BC CDC; Special Concern, Threatened or Endangered species as defined by the COSEWIC; and species protected under Schedule 1 of the *Species at Risk Act*.

English Name	Scientific Name	SARA Schedule[1]	COSEWIC[2]	BC List[3]	Potential to Occur in the Project Study Area[4]	Potential to Interact with Project[5]
Birds						
Great blue heron, *fannini* subspecies	*Ardea herodias fannini*	1-SC (Feb 2010)	SC (Mar 2008)	Blue	High	Low
Mammals						
Pacific water shrew	*Sorex bendirii*	1-E (Jun 2003)	E (Apr 2016)	Red	Low	Low

Note:
1 SARA listing: 1 = Schedule 1; T = Threatened, E = Endangered, SC = Special Concern.
2 COSEWIC listing: T = Threatened, E = Endangered, SC = Special Concern.
3 BC List: Red = Species that are extirpated, endangered, or threatened; Blue = Species of special concern.
4 **Low**: current understanding of the species' range and/or species habitat associations suggests that the species is unlikely to occur within the site with regularity or in adequate density to provide a functional population; **Moderate**: species is expected to occur in the site on a temporary or regular (i.e., predictable) seasonal basis and in densities that facilitate persistence of a functional population within the site or species has a low likelihood to be regularly present but site overlaps with designated critical habitat; **High**: current understanding of the species' range and/or known species habitat associations suggests that the species is expected to occur in the site regularly and in densities indicative of a preferred habitat.
5 **Nil**: Anticipated activities will not negatively alter habitat required by species to meet life requisites. In this case the effects from habitat alteration may be challenging to quantify but are suspected to be neutral or positive; **Low**: Anticipated activities will alter habitat required by species to meet life requisites. In this case the effects from habitat alteration may be challenging to quantify but suspected to be slightly negative or benign; **Medium**: Anticipated activities will degrade habitat (i.e., negatively alter habitat) required by species to meet life requisites; **High**: Anticipated activities will permanently damage or destroy habitat (i.e., remove habitat) required by species to meet life requisites.

3.4.1 Rare Plants

Some habitats within the Project study area are likely to support rare plant species summarized in **Table 3-2**. Habitat characteristics within the Project footprint that may be considered to support rare plants the mature forests adjacent to the road, as well as wet areas and rocky outcrops. Rare plant absence within the Project footprint could not be definitively determined on the February 1, 2019 field assessment, as rare plant surveys should be conducted during the growing season. However, no suitable habitat for rare plants is present within the road footprint and right-of-way and the likelihood of occurrence is considered to be low. As such, rare plants are not considered further in this document.

3.4.2 Fish

Due to a combination of the steep gradient terrain, relatively low flows, lack of perennial fish habitat, and identified downstream barriers to fish migration, fish are not anticipated to occur in the immediate Project area (i.e., in the watercourse reaches crossing the access road); however, Project activities have the potential to impact water quality and flow conditions in the watercourses which could have some effect on downstream fish-bearing watercourses. Therefore, fish species with potential to occur downstream of the access road (e.g., in the lower portions of Pretty Creek, and/or the Chehalis River), were identified in **Table 3-2**.

3.4.3 Amphibians

Amphibian species listed in **Table 3-2** share similar breeding habitat features. Aquatic environments, especially standing water and emergent vegetation are conducive to Oregon spotted frog (*Rana pretiosa*), western toad (*Anaxyrus boreas*), and red-legged frog (*Rana aurora*) breeding. Potential amphibian breeding habitat in the Project footprint was determined to be restricted to limited areas of standing water.

3.4.3.1 Oregon Spotted Frog

Oregon spotted frog is an amphibian designated as endangered by COSEWIC and SARA and red-listed by the province of BC, and it has been documented within four kilometers of the Project study area (BC CDC 2017, DataBC 2017). Additionally, the Project area is located 1.5 km from mapped Oregon spotted frog critical habitat (**Figure 3-1**), which has been identified east of the Morris Valley Road entrance to the access road, at a water crossing along the Morris Valley Road (Environment Canada 2015).

The habitat of Oregon spotted frogs is mainly aquatic, with frogs leaving the water for very short periods during and after rain showers, where they forage in among wet vegetation. This species is usually associated with large wetlands (i.e., > 4 ha) with emergent or floating vegetation within forested landscapes (COSEWIC 2011). This species does not move between ponds except by connecting waterways (COSEWIC 2011, BC MOE 2017). Suitable habitats are vulnerable to fluctuating water levels, and changing land use patterns (BC MOE 2017). Oregon spotted frogs prefer ponds that are exposed to sunlight, so that the water can be warmed; too much shade can make an area unsuitable for them. This makes the frogs especially vulnerable to fragmentation of their habitat. The Oregon spotted frog starts breeding in late February or early March (early spring), when males become vocal and begin calling. Females lay their eggs in a communal sites with still or slow moving warm and shallow waters, at the edge of marshes or seasonally inundated areas (COSEWIC 2011, BC MOE 2017). After laying the eggs, females will disperse, living a solitary life until the next spring. The males will remain together at the breeding site until the end of the month-long breeding season and then disperse to other areas of the wetland.

3.4.3.2 Western Toad

Adult western toads inhabit a wide range of terrestrial habitat, including forested areas, wetlands, fields, and roadside ditches (COSEWIC 2012). Western toads breed in early-spring in a variety of aquatic habitats, including watercourses within developed areas (COSEWIC 2012, Environment and Climate Change Canada 2016). Western toad tadpoles undergo metamorphosis and emerge from breeding sites from early-July to late-September, depending on annual weather conditions (Bull 2009). After metamorphosis, western toads transition to predominantly terrestrial habitat

Occurrences of western toad in or near the Project study area have not been confirmed, although given the nature of this species, it is probable that individuals occur in proximity to the Project study area. Given the habitat suitability of the site and the variety of habitats that western toads are found in, western toads are considered to have a moderate potential to occur within the Project study area, and a low potential to interact with Project activities, including instream works and use of heavy machinery adjacent to riparian areas.

3.4.3.3 Northern Red-legged Frog

Northern red-legged frog is an at-risk amphibian that breeds in a variety of permanent and temporary freshwater bodies, including potholes, ponds, ditches, springs, marshes, margins of large lakes, and slow moving portions of rivers (COSEWIC 2004, Environment and Climate Change Canada 2017). Northern red-legged frog eggs hatch in late-spring and metamorphosis occurs between July and August. After metamorphosis, red-legged frogs transition to predominantly terrestrial habitat. Adult northern red-legged frog inhabits a variety of forest types, but occurs most often in older, damp forest stands (COSEWIC 2004). As the breeding habitat suitability of the site is considered low quality (due to high levels of reed canary grass (*Phalaris arundinacea*)), red-legged frogs are considered to have a low potential to interact with Project activities, including instream works and use of heavy machinery in the riparian area.

3.4.4 Birds

3.4.4.1 Great Blue Heron

The fannini subspecies of great blue heron (*Ardea herodias fannini*) is an at-risk wading bird that commonly nests in colonies in isolated locations that discourage predation and disturbance (Vennesland and Butler 2011, BC CDC 2017). While this species commonly nests in colonies in trees, bushes, and on artificial structures near water, other habitat requirements are also needed during the breeding season. This includes a productive food supply; great blue herons forage in wetlands, water bodies and watercourses of all shapes and sizes (Vennesland and Butler 2011). Although suitable nesting habitat is unlikely to occur within the Project study area, great blue herons have been recorded near the Project area with observations from 2011 and 2017 showing individual great blue heron sightings along Morris Valley Road (eBird 2017).

Great blue heron nesting in the Project footprint is not anticipated, but water features (including ditches) and wetlands in proximity may have some suitability as forage habitat. Great blue herons are anticipated to occur within the Project study area with regularity, but are not expected to experience any effects to breeding locations. The potential for great blue heron foraging habitat to be affected by the Project is considered low.

4.0 POTENTIAL PROJECT EFFECTS

This section identifies and describes potential Project-related effects on identified environmental components that may result from the proposed Project, including its construction and subsequent operational phases. The following activities have been identified as having potential to affect environmental receptors assessed as part of this EEE:

- Vegetation brushing within the riparian area to facilitate the removal of old culverts, installation of new culverts, and removal and installation of ancillary road infrastructure (e.g., installation of erosion protection barriers and removal and replacement of roadside traffic safety barriers);
- Removal and replacement of instream culverts (with equivalent diameter, or larger, culverts);
- Installation of headwalls (at the culvert inlets/outlets) and riprap armouring at the culvert outfalls for the two Chehalis Tributary 2 crossings;
- Ditch infilling and grading with the potential to impact water quality to connecting fish habitat;
- Cut and fill activities that increase erosion and sedimentation potential due to increased exposure of the gravel sub-base; and
- Use of industrial machinery with potential to result in spills of deleterious substances to the environment.

The operation phase of the Project includes all anticipated potential Project-related effects following construction activities, as regular use continues on these portions of the access road.

4.1 Fish and Fish Habitat

Potential project-related effects to fish and fish habitat, prior to implementation of mitigation measures, are associated with both land-based (e.g., use of industrial equipment near watercourses; clearing of riparian vegetation; and, grading) and in-water construction activities (e.g., use of industrial equipment; placement of materials or structures in water; structure removal; change in timing, duration and frequency of flow; and, stormwater management). General pathways of effects for typical construction activities have been defined by Fisheries and Oceans Canada (DFO) and are used to describe activities associated with projects in terms of the: activities that are involved; type of cause-effect relationships that are known to exist; and mechanisms by which stressors can ultimately lead to effects on fish and fish habitat (DFO 2014). Potential pre-mitigation Project-related effects to fish and fish habitat are discussed below and summarized in **Table 4-1**.

.

Table 4-1 Potential Project-related Effects to Fish and Fish Habitat Prior to Implementation of Mitigation Measures

Potential Residual Effect	Adapted Description (DFO 2014)	Pathways of Effects								Pre-mitigation Likelihood of Effects
		Land-based Activities			Instream Activities					
		Use of Industrial Equipment	Vegetation Clearing	Grading	Use of Industrial Equipment	Placement of material or structures in water	Structure Removal	Change in timing, duration, and frequency of flow	Wastewater Management	
Change in sediment concentrations	Increased sediments, which contain nutrifying elements and can capture or absorb contaminants, are suspended or else settle and collect in waterways affecting physical processes, structural attributes, and ecological conditions such as water clarity (by reducing visibility and sunlight, and damaging fish gills) and reducing the availability and quality of spawning/ rearing habitat (through infilling).	X	X	X	X	X	X		X	**Possible**. Increased sediment inputs to the Project watercourses currently occurs during rain events when the road base is disturbed (e.g., from vehicles driving across the access road, as observed during the February 1, 2019 assessment). During construction, the disturbance of the gravel road base from construction activities may also increase sedimentation in the watercourses if there are inadequate erosion and sediment control measures. Following construction, as the Project will enhance drainage conditions along the road, sediment inputs to the watercourses is likely to decrease when compared to pre-construction conditions (i.e., due to less potential for stormwater to interact with the gravel road base prior to discharging into the watercourses).
Change in contaminant concentrations	An increase in concentrations of toxins and pollutants in sediments and waters can breach the range of chemical parameters that support healthy aquatic communities, seriously affecting fish and fish habitat. The ecological effects can range from direct fatality to organisms, alteration of the ecosystem structure through changes in the abundance, composition, and diversity of communities and habitats, and persistence and progressive accumulation in sediments or biological tissues (bioaccumulation, bio-magnification). Deformities, alterations in growth, reproductive success, and competitive abilities can result.	X			X				X	**Possible.** During construction, the use of machinery increases the potential for leaks and spills of pollutants to occur.
Change in habitat structure and cover	The addition of instream organic structure and soils can affect the capacity of a watercourse to maintain a dispersed and diverse community of aquatic organisms by restricting habitat connectivity and the opportunities for organisms to use, colonize, and move between existing aquatic environments. The removal of instream vegetation can reduce channel stability, cover and protection from predators and physical disturbances, and the availability of diverse and stable habitats.		X			X	X			**Unlikely.** The Project will involve upgrades to culverts along the road. In general, the culverts are anticipated to be approximately the same length, although riprap armouring will be placed at the outlet of two crossings of the Chehalis Tributary 2 crossing. However, given the existing armouring (e.g., at the 3+055 crossing) and the gravel migration (occurring at the 3+420 crossing), impacts to instream conditions are not anticipated to be significantly altered from pre-construction conditions. In addition, brushing of riparian vegetation for construction activities may alter the riparian habitat, at least temporarily until new vegetation becomes established.
Change in food supply	The aquatic food supply must be plentiful and diverse to sustain the productivity of a watershed. An increase or decrease in the quantity or composition of the food supply, beginning with plants and organic debris that fall into a waterway, can alter the structure of the aquatic community.		X							**Unlikely.** Brushing of riparian vegetation and subsequent may result in a very marginal temporal effect on terrestrial food supply availability (e.g., insect drop) until vegetation can re-establish.
Change in nutrient concentrations	Some activities may cause an increase in nutrifying elements such as nitrogen and phosphorus and mineral compounds such as ammonia, nitrates, nitrites, and orthophosphates. This can lead to eutrophication which consumes oxygen, depleting it from bottom waters. The resulting low dissolved oxygen concentrations drive fish from their preferred habitat and can cause other organisms to die.		X						X	**Unlikely.** Brushing of riparian vegetation may result in a very marginal temporal effect on the nutrient supply and availability to fish (e.g., leaf litter drop and impacts from shading).
Change in water temperature	Water temperature directly affects many of the physical, biological, and chemical characteristics of a waterway. In elevated temperatures, many cold water fish, such as trout and salmon, could experience reduced reproductive activity or direct mortality, including egg mortality. High temperatures also encourage the microbial breakdown of organic matter, leading to a depletion of dissolved oxygen in the water body.		X							**Unlikely.** Brushing of riparian vegetation may result in a very marginal temporal effect on the localized temperatures in the creek (e.g., due to loss of shading).

Potential Residual Effect	Adapted Description (DFO 2014)	Pathways of Effects								Pre-mitigation Likelihood of Effects
		Land-based Activities			Instream Activities					
		Use of Industrial Equipment	Vegetation Clearing	Grading	Use of Industrial Equipment	Placement of material or structures in water	Structure Removal	Change in timing, duration, and frequency of flow	Wastewater Management	
Change in access to habitat/ migration	An alteration in water depth, flow, and/or substrate size causing a disruption in access to fish habitats essential for various life processes within given fish populations such as spawning and rearing.					**X**	**X**	**X**		**Unlikely.** Fish are not known to occur within the watercourse reaches crossing the access road (note: no changes to the Pretty Creek mainstem crossing structure is proposed as part of this Project). In addition, even if fish were present in the Project area, the Project (e.g., replacement and installation of new culverts) is not likely to change existing habitat conditions for fish (e.g., resulting from the lack of perennial fish habitat, combined with migration barriers and steep gradients).
Displacement or stranding of fish	Excessive flow and high water velocities can displace fish from habitat and create migration barriers. Reduced flow can result in the stranding of fish.					**X**	**X**	**X**		**Unlikely.** Fish are not known to occur within the watercourse reaches crossing the access road. In addition, the Project is not likely to change existing habitat conditions for fish, if fish were present in any of the reaches.
Potential mortality of fish/ eggs/ ova	Direct injury or mortality of fish (eggs, larvae, invertebrates, etc.) from physical disruption from equipment.	**X**			**X**					**Unlikely.** Direct mortality of fish due to physical disturbance from equipment unlikely to occur as fish are not known to occur within the watercourse reaches crossing the access road.

4.2 Wildlife and Wildlife Habitat

The proposed Project will involve disturbance to instream areas around the culvert crossings and some temporal disturbance to vegetated riparian areas. Potential effects on wildlife and wildlife habitat include:

- Alteration and/or loss of habitat
- Injury or mortality of individuals
- Destruction of nests or dens
- Disturbance (i.e., disruption of breeding, foraging, and roosting behaviour due construction activities).

4.2.1 Wildlife Species of Regulatory and Conservation Concern

The same potential effects referenced above for more common species and summarized below in **Table 4-2** also apply to species at risk with a medium or high likelihood of presence, as identified in **Table 3-2**. This includes habitat alteration or loss; injury or mortality; destruction of nests or dens; and disturbance to wildlife species.

The construction activities could interact with species at-risk that have medium or high likelihood to be present in the area **Table 3-2**. The vegetation brushing estimated for the Project is minimal; and is likely only restricted to shrubs along the road, and the potential effects on rare plants is anticipated to be negligible, given that no suitable habitat for rare plants was detected during the site visit.

Alteration or loss of habitat and mortality of individuals may occur during work activities. Additionally, although ditches to be modified within the Project footprint may have limited breeding habitat potential for amphibians (including Northern-red legged frog and Oregon spotted frog) the water features may serve as connecting habitat between areas of potentially suitable habitat (i.e., Oregon spotted frog's critical habitat 1.5 km north west from the Project study area and location of individual at Elbow Lake, south of the project). If, for instance, any portions of seasonally wetted ditches were fully infilled or modified in such a way that aquatic connectivity was impaired, previously unidentified breeding populations could become isolated from one another. Construction activities such as excavating and heavy traffic in the area could lead to mortality of individuals, regardless of time of year (i.e., hibernating individuals in winter, breeding individuals, egg masses, and larvae during the breeding season, dispersing individuals in summer).

Effects on birds includes the removal of vegetation (habitat loss or alteration) that could provide suitable breeding habitat. Small trees and thick shrub species, and to a lesser extent, emergent vegetation, may provide suitable nesting habitat for various bird species groups (e.g., songbirds, waterfowl, shorebirds). Vegetation removal may result in the loss of nests, or the destruction of young that have not yet fledged. Disturbance to birds is also a potential effect of the Project. Great blue heron have been recorded near the footprint of the project. However, the impact on this species and their habitat is anticipated to be low, and by following least-risk timing windows, breeding individuals should not be present during construction activities. Effects on Pacific water shrew (*Sorex bendirii*) are not anticipated as specific habitat conditions required for this species (i.e., emergent native vegetation and coarse woody debris) are lacking within the Project footprint. The remaining at-risk species identified in **Table 3-2** were considered to have low to moderate potential to be found in the Project study area and were assessed as having a low potential to be affected by Project construction activities.

Table 4-2 Summary of Potential Project-related Effects on Wildlife and Wildlife Habitat

Potential Project-related Effect	Project Phase	Description
Alteration and/or loss of Habitat	Construction and Operation	Construction activities will alter the quantity and/or quality of wildlife (including at-risk species) habitat, primarily through the clearing of vegetation and installation of culverts. Potential adverse alterations to habitat (e.g., amphibian breeding habitat) include the temporary removal of vegetation which may provide food sources or shelter to wildlife. In the absence of proper restoration, vegetation removal and disturbance of soil may increase the potential for invasive or non-native vegetation growth, which could potentially result in long-term changes to habitat structure and diversity. With the implementation of mitigation measures described in **Section 5.2**, alteration and/or loss of habitat is considered likely to occur, but is not expected to result in a significant change to overall wildlife habitat suitability in the area.
Injury / Mortality	Construction	Injury or mortality of individual organisms (both plants and wildlife) may result through the operation of heavy machinery (i.e., vegetation clearing, installation of culverts and reconstruction of ditches). In general, the risk of this effect is higher for static or less-mobile species and life stages (i.e., plants, amphibians, young wildlife or larvae). By adhering to mitigation measures described in **Section 5.2**, the likelihood of injury and mortality resulting from the Project is considered low.
Destruction of Nests or Dens	Construction	Construction activities, primarily involving the use of heavy machinery and the clearing of vegetation, have the potential to destroy nests or dens located within the Project footprint. In cases where these nests or dens are occupied at the time of construction, this has potential to result in the injury or mortality of wildlife. Wildlife may also need to expend extra energy and/or resources in order to rebuild or relocate their nest/den. By following least-risk timing windows described below in **Section 5.2**, the likelihood of this effect is considered low.
Sensory Disturbance	Construction	Wildlife may be disturbed as a result of construction activities through disruption of breeding, nesting, and roosting behaviours caused by the presence of construction equipment and crews, including resultant noise, vibration, and physical disturbance factors. Existing foraging areas may also be temporarily disrupted within the Project footprint if wildlife are unwilling to approach the construction area.

5.0 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

5.1 Best Management Practices and Guidelines

The implementation of proper guidelines and Best Management Practices during work activities in this project could limit the potential Project-related adverse effects to aquatic resources and at-risk species. These guidelines include, but are not limited to:

- Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013)
- *A User's Guide to Working in and Around Water* (MOE 2005)
- Land Development Guidelines for the Protection of Aquatic Habitat (DFO and MELP 1992).
- Standards and Best Practices for Instream Works (MWLAP 2004)
- *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture* (MOE 2017*c*)
- Guidelines for Amphibian and Reptile Conservation during Urban and Rural Development in British Columbia (MFLNRO 2014)
- Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MOE 2013)
- *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (BC MOE 2014).

5.2 Site-Specific Mitigation Measures

Specific mitigations measures that should be implemented to avoid potential adverse effects described in **Section 4.0** during work activities are summarized in **Table 5-1**. The information below includes mitigative approaches and strategies derived from the above list of BMPs and guiding documents.

Table 5-1 Proposed Site-Specific Mitigation Measures

Activity	Mitigation Measures
Erosion and Sediment Control	• Develop a site-specific Environmental Protection Plan (EPP) that addresses erosion and sediment control (ESC) mitigation to be implemented during construction. Mitigation is expected to include: ▫ Appropriate ESC perimeter controls (e.g., sediment fencing) to be implemented prior to the commencement of construction activities, as necessary. ▫ Installation and maintenance of temporary measures which may include, silt fences, straw bales, geotextiles, berms, temporary drainage piping or ditching, vegetative cover, and/or other mitigation measures to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where impacts to sensitive environmental receptors may result. ▫ Soils exposed as a result of Project activities, and/or implementation of other erosion protection or sediment control measures should be covered with a liberal layer of scattered straw or poly material until such time that re-vegetation (soil stabilization) can be implemented. ▫ Disturbed areas should be restored as soon as possible, through hydroseeding or replanting, to ensure stabilization of exposed soils. • All installed ESC measures should be regularly inspected and replaced/modified as required during construction • Culvert replacements should occur during dry weather conditions to reduce potential for sediment-laden waters to migrate to downstream fish-bearing watercourses. • Instream works should be conducted in-the-dry and surface flow should be diverted around works, using techniques such as pumping and/or piping of flows. • Any sediment-laden water should be discharged areas that are at least 30 m away from any aquatic habitats. Discharge locations should be in vegetated / forested areas to allow for infiltration back into the ground and filtration of sediment-laden water away from watercourses. Discharging should not be conducted in a manner that promotes further erosion and increased sedimentation at the discharge site (e.g., direct water at the face of a large rock to dissipate energy).
Protection of Surface Water Quality and Spill Management	• Equipment must arrive onsite washed and free of leaks, invasive species, and noxious weeds. • All fuelling, washing, and maintenance of equipment must be conducted at a safe distance at (i.e., at least 30 m away) from aquatic habitats to prevent the introduction of deleterious substances into these habitats (i.e., outside the riparian buffer area). • Use biodegradable fluids in heavy machinery associated with instream works, where practicable, and ensure equipment is clean and free of excess oil and grease prior to initiating work. • Ensure any gravels, rock, riprap or other materials placed on the banks or within watercourse channels are inert, and free deleterious substances. Ensure basic spill kits are available within every vehicle and piece of equipment operating within the construction site.

Activity	Mitigation Measures
Fish and Fish Habitat	• The work will involve removal and removal and installation of culverts conveying flow from the mapped watercourses outlined in **Section 3.1**, in addition to the drainage ditches along the road shoulder. The majority of the watercourses that will require crossing structure removal and/or replacement appear to be ephemeral features with very low potential to be fish-bearing. In this regard, the instream work should be conducted during dry weather conditions (e.g., in the summer) with reference to the general least risk window for salmonids August 1st to September 15th. • All instream works will be conducted in isolation of flowing water. The contractor will be required to have isolation and diversion materials (e.g., sandbags, pumps, and polyethylene sheeting) on site and ready for deployment. • A Qualified Environmental Professional will be retained to conduct the monitoring during watercourse diversions (if required) and will assess the requirement to conduct a fish salvage (depending on conditions observed on site)). • The duration of instream works should be minimized to the extent possible.
Other Aquatic Biota	• For any instream works a QEP should implement active salvage efforts (i.e., visual searches) within wetted water features for amphibians prior to any instream works. The work area (i.e., channel) shall be isolated before any salvage efforts are carried out.
Wildlife and Wildlife Habitat	• Minimize the area of vegetation clearing to the extent possible. • Clearing activities should take place in the least-risk timing window for breeding birds and amphibians (i.e., before late March and after mid August for breeding birds; before late February and after late May for amphibians) which will minimize the potential for adverse effects on breeding birds and amphibians. • If the above least-risk timing windows cannot be adhered to, pre-clearing nest surveys will be required for breeding birds, and exclusion-fencing and/or amphibian salvage efforts may be required for breeding amphibians.
Riparian Vegetation	• Minimize the area of vegetation clearing to the extent possible. • Clearly mark the limits of construction activities and appropriate buffers around any sensitive environmental features (i.e., wetlands) prior to vegetation clearing. • Ensure that any invasive plant infestations are properly mapped and clearly delineated on the ground, in support of measures to avoid the spread of invasive plant species on site.
Environmental Monitoring	• Working under the guidance of a QEP, a qualified Environmental Monitor should be present on-site during instream work to assist with site dewatering, ESC measures, protection of fish and fish habitat, and management of any potential at-risk species habitat. • Conduct environmental monitoring, with an emphasis on those works with the greatest potential to impact aquatic and riparian habitats (e.g., culvert replacement activities). The Environmental Monitor must have written authority to halt work if environmental monitoring indicates there is a current or imminent impact to the environment that has not been otherwise permitted or approved. • Monitor turbidity on an ongoing basis, to ensure that water quality in watercourses meets federal water quality objectives (CCME 2002).

6.0 DISCUSSION ON ENVIRONMENTAL EFFECTS

6.1 Fish and Fish Habitat

The pre-mitigation likelihood of negative effects to fish and fish habitat resulting from the Project are largely related to potential increases in sediments and contaminants resulting from use of industrial equipment around watercourses. All other effects were assessed as being unlikely to occur (**Table 4-1**). The potential for negative impacts to fish and fish habitat was evaluated for each potential effect in consideration of the pathways of effects described in **Table 4-1** and was based on professional judgement. Residual effects and their potential to cause serious harm were characterized as follows:

- Nil: very unlikely to result in serious harm
- Low: unlikely to result in serious harm;
- Medium: moderately likely to result in serious harm; and
- High: highly likely to result serious harm.

The assessment concluded that potential Project effects will be temporary and reversible, and best management practices and mitigation measures can be applied to minimize the duration and magnitude of residual effects. The risk of serious harm to fish resulting from the Project is considered to be nil.

6.2 Wildlife and Wildlife Habitat

The pre-mitigation likelihood of negative effects to wildlife and wildlife habitat resulting from the Project are largely related to vegetation clearing. Given the limited scope of the project and previously disturbed character of the project area, these impacts are anticipated to be limited to the area immediately adjacent to the roadway.

The assessment concluded that potential Project effects will be temporary and reversible, and best management practices and mitigation measures can be applied to minimize the duration and magnitude of residual effects. The risk of serious harm to wildlife and wildlife habitat resulting from the Project is considered to be nil.

7.0 ANTICIPATED FEDERAL PERMITS / APPROVALS

7.1 Fisheries Act

The *Fisheries Act* (DFO, 2012; FA) requires that projects avoid causing Serious Harm to fish and fish habitat unless authorized. Serious Harm includes the killing of fish, and the permanent alteration of or destruction of fish habitat that supports commercial, recreational or aboriginal fisheries (CRA fisheries). On a project-by-project basis, DFO expects proponents and/or qualified practitioners working on their behalf to consult DFO Pathways of Effects to evaluate project related effects and make a determination with respect to Serious Harm (DFO 2014). This EEA, which includes an aquatic effects component concludes that there is a very low risk of residual adverse effects on fish and fish habitat. Based on the proposed scope of the Project, there is a very low likelihood of potential death of fish or net negative residual habitat impacts to fish habitat resulting from the Project. It is of Hemmera's opinion that the proposed Project will not result in Serious Harm to fish that are part of any CRA fisheries, or to any fish that support such fisheries, and that a Section 35(2)(b) Authorization is not required to complete this Project.

7.2 Migratory Bird Convention Act

The *Migratory Birds Convention Act, 1994* (S.C. 1994, c. 22) is administered by Environment and Climate Change Canada, and protects various species of migratory birds including gamebirds, insectivorous birds, and non-gamebirds. This Act restricts the possession of live and dead migratory birds and bird parts, and prohibits the taking of migratory bird nests and the deposit of harmful substances in waters or areas frequented by migratory birds. No permits/approvals under this Act are expected to apply following the implementation of mitigation measures and BMPS listed in **Table 5-1** of **Section 5.0**. These measures include pre-clearing bird nesting surveys if construction activities require vegetation clearing within the breeding bird window.

7.3 Species at Risk Act

Species listed under SARA cannot be killed or harmed and there are prohibitions against destroying their residences. The SARA protects 'at-risk' wildlife species on federal land and within federally designated Critical Habitat. The protection also applies to all lands for listed aquatic species (i.e., a wildlife species that is a fish, as defined in Section 2 of the *Fisheries Act*) and listed migratory birds (also listed in the *Migratory Birds Convention Act, 1994*). A few species listed under the SARA are considered to have potential to occur within the Project study area and within the Project footprint (see **Table 3-2**). As the Project study area does not intersect any federal land; there is no requirement for a SARA permit. For any aquatic biota salvage efforts that may be required, permitting under the *Wildlife Act* will ensure compliance.

8.0 CLOSURE

Provided the proposed mitigation and restoration measures outlined in this report (**Section 5.0**) and standard BMPs are implemented and maintained, the Project is expected to present minimal risk to the identified Project receptors (fish and fish habitat, wildlife and wildlife habitat, and at-risk species) assessed in this report.

We have appreciated the opportunity of working with you on this Project and trust that this report is satisfactory to your requirements. Please feel free to contact the undersigned regarding any questions or further information that you may require.

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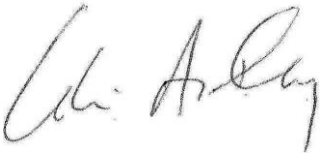

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