

*Environmental Impact Management Proposal  
Gardom Pond Outlet dam reconstruction  
For CRD Engineering*

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email: [REDACTED]

To: Ben Martin  
CRD Engineering and Planning  
479 Island Highway, Victoria, BC V9B 1H7

March 20, 2019

Re: Gardom Pond, Pender Island B.C.

**Environmental Impact Management report:** Dam decommissioning and outlet stream restoration

Dear Mr. Martin:

This letter deals with the management of the environmental impacts of the decommissioning of the old water storage dam on Gardom pond on North Pender Island. All documentation related to the decommissioning of the existing dam has been provided by the Capital Regional District (CRD). Background information has also been provided by some of the Gardom Pond property owners [REDACTED] (2018, personal communication). The purpose of this report is to provide measures to manage the environmental aspects of the new spillway construction and minimize the impact on the aquatic habitat of the pond.

### **1. Introduction**

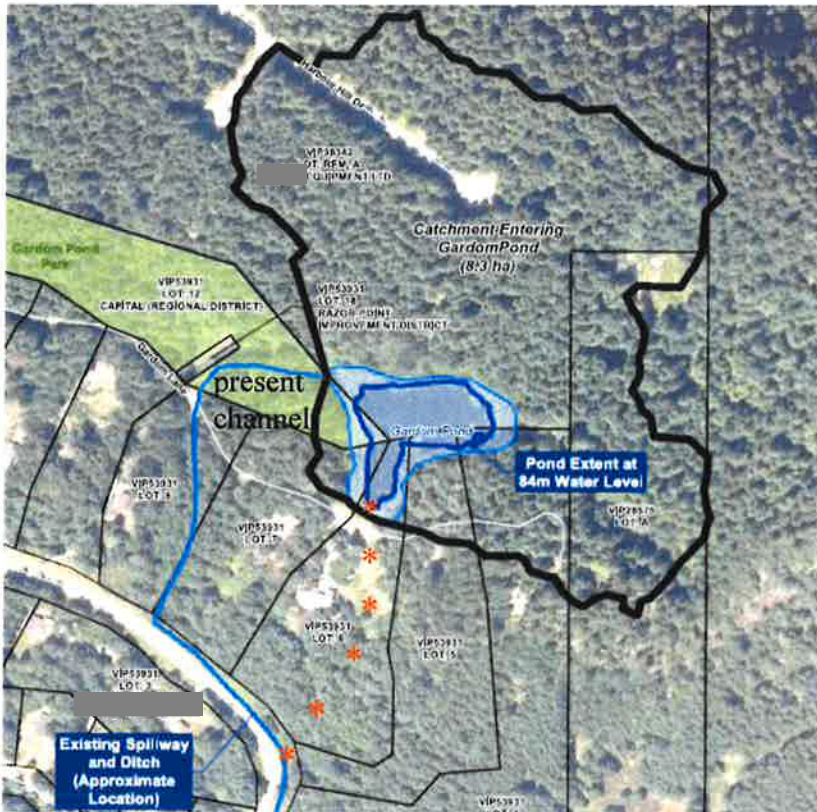
The present earthen dam on Gardom Pond has been assessed by the Provincial Dam Safety office and found to be at a risk of failing with a "High" consequence of damage for downstream properties and local inhabitants. The land around the pond belongs to 5 separate property owners and CRD Parks who have the larger portion of land along the previous outlet of the dam (Map 1). The park is maintained by the Pender Island Parks Commission.

After years of engineering studies, the Capital Regional District and property owners are proceeding with a plan to decommission the dam, lowering the water level of the reservoir by approximately 2 meters.

They have determined that the most practical solution is to restore the original channel that drained the wetland area decades ago before the dam was constructed

The dam outlet stream between the lowered pond and Harbour Hill Drive will be reconstructed to pass a 1 in 200 year rain event. The new outlet stream will be located along the original drainage from the wetland to the sea and thus avoid excavation of the existing outflow channel through the CRD Park (Map 1).

**Map 1. Shows Gardom Pond, property owners, the present location of the drainage and the future route along the restored original channel.**



\*\*New channel location

## 2. Existing fish, birds, amphibians and other wildlife in Gardom Pond

There has been a history of stocking the pond with rainbow trout although residents state there has been none present for several decades (personal communication). In 2009 when a Riparian Areas Assessment report was completed, the remains of an old fish fence were seen at the outlet of the pond (Photograph 1).

It is important to note that, because of the steep grade below Razor Point Road, there is no access upstream from the sea to the pond for anadromous fish.

The pond is also known to support populations of redlegged frogs and rough-skinned newts. These species are protected under the British Columbia Wildlife Act (personal communication). There have also been wild ducks observed using the pond and there has been a report of otters visiting in years past.

This area has cattails (*Typha sp.*), sedges (*Carex sp.*) and native water lilies (*Nuphar sp.*) growing near the present high-water mark (Photos 2-4). These all provide habitat for the birds and amphibians. The cattails (also known as Bull Rushes) along the foreshore of the pond, are excellent habitat for nesting birds. The nesting times vary between June and August depending on the species. As red winged blackbirds use the cattails extensively, the area along the pond that will be excavated at the new outlet should not be disturbed until later in the summer.

### **2a. Impacts on fish if they are found to be present**

The pond should be lowered only to the level required for the decommissioning. At an elevation of 84 meters there is enough remaining water for the aquatic species. After the draining the pond will be mostly two meters deep with two deeper 3-meter spots.

Since there have been fish present at some time in the past, any pumping of the water to lower the pond during the new outlet construction must include screening the intake so fish are not transported down stream. A silt fence should be placed across the pond above the work area.

The draining should be monitored by a QEP. The Biologist and members of the Island Stream and Salmon Enhancement Society have a fish collection and fish salvage permit from Fisheries and Oceans as well as equipment that will be on hand in case there are any unexpected fish that may require relocation. There will also be a small boat on site for the monitoring.

### **2b. Impacts on amphibians and other aquatic species**

If the decommissioning takes place in the late summer the redlegged frogs will have left the water. There may be rough skinned newts present year-round. Because the pond is being lowered but not drained completely there should be little disturbance to these amphibians.

## **3. Managing Impacts of the lowering of the dam and the new outlet channel restoration**

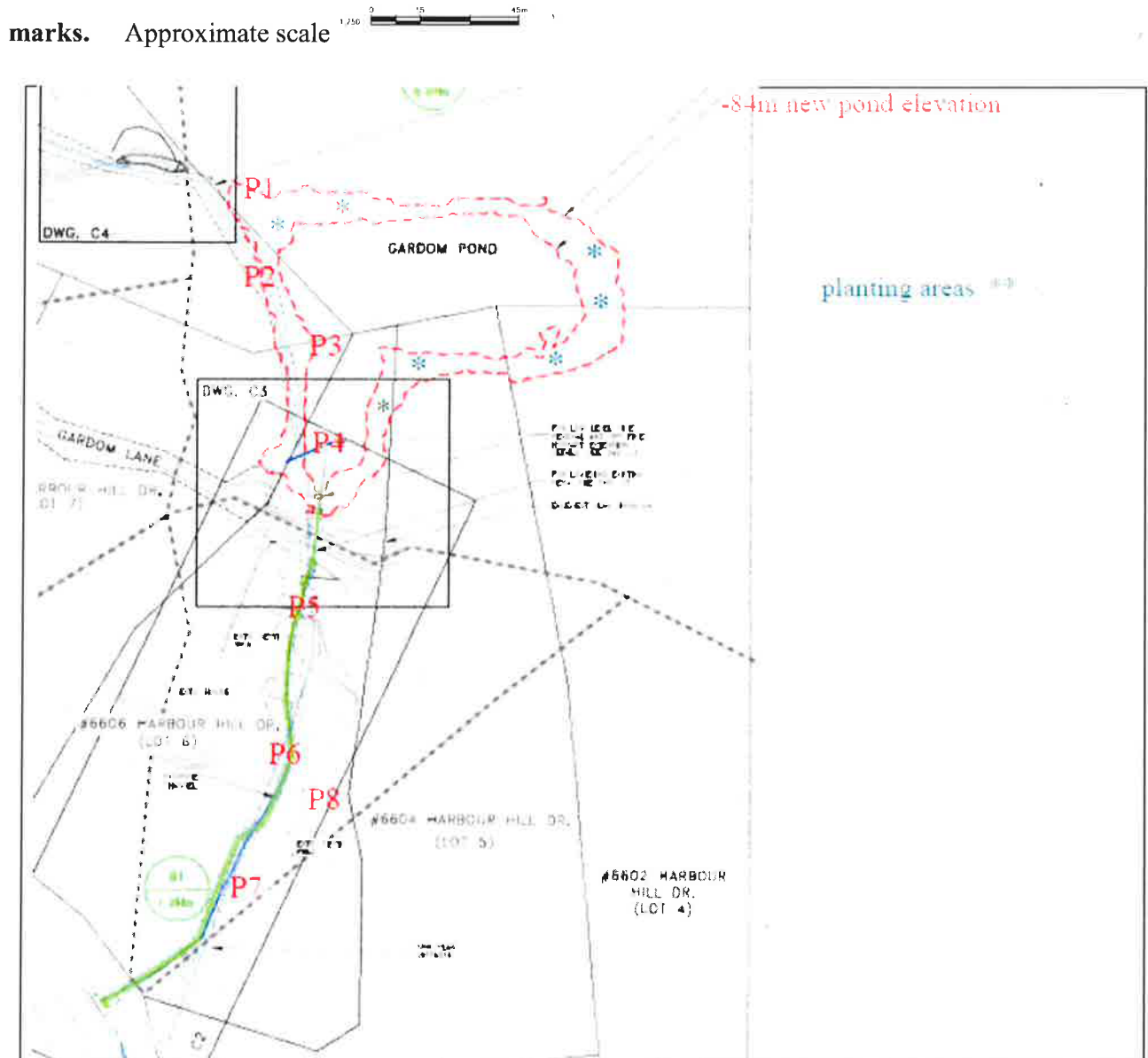
### **3a. The new spillway on Gardom Lane**

The important environmental concern is the section of the excavation that takes place within the present wetland boundaries. The work area will extend into the pond, so it is important to lower the water slightly below 84 m. The pond water should also be at low level for at least two weeks before the excavation takes place in order to ensure that the work area is sufficiently dry.

Monitoring will be necessary when the water level is being lowered. After the water in the pond

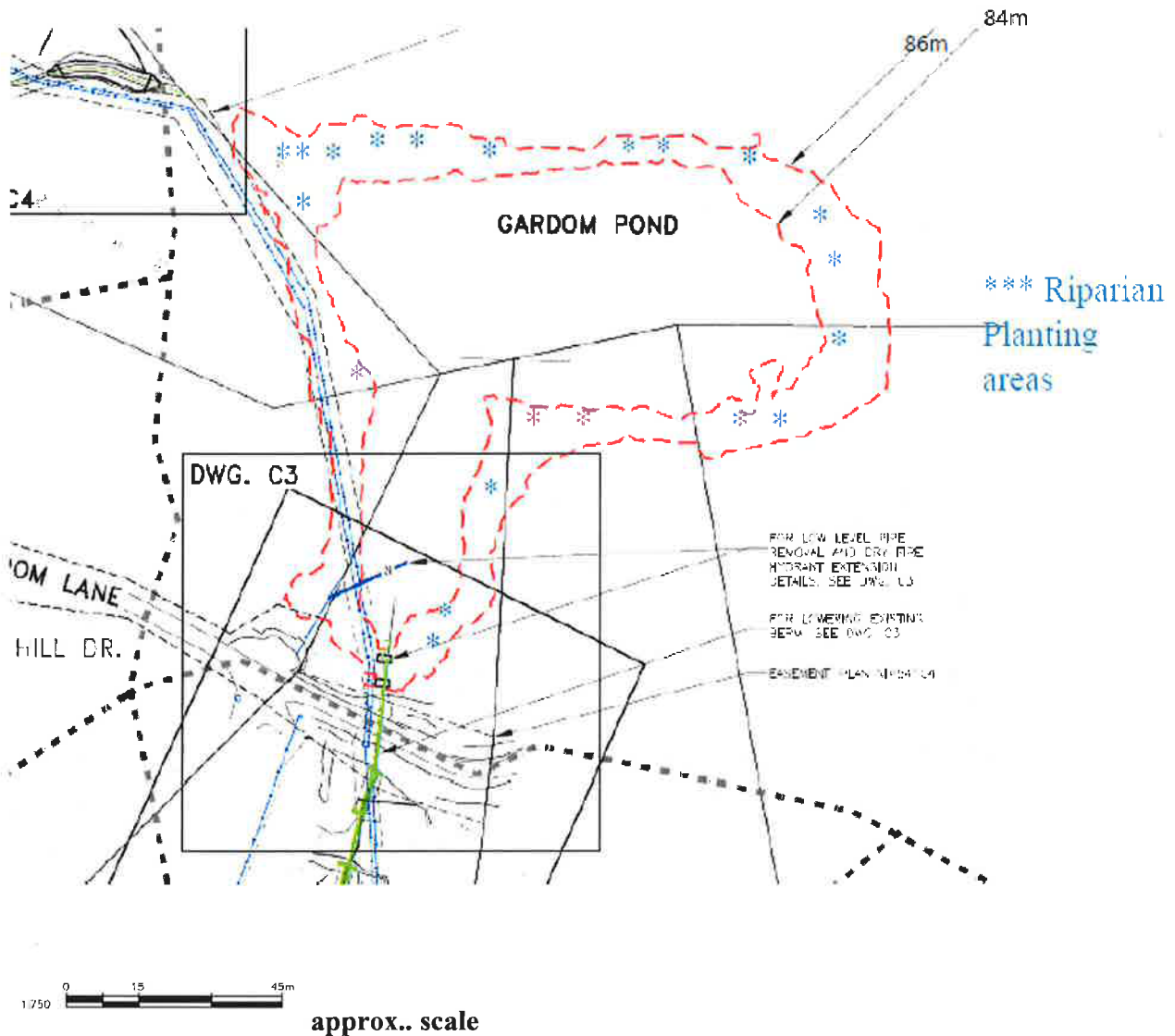
has reached the new level the pond should also be monitored regularly to determine any negative impacts on the fish or amphibians. The silt fence will be necessary to prevent sediment from the disturbed area from entering further into the pond. The placement of the fence can be decided once the pond level is lowered. Some straw bales may be necessary as well to help support the fence. Any of the aquatic vegetation that is suitable for the post development wetland restoration should be carefully placed aside. After the excavation is complete the disturbed area should be stabilized, reseeded from surrounding plants and mulched with straw where necessary until planting is completed.

**Map 2. Shows the area of the proposed reconstruction of the outlet stream of Gardom Pond and Photograph location (P1—P8). Also shows the present and future high-water marks.**





**Map3. The outlet of the pond showing excavation area**



**3b. The new outlet stream between the pond and Harbour Hill Drive**

The outlet channel reconstruction work will result in a 2.5-meter-wide rip rap lined ditch excavated through a second growth Douglas fir forest (Photograph 5). There are no large trees that will be removed. Other trees that are adjacent to the new channel and could be impacted should be protected by wrapping them with heavy landscape fabric to prevent accidental equipment scrapes. Excess fill from channel restoration should be disposed of carefully into the forest without damaging existing any vegetation.

The route follows the original channel through the second growth forest. There are many small Douglas fir and cedar trees and the understory has both sword ferns and salal. Wherever possible any disturbed native shrubs should be carefully salvaged and replanted once the construction

work is complete. As many as possible invasive *Daphne* shrubs should be removed and disposed of in a safe manner. (Photo 6).

#### **4. Environmental Management of the Construction activities**

Any sensitive areas along the new channel or near the foreshore of the pond that should not be disturbed must be clearly marked with Riparian survey tape, so the contractor is aware of them. There should be no need for any heavy machinery intrusion below the new water level of the pond.

##### **4a. Timing**

All excavation work should be completed in the dry season. (July-October 2018) Planting the disturbed riparian areas may continue after the construction is complete. The foreshore work can take place after the red winged blackbird nesting time period.

##### **4b. Equipment maintenance**

All machinery should be regularly checked so fuel leaks can be detected. This is important within the well catchment zone. A fuel spill kit must be present on site.

##### **4c. Erosion and Sedimentation Control**

The guidelines from "Land development Guidelines for the protection of Aquatic Habitat: [www.dfo-mpo.gc.ca/Library/165353.pdf](http://www.dfo-mpo.gc.ca/Library/165353.pdf)" are still recommended for use for projects near sensitive water bodies. The measures for silt control include the standards for silt fences and sedimentation ponds. These measures must remain in place until all the construction work is completed and there is no possibility of storm water damage to the site.

There must be silt fencing installed around the disturbed area near the new outlet and it should be left in place until all excavation is completed and there is no chance of erosion occurring along the new channel. There must be no deposition of loose excavated material into the remaining water behind the dam.

#### **5. Riparian vegetation restoration**

A planting plan should be completed once the extent of the vegetation disturbance is determined and the substrate in the newly exposed areas is revealed.

Land owner permission will be required as there are several private properties around the pond. The Island Trust Conservancy holds a covenant on part of the foreshore and must also be consulted. The QEP will advise and assist if necessary, with the planting plan and the riparian restoration.

All the exposed soils should be reseeded with fall rye or a wetland mix after the machine work is done. In some areas around the pond, mulching with straw will also be necessary to help prevent silty water runoff during the rainy season.

Suitable species for planting along the newly exposed riparian areas are native sedges and Cattails (*Typha sp.*). Pacific willow and Scoulers willow, (*Salix sp.*) and native wild roses. Red Osier Dogwood (*Cornus stolonifera*) would also be suitable depending on the substrate that is found in the newly drained areas. The Red Osier Dogwood and Scoulers Willow can also be planted as stakes or wattles depending on the condition of the exposed areas after decommissioning.

The spacing of the trees and shrubs should be as recommended in the Pacific Streamkeeper's guide. (One plant per square meter)

See Appendix A for wetland plant species and their habitat requirements. All the trees and shrubs will require after-planting care for approximately two years.

#### 6. Post development clean up and monitoring

Removal of sediment containing silt fencing and hay bales must be done with great care and all the collected silt must be disposed of away from the pond.

The QEP must conduct a site visit after the winter rains begin in order to ensure there is no probability of erosion and sedimentation. There should be a post development report submitted to the Provincial Dam Safety Office, the CRD and Islands Trust.

These recommendations can be adapted as conditions at the site may change. Please let me know if you need more information.

Sincerely,

Kathleen Reimer



Kathleen Reimer MSc.,  
Registered Professional Biologist  
Island Stream and Salmon Enhancement Society



(to be signed and stamped)

## List of References

BC Ministry of Environment and Department of Fisheries and Oceans 1992. "Land development Guidelines for the protection of Aquatic Habitat: [www.dfo-mpo.gc.ca/Library/165353.pdf](http://www.dfo-mpo.gc.ca/Library/165353.pdf)

DFO Measures to prevent Harm to fish and Aquatic Species at Risk

<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>

Department of Fisheries and Oceans, 1995. The Streamkeepers Handbook . Community Involvement Program. Vancouver B.C. Module 7. Riparian planting

Gardom Pond property owners: [REDACTED] 2018 Personal Communication

Island Stream and Salmon Enhancement Society 2019-2017. Personal communication regarding the decommissioning of two dams on Salt Spring Island. Both of which were on fish bearing streams and some of the aquatic habitat was preserved.

Ministry of Environment. Standards and Best Practices for Instream works.  
<http://www.env.gov.bc.ca/wld/instreamworks/.htm>

Pojar, Jim and Andy MacKinnon, 1994. Plants of Coastal British Columbia. Lone pine publishing, Vancouver B.C.

Reimer, Kathleen, 2009. Gardom Pond: Riparian Areas Assessment Report prepared for property owner [REDACTED]

**Photograph 1. The present outlet of the pond where the old fish fence was located. The sedges will seed in the new exposed foreshore areas.**



**Photograph 2. Sedges near photograph 1.**





**Photograph 3. Looking to the east from Gardom Lane along the wetland riparian area, shows the waterlilies, cattails and sedges.**





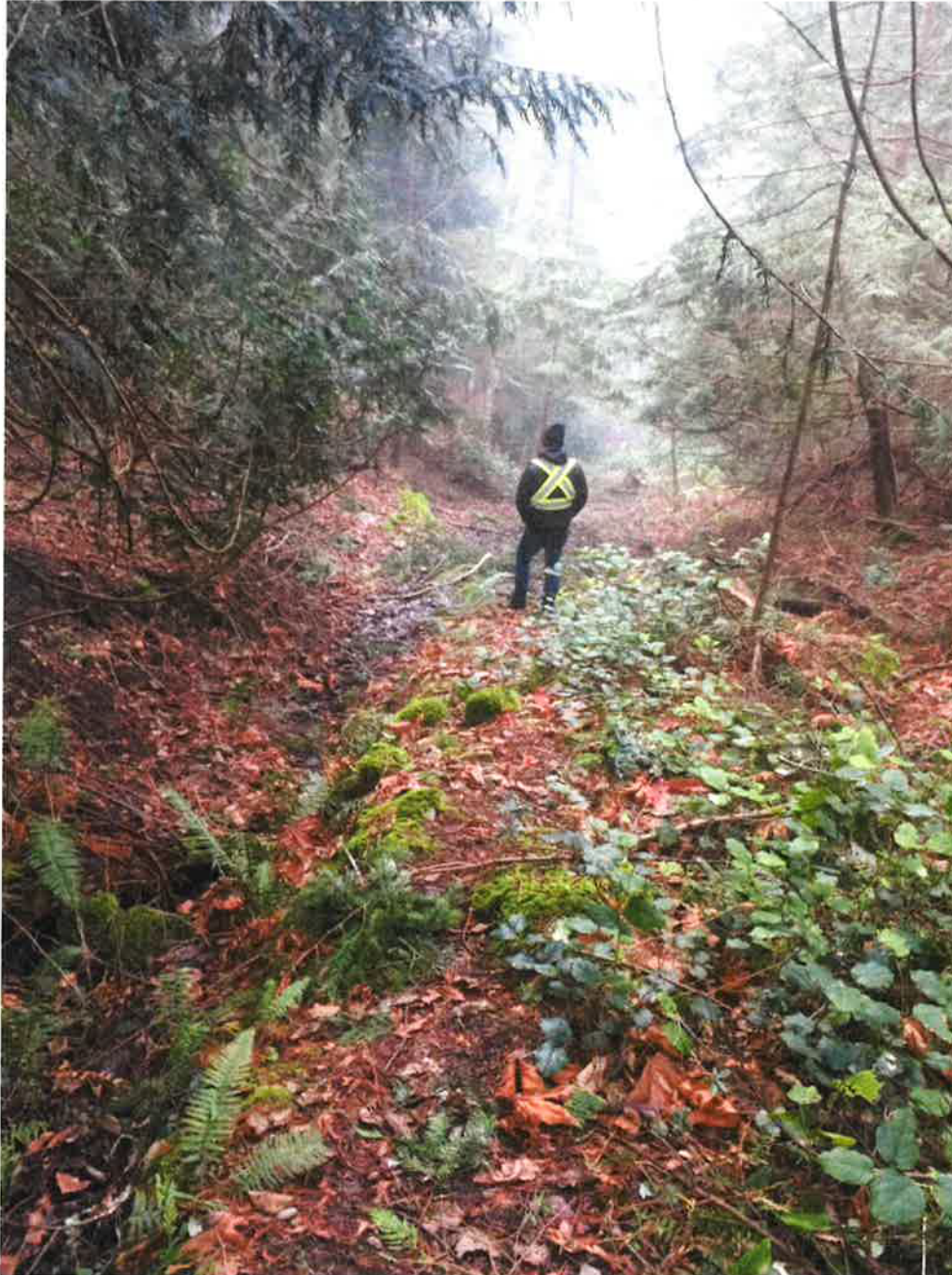
**Photograph 4. View of the pond from Gardom Lane in the area near the water release structure where the new outlet will be constructed. . The cattails are very numerous, and they will reseed the future exposed shoreline.**

**Any cattails or waterlilies removed during the channel excavation should be placed aside for replanting in the new exposed areas.**





**Photograph 5. Downstream of the new outlet. Shows the original drainage route and the second growth forest.**



**Photograph 6. Further downstream toward Harbour Hill Drive along the pond drainage channel. Inside the streambed, there are many invasive spurge laurel plants (*Daphne sp.*) that are toxic to handle and should be carefully removed ,**



**Photograph 7. The downstream area close to Harbour Hill Drive.**





**Photograph 8. View of the west side of the new channel riparian area from shows the natural forest vegetation.**





**Appendix A.** Habitat Requirements and Propagation Methods from Streamkeepers Module 7. Code: c = coastal s/ = sun upl = obligate upland i = inland /s = shade facu = upland/some wetland ps = part shade fac = upland + wetland facw = wetland/some upland wet = obligate wetlands

Common Name (scientific name)	Coastal/ Inland	Sun/ Shade	Wetland/ Upland	Propagation method
<b>TALL CONIFEROUS TREES</b>				
Douglas fir ( <i>Pseudotsuga menziesii</i> )	c/i	s/ps	upl	seed, transplant
Sitka spruce ( <i>Picea sitchensis</i> )	c	s/s	fac	seed, transplant
Western Hemlock ( <i>Tsuga heterophylla</i> )	c/i	/s	facu	transplant, seed
Western Red Cedar ( <i>Thuja plicata</i> )	c/i	/s	fac	transplant, seed
<b>TALL DECIDUOUS TREES (&gt;50 Feet)</b>				
Big Leaf Maple ( <i>Acer macrophyllum</i> )	c/i	s/ps	facu	seed, transplant
Black Cottonwood ( <i>Populus trichocarpa</i> )	c/i	s/	fac	cutting, seed, transplant
Quaking Aspen ( <i>Populus tremuloides</i> )	i	s/	facw	seed, sucker
Red Alder ( <i>Alnus rubra</i> )	c	s/s	fac	seed, cutting, sucker,
<b>SHORT DECIDUOUS TREES (15 - 60 Feet)</b>				
Bitter Cherry ( <i>Prunus emarginata</i> )	c	S/ps	facu	seed, transplant
Black Hawthorn ( <i>Crataegus douglasii</i> )	c/i	s	fac	seed, transplant
Cascara ( <i>Rhamnus purshiana</i> )	c	s/s	fac	cutting, seed, transplant
Crabapple (Pacific) ( <i>Malus diversifolia</i> )	i	s/	fac	seed
Mountain Alder ( <i>Alnus tenuifolia</i> )	c	s/	facw	seed, transplant
Oso Berry or Indian Plum ( <i>Osmaronia cerasiformis</i> )	c	s/s	upl	transplant, seed, cutting
Red Elderberry ( <i>Sambucus racemosa v. arborescens</i> )	c	s/ps	facu	cutting, seed
Vine Maple ( <i>Acer circinatum</i> )	c	/s	facu	seed, transplant
Water or Black Birch ( <i>Betula occidentalis</i> )	c/i	s/s	wet	seed, transplant
White or Paper Birch ( <i>Betula papyrifera</i> )	c/i	s/	facu	seed, transplant
Willows: Pacific ( <i>Salix lasiandra</i> ), Sitka ( <i>S. sitchensis</i> ) Scouler's ( <i>S. scouleriana</i> ), Sitka ( <i>S. sitchensis</i> ) (many called pussy willow)	c/i	s/	facw/wet	cuttings

Common Name (Scientific Name)	Coastal/ Inland	Sun/ Shade	Wetland /Upland	Propagation method
<b>SHRUBS (2 - 15 FEET)</b>				
Blueberry, Huckleberry ( <i>Vaccinium spp.</i> )	c/i	s/s	upl	seed, cutting, sucker
Douglas, Rocky Mtn maple ( <i>Acer glabrum</i> )	c/i	/s	facu	seed, transplant
Gooseberries ( <i>Ribes spp</i> )	c/i	s	fac	seed, cutting, layer
Hudson Bay currant ( <i>Ribes spp.</i> )	i	s	fac	seed, cutting, layer
Mock Orange ( <i>Philadelphus gordonianus, P. lewisii</i> )	c	s/s	fac	cutting, layer
Ninebark ( <i>Physocarpus capitatus</i> )	c	s/s	fac	cutting
Nootka or Wild Rose ( <i>Rosa spp, R. nutkana</i> )	c/i	s/ps	fac	cutting, sucker, seed
Red Osier Dogwood ( <i>Cornus stolonifera</i> )	c/i	s/s	facw	cutting, seed layer
Salal ( <i>Gaultheria shallon</i> )	c	s/	upl	transplant, seed
Salmonberry ( <i>Rubus spectabilis</i> )	c	s/s	fac	cutting, transplant
Service or Saskatoonberry ( <i>Amelanchier spp.</i> )	c/i	s/	facu	sucker, seed
Sitka Alder ( <i>Alnus sinuata</i> )	c/i	s/s	facw	seed, cutting, sucker
Snowberry ( <i>Symphoricarpos albus</i> )	c/i	s/s	facu	cutting, transplant
Snowbrush ( <i>Ceanothus velutinus</i> )	i	s/	upl	cutting, transplant
Spiraea or Hardhack ( <i>Spiraea douglasii</i> )	c/i	s/s	facw	sucker, cutting
Tall Oregon Grape ( <i>Berberis aquifolium</i> )	c/i	s/s	upl	cutting, layer
Thimbleberry ( <i>Rubus parviflorus</i> )	c/i	/s	facu	cutting, transplant
Twinberry (black) ( <i>Lonicera involucrata</i> )	c/i	/s	fac	cutting, seeds
Twinberry (red) ( <i>Lonicera utahensis</i> )	i	/s	facu	cutting, seeds