

- The final soil deposit will be constructed under the advice of a Professional geotechnical engineer for safe slope stability such that the soil deposit does not create a danger from flooding, erosion or landslide. There is negligible flooding risk of the fill site.

## **5 Environmental Protection Measures for Soil Deposit Work**

### **5.1 Erosion and Sedimentation Controls**

Soils are particularly vulnerable to erosion during activities such as excavation, transport, stockpiling and fill placement. The key factors in erosion and sediment control include intercepting and managing runoff. Soil and sedimentation control measures adapted from the Fisheries and Oceans Canada (DFO) Land Development Guidelines for the Protection of Aquatic Habitat (1993) will be implemented as required during soil relocation activities as follows.

- Prior to commencing work, the proposed area will be delineated for soil placement to minimize impacts to vegetation and soil exposure outside of the designated fill placement area.
- Soil relocation activities will be planned during periods of dry weather to avoid potential rainfall events and delays.
- Where practical, soil placement will be phased to allow for “green up”, or re-establishment of vegetation to minimize soil exposure and erosive surfaces.
- Construction will be halted during periods of heavy rainfall to minimize soil disturbance and wash out.
- Existing vegetation will be retained where practical.
- Exposed slopes and disturbed natural slopes will be seeded and re-vegetated following soil placement. Seeding and planting will be conducted to allow for establishment of vegetation before the end of the growing season.
- Mulches or other organic stabilizers will be applied where necessary to minimize erosion until vegetation is established.
- The length and steepness of slopes will be considered in the site design to minimize erosion and soil loss.
- Sediment traps and / or silt fences will be installed at the base of the slope of the newly placed soil as required to retain soil/ sediments in the work area.
- Erosion control measures will be inspected on a regular basis (e.g. weekly) and before and after heavy rainfall events. Erosion control measures will be repaired and replaced if determined to be ineffective.

### **5.2 Slope Protection**

The following techniques will be implemented as required to prevent initiation of surface soil erosion and movement of sediment from slopes.

- In dry conditions, all cut/ fill and cleared natural slopes and surfaces will have erosion controls implemented within 14 days.
- During wet conditions, erosion control will be implemented immediately following vegetation removal and soil placement.
- Soils temporarily stockpiled for more than seven days and less than two months will be covered with plastic sheeting or contained by a silt fence.
- Soil stockpiled for periods longer than two months should be shaped to have side slopes no steeper than 1:5H:1V and remain covered with plastic sheeting or means of surface protection.

### **5.3 Measures for Protecting Sensitive Habitat**

Sensitive habitat includes aquatic habitat, wetlands, riparian habitat or other environmental features that support sensitive species. The construction activities were designed and planned to avoid soil placement in sensitive habitats and ecosystems. No work is planned near waterways on the Property or within the 30 m riparian offset area. Activities associated with soil deposit operations (e.g. land clearing) will be conducted in accordance with applicable local bylaws and environmental legislation.

### **5.4 Measures for Minimizing Soil Transfer to Public Roads**

Vehicles and equipment used for soil placement will be inspected by the vehicle operator prior to entering a public road. A vehicle washing station will be established on the Property, if necessary, to minimize the transfer of soils from vehicles and equipment to public roads. The vehicle washing station will be established within the boundaries of the Property and at least 30 m from waterways and sensitive habitat.

### **5.5 Dust Control**

The following measures are recommended to mitigate dust during and after soil placement, as applicable:

- Bare soils temporarily stockpiled will be covered with plastic sheeting or other suitable covering to mitigate airborne soil transport.
- Water will be applied using a water truck or irrigation methods to dampen soil during dry weather conditions.
- Soil transport will not be planned during high wind conditions.
- Vehicle transport speeds in and around the property will be reduced as required to minimize dust emissions.

### **5.6 Management of Onsite Drainage**

- Natural drainage patterns on the property will be retained where feasible.
- No work is planned near waterways or within 30 m of a waterway or sensitive habitat.
- Measures to mitigate erosion and sedimentation identified in Section 5.1 will be implemented to mitigate runoff during soil deposit activities.



## 5.7 Noxious Weed and Invasive Species Management

Noxious weeds are non-native plants introduced to BC. These non-native plants are difficult to control and have the potential to be highly destructive to native plant populations. The BC *Weed Control Act* imposes a duty on all land occupiers to control designated noxious plants. The most significant invasive plant species documented in the CVRD include Scotch broom, Canada Thistle, Himalayan Blackberry, St. Johns' Wort, Oxeye Daisy, Bull Thistle, Common Tansy, Japanese knotweed, Yellow Iris, Tansey Ragwort and Curled Dock (Cowichan Valley Environment Commission's State of Environmental Reporting Subcommittee [CVECSERS], 2014). Specific priority management species identified for the CVRD are identified in Table 1.

**Table 1 Priority Species for the Coastal Invasive Species Committee Region, including the CVRD (From CVECSERS, 2014)**

Species	Management Category	Classification under Weed Control Act	Total Area (ha) – All CVRD jurisdictions	Ecological Risk	Human Health Risk	Economic Risk	Overall Risk Score	Overall Assessment
Giant Hogweed	Eradicate	BC Noxious	1.1	High	High	High	6	BC Noxious weed and high priority in the CVRD
Yellow Iris	Contain	BC Noxious	34.4	Medium	High	High	5	
Daphne / Spurge Laurel	Contain	BC Noxious	7.7	Medium	High	High	5	
Blessed Milk Thistle	Eradicate	BC Noxious	0.01	Medium	Medium	High	4	
Knotweed Species	Eradicate	BC Noxious	38.0	High	Low	Medium	3	
Carpet Burweed	Eradicate	BC Noxious	0.02	Medium	Medium	Medium	3	
Tansy Ragwort	Control	BC Noxious	28.6	Medium	Medium	Medium	3	
Poison Hemlock	Contain		0.0005	High	High	High	6	High priority in the CVRD
Scotch Broom	Control		404	Medium	Medium	High	4	
Scotch Thistle	Eradicate	BC Noxious	7.3	Medium	Low	Medium	2	BC Noxious Weed
Gorse	Eradicate	BC Noxious	2.1	Medium	Low	Medium	2	
Spotted Knapweed	Control	BC Noxious	3.4	High	Low	Low	2	
Kudzu	Prevent		0	Low	Low	High	2	CISC priority
Butterfly Bush	Eradicate		0.01	Medium	Low	Low	1	
Spartina	Eradicate		0	Low	Low	Low	0	
Garlic Mustard	Eradicate		0	Low	Low	Low	0	

The following measures will be implemented to mitigate the spread and establishment of invasive plant species:

- Soil provider will provide assurance that soils transported to the site are noxious weed free.
- Movement of equipment through areas infested with invasive species will be avoided. If equipment used for transporting soils was operated in an area with noxious weeds, it will be cleaned prior to loading including the truck exterior and wheels.
- To prevent establishment of invasive species following soil placement, soils will be revegetated, or an interim cover crop will be established that will ultimately be replaced by the final landscaping or planting. The seeds and plants used for revegetation must also be free of invasive species.
- The site will be monitored following soil placement to identify the establishment of invasive species.

- Invasive species identified in the soil placement area will be eradicated in accordance with The CVRD strategy for invasive plant management (CVRD, 2019b).

## **6 Groundwater Impact Assessment**

The application area is within 100 m of Aquifer 203 and approximately 100 m from Aquifer 208, both high vulnerability. As requested by the CVRD, a Ground Water Impact Assessment was prepared by a Registered Professional. The assessment is provided in Appendix 4. The assessment concluded that the soil deposit activity would not pose a threat to the local aquifer quality or quantity.

## **7 Site Remediation**

The following subsections describe the remediation plans that will occur subsequent to completion of the soil deposit activities.

### **7.1 Landscaping**

Consistent with the proposed equestrian use, the following landscaping measures are planned:

1. Level grades will be finished with a layer of crushed rock and/or a layer of mulch. These are porous materials that will promote diffuse drainage, and will cover deposited soils to mitigate erosion. Some areas will also be strategically landscaped with vegetation to promote soil stabilization and aesthetic interest.
2. Slopes will be vegetated with a combination of seed (e.g. native grasses, wildflowers), trees, and/or shrubs. This will promote slope stabilization, and erosion protection. Appropriate native seed/plant/tree species will be used where practical for re-vegetation and landscaping.

### **7.2 Stormwater Management**

Stormwater will be managed using the following principles, so as not to create erosion or other adverse effects of the landscape:

- Natural drainage patterns on the property will be retained where feasible.
- Land areas will be sloped to collection ditches/swales, settling ponds, and natural vegetated areas to minimize sediment transport and turbidity.
- The majority of land surface will be landscaped with permeable materials to allow for diffuse infiltration into the ground.
- Bare soils on sloped surfaces will be vegetated to slow runoff and mitigate erosion.

### **7.3 Noxious Weeds and Invasive Species**

Site remediation will be completed in a manner that will minimize colonization and spread of noxious weeds. As stated in Section 5.7, the most significant invasive plant species documented in the CVRD include Scotch broom, Canada Thistle, Himalayan Blackberry, St. Johns' Wort, Oxeye Daisy, Bull Thistle, Common Tansy, Japanese knotweed, Yellow Iris, Tansey Ragwort and Curled Dock (Cowichan Valley