

## TOWN OF LADYSMITH DEVELOPMENT PERMIT

(Section 489 *Local Government Act*)

FILE NO: 3060-20-21  
DATE: December 10, 2020

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Name of Owner of Land: Town of Ladysmith

Applicant: Julie Budgen, R.P. Bio., Corvidae Environmental Consulting Inc.  
as Agent for the Proponent

Proponent: 661314 B.C. LTD., Inc. No. BC0661314

Subject Property (Civic Address): Holland Creek and Trail

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1. This Development Permit is subject to compliance with all of the bylaws of the Town of Ladysmith applicable thereto, except as specifically varied by this Permit.
2. This Permit applies to and only to those lands within the Town of Ladysmith described below, and any and all buildings structures and other development thereon:

**District Lot 143, Oyster District**  
**PID: 009-476-261**

AND

**Lot 5 Block 1399 Oyster District Plan VIP75559, Except Plan VIP82328**  
**PID: 025-708-660**

AND

**Lot 4 Block 1399 Oyster District Plan VIP75559 (see Plan as to limited access)**  
**PID: 025-708-651**

(referred to as the "Land")

3. This Permit has the effect of authorizing the alteration of land for the construction of a road and engineered arch bridge on the Land, located within Development Permit Area 6 – Riparian, as designated in the Official Community Plan Bylaw 2003, No. 1488 under section 488(1)(a) of the *Local Government Act*, in accordance with the plans and specifications attached to this Permit, and subject to the conditions, requirements and standards imposed and agreed to in this Permit and all applicable laws.

This Permit does not have the effect of varying the use or density of the Land specified in Zoning Bylaw 2014, No. 1860.

4. This Permit is issued to enable the Proponent, which is the holder of rights under Registered Easement EV82003/EV81999, to construct the Road System and Utilities referred to in the Easement.
5. The Proponent, as a condition of the issuance of this Permit, shall undertake the **road and engineered arch bridge construction project (the Project)** under the following **terms** in order to protect and restore the:
  - Streamside Protection and Enhancement Area (SPEA) and Riparian Assessment Area (RAA) on the Land as shown on **Figure 1** within this Permit, and
  - Affected Lands within the area of Holland Creek Trail located within Development Permit Area 6 – Riparian.

**(a) Timing of Construction**

- i. Land alteration shall not commence prior to the issuance of Construction Approval (detailed design) for the Project by the Town.

**(b) Protection and Mitigation Measures**

- i. Project work within Holland Creek and the SPEA shall be undertaken in accordance with the Section 11, Water Sustainability Act - Terms and Conditions (**Schedule A**).
- ii. All Project work on the Lands shall be undertaken in accordance with 'Construction Environmental Management Plan and Erosion and Sediment Control Plan for Holland Creek Bridge Construction' prepared by Corvidae Environmental Consulting Inc. (**Schedule B**).
- iii. Environmental management and restoration of the Lands shall be undertaken in accordance with 'Amendment to the Approved Environmental Report and Restoration of the Proposed Development Holland Creek Crossing Development Permit Area 6' prepared by Corvidae Environmental Consulting Inc. (**Schedule C**).
- iv. Changes to the Project as part of Construction Approval shall require updated assessments by Corvidae Environmental Consulting Inc. to reassess the proposal with respect to impact on the SPEA.
- v. Replacement native tree species shall be planted in restored areas where they will not affect line of sight for drivers, or in other areas acceptable to the Town. Tree removal shall be documented by size and species and the proposed 20 Acer macrophyllum (Big Leaf Maple) replacement trees shall be reviewed by the Registered Professional Biologist and the Town to confirm number, species, size and planting location.

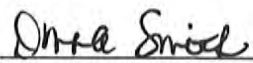
**(c) Monitoring and Reporting**

- ii. Prior to any land alteration:
    - a. The SPEA, RAA and any management areas outlined in any of the Schedules to this Permit shall be identified by sign and delineated by snow-fencing or another similar barrier along the edge of the Project area.
    - b. Install signage to advise contractors of “no go” boundaries and contact information for the Environmental Monitor. Provide signage to the Town for review prior to installation.
  - iii. During land alteration and construction:
    - a. Environmental monitoring, water quality sampling and environmental incident reporting by the Registered Professional Biologist (Corvidae Environmental Consulting Inc.) shall be undertaken as outlined in Appendix D of **Schedule B** and provided to the Town.
  - iv. Following project completion:
    - a. Native plant restoration areas shall be:
      - i. Fenced as approved by the Town for two years to prevent trampling;
      - ii. Watered during dry periods until the plants are established to an 80% level, for a minimum of two growing seasons;
      - iii. Monitored and invasive species removed by hand; and
      - iv. Replanted during the establishment period if plants have not survived.
    - b. Monitoring the restored area by the Project Registered Professional Biologist (Corvidae Environmental Consulting Inc.) shall be continued until such time as 80% or greater species establishment has been achieved.
    - c. A completion inspection report from the Registered Professional Biologist confirming compliance with the conditions in Section 6 of this Permit must be submitted to the Town prior to the release of the security referred to in Section 7 of this Permit.
6. This Permit is issued on the condition that the Proponent has provided to the Town of Ladysmith security in the form of an irrevocable Letter of Credit to guarantee the performance of the conditions in Section 6 of this Permit. The Letter of Credit shall be for a period of two years, shall be automatically extended, and shall be in the amount of **\$50,000**.
7. Should the Proponent fail to satisfy the conditions referred to in Section 6 of this Permit, the Town of Ladysmith may undertake and complete the works required to satisfy the landscaping conditions at the cost of the Proponent, and may apply the security in payment of the cost of the work, with any excess to be returned to the Proponent.

8. Should there be no default as herein provided, or where a Permit, the Town of Ladysmith shall return any security provided to the Proponent.
9. The permittee may, in lieu of a Letter of Credit, deposit with the Treasurer of the Town of Ladysmith the sum of the security in cash.
10. If the Proponent does not substantially start any land alteration permitted by this Permit within **two years** of the date of this Permit as established by the authorizing resolution date, this Permit shall lapse.
11. The plans, reports and specifications attached to this Permit are an integral part of this Permit.
12. Notice of this Permit shall be filed in the Land Title Office at Victoria under s.503 of the *Local Government Act*, and upon such filing, the terms of this Permit (**3060-20-21**) or any amendment hereto shall be binding upon all persons who acquire an interest in the land affected by this Permit.
13. This Permit prevails over the provisions of the Bylaw in the event of conflict.
14. Despite issuance of this Permit, construction may not start without Construction Approval, or other necessary permits, or contrary to other applicable restrictions or limitations on the timing of this Project.

APPROVED PURSUANT TO "LADYSMITH OFFICERS AND DELEGATION OF AUTHORITY  
BYLAW 2016, NO. 1905" ON THE 10<sup>TH</sup> DAY OF DECEMBER 2020.

  
Owner - Town of Ladysmith  
Mayor D. Stone

  
Corporate Officer (D. Smith)


I HEREBY CERTIFY that I have read the terms and conditions of the Development Permit contained herein. I understand and agree that the Town of Ladysmith has made no representations, covenants, warranties, guarantees, promises or agreements (verbal or otherwise) with **661314 B.C. LTD., Inc. No. BC0661314** other than those contained in this permit.

  
Signed

  
Title

  
Date

  
Witness

  
Occupation

  
Date

FIGURE 1: DP 3060-20-21  
STREAMSIDE PROTECTION AND ENHANCEMENT AREA (SPEA) AND  
RIPARIAN ASSESSMENT AREA (RAA)







DP# 3060-20-21

Approved Schedule

**SCHEDULE A: DP 3060-20-21**

**BC WATER SUSTAINABILITY ACT, SECTION 11 NOTIFICATION (1004975) – HOLLAND CREEK – TERMS AND CONDITIONS (MINISTRY OF FOREST, LANDS, NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT)**

**Conditions:**

- Work must be completed during dry periods between October 30 and December 31, 2020. Preference would be for these works to occur outside of spawning times for the species present in Holland Creek;
- Must adhere to Environmental Report – Proposed Development Holland Creek submitted by Corvidae Environmental Consulting Inc.;
- Environmental monitor (EM) must be on site at all times during work where there is potential for instream impacts (e.g. exposure of soils hydrologically connected to stream, blasting, works immediately next to stream, riparian vegetation clearing, concrete pouring, etc.) and employ all appropriate erosion and sediment control measures;
- The EM must have the ability to shut down the works and secure the site in case of heavy rain;
- No work can occur within the high water mark of Holland Creek and no permanent or temporary fill to be placed below the high water mark;
- Follow best practices from DFO for avoiding fish harm <https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html> and for blasting near water in order to avoid harm to salmon eggs or fish;
- Minimize removal of riparian vegetation and re-vegetate disturbed areas using appropriate native plant species. Monitor species for survival for two summers and replace mortalities;
- Must adhere to Construction Environmental Management Plan and Erosion and Sediment control Plan submitted by Corvidae Environmental Consulting Inc. dated July 2018;
- Work to be done in low water flow level, project must stop if significant rains occur or qualified professional deems it is necessary to stop work;
- Ensure native plants receive sufficient water during the first two summers to fully establish. Monitor the survival of native plants for the proposed work and replant if there is mortality;
- Ensure that all works involving the use of concrete, cement, mortars and other Portland cement or lime-containing construction materials will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any water body. Concrete materials cast in place must remain



inside sealed formed structures. Concrete leachate is alkaline and highly toxic to fish and other aquatic life; and

- All containment booms, absorbent pads, and any temporary screening and sediment control structures must be removed at the end of the project.

**Comments:**

- Environmental Report – Proposed Development Holland Creek submitted by Corvidae Environmental Consulting Inc; and
- Construction Environmental Management Plan and Erosion and Sediment Control Plan submitted by Corvidae Environmental Consulting Inc.

Notifications received by this office will be used to plan and carry out on-site inspections and monitoring during and after the works are completed.

This email provides direction under Section 11 of the *Water Sustainability Act* only, and does not constitute permission or consent under any other Act or Authority. It is your responsibility to consult with other Provincial program areas, Fisheries and Oceans Canada (DFO) and the local government (municipality or regional district) to determine if there are any additional requirements for your proposed works.





DP# 3060-20-21

Approved Schedule

***Construction Environmental Management Plan and  
Erosion and Sediment Control Plan for  
Holland Creek Bridge Construction***

Prepared for:

1399 Developments Inc.,  
Malahat, BC

Prepared by:

Corvidae Environmental Consulting Inc.  
Sooke, BC

**CORVIDAE**  
ENVIRONMENTAL CONSULTING INC.

Corvidae Project No. CE 20180312  
August 2018

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### Caveat

This Construction Environmental Management Plan (CEMP) and Erosion and Sediment Control Plan (ESCP) have been prepared with the best information available at the time of writing, including communications with the Prime Contractor, site visits, review of design drawings, and other documentation relevant to the project. This CEMP/ESCP has been developed to assist the Prime Contractor in remaining in compliance with relevant environmental regulations, acts and laws pertaining to the project, and to identify and mitigate the expected impacts of construction, operation, and reclamation activities directly related to the project. The CEMP/ESCP has been prepared as a resource tool for use specifically by the project construction team; subcontractors to the Prime Contractor are responsible for complying with the measures detailed in the CEMP/ESCP. Any use of this CEMP/ESCP by other parties is done so exclusively at their risk. The author assumes no responsibility for: [i] this CEMP or iterations of this CEMP/ESCP that are unsigned by the author, [ii] any changes made to this document other than those made or endorsed by the author, or [iii] day-to-day construction compliance.

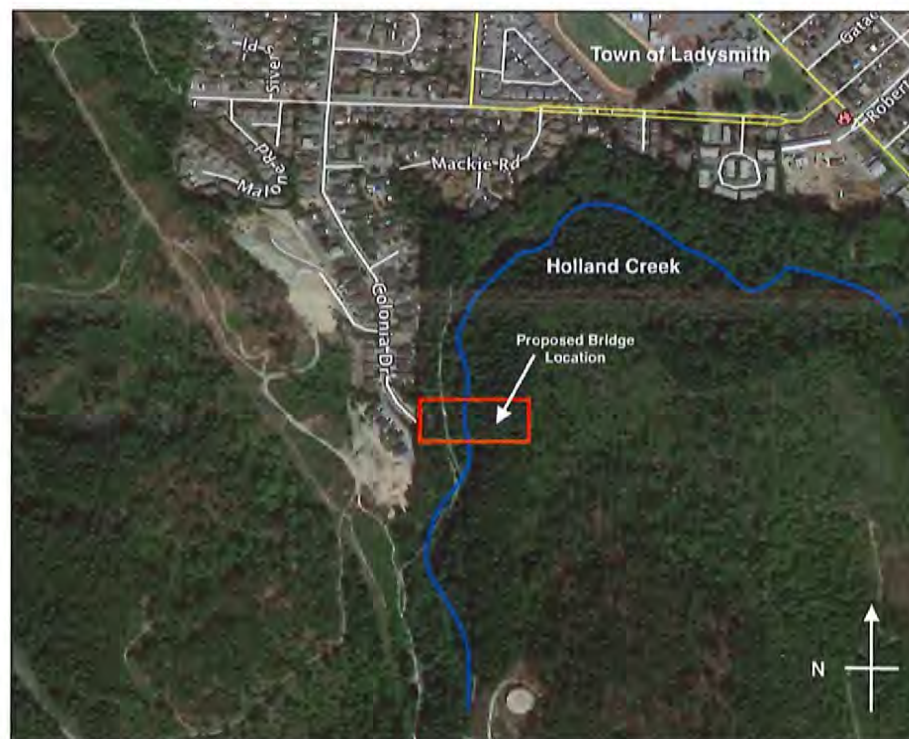


# 1 INTRODUCTION

1399 Developments Inc. (the 'Proponent') is undertaking a road and bridge construction project (the Project) in Ladysmith, BC in order to provide access to a subdivision development of 38 residential lots at Lot 5, Block 1399, Oyster District, Plan VIP75559 (except Plan VIP82328). The Project extends from the west end of Colonia Drive to the east side of Holland Creek, connecting the new subdivision development to the existing roadway infrastructure by means of an engineered arch culvert bridge (the Bridge) – see Figure 1.

The Project is located within the Riparian Development Permit Area 6 (DPA-6) and Holland Creek Local Area Plan (HCLAP) as described within the City of Ladysmith Official Community Plan (OCP) Bylaw 1488. Holland Creek originates on northern and eastern slopes of the Vancouver Island Mountains (Coronation Mountain) and flows north and east about 12 km before entering Ladysmith Harbour<sup>1</sup>.

**Figure 1 Proposed Bridge Location**



The proponent has retained Corvidae Environmental Consulting Inc. (Corvidae) to provide this Construction Environmental Management Plan (CEMP) and Erosion and Sediment Control Plan (ESCP) as well as, submitted under separate cover, a Section 11 Notification to the Ministry of Forests, Lands and Natural Resource Operations for Works in and About a Stream and a Development Permit Application to the Town of Ladysmith.

<sup>1</sup> Water Quality Branch Environmental Protection Department. Ministry of Environment, Lands and Parks. 1996. *Water Quality Assessment and Objectives for Holland Creek and Stocking Lake Watersheds, Vancouver Island*.





This CEMP includes sections dedicated to Environmental Construction Specifications (environmental protection measures and protocols that apply to all aspects of the proposed construction activities), an Erosion and Sediment Control Plan, Erosion and Sediment Control Figures (Appendix A), Erosion and Sediment Control Typical Drawings (Appendix B), a Spill Response Plan (Appendix C), Environmental Monitoring, and Environmental Incident Reporting Plan (Appendix D).

The general nature of the Project to be carried out, as per the available Project drawings, Town of Ladysmith Preliminary Layout Acceptance (PLA) and communication with the Proponent consists of, but is not limited to, the following activities:

- Mobilization to site
- Environmental management and monitoring, erosion/sediment control measures set-up
- Clearing and low impact road development for access to east and west bridge footings and work area
- Excavation/blasting for bridge footings and base of Mechanically Stabilized Earth (MSE) wall
- Cast-in-place (CIP) concrete for footings (bridge and MSE wall)
- Placement of bridge structure
- Construction of MSE wall and backfill
- Construction of pedestrian pathway crossings
- Construction of subgrade to elevation ready for final road prism development and paving
- Supply and placement of asphalt pavement
- Revegetation of disturbed soils and the MSE wall

The main project works related to construction environmental management are outlined in Section 3.

## **2 REGULATORY FRAMEWORK**

### **2.1 Legislation**

This CEMP is designed to assist the proponent in maintaining compliance with the provisions for environmental protection contained in the following relevant legislation, acts, regulations, and specifications:



**Table 1. Legislation and Application to the Project Scope of Work.**

<b>Legislation, Regulations and Other Requirements</b>	<b>Application to Project Scope of Work</b>
<b>Federal</b>	
<i>Canadian Environmental Protection Act</i>	Does not apply to the scale of project scope of work.
<i>Migratory Birds Convention Act</i>	Tree clearing and grubbing is required for the road way approach and clear-span bridge abutment locations on either side of Holland Creek. A pre-construction nest sweep must be conducted by a Qualified Environmental Professional prior to clearing between April 15 <sup>th</sup> and August 31 <sup>st</sup> .
<i>Fisheries Act</i>	No instream works or disturbance of aquatic habitat is expected for this project scope of work. At the current design stage the proposed bridge works will be outside of the wetted area of the stream (above the Q200 elevation).
<b>Provincial</b>	
<i>Water Sustainability Act</i>	A Section 11 Notification (No. 1004120) has been completed for the Bridge construction. Sediment and Erosion Control Best practices and contingency measures are outlined within this CEMP/ESCP.
<i>Wildlife Act</i>	Clearing and grubbing activities will occur within the riparian area of Holland Creek. Provincially blue-listed Cutthroat trout were identified as present in Holland Creek. Best Management Practices for wildlife interactions and observations are outlined in this CEMP.
<i>Weed Control Act</i>	Minimal excavation works are required for this project. Excavated materials must be managed appropriately to prevent invasive weed colonization in this area. General weed control best practices are outlined in this CEMP specifically to equipment use for the project.
<i>Environmental Management Act</i>	Mobile equipment will be used to construct the road way approach and bridge. Spill prevention and contingency measures will be followed as outlined in this CEMP.
<b>Local Government Requirements</b>	
<i>City of Ladysmith Official Community Plan (OCP) Bylaw 1488.</i>	This project exists within a Riparian Development Permit Area (DPA-6). The permit must be obtained prior to start of project construction activities; Corvidae has submitted an Environmental Report for the permit application under separate cover.



## 2.2 Project Specific Approvals, Authorizations, Permits, and Designations

Prior to starting construction, the proponent is required to ensure that all applicable licenses, permits, and approvals have been secured in writing from the applicable regulatory authorities. Copies of these must be maintained on the worksite during construction. A summary of the relevant project designations and potential required approvals is included in Table 1.

## 3 ENVIRONMENTAL CONSTRUCTION SPECIFICATIONS

Environmental protection measures summarized in this section relate specifically to the proposed project works and have been compiled from a review of the contract specifications, applicable regulatory standards, as well as best management practices (BMPs) including the following:

- BC Ministry of Environment *Develop with Care Environmental Guidelines for Urban and Rural Land Development in British Columbia*
- Fisheries and Oceans Canada *Measures to Avoid Causing Harm to Fish and Fish Habitat*
- Fisheries and Oceans Canada *Land Development Guidelines for the Protection of Aquatic Habitat*
- City of Ladysmith Official Community Plan Bylaw 1488. *Riparian Development Permit Area.*
- City of Ladysmith Official Community Plan Bylaw 1488. *Holland Creek Land Area Plan.*

### 3.1 Significant Locations and Activities

The main construction activities that have been identified as having the highest potential to adversely impact the environment are:

- Roadway / access development
- Heavy equipment operation , fuel management
- Excavation/blasting adjacent to Holland Creek for footings
- Construction of CIP footings adjacent to Holland Creek for the bridge footings and the base of the MSE wall.
- Construction of MSE wall and backfill
- Supply and placement of asphalt pavement
- Revegetation of disturbed soils and the MSE wall

Details of the specific potential impacts and the associated mitigations are included in Table 2. Construction should be completed in compliance with the timing restrictions outlined in Table 3, where practicable. Timing restrictions have been developed through regulatory agencies as a mitigation to prevent impacts to a particular environmental element (e.g. birds, fish) during periods of highest risk or sensitivity and can form parts of approvals, authorizations and permits; however, in certain situations, provided the appropriate rationale and other mitigations (e.g. bird nest sweep) have been considered, work may occur within the timing restriction periods subject to approval by the applicable regulatory agency.





Table 2 is designed to be a reference guide for specific activities and site wide general measures for environmental protection are summarized in Sections 3.2 Information found in Table 2 is not repeated in Section 3.2.



Table 2. Impacts and Mitigations

Construction Activity	Potential Impact	Mitigation
Roadway / access development  Heavy equipment operation  Fuel management	<p>Vegetation removal, damage/destruction to wildlife habitat and risk of erosion &amp; sedimentation of exposed soils into Holland Creek.</p> <p>Wildlife and human disturbance from construction-related noise and activities that result in wildlife avoidance or interference with nesting of breeding birds or inconvenience to the neighboring public.</p> <p>Hydrocarbon release to soil and potential watercourse including accidental spill of deleterious materials.</p>	<ol style="list-style-type: none"> <li>1. Limit clearing, grubbing, and excavation to minimum area required for access, staging, bridge construction and demolition, safety considerations, equipment operation, storage, and stockpiles. All clearing limits defined prior to clearing.</li> <li>2. There is the potential to salvage plants during this stage of the project (and during ultimate clearing/grubbing/stripping for full roadway development prior to MSE wall construction) for later use in reclamation of disturbed areas and for vegetation establishment of the MSE wall. Corvidae's reclamation specialist will work with the proponent to identify appropriate strategies and locations for these efforts.</li> <li>3. Preliminary access roads to be cleared and grubbing limited (stumps directly in travel path only) to that required from machine access. As much vegetation as possible is to remain in order to hold the soils together</li> <li>4. Impacts to vegetation not required to be cleared will be avoided or minimized; should impacts to this vegetation occur then efforts will be made as soon as practicable to re-vegetate the disturbed area to eliminate erosion potential and invasive species infestation.</li> <li>5. Clearly delineate watercourses, drainages, and sensitive and "no-go" areas with flagging or fencing prior to construction and maintain flagging or fencing throughout the project life so these features are always visible. This includes draws that cross the RoW.</li> <li>6. To protect the aquatic habitat and prevent harm to fish in Holland Creek, the following measures will be followed: (i) where possible pruning/topping of vegetation close to the high water mark will be used instead of grubbing/uprooting, (ii) immediately stabilize any areas of stream bank disturbed, following re-vegetation with native plants.</li> <li>7. Clearing shall only be undertaken between September 1 – April 14 in accordance with the Holland Creek Land Area Plan unless a pre-clearing breeding bird survey is completed by a QEP.</li> <li>8. Construction personnel shall not harass or otherwise disturb wildlife. Wildlife encountered during construction will be allowed to move unimpeded through the project site.</li> <li>9. If amphibians or reptiles are encountered within the project work area, the EM is to be notified immediately and appropriate mitigation measures will be implemented.</li> <li>10. Local City of Ladysmith noise bylaws must be adhered to.</li> </ol>



Construction Activity	Potential Impact	Mitigation
		<p>11. All heavy equipment shall be equipped with functional noise abatement equipment (mufflers) and machines should not be left idling for any longer than 15 minutes.</p> <p>12. To prevent the spread of invasive plants, the contractor will ensure that soils, seeds and debris attached to construction equipment, vehicles, footwear and clothing are removed prior to arrival at, and leaving, the work site. Heavy equipment will be inspected for contaminants (soils, seeds, and debris) by the Site Superintendent or their designate upon arrival to the staging area and prior to project initiation.</p> <p>13. All stripped, exposed soils to be re-vegetated or covered as soon as practical to prevent establishment of invasive weed species.</p> <p>14. Soil stockpiles will be covered when not in use to prevent erosion and the establishment of invasive species.</p> <p>15. All equipment on site is to be well maintained and leak free to minimize the potential for spills (see Appendix C for Spill Response Plan. If equipment leaks/spills hydrocarbons to ground, the machine will be shut down immediately and the spill will be contained and cleaned up as per Appendix C Spill Response Plan. If equipment leaks/spills hydrocarbons to water, the machine will be shut down and removed from the area immediately, and the spill will be contained and cleaned up as per Appendix C Spill Response Plan. No leaking equipment will be permitted to operate on the site until adequately repaired.</p> <p>16. All fuel tanks and other potential spill sources located within the project will have secondary containment with a capacity of 110% of the volume of the substance of concern. This includes fuels cans, generators, welders, light plants, etc (self-powered vehicles are exempt). Portable fuel containers for fuelling small equipment will be removed from site or stored in a locked enclosure at the end of each day. When onsite portable fuel containers will be securely capped, confined in a secondary means of containment (e.g. drip tray), and stored out of the way of traffic.</p> <p>17. Two large, mobile spill kits will be kept onsite; one east and one west of the creek crossing. Each will be designed to mitigate spills of 100 L of fuel.</p> <p>18. Report spills immediately to the site superintendent and EM. See Appendices C and D for further details.</p>



Construction Activity	Potential Impact	Mitigation
		<p>19. No fueling of heavy equipment or permanent storage of fuel within 30 m of watercourses or water bodies, including ditches and drainages. Stabilized equipment (equipment with outriggers extended – crane, concrete truck, light plant, etc.) are exempt. Fueling of equipment will be completed by certified bulk fuel carriers or from slip tanks that remain in the transport vehicle at all times. Fueling personnel shall maintain presence for the duration of refueling activities.</p> <p>20. Fuel and service trucks will have a spill kit with a minimum of 50 absorbent pads, 5 kg of dry, loose absorbent material, 2 pairs of impermeable gloves, 5 heavy duty large disposal bags, a 3 m x 3m impervious ground sheet and two 2-inch x 6-foot-long sections of absorbent boom.</p> <p>21. There will be onsite, a secure enclosure that contains a length of minimum 10 cm diameter linked, floating, hydrocarbon absorbent boom that can span the full width of Holland Creek plus two metres on either side. Each end of the boom will have a line attached with a weight on the end so that the line can be thrown from one side of the creek to the other and then the main section of boom hauled across. There will be anchor spots established and marked with flagging or marking paint on the east and west banks of the creek. These booms are a critical response measure in case of a spill to water from the shore or the bridge. Refer to Appendix A and B for more details.</p>
Excavation/blasting adjacent to Holland Creek for footings	<p>Blasting activities causing impacts to aquatic habitat and fish of Holland Creek (including encroachment of aggregate materials into watercourse).</p> <p>Accidental spill / release of hydrocarbon impacts to soil and Holland Creek.</p>	<p>See mitigation measures 15-20.</p> <p>22. No ANFO (Ammonia Nitrate Fuel Oil mixture) to be used for blasting activities within 15 metres of Holland Creek. Blasting Contractor to prepare a blasting plan demonstrating that their activities will conform to the guidelines set out in the <i>DFO Guidelines for Use of Explosives in Water</i>. EM to review blasting plan prior to any blasting occurring. The 15 metre buffer will be flagged and an EM will be onsite during blasting.</p> <p>23. If blasted rock enters Holland Creek, the EM will determine if it is best to retrieve it or leave it.</p> <p>24. EM to conduct water quality sampling as per Appendix D <i>Environmental Monitoring, Water Quality Sampling and Environmental Incident Reporting Plan</i>.</p>
Construction of CIP footings adjacent to Holland Creek for the bridge footings and	Release of concrete or high pH water to Holland creek.	<p>25. Prior to concrete pours, a CO<sub>2</sub> tank with regulator, suitably long hose and gas diffuser will be readily available during concrete work within or near water to neutralize pH in the event of a spill.</p> <p>26. Formwork to be contained so that no leakage may enter Holland Creek.</p> <p>27. EM to be onsite for arch culvert bridge footing concrete pours.</p>





Construction Activity	Potential Impact	Mitigation
the base of the MSE wall.		28. There shall be no washout of diluted concrete mix or washing of concrete related equipment to ground at this site. The contractor or the concrete suppliers and finishers shall contain all materials for off-site disposal.
Construction of MSE wall and backfill	Accidental spill / release of hydrocarbon impacts to soil and Holland Creek.  Release of backfill to Holland Creek.  Introduction of Invasive species.	Follow mitigation measures 15-20.  29. All backfill to be contained within MSE wall structure. The design barrier material (usually geotextile cloth) to be securely attached to the exterior mesh panels prior to placement of backfill. EM to monitor progress at start of MSE wall (first courses will occur adjacent to but not yet over top of Holland Creek) and work with proponent to fine tune the process so that when the structure is being built over Holland Creek no material is released past the exterior of the wall.
Supply and placement of asphalt pavement		30. Application of primer, tack coat or asphalt not to occur during wet weather (or forecast wet weather) that would cause hydrocarbon runoff to leave the road perimeter.
Revegetation of disturbed soils and the MSE wall		Follow mitigation measures 15-20, 29 & 26.  31. MSE wall to be revegetated with native vegetation. Soils with local native seed bed and vegetation salvaged from the project will be utilized to the extent possible for the MSE wall and embankment fills disturbances. Additional seeding requirements will be determined through a collaborative effort between the proponent and Corvidae's reclamation specialist.



**Table 3. Timing restrictions**

Type	Restriction Dates	Restriction Details
Migratory Bird Nesting Window	April 15 – August 31	Under the <i>Migratory Bird Convention Act 1994</i> (MBCA) it is an offence to harm or harass a migratory bird and destroy or disturb a nest of a migratory bird. No clearing of vegetation during restriction period unless a nesting bird survey is completed by a qualified professional and no active nests are found. If a nest is found and determined to be active, a site-specific management plan will be required for works in the vicinity of the nest
Raptors and Herons	Raptors – January 1 to August 31 annually	Construction activities may need to be modified to provide buffers for nesting or rearing raptors as per BCMFLNRO <i>Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia</i> . Identify and conserve all protected bird nests.
Fisheries Construction Timing Window	May 15 <sup>th</sup> – September 15 <sup>th</sup>	Under the <i>Water Regulation</i> the habitat officer has determined the reduced risk work windows for fish and fish habitat to be between these dates. DFO review is not required for the construction of clear-span bridges if a) no new temporary or permanent fill placed below the high water mark, b) channel realignment is not required and c) relevant measures to avoid harm are followed. If the project requirements change, a Request for Project Review will be submitted.

### 3.2 General Measures

All personnel employed by or sub-contracted to the proponent will conduct operations in a manner that complies with all environmental requirements of all authorities having jurisdiction over the project.

The proponent will provide all required equipment and precautions required to protect terrestrial and aquatic environments from pollution or degradation which may significantly harm fish, wildlife, or their habitats.

The proponent will suspend any activities or operations which are in contravention of any environmental legislation, regulation, or act that are causing, or have the potential to cause, significant environmental damage. In the event that such activities occur, and no corrective action is initiated by the proponent, the EM, environmental manager, or their designate may issue a Stop Work Order directing the immediate suspension of all or a portion of the activity causing the environmental impact. The Stop Work Order shall remain in place until appropriate mitigation measures are implemented to prevent further occurrences.

In the event of a discrepancy between any of the clauses of this CEMP/ESCP and the provisions of any applicable legislation, regulations, standards, guidelines, or codes of practice, the more stringent provisions resulting in the higher degree of environmental protection and safety shall prevail.

### 3.3 Site Access and Protection of Work Limits

Access to the Site can be gained via Colonia Dr and Dogwood Dr. Access points to the Holland Creek Bridge will not be located in a manner that creates significant potential for sediment release to Holland



Creek. Access points may need to be stabilized with rock during wet weather or as site conditions change.

### 3.4 Pollution Control, Fueling, and Spill Response

Spills of deleterious materials will be reported to the site superintendent or their onsite designate, as well as the EM and the Town of Ladysmith representative. Sediment-laden runoff is considered a deleterious material. If a spill exceeds any of the specified amounts (Table 4) in the *Environmental Management Act – Spill Reporting Guideline* or in any amount that will affect a watercourse it must also be reported immediately to Emergency Management BC at 1-800-663-3456 and, if it will affect fish bearing waters, to DFO's Observe, Record, and Report Hotline 1-800-465-4336.

The proponent will make all reasonable efforts to prevent any deleterious materials that would cause damage to marine, aquatic, or riparian habitat from entering any wetland (constructed or natural), water body (marine or freshwater), or watercourse (including ditches and drainages). Sediment-laden runoff and uncured cementitious materials are considered deleterious materials.

Fuel and other hazardous materials will be secured so that they may not be emptied or upset by vandals when left overnight in the project area and will be permanently stored no closer than 30 m from any watercourse, watercourses include ditches/drainages. The 30 metre buffer will be clearly flagged.

Repairs or other mechanical services required when a piece of machinery cannot be moved due to break down may be done on site. The ground surface will be protected from fluids generated during repairs by an impervious membrane or drip pan.

**Table 4. Spill Reporting Guidelines.**

Item	Substance Spilled	Specified Amount
1.	Class 1, Explosives as defined in section 2.9 of the Federal Regulations	Any quantity that could pose a danger to public safety or 50 kg
2.	Class 2.1, Flammable Gases, other than natural gas, as defined in section 2.14 (a) of the Federal Regulations	10 kg
3.	Class 2.2 Non-Flammable and Non-Toxic Gases as defined in section 2.14 (b) of the Federal Regulations	10 kg
4.	Class 2.3, Toxic Gases as defined in section 2.14 (c) of the Federal Regulations	5 kg
5.	Class 3, Flammable Liquids as defined in section 2.18 of the Federal Regulations	100 L
6.	Class 4, Flammable Solids as defined in section 2.20 of the Federal Regulations	25 kg
7.	Class 5.1, Oxidizing Substances as defined in section 2.24 (a) of the Federal Regulations	50 kg or 50 L
8.	Class 5.2, Organic Peroxides as defined in section 2.24 (b) of the Federal Regulations	1 kg or 1 L
9.	Class 6.1, Toxic Substances as defined in section 2.27 (a) of the Federal Regulations	5 kg or 5 L





Item	Substance Spilled	Specified Amount
10.	Class 6.2, Infectious Substances as defined in section 2.27 (b) of the Federal Regulations	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
11.	Class 7, Radioactive Materials as defined in section 2.37 of the Federal Regulations	Any quantity that could pose a danger to public safety and an emission level greater than the emission level established in section 20 of the "Packaging and Transport of Nuclear Substances Regulations"
12.	Class 8, Corrosives as defined in section 2.40 of the Federal Regulations	5 kg or 5 L
13.	Class 9, Miscellaneous Products, Substances or Organisms as defined in section 2.43 of the Federal Regulations	25 kg or 25 L
14.	waste containing dioxin as defined in section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
15.	leachable toxic waste as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L
16.	leachable toxic waste as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L
17.	waste containing polycyclic aromatic hydrocarbons as defined in section 1 of the hazardous Waste Regulation	5 kg or 5 L
18.	waste asbestos as defined in section 1 of the Hazardous Waste Regulation	50 kg
19.	waste oil as defined in section 1 of the Hazardous Waste Regulation	100 L
20.	waste containing a pest control product as defined in section 1 of the Hazardous Waste Regulation	5 kg or 5 L
21.	PCB Wastes as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L
22.	waste containing tetrachloroethylene as defined in section 1 of the Hazardous Waste Regulation	50 kg or 50 L
23.	biomedical waste as defined in section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
24.	A hazardous waste as defined in section 1 of the Hazardous Waste Regulation and not covered under items 1 – 22	25 kg or 25 L
25.	A substance, not covered by items 1 to 23, that can cause pollution	200 kg or 200 L
26.	Natural gas	10 kg, if there is a breakage in a pipeline or fitting operated above 100 psi that results in a sudden and uncontrolled release of natural gas

For any hazardous materials brought to the Project Site, the Safety Data Sheets (SDS) will be compiled in a binder and kept available at the project trailer in a clearly labeled and easily visible/accessible location. The site trailer will be located on the development property at the top of the hill, opposite



Colonia Drive. All hazardous materials will be stored in their original containers and properly labeled as per Workplace Hazardous Materials Information System 2015 (WHMIS 2015) requirements.

A ready to deploy absorbent boom will be located along the creek edge approximately 20 m downstream of the work area with an installed anchor point on both banks of the creek. The idea is that a line tied to the boom can be thrown across the creek to someone who can pull the boom over and tie it off. See ESC Drawing 100 in Appendix A.

In the event of a major spill, work shall be stopped, and all required personnel devoted to spill containment and clean-up, once the area is secured and safe. Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. For further details, see Appendix C – Spill Response Plan.

The containment, storage, security, handling, use, and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation.

A copy of the complete Emergency Contact List (see Table C-1, Appendix C – Spill Response Plan) will be posted in site trailers and other common construction areas. A map to the nearest medical facility will be posted in site trailers and other common construction areas. The closest emergency medical facility is the Ladysmith Medical Health Centre, 1111 4<sup>th</sup> Ave, Ladysmith, BC (250-739-5777), approximately 1.6 km northeast of the project site.

The project site will be kept litter free. Idling of all vehicles will be kept to a minimum. The proponent will be required to provide regularly serviced toilet facilities for construction personnel. Burning or burial of waste is not permitted.

### **3.5 Fire Prevention and Control**

If a fire occurs, construction personnel will attempt to control it if it is safe to do so. Any fires at the project site will be reported to the EM and site superintendent immediately. Call 911 if the fire has the potential to get out of control or cause damage to surrounding areas.

The proponent will have fire extinguishers available in all heavy equipment.

Smoking will be restricted to vehicle cabs or outdoors on impervious, non-vegetated surfaces. All cigarette butts to be retained in vehicle / equipment cabs, designated butt disposal cans or on the smoker's person.

Fires or burning of waste is not permitted.

### **3.6 Wildlife**

Construction personnel shall not harass or otherwise disturb wildlife. There will be no feeding, baiting, or luring of any wildlife and wildlife will not be approached or harassed in any form. Wildlife encountered during construction will be allowed to move unimpeded through the project site.

All clearing will be completed as per the provisions summarized in Table 2 and Table 3. If active raptor or heron nests are identified within or around the project area, the proponent site superintendent will be informed and a management plan prepared by a QEP.



If ditches have standing water and are to be modified, they shall be inspected for breeding amphibians by the EM. Timing of ditch clearing activities shall be scheduled to avoid sedimentation during periods when larvae or eggs may be destroyed and follow BMPs<sup>2</sup> outlined for amphibians.

Species-at-risk could potentially be observed on or near the project locations. Should this occur, operations in the immediate vicinity of the species should be halted and should re-commence only when the species has left the immediate area.

The EM should be notified immediately in the event of human-wildlife interactions, or activity or encounters with bears, cougars, or any species at risk.

All practical efforts to prevent wildlife from accessing human food, garbage, or other domestic wastes shall be made. Lunches, coolers, and food products, including waste food products, shall be securely stored away from access by animals. Secured disposal bins and washrooms will be provided by the proponent on site at the site laydown/office trailer area and other locations as deemed necessary during the course of construction.

No firearms or pets will be allowed on the project site.

### 3.7 Aquatics

There are no instream works planned in freshwater water bodies or watercourses as part of the Project, however, the construction of the bridge concrete abutments has the potential to affect water quality and aquatic habitat. All mitigation measures outlined in Table 3 and section 3.7 must be followed to ensure there are no impacts to the creek. The water quality guidelines outlined in Table 5 are not to be exceeded and the EM will work with the Proponent to ensure this.

**Table 5. BC Ministry of the Environment Water Quality Guidelines – Turbidity (2014)**

Maximum Induced Turbidity - NTU or % of background
Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters
Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters
Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters.

Fresh concrete will not be allowed to contact the wetted area of Holland Creek.

To neutralize pH levels in the event of a spill, a carbon dioxide (CO<sub>2</sub>) tank with regulator, hose and gas diffuser will be readily available during concrete work that may impact watercourses. If there is a release of concrete or concrete wastewater to an aquatic environment the protocol for CO<sub>2</sub> use is:

- Stop the release of concrete / concrete wastewater. Start remedial action for removal of spilled material.

<sup>2</sup> BC Ministry of Forests Lands and Natural Resource Operations. 2016. Best management practices for amphibian and reptile salvages in British Columbia



- Ensure the CO<sub>2</sub> cylinder is secured so that it remains upright and the regulator is protected from impact.
- Extend the diffuser (weighted hose or pipe with holes drilled in it) to the area of release and ensure it is in a stable location.
- Turn on flow of CO<sub>2</sub>.
- Measure pH of water surrounding the diffuser (2 metres beyond the edge of the bubble affected area) to ensure that it remains within the guidelines in Table 5. Adjust flow of CO<sub>2</sub> to keep pH within the guidelines. pH test strips that measure to 0.2 units of accuracy are acceptable to measure pH.
- Once the release is contained and no further pH impacts are expected turn off the CO<sub>2</sub> and remove the diffuser.

Washrooms will be located a minimum of 15 m from any project watercourses. They will be located on the development property at the top of the hill, opposite Colonia Drive.

### 3.8 Vegetation

Local vegetation resources will be protected by restricting vehicle and equipment traffic to within the staked work limits. All personnel will be informed and attend the site kick-off meeting and environmental protection measures. 1399 Developments Inc. will be responsible and liable for all works in the project area and following the CEMP.

Unless authorized by the City of Ladysmith Representative, the restoration of any damaged areas beyond the construction limit of work areas is the responsibility of the contractor and will be guided by a qualified environmental professional to ensure the ecological integrity of the project area is maintained.

Trees not being removed must be protected from material or equipment intrusion within their dripline (the extent of the tree crown for each tree). Vehicle traffic and material storage will not be allowed within the limits of the drip line of any trees not to be removed. Broken branches greater than 5 cm in diameter will be trimmed with a chainsaw or equivalent to create a flat vertical surface that will reduce the potential for further damage to the tree.

Fill material will not be allowed to sluff past delineated work limits.

### 3.9 Contaminated Material Discovery

Although expected to be low, there is the potential for sources of contamination to be encountered during construction. Indications of possible contamination include but are not limited to:

- Rusted barrels and containers.
- Stained or discolored earth in contrast with adjoining soil.
- Fill material containing debris.
- Non-earthly odors which emanate when the earth is disturbed.
- Oily residue intermixed with earth.
- Sheen on groundwater.
- Cinders or other combustion products like ash.



If potentially contaminated material is encountered the crew will stop work immediately and inform the site superintendent. The site superintendent will contact the City of Ladysmith Representative and the EM. Appropriate assessment and mitigation protocol will be developed to comply with all applicable legislation.

### **3.10 Waste Material Storage and Removal**

Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried, or discarded at the construction site.

Where practical, solid waste will be segregated (food waste, recyclables, and construction waste). A simple program is to separate recyclable paper and beverage containers at the site trailers and a metal bin be kept onsite for all metal. Local metal recyclers will drop bins off for free.

There will be no on-site garbage containers used for domestic garbage or food waste unless they are stored inside site trailers or are able to be secured against wildlife opening them. Food waste (food, food containers, beverage containers, coolers, etc.) and other wildlife attractants are not permitted to be left out in the project area or in construction trade waste bins.

Trade waste (construction waste) materials will be disposed of in designated trade waste bins. These bins will be emptied when a maximum of 90% full to ensure material does not get blown out of the bins and impact adjacent areas.

It is highly recommended that waste bins be visibly labeled to ensure the proper waste bin is used for the purpose intended. Domestic waste that ends up in trade waste bins, which can remain on site for long periods, could attract wildlife.

It is expected that the main source of contaminated waste potentially generated by the proponent will be hydrocarbon contaminated soil associated with equipment failures. Containment, storage, handling, use and disposal of contaminated materials will be in compliance with all applicable regulations. Contaminated materials may be stored temporarily on site in a dedicated, approved container (impermeable, lined steel bin or equivalent) until a full load is available for disposal. Disposal will be at a facility approved to accept the contaminated materials and a manifest detailing the date, amount and contents of the disposed materials will be kept on file at the site trailer. Confirmation of complete remediation of contaminated soils will be required.

### **3.11 Clearing and Grubbing**

Clearing and grubbing limits will be clearly flagged prior to clearing.

The proponent will be using heavy equipment and chainsaws to clear trees as required. All clearing activities will be designed to fall trees onto the project area right-of-way (RoW) and the machinery will stay within the staked RoW at all times.

Trees that fall outside the RoW will be removed by lifting as much as possible to reduce impacts due to dragging.

The perimeter of cleared areas will be assessed by the EM or City of Ladysmith Representative to determine if rehabilitation or restoration of the areas outside the work area limit is required.

All clearing of trees will be completed as per the provisions summarized in Table 2 and 3.



Any clearing of trees between April 15<sup>th</sup> and August 31<sup>st</sup> annually must be preceded by a breeding bird survey and nesting survey completed by an QEP prior to tree clearing and removal. Tree disturbance (tree shaking) is to be avoided as it may lead to shaken egg embryos and increase mortality.

## 4 EROSION AND SEDIMENT CONTROL PLAN – ACTIVITY / SITE SPECIFIC CONTROLS

### 4.1 General Measures

Erosion and sediment control measures summarized in this section relate specifically to the proposed project works. Previously outlined general measures related to environmental management are not repeated here.

### 4.2 Environmentally Sensitive Areas / Special Erosion Protection Areas

### 4.3 Activity/Site Specific Controls

For additional details regarding site specific erosion and sediment controls, refer to Appendix A – Erosion and Sediment Control Site Drawings. The following notes are in addition to the notes on the drawings and are intended to complement details provided on the drawings. For installation details and typical figures related to the correct installation of ESC measures please refer to Appendix B. Erosion and sediment controls are presented below based on their location with respect to the Project.

#### 4.3.1 Site Wide

- 1) **Construction staging/supply chain management** - must be managed so that as new areas are cleared or disturbed they are being stabilized against erosion in a timely manner (prior to rainfall). The effect of this is to limit the amount of time erosive forces can act on the disturbed areas to create sediment that is then mobilized towards Holland Creek.
- 2) **Erosion control** – if rainfall greater than 10mm/24 hrs is forecast then exposed soils at risk of generating sediment may need to be covered with mulch or other stabilizing material; EM to be consulted regarding what areas require cover. Straw may be used as an easily accessible and simple method. A single regular bale covers 50 m<sup>2</sup> w at 90% coverage at 3-5 cm deep and is extremely effective at eliminating erosion. See Appendix B for a typical drawing.
- 3) **Sediment control** – the site presents limited opportunities for containing or settling fine sediment from stormwater but protection of Holland Creek can be achieved by pumping collected water to areas identified for discharge (depressions, areas with long, vegetated flow paths away from Holland Creek, etc.). Once final design is achieved the EM will review the site to determine appropriate locations for diverting / discharging stormwater to. Manufactured sediment dewatering bags are required and there shall be two of these on site prior to the start of stripping activities. They shall be a minimum of 5' x 4' and have a fabric collar that can be attached to a 4 inch or smaller pump discharge hose. Sand bags will be available for use in creating diversion / containment berms to capture surface flow so that it may be collected and pumped to dewatering bags set up in locations approved by the EM.



- 4) **Hydrocarbons in equipment** - Biodegradable hydraulic oil will be used for any heavy equipment working within the SPEA or RAA (30 meters of the High Water Mark).

## 4.4 East side of Holland Creek

### 4.4.1 Roadway development

Limit ground disturbance as per Table 2 in Section 3. Leave as much vegetation as possible undisturbed as long as possible.

Water bars (shallow and wide swales that cross the access roadway at a 30 to 45 degree angle) are to be constructed at strategic locations to direct water into adjacent vegetation and minimize its ability to concentrate and cause erosion. The water bar locations will be determined through a collaborative effort of the proponent and the EM once the roadway alignment has been delineated in the field. See ESC Drawing 100 in Appendix A.

Any draws or drainages (not watercourses) that are crossed by the access road are to be filled with geotextile wrapped blast rock or a culvert so that cross flow can be conveyed across the access road without generating sediment. The EM will review the site once the access alignment has been finalized and identify areas where this protocol is to be followed.

Once final roadway alignment is determined, EM will determine where silt fence or straw wattles will be installed as perimeter sediment control. See Appendix B for a typical figure of correct silt fence installation. It is anticipated that silt fence installations may need to be dewatered since they may be impounding water in areas upgradient of pathways to Holland Creek. Dewatering will be to areas identified for discharge by the EM.

### 4.4.2 East bridge footing

Clean soil off rock carefully with clean up bucket prior to drilling so that soil is not displaced into Holland Creek. Once the location of the east footing is identified in the field, a containment system (likely secured geotextile fabric) will be installed below the work area so any displaced soil is captured during clean off of soils, drilling or blasting. Photos identifying the footing locations are provided in the DPA report and will be clearly marked in the field.

Drill fines are to be removed at the end of each day of drilling so that wind or rain do not mobilize them to Holland Creek.

Blast mats will be placed on top of the blast and overhanging the edge of the creek to contain fly rock and prevent it from reaching Holland Creek. The containment system may need to be repositioned after the blast to capture fugitive material as the blasted rock is cleared away.





#### **4.4.3 Full width roadway development and MSE wall construction**

Full width of roadway to be stripped only during dry weather and only when there is enough material available to place the base course of rock or subbase material prior to the next rainfall event.

Sediment dewatering areas previously utilized during access road development will be utilized for stormwater management.

As the embankment fills are constructed (at either end of the MSE wall locations) they will be protected from erosion by straw mulch or plantings.

### **4.5 West bank**

#### **4.5.1 Roadway development**

Limit ground disturbance as per Table 2 in Section 3. Leave as much vegetation as possible undisturbed as long as possible. The existing trail from the east end of Colonia Drive should be utilized as the access down to the west footing area as much as possible as it is already stabilized and compacted. It is expected that heavy equipment travel will degrade the surface but using it will reduce the disturbance of vegetated ground.

Water bars - same as Section 4.4.1.

Silt fence / straw wattles – same as Section 4.4.1.

#### **4.5.2 West bridge footing**

This location will likely have a much lowering potential for impacts to Holland Creek because it is located on a flat bench beside the creek and appears to be underlain by cobble / boulder rather than bedrock. Once the location of the west footing is identified a method of isolating the work area from Holland Creek will be developed – likely silt fence installation, mass material berm or straw wattles.

No drilling or blasting expected for the west footing.

#### **4.5.3 Full width roadway development and MSE wall construction**

Full width of roadway to be stripped only during dry weather and only when there is enough material available to place the base course of rock or subbase material prior to the next rainfall event.

Sediment dewatering areas previously utilized during access road development will be utilized for stormwater management.

As the embankment fills are constructed (at either end of the MSE wall locations) they will be protected from erosion by straw mulch or plantings.



#### 4.6 Anticipated Equipment on Site

The following equipment will be on site prior to initiating associated activities that might cause negative impacts to the designated streams or any other environmentally sensitive areas on the project site:

- Two x 2 inch electric submersible pumps and 50 metres of discharge hose for each.
- One x 3 inch trash pump, a hard intake hose and 50 metres of discharge hose.
- Two sediment dewatering bags.
- Geotextile fabric or polyethylene sheeting for scour protection at pump discharge locations.
- 100 m of standard silt fencing.
- One hundred sand bags.
- 10 straw bales for mulch (hay not acceptable due to having significantly more seeds).
- Two mobile spill kits capable of handling spills of 100 L of fuel.
- Enough linkable absorbent boom to span Holland Creek and set up in a “ready-to-deploy” state and location to contain hydrocarbon spills that may discharge to Holland Creek. See Table 2. See Appendix B for a typical figure of boom setup.

EMP / ESCP Prepared By:



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Re—submitted August 27, 2018



## **APPENDIX A – EROSION AND SEDIMENT CONTROL SITE DRAWINGS**



Original drawing source: McElhanney Consulting Services Ltd. *Holland Creek Crossing – Option 2. Title – PLAN. 2018.*

Potential silt fence / straw wattle location:



Water Quality Sampling location:



Absorbent boom anchor points:



### Holland Creek Bridge - ESC Plan Drawing 100

Corvidae Project No. CE18

Corvidae Drawing No. ESCP - 1020

Revision No. 0

Date: July 3, 2018

**CORVIDAE**  
ENVIRONMENTAL CONSULTING INC.

## **APPENDIX B - ESC TYPICAL FIGURES**



Typical installation of linked absorbent boom across waterway to capture deleterious substances.

Key elements:

- 1) Boom is securely stored in a linked, ready to go state.
- 2) There are personnel onsite who know where it is and how to deploy and when to deploy it.
- 3) There are established, easily identified anchor points on either side of the water body.
- 4) A means of getting the lead line across the waterway is available.





## Straw mulch typical application



Straw to be placed 3 – 5 cm deep at greater than 85% ground coverage (as shown). This is approximately 1 regular small bale per 50 square metres.

Straw is preferable to hay because it has far fewer seeds that may contain invasive species or otherwise impact local habitats.

For better adhesion to the soils in very dry or windy conditions the straw should be track packed in. In wet conditions the straw does not need to be track packed.

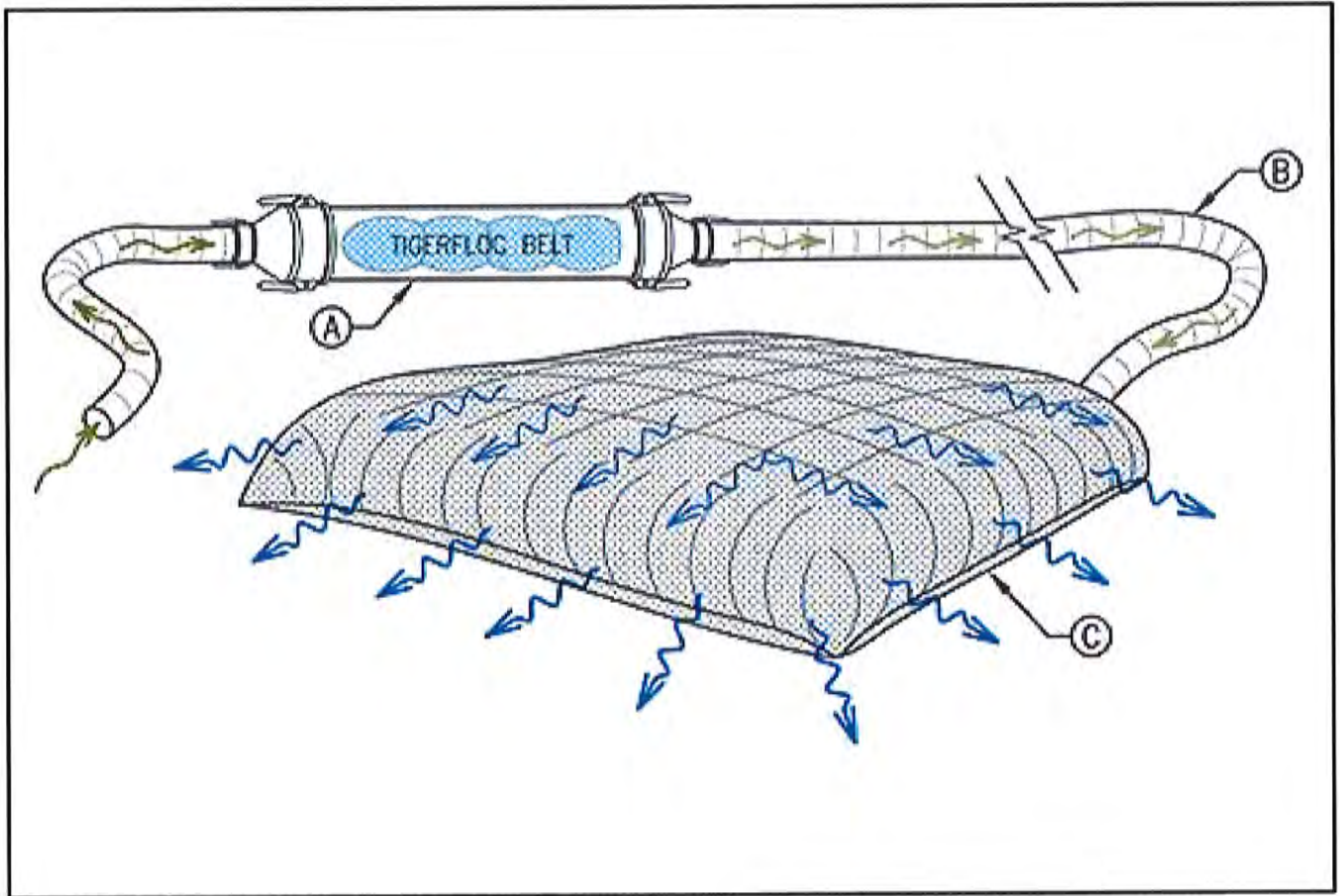
Straw mulch is effective to stop initial erosion due to rainfall impact – it is not effective at stopping concentrated flows. Do not place in ditches, at culvert outlets etc. It can be utilized with other ESC measures (silt fence, diversion ditches etc) to increase its effectiveness.





### Inline flocculant and sediment dewatering bag typical application

Inline flocculant not necessarily required for this project - to be determined by site conditions

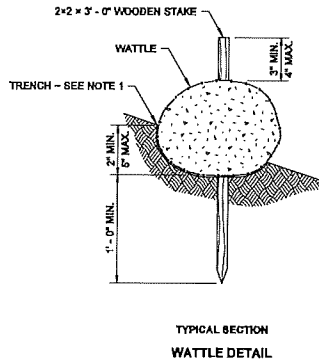
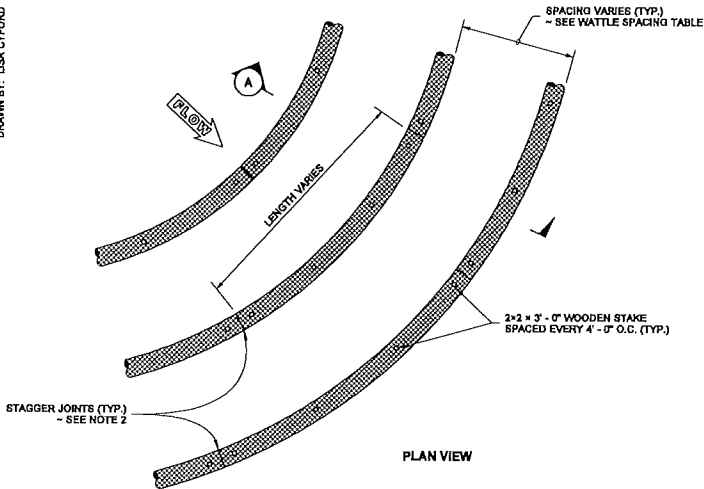


A = Inline flocculant that is mixed prior to discharge.

B- Minimum 50 feet of discharge hose between inline flocculant and sediment dewatering bag.

C – Sediment dewatering bag. Set up in location where seepage from bag will not cause erosion.

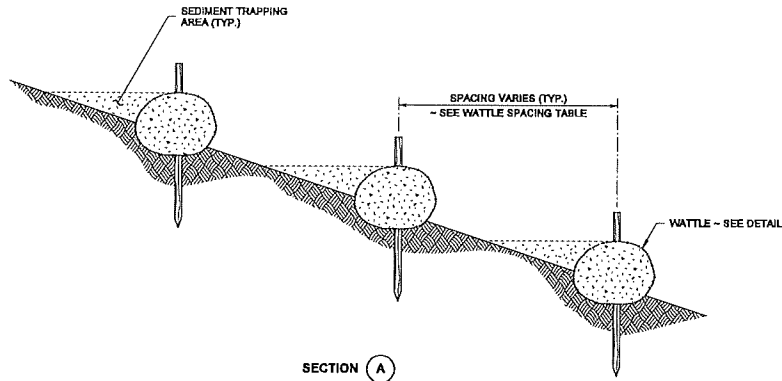




NOTES

1. Wattles shall be in accordance with Standard Specification 9-14.5(6). Install Wattles along contours. Installation shall be in accordance with Standard Specification 8-01.3(10).
2. Securely knot each end of Wattle. Abut adjacent Wattles tightly, end to end, without overlapping the ends.
3. Pilot holes may be driven through the Wattles and into the soil when soil conditions require.
4. Live stakes may be used for permanent installation and shall be in accordance with Standard Specification 9-14.5(8).
5. Wattles shall be inspected regularly, and immediately after a rainfall produces runoff, to ensure they remain thoroughly entrenched and in contact with the soil.
6. Perform maintenance in accordance with Standard Specification 8-01.3(16).

WATTLE SPACING TABLE	
SLOPE	MAXIMUM SPACING
1:1	10' - 0"
2:1	20' - 0"
3:1	30' - 0"
4:1	40' - 0"



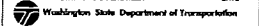
NOTE: THIS PLAN IS NOT A LEGAL INSTRUMENT. IT IS A DESIGN DOCUMENT. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS PART OF THE RECORD SET. ANY REVISIONS TO THE ORIGINAL SHALL BE OBTAINED UPON REQUEST.

**WATTLE INSTALLATION  
ON SLOPE**  
**STANDARD PLAN 1-30.30-00**

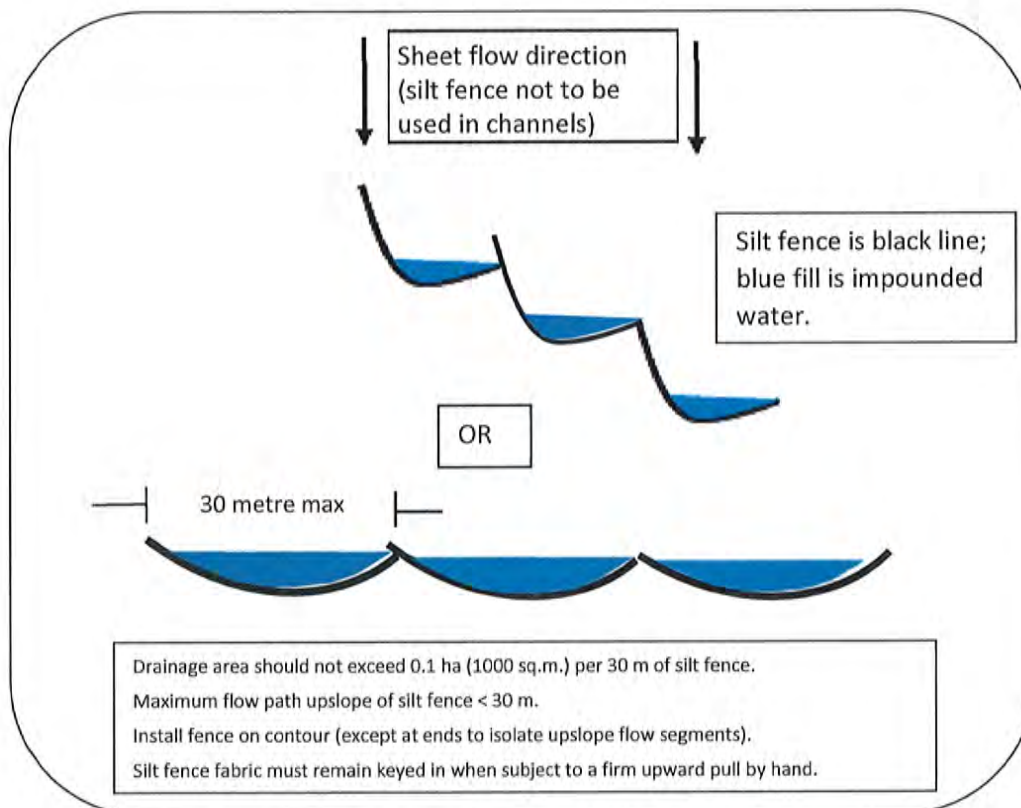
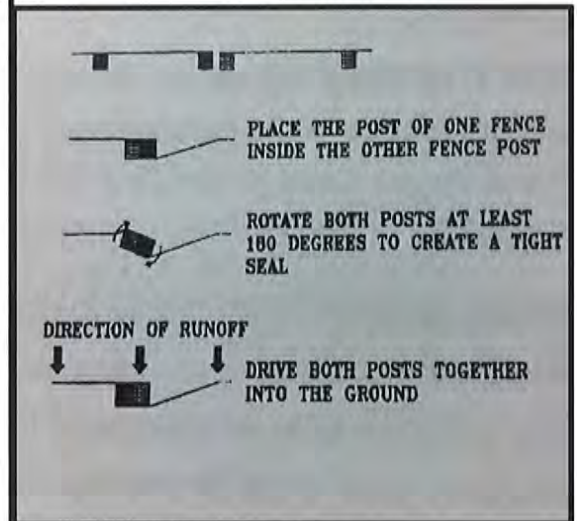
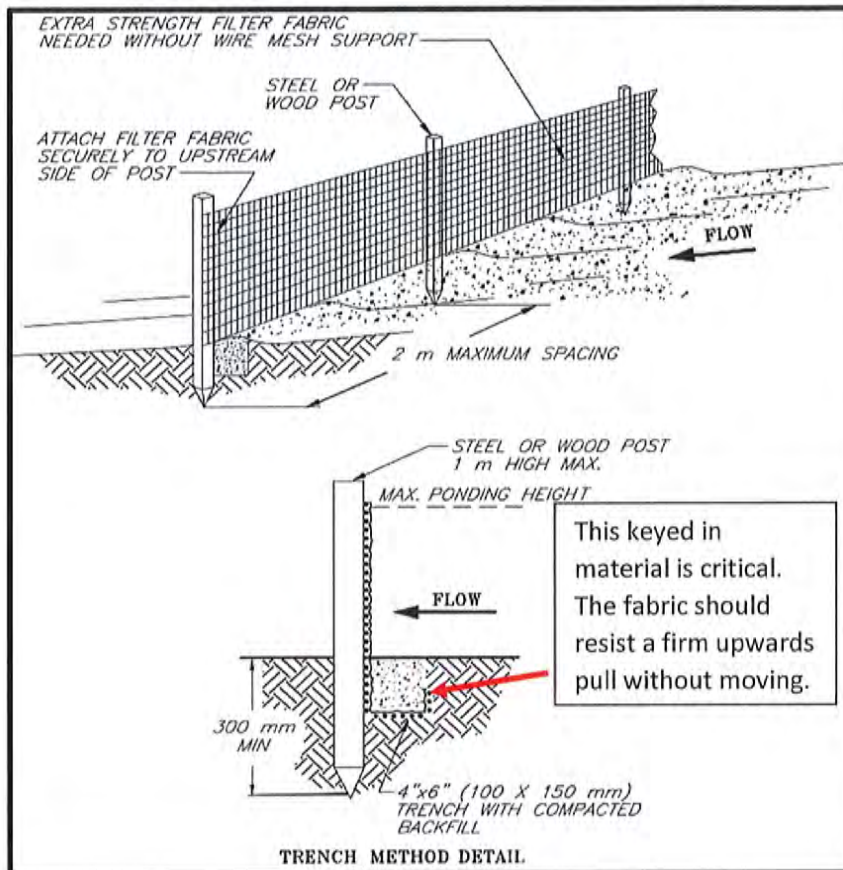
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

**Pasco Bakotich III** 09-20-07  
STATE DESIGN ENGINEER DATE



## Silt fence installation, post roll and configuration typical drawings



## APPENDIX C – SPILL RESPONSE PLAN

Spills are reportable if:

- It has caused, is causing, or may cause an adverse effect to the environment or people.
- The release is into a groundwater or surface water body.
- The quantity/volume exceeds the quantities or emission levels set out in the relevant legislation, guideline, approval, or code of practice. For this project any release of petroleum hydrocarbons or allied products is to be reported to the EM.

All spills of deleterious materials to be reported to the site superintendent, City of Ladysmith Representative, and the EM (sediment-laden runoff is considered a deleterious material). If spill exceeds 100 L of fuel report to Emergency Management BC (EMBC) at 1-800-663-3456. Spills less than 100 L will be reported internally, this includes reporting to the EM. When reporting a spill by phone expect to provide the following information:

- the contact information:
  - for the individual making the report,
  - the responsible person in relation to the spill, and
  - the owner of the substance spilled;
- the date and time of the spill;
- the location of the spill site;
- a description of the spill site and the surrounding area;
- a description of the source of the spill;
- the type and quantity of the substance spilled;
- a description of the circumstances, cause and adverse effects of the spill;
- details of action taken or proposed to comply with Section 91.2 (2) [Responsible Persons - Spill Response 1 of the Environmental Management Act];
- the names of the government, federal government, local government and first nation government agencies at the spill site;
- the names of other persons or government, federal government, local government or first nation government agencies advised about the spill.

A spill report form will be completed, and copies of the documentation generated as soon as possible or within 24 hours of the event. Copies of the documentation will be kept on file in hard copy format at the proponent site trailer.

The Contractor will provide a report on impact as per statutory requirements (“Duty to Notify” provisions in the *Fisheries Act*) where those impacts include water quality discharges.

The spill report form will contain the following information (see form below bulleted list):

- reporting person’s name and phone number;
- name and phone number of person who caused the spill;

- date, time, location, duration and rate of release;
- type and quantity of release;
- detailed description of circumstances leading up to the spill and the effect of the spill;
- description of equipment involved, e.g. leak in machine, compromised equipment;
- procedures used to control, minimize and stop the release;
- disposal methods for contaminated materials, and
- measures taken to prevent further releases.



## Environmental Incident Report

Reported by (name and phone #)	Title	Date Reported	YY	MM	DD
Location (office, field, geographic location)	Date of incident ( yyyy/mm/dd)	Time	(24-hr clock)		
Project	Responsible party name	Responsible party phone #			
<b>Incident</b>					
<u>What happened – include duration of release</u>		<u>Location –surrounding features(waterbodies, drainage patterns etc)</u>			
<u>Magnitude of potential impact</u>		<u>Remedial action taken – include disposal details</u>			
<u>What steps can be taken to avoid future incidents</u>		<u>Remedial action still required</u>			
If a release which substance: _____  Amount: _____ kg / L / m <sup>3</sup> Circle one.		Environment substance was released into: land / water / air Describe:			
<b>Reporting</b>					
Has the incident been reported to any regulatory authority? Circle one.                      Yes                      No					
<b>Detailed Description of Incident</b>					
Include all related events leading up to incident and a description of equipment, property damage or loss. Attach any diagrams, photographs or other pertinent information. Attach extra sheets as required.					
Name of person making report		Signature		Date:           YY           MM           DD	
Name of responsible party		Signature		Date:           YY           MM           DD	

After a spill is contained and cleaned up, the proponent will be responsible for ensuring that disposal follows all applicable legislation. Manifests documenting proper disposal will be kept on file in hard copy format at the proponent site trailer.

The containment, storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation.

A copy of the complete Emergency Contact List (Table C-1) will be posted in site trailers and other common construction areas.

A copy of the Spill Response Plan will be distributed to all superintendents and foremen on site. On-site superintendents and foremen must understand the Spill Response Plan procedures and know the appropriate authorities to contact in the event of a spill.

For any hazardous materials brought to the project site, the Safety Data Sheets (SDS) will be compiled in a binder and kept at the project trailer in a clearly labeled and easily visible location.

All hazardous materials will be properly labeled, as per Workplace Hazardous Materials Information System 2015 (WHMIS 2015) requirements.

### **Spill Response Protocol**

As there are works of significant scope and duration occurring close to Holland Creek, a large labeled mobile spill kit capable of mitigating spills of 100 L of fuel will be kept on each side of the bridge and readily accessible during all construction activities. A ready to deploy absorbent boom will be located on either side of the bridge so that rapid deployment is possible at all times.

The proponent will immediately respond to the spill and ensure the safety of site personnel. Once it is determined that personnel are safe, and the area is safe to access the following general procedures will be followed:

#### **If the spill is fuel based, remove ignition sources**

- Shut off equipment and don't allow other sources of ignition (cutting torches, vehicles, smoking, etc.) near the area. Keep a fire extinguisher on hand but keep it a safe distance away so it is accessible in case of a fire.

#### **Stop the flow**

- Immediately take action to stop the spill: close valves, crimp and / or plug hoses, apply stop leak compound, etc.

#### **Contain the spill**

- Once the spill has been stopped take action to protect waterbodies, watercourses or wetlands by creating berms, diverting water, capping storm drain inlets, installing ditch blocks, etc.

#### **Enlist the help of personnel on site**

- Notify site superintendent or foreman as soon as possible.
- Mechanic to be dispatched to scene if appropriate.



- Appropriate parties are to be notified of the spill – the proponent site superintendent and EM. If the release will affect a fish bearing water body the Department of Fisheries and Oceans must be notified.
- See Table C-1 Emergency Contact List at the end of this Spill Response Plan for contact numbers.

#### **Remediate spill**

- The proponent will be responsible for ensuring that proper clean up and disposal is undertaken in a timely manner and in compliance with all applicable legislation. Copies of manifests documenting proper disposal will be kept on file in hard copy format at the proponent site trailer and available for review by the EM and City of Ladysmith Representative.

#### **Reporting**

- A spill report form will be completed, and copies of the documentation generated within 48 hours of the event. Copies of the documentation will be kept on file in hard copy format at the proponent site trailer.
- The spill report form will contain information as outlined in the fourth paragraph of this Spill Response Plan.

#### **Procedure review**

- The proponent will review the spill report form and determine if enhancements to the procedure are required and implement any required changes.

**Table C-1 Emergency contact list**

Organization / Company	Name	Position	Phone #	Cell #
Emergency Dispatch (Fire, Ambulance, Police, Hazmat)			911	
City of Ladysmith	Felicity Adams	City of Ladysmith Representative	250-245-6405	
Emergency Management BC			800-663-3456	
Fisheries and Oceans Canada		Observe, Record, Report Hotline	800-465-4336	
Hospital – Ladysmith Medical Health Center		11110 4 <sup>th</sup> Ave, Ladysmith, BC	250-739-5777	
1399 Development Inc.	Bill Eller	Project Manager		250-744-7411
Corvidae Environmental Consulting Inc.	Wade Kennedy	Environmental Monitor		250-615-7860
	Matt Johnson	Environmental Manager		250-609-0199

## **APPENDIX D – ENVIRONMENTAL MONITORING, WATER QUALITY SAMPLING AND ENVIRONMENTAL INCIDENT REPORTING PLAN**

### **Environmental Monitoring**

Environmental monitoring will focus on compliance with the CEMP/ESCP and associated plans, and conformance with the Land Development Guidelines to ensure the protection of adjacent Holland Creek waters.

The proponent's EM will be a QEP. Environmental monitoring will include a detailed review of erosion and sediment control measures on site, recording of deficiencies, timelines for mitigation, and using the construction schedule to plan mitigations for potential future impacts. The project activities can likely be adequately monitored by weekly monitoring visits and visits to review erosion and sediment control measures during rain events forecast to exceed 10 mm of rain in 24 hours.

The Environmental Monitor shall be on-site during work in Environmentally Sensitive Areas including, but not limited to the following activities: preliminary access road grubbing, blasting for pipe arch footings, concrete pours and grouting operations adjacent to and above Holland Creek, initial installation of erosion and sediment controls and measures.

The EM shall attend weekly tailgate / construction meetings with the proponent project team onsite to discuss current activities, upcoming activities, collaborate on solutions and to inform the project team of the specific environmental requirements of upcoming works.

The EM shall provide environmental orientations to the proponent's earthworks, blasting and concrete contractor prior to their start of activities onsite.

The EM will prepare daily summary monitoring reports that will include records of construction activities undertaken since the last site visit, current site activities and conditions, communications with onsite crew, environmental incidents, impacts and corrective actions taken as well as what work plan modifications or mitigations are required. Water quality monitoring results will be included as applicable. These reports will also be provide to the Town electronically.

### **Water Quality Monitoring**

- The EM will oversee water quality monitoring on site. Sampling locations, methods, duration and timing will be outlined and designed to provide enough detail to demonstrate compliance with all applicable acts, regulations and requirements of regulatory approvals.
- Water quality monitoring will be completed by Corvidae during environmental monitoring visits. Visits are scheduled weekly during dry weather and daily during rain events forecast to be equal to or greater than 10 mm / 24 hrs (as measured at the Ladysmith Secondary School weather station – data available at [www.victoriaweather.ca/station.php?id=177](http://www.victoriaweather.ca/station.php?id=177)).
- Water quality will be sampled for NTU and pH.
- NTU will be assessed by use of a calibrated (10 NTU or 100 NTU standard for calibration dependent on site conditions the day of sampling) digital turbidity meter capable of reading NTU to .01 NTU resolution.

- pH will be assessed by use of a calibrated (4, 7, and 10 pH buffer solutions) digital pH meter capable of reading pH to 0.1 pH units.
- Calibration standards and methods will be as per technical reference manuals supplied with the equipment.
- Proposed water quality sampling locations are presented in ESCP Figure 100 in Appendix A. Water quality samples will be collected from shore by means of a modified double check valve sampling bailer that can be slung out into the creek water to collect isolated, discrete water samples.
- Any discharge water from cast-in-place concrete work will be pH monitored using a hand-held pH meter calibrated using a standard three-point calibration with buffer solution (4, 7, and 10). If required, pH neutralization will be done using a CO<sub>2</sub> diffusion system.

#### **Water Quality Sampling Frequency**

- During dry weather scheduled environmental monitoring visits (weekly), water quality will be sampled by the EM once per site visit at each sampling location unless visual indicators are present that indicate water quality may be being impacted by the site. Additional water quality samples will be collected as required to delineate potential impacts over time.
- During wet weather environmental monitoring visits (greater than 10mm / 24 hrs water quality will be sampled approximately hourly at each sampling location for the duration of the site visit. This may be modified if the EM is busy attending to other elements of site management.

#### **Environmental Incident Reporting**

Environmental incidents will be reported to the EM immediately and an Environmental Incident Report generated within 24 hours that outlines the nature of the incident, magnitude of potential impact and remedial action taken / required. Copies of the Environmental Incident Report will be submitted to the proponent and from the proponent to the applicable regulatory agencies having jurisdiction.

Environmental incidents to be reported to the EM will include but not be limited to the following:

- Spills of petroleum hydrocarbons (see Appendix C – Spill Response Plan for further info).
- Releases of deleterious substances (including sediment) into Holland Creek.



**AMENDMENT TO THE APPROVED ENVIRONMENTAL  
REPORT AND RESTORATION  
OF THE  
PROPOSED DEVELOPMENT HOLLAND CREEK CROSSING  
DEVELOPMENT PERMIT AREA 6**

PREPARED FOR:

DEVELOPMENT SERVICES DEPARTMENT,  
TOWN OF LADY SMITH  
PO BOX 222  
LADY SMITH BC V9G 1A2

AND

661314 BC LTD. O/A LADYSMITH JV  
200, 5716 1<sup>ST</sup> STREET SE  
CALGARY, AB, T2H 1H8

CORVIDAE PROJECT #2020-064  
NOVEMBER 2020

**CORVIDAE**  
ENVIRONMENTAL CONSULTING INC.  
6526 WATER STREET, SOOKE, BC

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## **1 Introduction & Background**

This is an amendment to a previously approved DPA (approved in 2018) for the Holland Creek crossing at Calonia Drive, Ladysmith, BC. The Town of Ladysmith and the project team (661314 BC Ltd. o/a Ladysmith JV, Corvidae Environmental Consulting Inc., Heavy Metal Marine and McElhanney Engineering) had a planning meeting to confirm the requirements and any updates to this DPA amendment. All of those items are addressed in this document.

661314 BC Ltd. o/a Ladysmith JV (the proponent) is undertaking a road and arch culvert bridge construction project (the project) in Ladysmith, BC in order to provide access to a subdivision development. See Figure 1 for a snapshot of the plans and Appendix A for detailed drawings. The project is located within the Riparian Development Permit Area 6 (DPA-6) and Holland Creek Local Area Plan (HCLAP) as described within the City of Ladysmith Official Community Plan (OCP) Bylaw 1488.

The proponent has retained the services of a Qualified Environmental Professional (QEP) at Corvidae Environmental Consulting Inc. (Corvidae) to complete an environmental assessment of Holland Creek. The purpose of the assessment was to determine the potential environmental impacts from the proposed Project and address the Federal, Provincial and Municipal requirements for this property. As part of the assessment, a QEP assessed the riparian area of the creek, the canopy type, wildlife features, and substrate.

This assessment describes the nature and extent of the proposed work along Holland Creek's boarder during construction and crossing of the creek, as well as presents key biological and physical features existing within the area, including aquatic and riparian habitat. Corvidae has addressed the legislative requirements. Provided are the proposed plans for the project, Riparian Area Assessment details, and results to determine the environmental significance of the project on the riparian area at Holland Creek. Potential project impacts for the development and a summary of mitigation measures are provided in Section 6.

Detailed mitigation measures are provided in a Construction Environmental Management Plan (CEMP) and Erosion and Sediment Control Plan (ESCP) that have been prepared. Specific sediment and erosion control methods and contingency measures are provided in the CEMP. During construction, there will be an Environmental Monitor (EM) on site for work in sensitive areas. Potential risk areas of sediment and erosion will be identified by the EM, and will be protected prior to the start of construction and for the duration of the project.





Figure 1: Proposed crossing of Holland Creek



\*Detailed drawing provided in Appendix A.

\*\*Note: these are representative drawings, the final drawings will be provided prior to development, for the review by the Town of Ladysmith.



## 2 Regulatory Requirements

Prior to starting the proposed Project, the proponent is required to ensure that all applicable licenses, permits, and approvals have been secured in writing from the applicable regulatory authorities. The following Federal, Provincial and Municipal legislative requirements are required for the proposed Project are outlined in Table 1.

Table 1. Legislation and Proposed Permit Application Requirements

Legislation, Regulations and Other Requirements	Proposed Permit Application Requirements
<b>Federal</b>	
<i>Fisheries and Oceans Canada (DFO), Fisheries Act – Self-Assessment</i>	<p>No instream works or disturbance of aquatic habitat is expected for this proposed project scope of work. Arch culvert works will be outside of the wetted area of the stream.</p> <p>Preparation of this assessment was carried out as per the requirements for the DFO's Self-Assessment for Projects near Water review criteria (<a href="http://www.dfo-mpo.gc.ca/pnw-ppel/index-eng.html">http://www.dfo-mpo.gc.ca/pnw-ppel/index-eng.html</a>). Corvidae has conducted a self-assessment of the potential for "serious harm<sup>1</sup>" based on the DFO Projects near Water website.</p>
<b>Provincial</b>	
<i>Water Sustainability Act - Section 11, Updated October 15, 2020</i>	<p>As part of this Notification, a Section 11 Application is being submitted to the provincial government. The Section 11 is part of the BC Water Sustainability Act (Government of British Columbia. Water Sustainability Act. Updated October 15, 2020. Section 11 – Changes in and About a Stream).</p> <p><a href="https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-licences-approvals/apply-for-a-change-approval-or-submit-notification-of-instream-work">https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-licences-approvals/apply-for-a-change-approval-or-submit-notification-of-instream-work</a></p> <p>The Section 11 includes a copy of this report and the CEMP/ESCP.</p>
<b>Municipal (Local)</b>	
<i>City of Ladysmith Official Community Plan (OCP) Bylaw 1488.</i>	<p>This project exists within a Riparian Development Permit Area (DPA-6). The permit must be obtained prior to start of project construction activities; Corvidae has submitted an Environmental Report for the permit application under separate cover.</p>

<sup>1</sup> Serious harm is death of fish or permanent alteration or destruction of fish habitat





### **3 Site Description**

The proposed project site location is Holland Creek, from the west end of Colonia Drive to the east side of Holland Creek, within the Town of Ladysmith and the Cowichan Valley Regional District (CVRD). The watershed code #920-321500 and the waterbody id is 306824. Holland Creek is a stream that contains anadromous fish<sup>1</sup> which originates on northern and eastern slopes of the Vancouver Island Mountains (Coronation Mountain). The stream flows north and east about 12 km before entering Ladysmith. The proponent has proposed a road and arch culvert construction project over Holland Creek to provide access to a subdivision development of 38 residential (R-1) lots at Lot 5, Block 1399, Oyster District, Plan VIP75559. The proposed project would extend from the west end Colonia Drive to the east, connecting the new subdivision development to the existing roadway infrastructure by means of an engineered arch culvert bridge (the bridge) (Figure 1).

#### **3.1 Project Footprint**

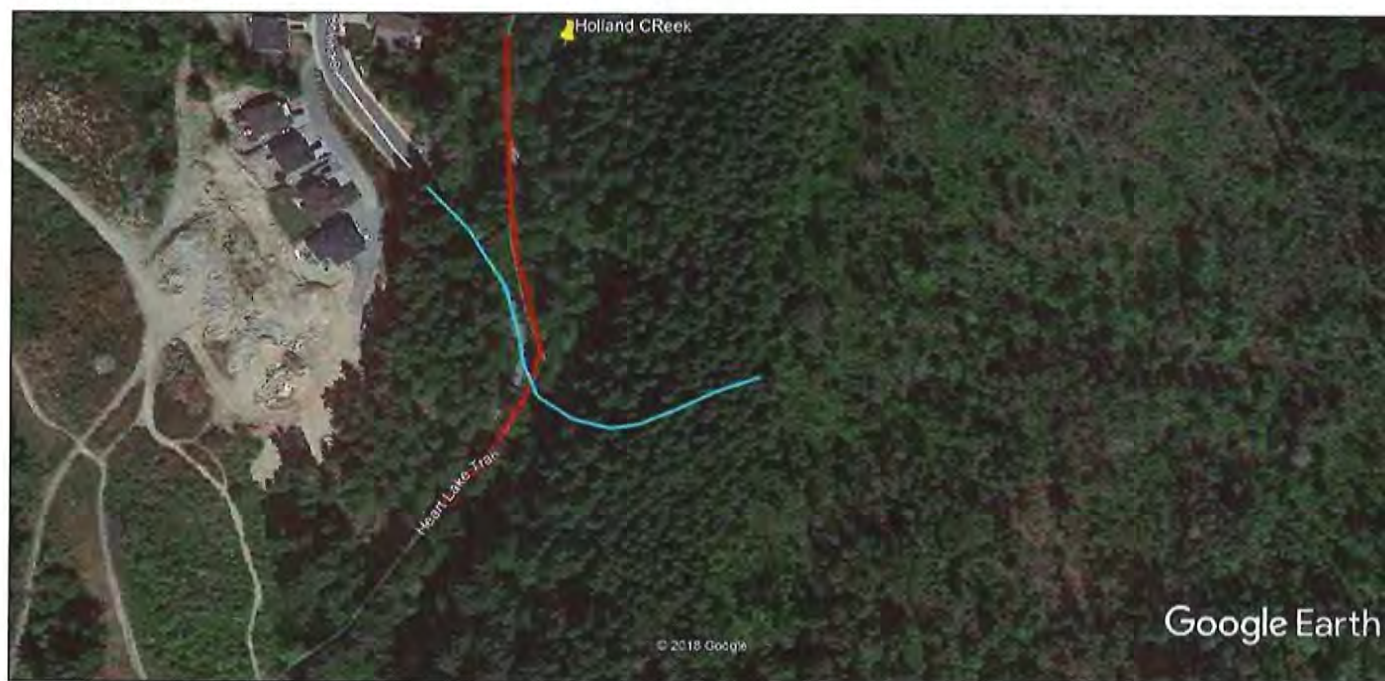
The proposed bridge design will meet the Canadian Highway Bridge Design Code and will support all municipal infrastructure to connect the proposed development area and the existing trail connections in the Holland Creek Corridor. The Proponent will consult with the Town of Ladysmith Engineering Department in the development of the bridge design and layout. The proposed bridge crossing is 19.14 meters wide. The bridge will be designed to accommodate pedestrian accessibility, cyclist traffic, and situated to accommodate existing trail connections in the Holland Creek Corridor. Figure 2 shows the proposed development footprint.

---

<sup>1</sup> Anadromous fish initiate their life in freshwater, but then depart to spend a portion of their life rearing in the ocean prior to returning back to freshwater as sexually mature adults to spawn (MOE 1998).



Figure 2. Proposed Holland Creek Crossing - existing gravel path in red, the proposed road & bridge is light blue



## 4 Methods

### 4.1 Background Review

Corvidae conducted a desktop review of existing information to characterize the aquatic resources and potential presence of species of special conservation status in the proposed Project area. Baseline biophysical conditions were compiled by reviewing the best available data and information including existing reports for the area and conducting searches of online provincial and federal databases. The desktop review was based on the following resources:

- ✈ BC Conservation Data Centre (BC CDC 2018b)
- ✈ BC Habitat Wizard (Province of BC 2018a)
- ✈ BC Species Ecosystem Explorers (Province of BC 2018)
- ✈ Fish Inventory Data Query (Province of BC 2018b)
- ✈ BC Sensitive Habitat Inventory Mapping (SHIM) database
- ✈ Ortho-imagery and aerial photographs of the property (Google Earth 2018)
- ✈ CVRD mapping system and databases (CVRD 2018)
- ✈ Fisheries and Oceans Canada (DFO), Fisheries Act – Self-Assessment
- ✈ Water Sustainability Act - Section 11, Updated June 20, 2018
- ✈ Local Government Act, Section 919.1(1)(a) and Section 872 - Development Permit Area 6 – Riparian
- ✈ Bylaw No. 1488 – Adopt an Updated OCP for the Town of Ladysmith





Corvidae completed a DFO Self-Assessment to determine potential for serious harm under the *Fisheries Act*. According to DFO's Projects Near Water review criteria, the proposed works are captured within the following activities that meet the criteria where DFO review is not required (DFO 2015a):

- ✎ Construction of clear-span bridges with no new temporary or permanent fill placed below the high water mark and no obstruction to fish passage with respect to their timing windows. The arch culvert bridge meets the definition of clear-span bridge for this criteria.

No instream works or disturbance of aquatic habitat is expected for this proposed project scope of work. All works will be outside of the wetted area of the stream. Work will be completed in the winter, which is not in the fisheries timing window. However, there will be no instream work and environmental protections in place to ensure no impacts to the fish habitat.

## 4.2 Field Assessment

The biophysical assessment was conducted by a QEP with several site visits in 2018, and again in 2020. The biophysical assessment included the characterization of habitat types, wildlife habitat and species observations, natural features and drainage, vegetation, the riparian area, and the identification of the Streamside Protection and Enhancement Area (SPEA).

## 5 Baseline Environment

The proposed Project is located in a regenerated mix coniferous and deciduous Coastal Douglas Fir forest. Access to the Site for the bridge crossing can be gained via Colonia Drive and Dogwood Drive access points. The proposed Holland Creek Bridge will not be located in a manner that creates significant potential for sediment release to Holland Creek. Access points may need to be stabilized with rock during wet weather or as site conditions change.

### 5.1 Climate and Biogeoclimatic Zone

The property is in the Coastal Douglas Fir, Moist Maritime (CDF mm) Biogeoclimatic (BEC) zone (CDC 2018). It is a unique habitat that occurs on the central and southeastern section of Vancouver Island. The average rainfall is 1155 mm/annually (<https://en.climate-data.org/location/10445/>). The elevation of the proposed Project is 102 m above sea level (Google Earth June 29, 2018).

### 5.2 SPEA

The riparian assessment followed the "Legislated Riparian Assessments in BC APEGBC/ABC FP/CAB Professional Practice Guidelines" (2017) and the Riparian Areas Regulation Assessment Methods (Government of British Columbia 2019). During the field assessment transects were taken every 6 m along the entire reach at, above and below the bridge footprint. Table 2 provides the stream widths and features to calculate the Stream Protection Enhancement Area (SPEA). Figure 3 shows the 30 m riparian area and the SPEA buffer. Following the Riparian Area Assessment methods, from the numbers from Table 2, the SPEA is calculated at 20 m.





Table 2. Stream Protection Enhancement Area Measurements

<b>Reach 1 – Downstream of centre line, gradient is 3%</b>					
<b>Transect</b>	<b>Distance from Centre line</b>	<b>Vegetation</b>	<b>Stream Width (m)</b>	<b>Stream Depth (cm) (average)</b>	<b>Substrate (rock, soil, soil type)</b>
<b>Transect 1</b>	30 m	20% coniferous, 30% deciduous	5.5	51	70% boulder, 20% cobble, 5% gravel, 5% sand, 0% bedrock
<b>Transect 2</b>	24 m	10%coniferous, 60% deciduous	5.48	72	80 B, 10 C, 5 G, 5 S
<b>Transect 3</b>	18 m	20% coniferous, 45% deciduous	7.27	62	60 B, 15 C, 15 G, 10 S
<b>Transect 4</b>	12 m	10% coniferous, 50% deciduous	6.58	46	60 B, 15 C, 15 G, 10 S
<b>Transect 5</b>	6 m	5% coniferous, 70% deciduous	8.93	52	80 B, 10 C, 5 G, 5 S
<b>Transect 6</b>	0 m	0% coniferous, 60% deciduous	7.5	60	50 B, 35 C, 0 G, 5 S
<b>Reach 2 – Upstream of centre line, gradient is 6%</b>					
<b>Transect 7</b>	6 m	10% coniferous, 40% deciduous	3.65	72	50 B, 35 C, 10 G, 5 S
<b>Transect 8</b>	12 m	20% coniferous, 40% deciduous	8.37	38	80 B, 5 C, 2.5 G, 2.5 S, 10 Br
<b>Transect 9</b>	18 m	10% coniferous, 30% deciduous	7.3	105	70 B, 5 C, 5 G, 5 S, 15 Br
<b>Transect 10</b>	24 m	25% coniferous, 40% deciduous	1.98	40	50 B, 15 C, 10 G, 10 S, 15 Br
<b>Transect 11</b>	30 m	20% coniferous, 20% deciduous	3.1	32	20 B, 15 C, 20 G, 5 S, 40 Br





## 5.3 Vegetation

### 5.3.1 Desktop Assessment for Vegetation Species at Risk

An on-line search of the two-kilometer radius search of the property was conducted using the British Columbia Conservation Data Centre's (CDC) iMap and BC Species and Ecosystems Explorer. This search resulted with a mapped occurrence of the Grand Fir / Dull Oregon Grape habitat type, outlined in Table 3. The Grand Fir / Dull Oregon-Grape habitat is found in Stanton Peak, on the northeast slopes of Ladysmith and lower slopes of Mount Stanton. The BEC zone and unit is CDFmm, CWH xm1. That ecological community occupies 32.37 ha and is based on Terrestrial Ecosystem Mapping.

In addition, a search of the potential at risk species in the area was conducted with the CDC tool, resulting in 10 species. These species are available in Appendix C, however none of these species were found in the proposed project area.

Table 3. Vegetation Community Listed, 2 kilometer radius search of the property for Holland Creek, Ladysmith, BC (CDC 2018).

English Name	Scientific Name	Shape ID	BC List	COSEWIC Status	SARA Schedule
Grand Fir / Dull Oregon Grape	<i>Abies grandis</i> / <i>Berberis nervosa</i>	107893	Red	NA	NA

**Provincial Status: Red:** Includes any indigenous species or subspecies that have, or are candidates for, Extirpated, Endangered, or Threatened status in British Columbia. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed. Not all Red-listed taxa will necessarily become formally designated. Placing taxa on these lists flags them as being at risk and requiring investigation. **Blue:** Includes any indigenous species or subspecies considered to be of Special Concern (formerly Vulnerable) in British Columbia. Taxa of Special Concern have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened. **Yellow:** Includes species that are apparently secure and not at risk of extinction. Yellow-listed species may have red- or blue-listed subspecies.

**COSEWIC Status: SC = SPECIAL CONCERN:** A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events. **NA = NOT ASSESSED.**

**SARA Status:** The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either extirpated, endangered, threatened, or a special concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

### 5.3.2 Vegetation Documented during Biophysical Assessment

During the site visit, the QEP did not observe rare or endangered plant species.

The property is forested mainly with coniferous species, Douglas-fir (*Pseudotsuga menziesii*) and Western Red Cedar (*Thuja plicata*), and deciduous species Red Alder (*Alnus rubra*) and Big Leaf Maple (*Acer macrophyllum*). From the site assessment, it was determined that the property consists of native species. Weeds and non-invasive species were not observed during the site visit.



During the site visit, the vegetation species were documented (Table 2). See Appendix B for photo documentation of vegetation.

Table 4. Native plant species observed during the site visit at Holland Creek, Ladysmith, BC.

Scientific Name	Common Name
<b>Tree Layer</b>	
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Acer macrophyllum</i>	Big leaf maple
<i>Alnus rubra</i>	Red alder
<i>Abies grandis</i>	Grand fir
<i>Thuja plicata</i>	Western red cedar
<b>Shrub Layer</b>	
<i>Mahonia nervosa</i>	Dull Oregon-grape
<i>Holodiscus discolor</i>	Ocean spray
<i>Gaultheria shallon</i>	Salal
<i>Rubus spectabilis</i>	Salmon berry
<b>Herb Layer</b>	
<i>Maianthemum dilatatum</i>	False lily-of-the-valley
<i>Aruncus dioicus</i>	Goat's beard
<i>Tiarella trifoliata</i>	Three-leaved foamflower
<i>Pteridium aquilinum</i> (L.)	Bracken fern
<i>Adiantum</i>	Maidenhair fern
<i>Polystichum munitum</i>	Sword fern
<b>Lichen and Moss Layer</b>	
<i>Cladonia</i> spp.	Lichen
<i>Sphagnum</i> spp.	Sphagnum moss
<i>Hylocomium splendens</i>	Step moss

## 5.4 Wildlife

The riparian environment provides habitat for birds, mammals, amphibians and invertebrates. The terrestrial ecosystem can provide habitat for black-tailed deer (*Odocoileus hemionus columbianus*), black bear (*Ursus americanus*) and cougar (*Puma concolor*). Many bird species will spend the winter months in this area due to the mild climate.





### 5.4.1 Desktop Assessment for Wildlife Species At Risk

A two-kilometer radius search of the property was conducted using the CDC tool and determined that one Blue Listed species (Table 4) was found within two kilometers of the project area. Appendix D provides a list of Species at Risk that have potential to occur. None of the species in Appendix D were detected during the biophysical assessment.

Table 5. Wildlife Listed, 2-kilometer radius search of the property Holland Creek, Ladysmith, BC (CDC 2018).

English Name	Scientific Name	Shape ID	BC List	COSEWIC Status	SARA Schedule
Great Blue Heron, fannini subspecies	<i>Andrea Herodias fannini</i>	102734	Blue	SC (Mar 2008)	1

**Provincial Status: Red:** Includes any indigenous species or subspecies that have, or are candidates for, Extirpated, Endangered, or Threatened status in British Columbia. Extirpated taxa no longer exist in the wild in British Columbia but do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed. Not all Red-listed taxa will necessarily become formally designated. Placing taxa on these lists flags them as being at risk and requiring investigation. **Blue:** Includes any indigenous species or subspecies considered to be of Special Concern (formerly Vulnerable) in British Columbia. Taxa of Special Concern have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened.

**COSEWIC Status: E = ENDANGERED:** A species facing imminent extirpation or extinction. **T = THREATENED:** A species that is likely to become endangered if limiting factors are not reversed. **SC = SPECIAL CONCERN:** A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events. **SARA Status T = THREATENED:** A species that is likely to become endangered if limiting factors are not reversed. **SC = SPECIAL CONCERN:** A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events. **NA = NOT ASSESSED.**

### 5.4.2 Wildlife Documented during Biophysical Assessment

During the site assessment no species at risk or threatened were observed. Nesting habitat, raptor nests and evidence of heron colonies were not observed during the site visit on the property. During the time of the site assessment, the QEP observed one wildlife tree with cavity nesting attributes. The tree is located upstream of the bridge crossing, close to the streams edge, outside of the project footprint. See Appendix B for a photo of the wildlife tree.

A migratory bird survey is recommended prior to any clearing if work is to be completed within the migratory bird window (i.e. prior to August 15<sup>th</sup>).

## 5.5 Fisheries

A rare and endangered aquatic species search was conducted using the Fish Inventory Data Query and CDC tool for fish species within the proposed Project area. A list of these species and their status with the proposed Project are outlined in Table 6.



Table 6. Summary of Listed-Species Potentially Occurring in the Project Area (CDC 2018, MOE 2018)

English Name	Scientific Name	Shape ID	BC List	COSEWIC Status	SARA Schedule
Chum salmon	<i>Oncorhynchus keta</i>	NA	Yellow	NA	NA
Coho salmon	<i>Oncorhynchus kisutch</i>	NA	Yellow	NA	NA
Pink salmon	<i>Oncorhynchus gorbuscha</i>	NA	Yellow	NA	NA
Rainbow Trout (Steelhead)	<i>Oncorhynchus mykiss</i>	NA	Yellow	NA	NA
Cutthroat trout (anadromous and resident)	<i>Oncorhynchus clarkii</i>	NA	No status	NA	NA
Coastal Cutthroat trout	<i>Oncorhynchus clarkii clarkii</i>	NA	Blue	NA	NA





## **6 Potential Impacts and Mitigations**

Impacts from the project will be loss of vegetation, soil and rocky sections along Holland Creek. This includes a loss of riparian wildlife habitat and cleared trees. There will be potential for the introduction of invasive plant species in the cleared areas. Prior to project completion and reclamation, there will be exposed soils with potential for erosion into the creek. For that reason, the prescriptive and detailed CEMP and ESCP for the project have been completed by Corvidae. These reports have been provided with this submission package and should be referenced for all planned environmental protection measures for the project. The proponent will be following the CEMP and EPP for the project. The vegetation and wildlife measures below are included in the CEMP and EPP, iterated here as a short summary.

### **6.1 Vegetation Management and Invasive Species Control**

The following measures will be put in place to protect the vegetation to remain and the site ecosystem:

- ✎ Limit habitat loss and disturbance to the project footprint only (clearly marked).
- ✎ Ensure all equipment entering the site is clean of debris to prevent importing seeds from invasive species.
- ✎ Stage construction vehicles on previously disturbed, non-vegetated areas where practical.
- ✎ For control of invasive species, cover stored topsoil with tarps and plant high densities of native vegetation in all bare areas as soon as the area has been cleared of construction.
- ✎ For topsoil for landscaping, use weed free topsoil from a local supplier (see Section 7 for details).

### **6.2 Wildlife Management**

Potential concerns regarding wildlife and wildlife habitat are loss of habitat, harm or death to wildlife, and noise disturbances.

Mitigation measures to protect and minimize disturbance to wildlife and their habitat include:

- ✎ Retain habitat that provides shelter for wildlife such as standing dead trees.
- ✎ Limit habitat loss and disturbance to the project footprint. Flag these areas to clearly delineate the boundary.
- ✎ Limit clearing as much as possible, and stage construction vehicles on previously disturbed, non-vegetated areas.
- ✎ Undertake all vegetation clearing outside the bird migratory season (March 15 to August 31). If this is not possible, a QEP must conduct preconstruction surveys to identify any nests or breeding bird activity within the project footprint and recommend appropriate protection measures. If any nests are found, recommendations will likely be made to stop construction until the nestlings have fledged.





## 7 Restoration Plan

This restoration plan provides:

- ✎ The total area to be landscaped (planted/seeded) separated out into area embankment fills and cleared area not covered by road structure.
- ✎ Restoration details for topsoil placement (depth and source).
- ✎ Details on species composition and densities for the landscaping in the project area.

### 7.1 Total Area for Restoration

The total area of disturbance is 21 meters x 225 meters, totaling 0.4725 ha. The area of disturbance has been separated out into area types listed in Table 7. Table 7 also provides the restoration planting group and topsoil application depths. Table 8 has details on planting prescriptions – species and densities per area.

### 7.2 Topsoil Application

Total topsoil volumes will be 15 m<sup>3</sup> for the areas outside of the paved areas. The 15 m<sup>3</sup> will be from the transplanted soil that has been removed from the project footprint and stored during construction.

### 7.3 Planting Prescriptions

Table 7. Project Areas and Reclamation Prescriptions per Area

Area	Total Area to Revegetate	Surface	Topsoil Application
Road	n/a	asphalt	n/a
Embankment and disturbed areas to be vegetated	100 m <sup>2</sup>	Soil	15 cm

The natural landscape understory is dominated by salal, sword fern and salmonberry. Salal can be propagated from berries; the sword fern from rhizomes and spores; and the thimble berry and salmon-berry berries. These will be used for propagation on the MSE wall and the areas to be vegetated outside of the sidewalk and paved surfaces. No large bush or trees can be planted in the MSE due to the importance of its structural integrity. In addition, a pioneer, nitrogen-fixing clover will be added to the soil medium to hold the space while native plants propagate and become established. The clover will be a native annual, so will cover the bare soil for a year, or two, as the native species start to grow. The recommended clover is *Trifolium wildenowii* (tomcat clover). It is a native annual that favors mesic sites.



Table 8. Restoration recommendations for areas to be reclaimed

Common Name	Scientific Name	Type	Quantity
Sword fern	<i>Polystichum munitum</i>	rhizome	500
Foam flower	<i>Tiarella trifoliata</i>	bulb	100
Salal	<i>Gaultheria shallon</i>	berry	500
False lily-of-the-valley	<i>Maianthemum dilatatum</i>	bulb	100
Licorice fern	<i>Polypodium glycyrrhiza</i>	rhizome	500
Tomcat clover	<i>Trifolium wildenowii</i>	seed	5 kg/area
Goat's beard	<i>Aruncus dioicus</i>	Natural regeneration	N/A
Swordfern	<i>Polystichum munitum</i>	transplant	50
Dull Oregon-grape	<i>Mahonia nervosa</i>	transplant	30
Tomcat clover	<i>Trifolium wildenowii</i>	seed	1 kg/area
Bracken fern	<i>Pteridium aquilinum</i> (L.)	rhizome	50



## 8 Conclusion

No instream works or disturbance of aquatic habitat is expected for this proposed project scope of work. The work will be outside of the allowable fisheries window, however this is allowable due to no instream work. The provincial Section 11 Notification has been accepted by the provincial government for works to proceed with the protection measures identified in this report, and associated documents. Culvert installation works will be outside of the wetted area of the stream. In addition to this document, a CEMP has been prepared and the environmental protection measures in that document will be followed. There will be an Environmental Monitor on site during any work within sensitive areas to make sure the environmental protection measures are followed.

Best regards,



Julie Budgen, R.P.Biol., B.Sc., PDC  
QEP, Environmental Planner  
Corvidae Environmental Consulting Inc.  
6526 Water St, Sooke, BC, V9Z 0X1  
250-415-8553





## 9 References

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## **Appendix A: Site Plans**





CLIENT

1399 Developments Inc.

ADDRESS / CONTACT INFO.

960 Aspen Road  
Malahat, BC,  
V0R 2L0

PROJECT NAME

HOLLAND CREEK CROSSING

DESCRIPTION

CIVIL DESIGN AND CONSTRUCTION  
OF CREEK CROSSING

McELHANNEY PROJECT

2243-16-028

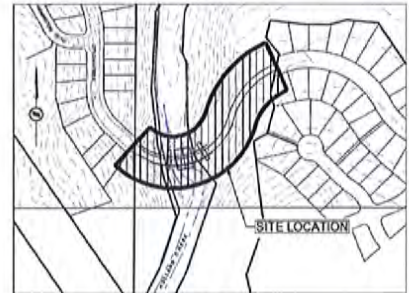
STATUS

ISSUED FOR APPROVAL

DRAWING LIST		REVISIONS			
SHEET #	NAME	PL	ME	SE	NO
100	COVER SHEET	X	X	X	X
101	PLAN PROFILE STA 1+00 TO 1+100				X
102	PLAN PROFILE STA 1+100 TO 1+200	X	X	X	X
103	PLAN PROFILE STA 1+200 TO 1+300	X	X	X	X
104	PROFILE AT INTERSECTION OF ROAD WALKS				X
301	TYPICAL DETAILS	X	X	X	X
302	TRUCK DETAIL	X	X	X	X
401	CROSS SECTION OF J	X	X	X	X
402	CROSS SECTION OF J	X	X	X	X



Suite 500  
3160 Quadra Street  
Victoria BC  
Canada V8X 4A3  
Tel 250 370 9221



KEY PLAN  
NOT TO SCALE

#### GENERAL NOTES

1. ALL WORK AND MATERIALS ARE TO THE TOWN OF LANSDOWNE STANDARDS UNLESS NOTED OTHERWISE ON CONSTRUCTION DRAWINGS OR AS OTHERWISE APPROVED BY THE MUNICIPALITY.
2. CONTRACTOR TO CONSIDER LOCATION AND ELEVATION OF EXISTING UTILITIES AT ALL DEPTHS AND CONSIDER TOWN POWER AND CEMETARY DEVIATIONS WITH THE ENGINEER PRIOR TO CONSTRUCTION. LOCATION OF EXISTING UTILITIES IS GENERAL APPROXIMATE ONLY. ALL EXISTING UTILITIES AND DEVIATIONS ARE NOT TO BE EXCAVATED, DELETED AND REINSTALLED TO THE CONSTRUCTION OF THE PROJECT. ANY DAMAGE OR REPAIR TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. ALL REVISIONS TO THESE DRAWINGS MUST BE APPROVED BY THE MUNICIPALITY. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE TOWN OF LANSDOWNE.
4. APPROVED IS TO BE NOTED PRIOR TO THE START OF CONSTRUCTION AND CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND SUBMITTING PROOF OF REGISTRATION TO THE CONSTRUCTION AUTHORITY.
5. CONSTRUCTION SHALL NOT BE UNDERTAKEN PRIOR TO THE APPROVAL OF THESE DRAWINGS BY TOWN OF LANSDOWNE AND BEFORE FOR CONSTRUCTION DAMAGE HAS BEEN COVERED BY INSURANCE TO THE TOWN.
6. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR THE REPAIR OF ANY DAMAGE CAUSED TO EXISTING ROADS OR SERVICES BY CONSTRUCTION EQUIPMENT AND/OR MATERIALS AND MATERIALS TO THE SITE. THIS WILL INCLUDE ALL CLEANING AND REPAIRS TO EXISTING ROADS OR SERVICES CAUSED BY CONSTRUCTION ACTIVITY.
7. TRUCKS ARE TO BE USED WHEN CARRYING TRUCKS EQUIPMENT ON ALL PAVED AREAS, WITH THE EXCEPTION OF AREAS DESIGNATED FOR RE-PAVEMENT.
8. TRAFFIC CONTROL IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL COMPLY WITH SECTION 10 OF THE REGULATION, HEALTH AND SAFETY REGULATIONS OF THE MUNICIPALITY. THE CONTRACTOR IS TO FOLLOW THE CURRENT T.O. TRAFFIC CONTROL MANUAL FOR WORK ON HIGHWAYS AS REQUIRED BY THE MUNICIPALITY OF TRANSPORTATION & INFRASTRUCTURE (2015).
9. EXIST. SURVEY POINT MARKERS ARE TO BE REPLACED IF DESTROYED OR DAMAGED DURING CONSTRUCTION. THIS WORK IS TO BE UNDERTAKEN BY A S.E. LAND SURVEYOR AT CONTRACTOR'S EXPENSE.
10. PROPOSED DIMENSIONS SHALL GOVERN OVER SCALED DIMENSIONS.
11. CONTRACTOR TO MAINTAIN AN UP-TO-DATE SET OF FIELDING COORDINATES FOR THE PROTECTION OF ALL CONSTRUCTED DIMENSIONS. THE RESPONSE ARE TO BE DELIVERED TO THE MUNICIPALITY PRIOR TO ANY REVISIONS. ALL DATA REQUIRED AT ANY ADJUSTMENT TO THE DIMENSIONS TO PREPARE THE REVISIONS SHALL BE SUBMITTED TO THE MUNICIPALITY PRIOR TO ANY REVISIONS. THE CONTRACTOR IS TO FOLLOW THE CURRENT T.O. TRAFFIC CONTROL MANUAL FOR WORK ON HIGHWAYS AS REQUIRED BY THE MUNICIPALITY OF TRANSPORTATION & INFRASTRUCTURE (2015).
12. EXIST. NOT DIMENSIONS: ANY EXISTING OPERATIONAL WORKS HAVE BEEN PROVIDED BY McELHANNEY CONSULTING ENGINEER.
13. CONTRACTOR TO PROVIDE AN ENVIRONMENTAL PROTECTION MANAGEMENT PLAN TO BE APPROVED BY TOWN OF LANSDOWNE PRIOR TO THE START OF CONSTRUCTION. THE ENVIRONMENTAL CONSULTANT SHALL ADVISE A MINIMUM OF 30 DAYS BEFORE COMMENCING CONSTRUCTION, WHICH SHALL PROVIDE OTHERS AND PROVIDERS AT A MINIMUM OF THE FOLLOWING:
  - 13.1. DISPOSAL OF WASTE
  - 13.2. DISPOSAL OF FRESH WATER
  - 13.3. EROSION AND SEDIMENT CONTROL
  - 13.4. CLOSING OFF EXISTING, EXISTING AND NEW OF WELLS
  - 13.5. DRAINAGE, TREATMENT AND DISPOSAL OF DEWATERING, BE ACCORDANCE WITH REGULATORY AGENCY REQUIREMENTS
14. NO WORK IS TO BE CONDUCTED IN THE TOWN OF LANSDOWNE WITHOUT A PERMIT.
15. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION SAFETY, HEALTH, METHOD, TECHNIQUES, REQUIREMENTS AND PROCEDURES FOR CONSTRUCTION OF THE VERTICAL PARTS OF THE WORK IN THIS DIVISION.
16. PERMITS/INSTRUMENTS AT TIME OF APPROVAL THIS DRAWING SET.

#### SIGNING AND PAVEMENT MARKINGS

1. ALL SIGNAGE AND PAVEMENT MARKINGS SHALL BE AS PER THE MANUAL OF STANDARDIZED CONSTRUCTION FOR CANADA. CONTRACTOR TO REFERENCE MANUAL OF STANDARDIZED CONSTRUCTION AND PAVEMENT MARKINGS (SEPTEMBER 2005) FOR SIGNAGE AND PAVEMENT MARKINGS. ALL SIGNS TO HAVE "CLASSIC QUALITY" PROTECTION. SIGNATURES.
2. PAVEMENT MARKING MATERIALS AND CONSTRUCTION TO BE IN ACCORDANCE WITH SECTION 10 OF 20. PAVED PAVEMENT MARKINGS.

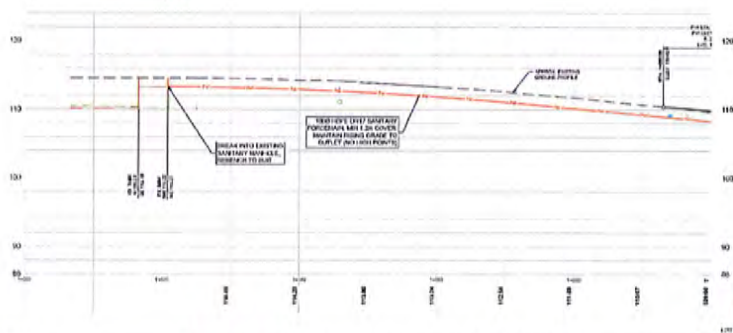
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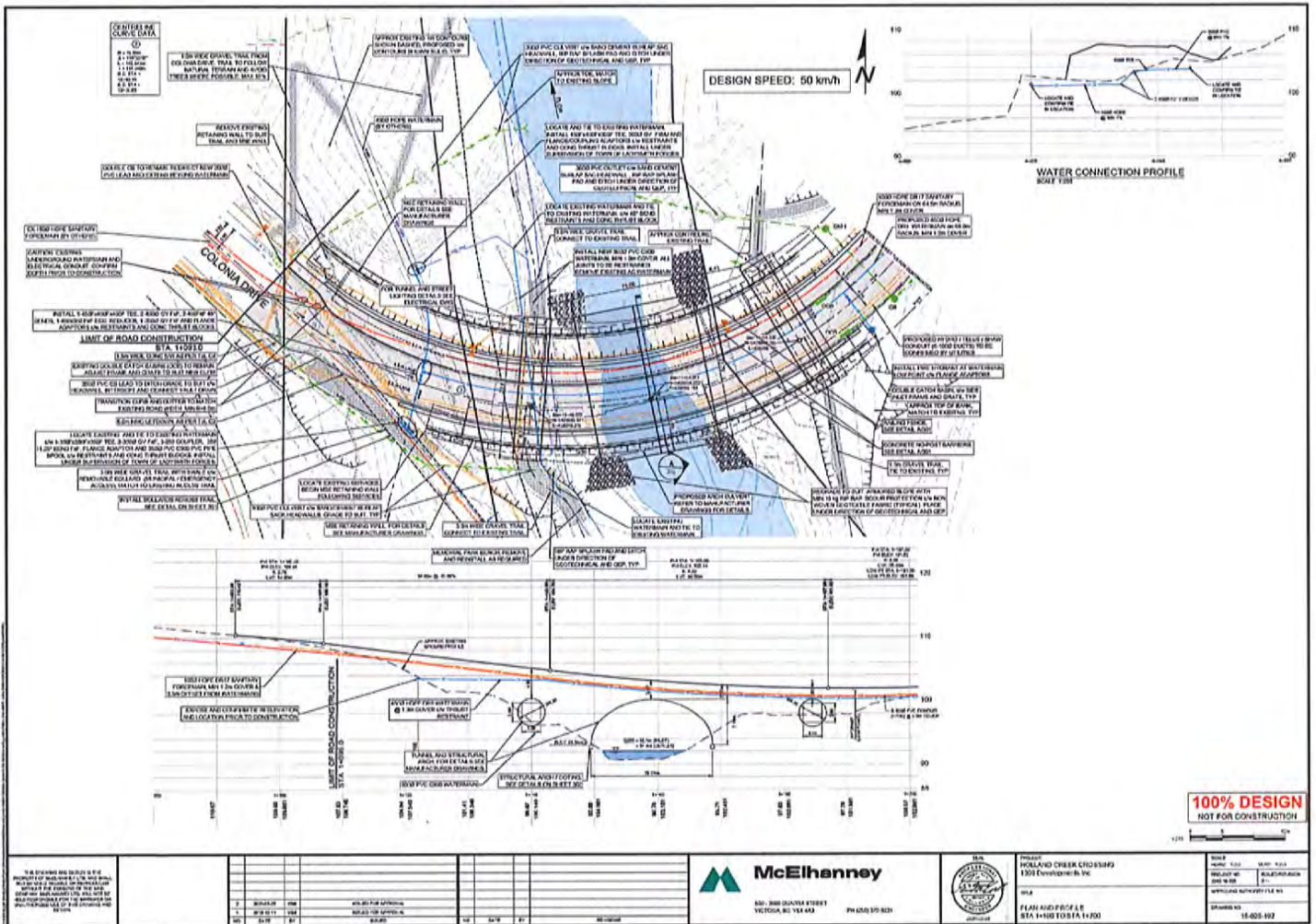
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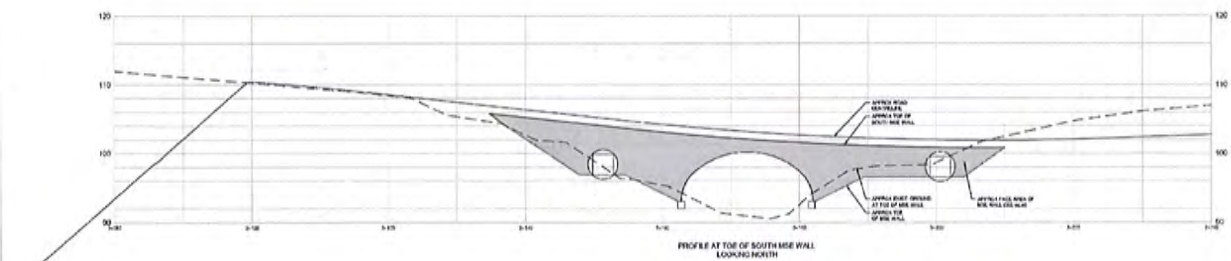
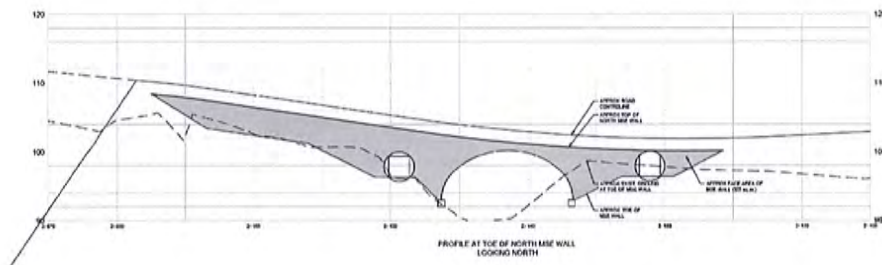
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TO: <b>McElhanney</b> 10000 McElhanney Blvd. Suite 100 Dallas, TX 75243 Tel: (214) 343-1111 Fax: (214) 343-1112 E-Mail: <a href="mailto:info@mcclhanney.com">info@mcclhanney.com</a>	<b>McElhanney</b> 10000 McElhanney Blvd. Suite 100 Dallas, TX 75243 Tel: (214) 343-1111 Fax: (214) 343-1112 E-Mail: <a href="mailto:info@mcclhanney.com">info@mcclhanney.com</a>	<b>STATE OF TEXAS</b> Department of Transportation Texas Department of Transportation 12000 North Loop West Suite 100 Dallas, TX 75243 Tel: (214) 343-1111 Fax: (214) 343-1112 E-Mail: <a href="mailto:info@mcclhanney.com">info@mcclhanney.com</a>	<b>PROJECT:</b> McElhanney Creek Crossing 10000 McElhanney Blvd. Suite 100 Dallas, TX 75243 Tel: (214) 343-1111 Fax: (214) 343-1112 E-Mail: <a href="mailto:info@mcclhanney.com">info@mcclhanney.com</a>
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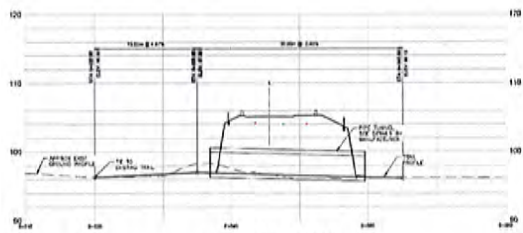
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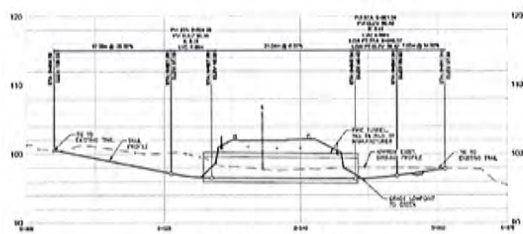
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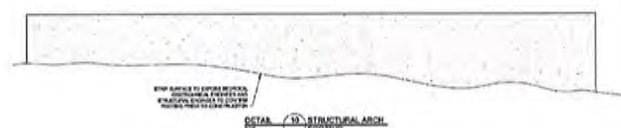




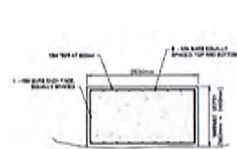
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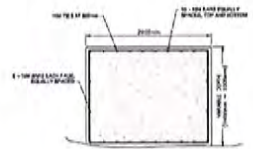
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DETAIL 10 STRUCTURAL ARCH  
FOOTING

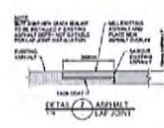


SECTION A STRUCTURAL ARCH FOOTING  
10' WIDE x 10' DEEP



SECTION B STRUCTURAL ARCH FOOTING  
10' WIDE x 10' DEEP

- GENERAL NOTES**
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**McElhanney**

1001 SOUTH GARDNER STREET  
HOUSTON, TEXAS 77058  
PH 713.865.1000



**PROJECT**  
HOLLAND CREEK CROSSING  
1500 Development Rd. E.  
HOLLAND, TEXAS 77330

**DATE**  
10/1/2010

**BY**  
J. L. HARRIS

**CHECKED BY**  
J. L. HARRIS

**APPROVED BY**  
J. L. HARRIS

**SCALE**  
1" = 10'

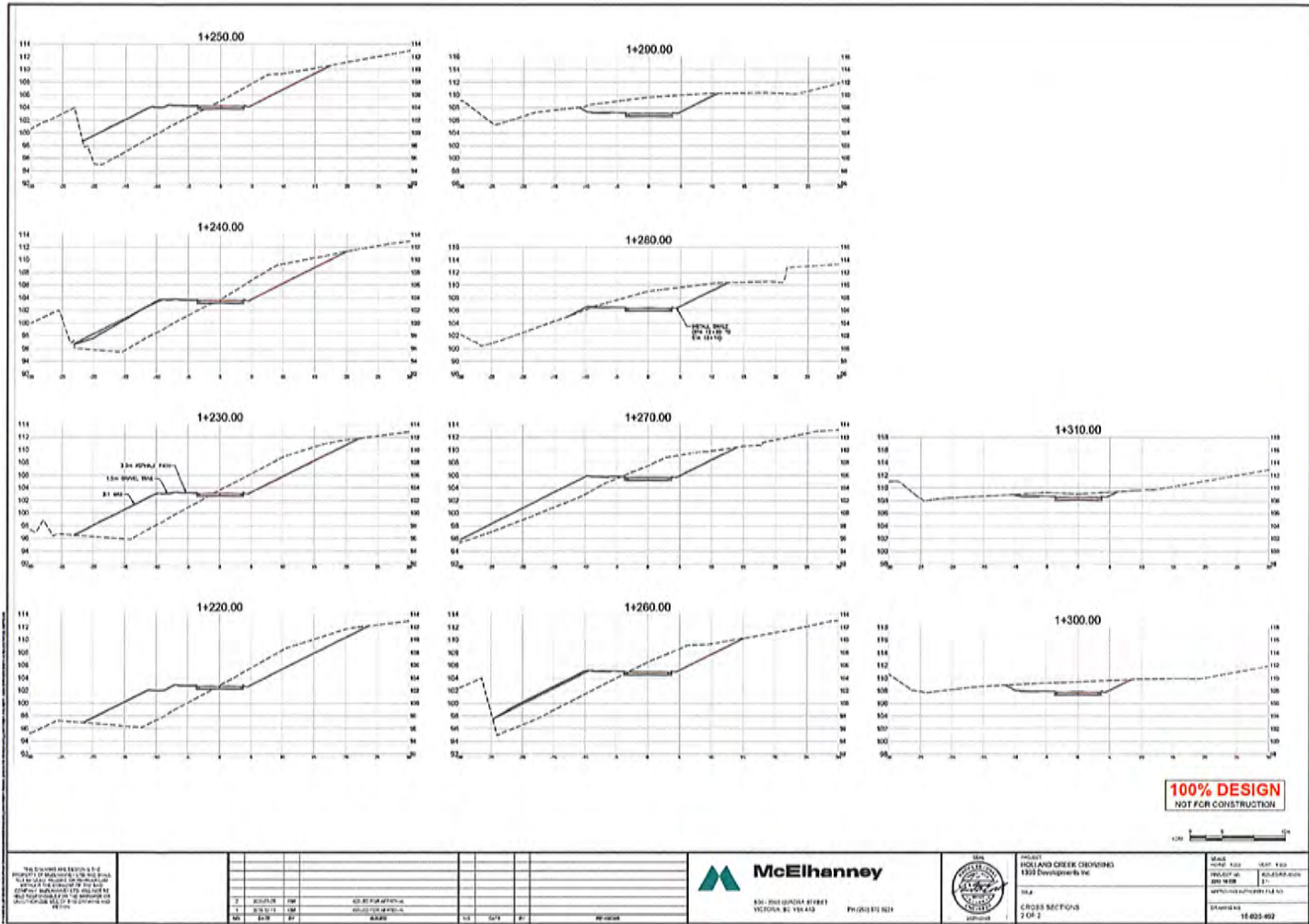
**DATE**  
10/1/2010

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## Appendix B: Site Photographs

Photo 1a. Looking east down the proposed roadway from the east end of Colonia Drive.



Photo 1b. Looking east down the proposed roadway from the east end of Colonia Drive. Note large slope gradient off left hand shoulder of existing road.



Photo 1c. View to west up Colonia Drive (red) from location of pedestrian pipe.



Photo 1d. Stream morphology and substrate expression at crossing location.





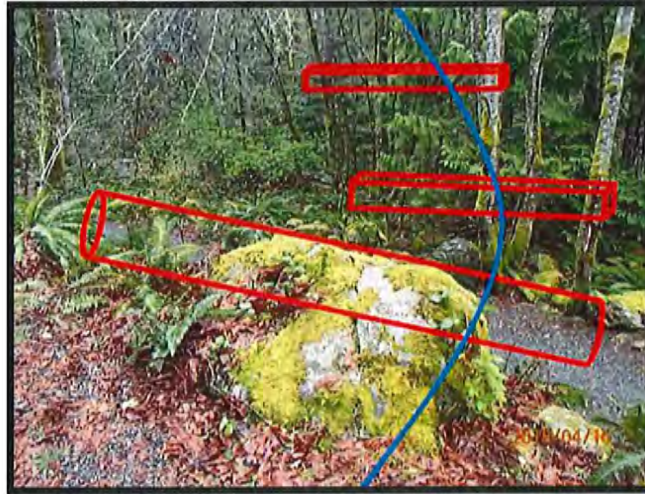
Photo 2. Approximate location of west arch footing.



Photo 3. Approximate location of east footing – view from west side of creek.



Photo 4. West pedestrian arch (tube) footings (rectangles) roadway – blue. View is from west to



east.

Photo 5. West ped pipe, footing and roadway. View is from east side of creek south (upstream) of structure.





Photo 6. East footing.



Photo 7. East arch footing detail.



Photo 8. East arch footing detail. Build retaining wall below to hold it.



Photo 9. Looking north downstream of Reach 1





Photo 10. Looking south upstream from the start of Reach 1

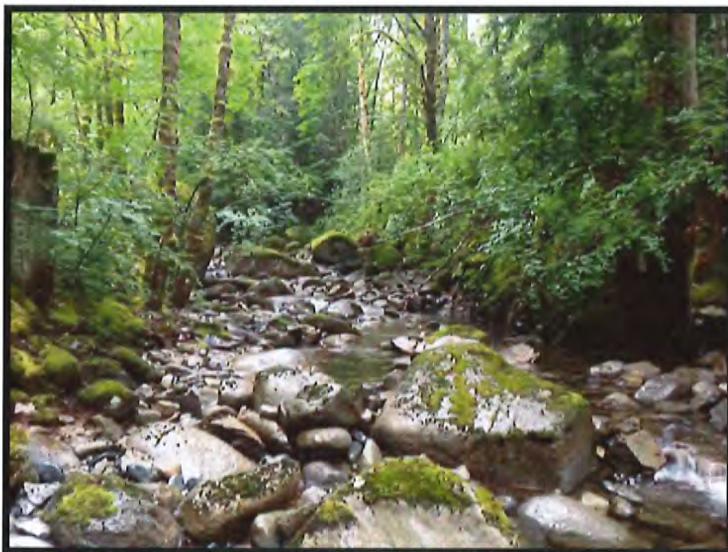


Photo 11. Looking north downstream of Reach 2

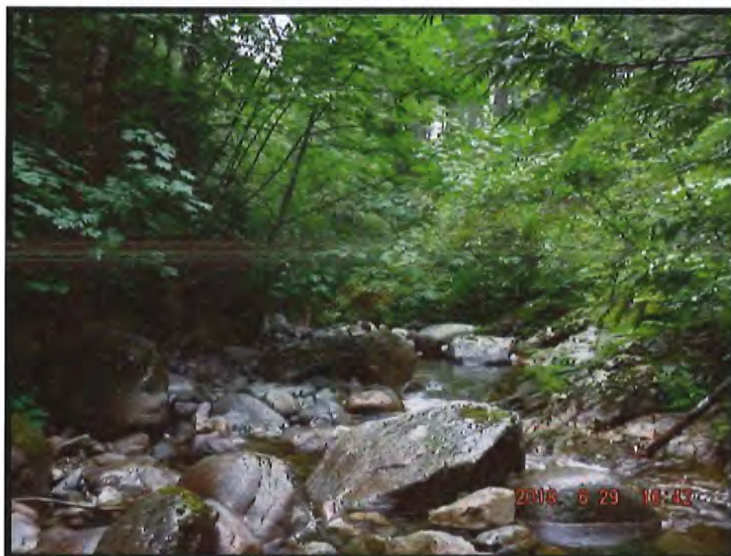


Photo 12. Looking south upstream of Reach 2



Photo 13. Pool in Reach 2

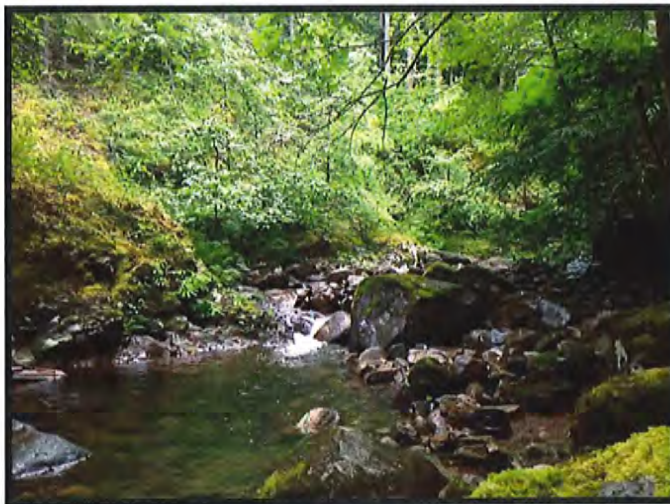




Photo 14. Wildlife tree located between Reach 1 and 2 on the west side of the stream



## Appendix C: Potential at Risk Plant Species that May Occur in the Area

English Name	Scientific Name	COSEWIC	BC List	SARA
Deltoid Balsaroot	<i>Balsamorhiza deltoidea</i>	E (2009)	Red	1-E (2003)
Washington Springbeauty	<i>Claytonia washingtoniana</i>	NA	Red	NA
Fern-leaved Desert-parsley	<i>Lomatium dissectum</i> var. <i>dissectum</i>	NA	Red	NA
White-top Aster	<i>Sericarpus rigidus</i>	NA	Red	NA
Green-fruited sedge	<i>Carex interrupta</i>	NA	Blue	NA
Oregon ash	<i>Fraxinus latifolia</i>	NA	Blue	NA
Nuttall's quillwort	<i>Isoetes nuttallii</i>	NA	Blue	NA
Giant chain fern	<i>Woodwardia fimbriata</i>	NA	Blue	NA
Bog bird's-foot lotus	<i>Hosackia pinnata</i>	E (2004)	Red	1-E (2005)
Cup clover	<i>Trifolium cyathiferum</i>	NA	Blue	NA

**Search Type:** Plants AND MOE Regions: 1- Vancouver Island (Restricted to Red, Blue, and Legally designated species) AND Regional Districts: Cowichan Valley (CVRD) (Restricted to Red, Blue, and Legally designated species) AND Habitat Types and Subtypes: Mixed Forest (deciduous/coniferous mix), Riparian (gravel bar, riparian forest, riparian herbaceous, riparian shrub), and Stream/River. (Restricted to Red, Blue, and Legally designated species) AND BEC Zone: CDFmm

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## Appendix D: Potential at Risk Wildlife Species that May Occur in the Area

English Name	Scientific Name	COSEWIC	BC List	SARA
American Water Shrew, <i>brooksi</i> subspecies	<i>Sorex navigator brooksi</i>	NA	Blue	NA
Autumn Meadowhawk	<i>Sympetrum vicinum</i>	NA	Blue	NA
Northern Red-legged Frog	<i>Rana aurora</i>	SC (2015)	(May) Blue	1-SC (Jan 2005)
Wandering Salamander	<i>Aneides vagrans</i>	SC (2014)	(May) Blue	1-SC (Feb 2018)
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	SC (2008)	(Nov) Blue	1-SC (Feb 2011)
Barn owl	<i>Tyto alba</i>	T (2010)	Blue	1-T (2018)
Barn Swallow	<i>Hirundo rustica</i>	T (May 2011)	Blue	1-T (Nov 2017)
Black Swift	<i>Cypseloides niger</i>	E (2015)	Blue	NA
Blue-grey Tailedropper	<i>Prophyaon coeruleum</i>	T (2016)	Blue	1-E (Dec 2007)
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	NAR (1978)	(May) Blue	NA
Great Blue Heron, <i>fannini</i> subspecies	<i>Ardea herodias fannini</i>	SC (2008)	(Mar) Blue	1-SC (Feb 2010)
Green Heron	<i>Butorides virescens</i>	NA	Blue	NA
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	T (May 2012)	Blue	1-T (Jun 2003)
Northern Goshawk, <i>laingi</i> subspecies	<i>Accipiter gentilis laingi</i>	T (Apr 2013)	Red	1-T (Jun 2003)
Northern Pygmy-owl, <i>swarhi</i> subspecies	<i>Glaucidium gnoma swarhi</i>	NA	Blue	NA
Olive-sided Flycatcher	<i>Contopus cooperi</i>	T (Nov 2007)	Blue	1-T (Feb 2010)
Peregrine Falcon, <i>pealei</i> subspecies	<i>Falco peregrinus pealei</i>	SC (2017)	(Dec) Blue	1-SC (Jun 2003)





<b>Peregrine subspecies</b>	<b>Falcon,</b>	<b><i>anatum</i></b>	<i>Falco peregrinus anatum</i>	NAR (2017)	Red	1-SC (2012)
<b>Purple Martin</b>			<i>Progne subis</i>	NA	Blue	NA
<b>Swamp Fingernailclam</b>			<i>Musculium partumeium</i>	NA	Blue	NA
<b>Umbilicate Sprite</b>			<i>Promenetus umbilicatellus</i>	NA	Blue	NA
<b>Western Bluebird Depression population</b>	<b>(Georgia)</b>		<i>Sialia mexicana pop. 1</i>	NA	Red	NA
<b>Western Screech-Owl, subspecies</b>		<b><i>kennicottii</i></b>	<i>Megascops kennicottii</i>	T (May 2012)	Blue	1-T
<b>Ermine, <i>anguinae</i> subspecies</b>			<i>Mustela erminea anguinae</i>	NA	Blue	NA
<b>Short-eared Owl</b>			<i>Asio flammeus</i>	SC (2008)	Blue	1-SC (2012)
<b>Sinuuous Snaketail</b>			<i>Ophiogomphus occidentis</i>	NA	Blue	NA
<b>Keen's Myotis</b>			<i>Myotis keenii</i>	DD (Nov 2003)	Blue	3 (Mar 2005)
<b>Townsend's Big-eared Bat</b>			<i>Corynorhinus townsendii</i>	NA	Blue	NA
<b>Broadwhorl Tightcoil</b>			<i>Pristiloma johnsoni</i>	NA	Blue	NA
<b>Threaded Vertigo</b>			<i>Nearctula sp. 1</i>	SC (Apr 2010)	Blue	1-SC (Jul 2012)
<b>Painted Turtle – Pacific Coast Population</b>			<i>Chrysemys picta pop. 1</i>	T (2016)	Red	1-E (2007)
<b>Propertius Duskywing</b>			<i>Erynnis propertius</i>	NA	Red	NA
<b>Warty Jumping-slug</b>			<i>Hemphillia glandulosa</i>	SC (Apr 2013)	Red	1-SC (Jan 2005)
<b>Western Thorn</b>			<i>Carychium occidentale</i>	NA	Blue	NA
<b>Common Ringlet, subspecies</b>		<b><i>insulana</i></b>	<i>Coenonympha tullia insulana</i>	NA	Red	NA
<b>Greenish subspecies</b>	<b>Blue,</b>	<b><i>insulanus</i></b>	<i>Plebejus saepiolus insulanus</i>	E (May 2012)	Red	1-E (Jun 2003)

**Search Type:** Animals AND MOE Regions: 1- Vancouver Island (Restricted to Red, Blue, and Legally designated species) AND Regional Districts: Cowichan Valley (CVRD) (Restricted to Red, Blue, and Legally designated species) AND Habitat Types and Subtypes: Mixed Forest (deciduous/coniferous mix), Riparian (gravel bar, riparian forest, riparian herbaceous, riparian shrub), and Stream/River. BEC Zone: CDFmm.

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