



# Environmental Development Permit Application

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**May 2, 2019 (Revision 01)**

Heather Keith  
Environmental Protection Officer  
District of West Vancouver  
750 – 17<sup>th</sup> St.  
West Vancouver, B.C. V7V 3T3

## **Re: Proposed Redevelopment at 2859 Bellevue Avenue, West Vancouver**

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Sartori Environmental Inc (SEI) has been retained by the owners of 2859 Bellevue Avenue to assess the environmental implications of redeveloping a single-family home site situated adjacent to a watercourse in West Vancouver, British Columbia. The following report and attached drawings form part of the District of West Vancouver's (DWV) Environmental Development Permit (EDP) application for this site. The site is encumbered by streamside development setbacks from Rodgers Creek top of bank (ToB), which flows north to south from the northwest corner of the subject property to the southeast corner.

### **Existing Conditions**

The subject property is 1555.4 m<sup>2</sup> in size and is presently developed with a single-family home that includes patios (concrete, paver and gravel), walkways, driveway, watercourse bridge crossing, wall structures, rockscape, covered pool/wooden deck and greenhouse. The existing dwelling and associated hard surfaces are located within the north half of the subject property with property access from Bellevue Avenue along the east side of the property. The bridge crossing of Rodgers Creek is located in the middle portion of the subject property.

Rodgers Creek flows as an open channel across the subject property and at the south property line enters a culvert underneath of Bellevue Avenue. Rodgers Creek discharges from the culvert and flows as an open channel for an additional 40-m before its confluence with the Burrard Inlet. The Subject Property is overlapped by the 15-m setback from Rodgers Creek on both the left bank and right bank sides of the watercourse.

Existing driveway access from Bellevue Avenue is located within the 5 and 15-m setback. Within the 15-m setback existing structures consist of the dwelling, concrete patios, gravel areas, paver patios, covered pool/wood deck, wall structures, stairways, pathways, and rockscape. Within the 5-m setback existing structures consists of covered pool/ wood deck, green house, existing dwelling, paver surfaces, rockscape, stairs and associated pathways, and a wooden bridge crossing over Rodgers Creek. The closest existing surface to ToB is the bridge crossing located at ToB and the closest existing foundation to ToB is the covered pool located at ToB.

Vegetation within the subject property riparian setbacks predominantly consists of landscape variety species and lawn. Native tree species located in the riparian setbacks adjacent to the subject property consist of western red cedar (*Thuja plicata*), western flowering dogwood (*Cornus nuttallii*) and western white pine (*Pinus monticola*). Native riparian understory vegetation within the riparian setbacks of the Subject Property is limited and includes periodic occurrences of: western sword fern (*Polystichum munitum*), red osier dogwood (*Cornus sericea*), red huckleberry (*Vaccinium parvifolium*), Kinnikinnick (*Arctostaphylos uva-ursi*), and naturalized pacific rhododendron (*Rhododendron macrophyllum*).

Periodic occurrences of non-native invasive species were present within the assessed riparian setback and subject property bounds. Non-native and invasive species observed within the riparian setback include:

- English ivy (*Hedera helix*)
- Speckled laurel (*Aucuba japonica*)
- Hypericum spp.
- Spurge laurel (*Daphne laureola*)
- English laurel (*Prunus laurocerasus*)
- Common periwinkle (*Vinca minor*)
- Yellow archangel (*Lamium galebodolon*)

SEI visited the subject property on October 25, 2018 and April 24, 2019. An approximately 50 m section of Rodgers Creek was assessed. The watercourse channel substrate consisted of boulders and cobbles. The bankfull width of Rodgers Creek ranged between 1.5 m at its narrowest section to approximately 5-m at its widest section. The banks of the watercourse consist of concrete rock walls. The average channel gradient within the subject property was approximately 5%.

Rodgers Creek (Watershed Code: 900-072300) has a total stream length of 3.18 km, a stream order of one, and a stream magnitude of 1. A review of the MoE Fish Inventory Data Query database<sup>1</sup> was conducted and the results show the documented presence of Coho salmon (*Oncorhynchus kisutch*) and Chum salmon (*O. keta*) near the mouth of Rodgers Creek. That portion of Rodgers Creek located within the Subject Property is fish accessible.

## Proposed Development

The proposed works consist of redevelopment of the home and associated hard surfaces including garage, parking area, patio areas, landscaping features, and secondary dwelling with separate driveway access. The proposed main dwelling has been moved eastward such that no new surfaces will be located within the 5-m setback. New hard surfaces associated with proposed redevelopment will be located both within and outside of the 15-m riparian setback. The existing driveway access to the main dwelling will be maintained. Regarding the pool removal, the existing rock wall at the perimeter of the pool (Rodgers Creek left bank) will be maintained in place. An appropriately qualified engineer will need to assess and provide sign off on the stability of the existing rock wall once the pool is removed and provide specifications for backfill requirements in advance of riparian restoration works. The existing pedestrian bridge crossing Rodgers Creek will be retained as part of redevelopment. All new structures associated

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<sup>1</sup> <http://maps.gov.bc.ca/ess/hm/habwiz/> (accessed: November 12, 2018)

with the proposed development will be outside the 5-m setback on both the left and right bank of Rodgers Creek.

A certified arborist was retained, in accordance with specifications of the Interim Tree Protection Bylaw No. 4892, 2016, to conduct an arborist assessment of trees located within the subject property (Talus Arboriculture & Landscape Architecture; October 2018). The arborist assessment provides recommendations for tree protection during the proposed redevelopment works and identifies trees to be removed based on the tree health, site plans, proximity to building envelope, and proposed heavy construction activities. Twenty-five trees are recommended for removal from the subject property as part of the proposed works including trees on and off-property, within and outside of the 15-m setback. There are eight trees proposed for removal from within the subject property riparian setback area. A summary table of proposed trees to be removed from the subject property as part of redevelopment is provided in Table 1.

Table 1: Summary table of proposed trees to be removed.

Tree ID	Species	DBH (cm)	Comment	Location
#1	Laurel	35/31/24 (multi-stem)	Poor Health	Off-property
#6	Lawson Cypress	77	Fair Health	Riparian – Subject Property
#18	Western Red Cedar	39	Fair Health	Riparian – Subject Property
#19	Western Red Cedar	45	Poor Health	Riparian – Subject Property
#20	Western Red Cedar	52	Fair Health	Riparian – Subject Property
#21	Western Red Cedar	31	Poor Health	Riparian – Subject Property
#22	Western Red Cedar	33	Fair Health	Riparian – Subject Property
#23	Western Flowering Dogwood	49	Very Poor Health	Riparian – Subject Property
#24	Western Red Cedar	24	Poor Health	Riparian – Subject Property
#25	Western Red Cedar	32	Fair Health	Subject Property
#26	Western Red Cedar	57	Fair Health	Subject Property
#27	Western Red Cedar	54	Fair Health	Subject Property
#28	Western Red Cedar	61	Fair Health	Subject Property
#29	Western Red Cedar	69	Fair Health	Off-property (District Boulevard)
#30-40	Western Red Cedar	16 - 65	Very Poor Health	Off-property (District Boulevard)

## Habitat Balance

### Habitat Impacts:

#### **5-m to 15-m setback**

New dwelling, secondary dwelling, and associated structures - 133 m<sup>2</sup>

### Habitat Gains:

#### **ToB-m to 5-m setback**

Removal of covered pool/wooden deck, pavers, rock walls and structures, patio areas, and main dwelling + 91 m<sup>2</sup>

#### **5-m to 15-m setback**

Removal of main dwelling, pathways, and retaining wall +45 m<sup>2</sup>

#### **Net Habitat Gain**

**+ 3 m<sup>2</sup>**

*Additional habitat improvements: Riparian Replanting Plan*

*+ 250 m<sup>2</sup>*

## Riparian Restoration

The proposed development footprint will be located entirely outside the 5-m setback and the main dwelling structures will be located predominantly over existing structures within the riparian setbacks. The secondary dwelling will be located predominantly within the 15-m setback over what is currently undeveloped lawn surface. The proposed main dwelling footprint has been moved east and further away from Rodgers Creek. Existing hard surfaces, including portions of the existing covered pool/wooden deck, greenhouse, rockscape and patio areas will be replaced with native, riparian suitable vegetation.

Riparian revegetation with suitable native plant species, as outlined in the attached riparian planting plan, should be conducted to enhance the vegetative buffer between the proposed development and the watercourse. The riparian replanting polygon delineated adjacent to the watercourse should be revegetated with competitive native stock for a minimum total riparian planting area of 250 m<sup>2</sup> (see Riparian Planting Plan). The planted vegetative buffer will function to delineate the riparian area and protect the adjacent watercourse in addition to providing additional habitat for local flora and fauna suited to native riparian conditions.

Invasive species identified within the riparian planting polygons, specifically groundcover species, should be removed by hand and disposed of appropriately prior to riparian re-vegetation within the riparian setback. Material import and export activities to and from the subject property should implement invasive species best management practices to prevent the spread and proliferation of invasive species. If off site disposal is required, mitigate the risk of spread by bagging, tarping securely, or sealing invasive species vegetative and soil materials in a container during transport to an appropriate disposal site.

## Construction Mitigation

Due to the proximity of redevelopment to the subject watercourse, an Erosion and Sediment Control (ESC) Plan has been developed for maintenance of ambient water quality during development activities. Information pertaining to location and details of silt fencing, site drainage management and treatment, access/egress route armouring, catch basin protection, tree protection, and dewatering are included on the ESC Plan. As part of the proposed site redevelopment, the following should be implemented during demolition and construction:

- Stockpiles of excavated material should be consolidated, bucket-packed, and covered with polyethylene sheeting (“poly”) to minimize erosion.
- All concrete pours of foundation walls or slabs should be covered over with poly to prevent creation of alkaline drainage and unintentional input to the watercourse.
- Machinery access and truck loading should be limited to prepared rock/gravel access and/or existing paved driveway areas only.
- If significant trucking is expected, sweeping should be conducted on affected areas of Bellevue Avenue to recover any fines tracked onto the road.
- Catch basin protection (silt sacks) should be installed on adjacent catch basins and maintained regularly to ensure proper functioning.
- All import material is to be clean, inert, and free of contamination.
- Installation of sediment fence Sediment fence along southern perimeter of subject property construction footprint and along the west property line.
- Installation of tree protection measures in accordance with the Arborist Report.

## Additional Measures Required for Pool Removal

- Prior to any work, snow fence/construction fence will be installed along the the rock wall (Rodgers Creek left bank) at ToB to create a clear delineation for demolition contractors. Environmentally sensitive signage should be installed along this fence to ensure personnel are aware that no deleterious material is permitted to access the adjacent watercourse. All materials removed during pool, deck and hard surface demolition should be pulled away from ToB to ensure no materials enter Rodgers Creek.
- If applicable, dust generated during concrete cutting for pool demolition should be suppressed with water.
- If alkaline water is generated as a result of concrete cutting, it must be contained and removed off-site. Note additional mitigation measures to treat alkaline water are available and may be discussed with the ESC Supervisor during demolition.
- Once the excavation is back filled, silt fence will be installed along the TOB to prevent sediment laden water from entering Rodgers Creek during the construction/landscape phases. Silt fence and construction fencing must remain in place until riparian landscaping is complete.
- Note – Contractors should be aware that an engineer may need to asses the wall at varying stages of demolition, backfilling and following planting to ensure the stability of the retaining adjacent to the existing pool.

Prior to the issuance of a building permit by the DWV, the owner and/or developer will be required to engage an appropriately qualified ESC supervisor to monitor compliance with the approved ESC Plan as well as requirements of the DWV Watercourse Protection Bylaw 4364, 2005. As a requirement, ESC inspections are set based on the following schedule:

- Biweekly inspections **1 June – 30 September** (dry season),
- Weekly inspections **1 October – 31 May** (wet season), and
- As required during or immediately following precipitation events exceeding **20 mm within 24 hours**

It is the responsibility of the owner and/or developer to contact their ESC supervisor prior to commencing earthworks, construction, or any other activities of ground disturbance. It is recommended that a preconstruction meeting be held to ensure that contractors are aware of the ESC requirements.

As per DWV Interim Tree Bylaw No. 4892, 2016, tree protection fencing, and signage must be installed and maintained to prevent damage to trees or their root systems during construction activities. This fencing should be installed around each tree to be retained post development and may be constructed in conjunction with silt fencing where appropriate. Tree protection fencing must be inspected and approved prior to the commencement of development works.

## Conclusions

In the opinion of SEI, the redevelopment at 2859 Bellevue Avenue as proposed addresses DWV Watercourse Protection Guidelines as follows:

- *Locate development on portions of the site that are least environmentally sensitive – **The proposed main dwelling development is to be relocated further east such that it is located entirely outside of the 5-m setback and further away from Rodgers Creek than the existing. The secondary dwelling will be located entirely outside of the 5-m setback over surfaces that currently consist predominantly of lawn.***
- *Avoid net loss of riparian habitat within 15-m of the top of the watercourse bank or edge of the wetland – **The habitat balance for the proposed development demonstrates a net positive habitat gain of 3 m<sup>2</sup>.***
- *Within 15 metres of the top of the watercourse bank or edge of wetland, locate new buildings, structures and impervious/semi-impervious surfaces at least as far from the watercourse or wetland as any existing development – **Currently, the closest existing structure to the watercourse is the bridge crossing at ToB and the closest foundation structure is the covered pool/wooden deck located at ToB. New structures associated with the proposed development will be located outside of the 5-m setback; no closer than existing.***
- *Keep free of new buildings, structures, and impervious/semi-impervious surfaces the area within 5 metres of the top of the watercourse bank or edge of the wetland – **No new structures are proposed within the 5-m setback. The existing driveway alignment and bridge crossing will be maintained as part of future development.***

- *Enhance, and where feasible, restore watercourses in already developed areas to improve watercourse quality from uplands to inlets – **The implementation of the Riparian Planting Plan will serve to increase the buffering capacity between the subject property development and the watercourse, and provide additional habitat for local flora and fauna suited to native riparian conditions.***

Upon review of habitat impacts associated with proposed redevelopment of 2859 Bellevue Avenue, West Vancouver, BC, it is the opinion of SEI that planned works pose no significant risk of Serious Harm to Commercial, Recreational, or Aboriginal (CRA) fisheries as defined by Sec. 35(1) of the Canada *Fisheries Act* provided that best management practices are implemented as described herein. With construction mitigation implemented as recommended, the proposed development meets municipal bylaw requirements under the District of West Vancouver environmental development bylaws.

Please contact the undersigned if you require any additional information or clarification of the above.

Sincerely,

**Sartori Environmental Inc**

**Authored by:**



**Assunta McCullough, B.Sc., B.I.T.**

**Reviewed and Endorsed by:**

*The undersigned certifies the work described herein fulfills standards acceptable of a Professional Biologist.*



**J. Stephen Sims, R.P. Bio.**

*Senior Biologist/Director*

*(e) [steve@sartorienv.com](mailto:steve@sartorienv.com); (m) 604.319.6078*

**(5) Attachments**

- Figure 1: Habitat Balance Plan (2018-11-15; Rev00)
- Figure 2: Riparian Planting Plan (2018-11-15; Rev00)
- Figure 3: Erosion and Sediment Control Plan (2018-11-13; Rev01)
- Figure 4: Erosion and Sediment Control Details (2018-11-13; Rev00)
- Arborist Report – Talus Arboriculture & Landscaping Architecture (2018-10-24; Rev#1)

## Photodocumentation



Photo 1. Rodgers Creek looking downstream at the Bellevue Avenue culvert crossing and at the 5-m setback (2018-10-25).



Photo 2. Looking upstream at Rodgers Creek and the existing bridge crossing and dwelling (2018-10-25).



Photo 3. Proposed secondary dwelling location; partially within the 15-m setback (2018-10-25).



Photo 4. Covered pool/ wooden deck located at ToB (2018-10-25).

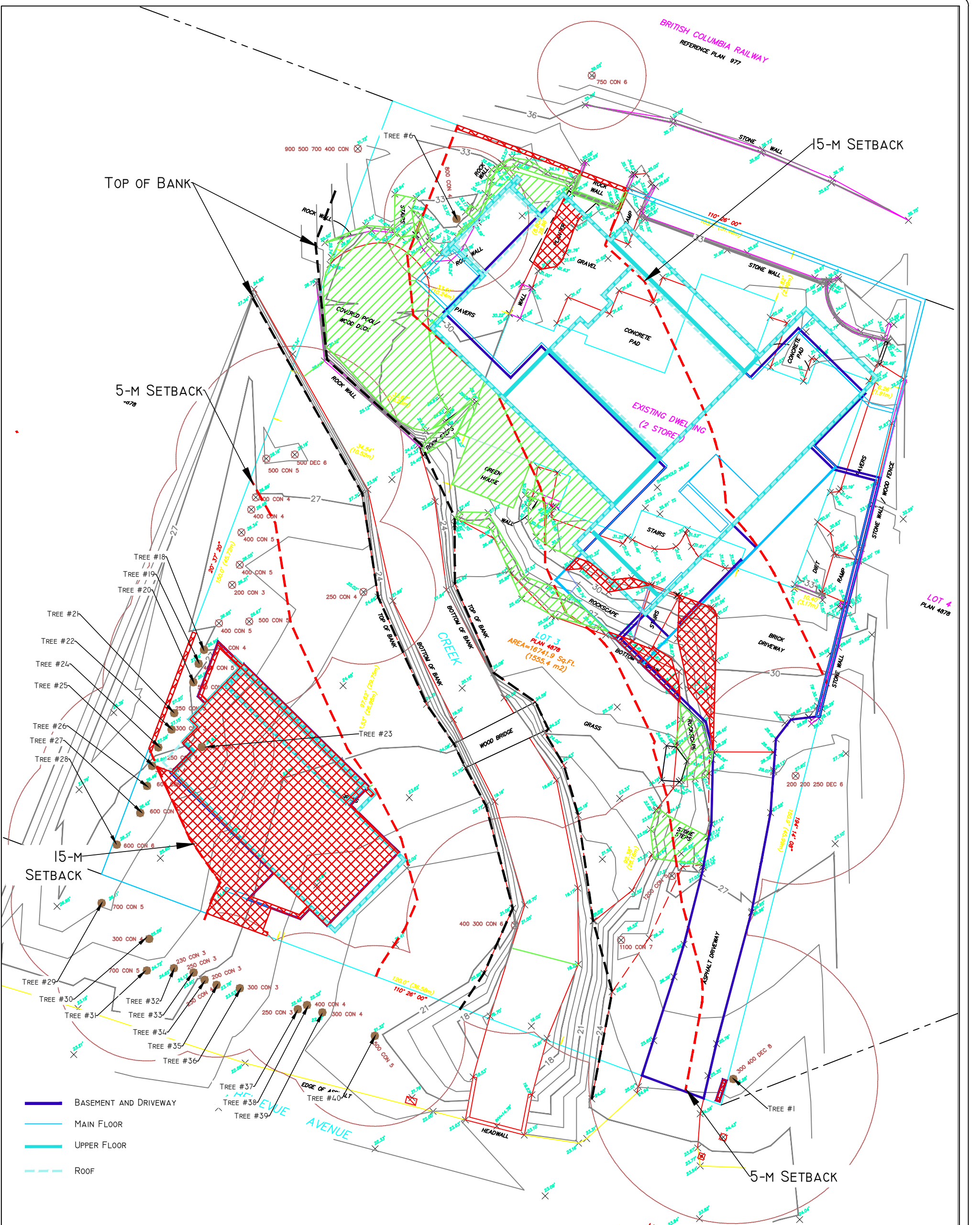


Photo 5. Right bank 5 and 15-m setback (2018-10-25).



Photo 6. Rodgers Creek and typical front yard riparian landscape (2018-10-25).





**Habitat Balance Within 15m Top of Bank**

*Habitat Impacts:*

**5m → 15m Setback:**

New dwelling, secondary dwelling and associated structures - 133 m<sup>2</sup>

*Habitat Gains:*

**ToB → 5m Setback**

Removal of covered pool/wooden deck, pavers, rock walls and structures, patio areas, and main dwelling + 91 m<sup>2</sup>

**5 → 15m Setback**

Removal of existing dwelling, pathway, and retaining wall + 45 m<sup>2</sup>

**Net Habitat Gain**

**+ 3 m<sup>2</sup>**

RECOMMENDED TREE REMOVAL

HABITAT GAINS

HABITAT IMPACTS

TOP OF BANK

DWV SETBACKS



2859 BELLEVUE AVENUE  
HABITAT BALANCE  
ENVIRONMENTAL SETBACK DRAWING

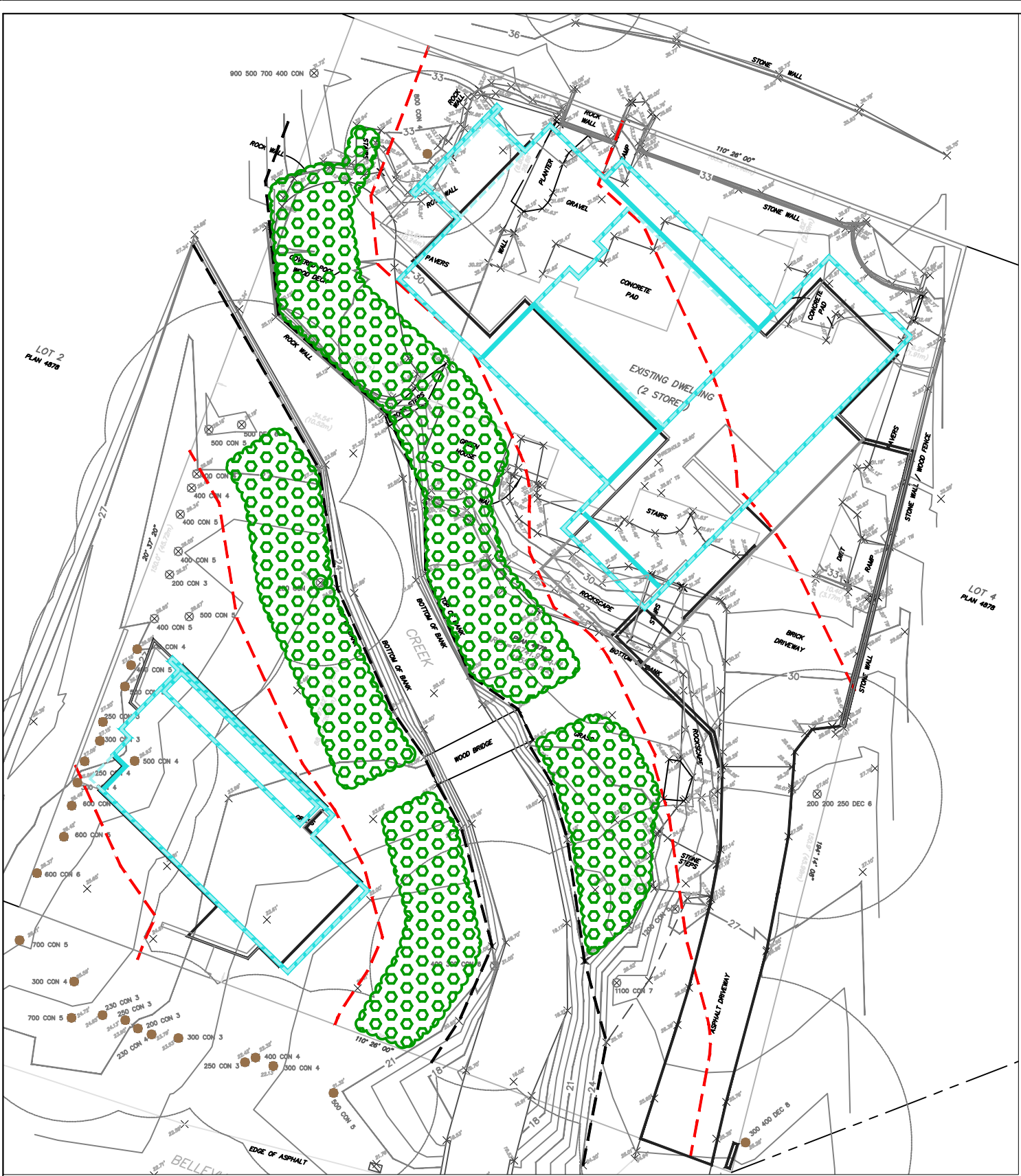
DATE 2018-11-15

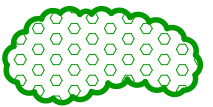
FIGURE I: HABITAT BALANCE

REV 00

DRAWN BY S.W.

SCALE 1:200



 250 M<sup>2</sup>  
 RIPARIAN PLANTING AREA  
 (1 PLANT PER 1.5 M<sup>2</sup>)

### Riparian Planting Plan

- The following riparian conditions have been determined:
- **Riparian Area Elevation:** 5- 10 MASL
  - **Watercourse Slope (on-property):** ~5-10%
  - **Watercourse Orientation/Flow:** North → South

Approximately **250 m<sup>2</sup>** of planting is proposed at an average density of 1 plant per **1.5 m<sup>2</sup>** within identified riparian planting areas to accommodate for calculated habitat gains, compensate for habit impacts, and increase the overall biological productivity of the watercourses riparian zone. Plant species have been selected with consideration to plant community, competitive nature, shade tolerance, growth rates and rate of spread. Efforts should be taken to retain existing native vegetation in-place or by careful storage and transplant. The following planting list is recommended (if species substitutions are desired due to reasons of aesthetics or plant stock availability, Sartori Environmental Inc should be contacted at 604.987.5588 to consider the approval):

\*Note\* Nurseries should be contacted as early as possible as larger specimens may need to be special ordered.

<u>Coniferous Trees</u>	<u>Deciduous Trees</u>	<u>Shrubs</u>
(3.0 - 5.0m Spacing from other coniferous trees, and purchased at a minimum height of 2.0m, unless otherwise specified)	(1.5 - 3.0m spacing from other deciduous and coniferous trees, and purchased at a minimum height of 1.2m, unless otherwise specified)	(0.25 - 1.0m spacing from other vegetation and purchased in minimum #1 or one gallon containers)
Western Redcedar <i>Thuja plicata</i> Western Hemlock <i>Tsuga heterophylla</i> Douglas Fir <i>Pseudotsuga menziesii</i>	Red Alder <i>Alnus rubra</i> Pacific Willow <i>Salix lucida</i> ssp. <i>lasianдра</i> Bitter Cherry <i>Prunus emarginata</i>	Salmonberry <i>Rubus spectabilis</i> Red huckleberry Red-osier Dogwood <i>Cornus stolonifera</i> Western Swordfern <i>Polystichum munitum</i> Salal <i>Gaultheria shallon</i>
<b>TOTAL - 15*</b>	<b>TOTAL - 34**</b>	<b>TOTAL - 121</b>
* coniferous trees must be purchased at a height of at least 2.0 m	** deciduous trees must be purchased at a height of at least 1.2m.	

### Purchasing, Site Preparation and Planting

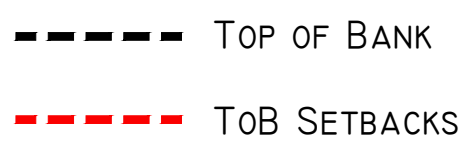
Botanical names should be referenced when purchasing to ensure accuracy and all specimens should be of guaranteed nursery stock. Purchased stock should be tagged with species name, and tags should be left on after planting for the purpose of planting confirmation. Nursery stock should be a minimum of two years old at purchase to ensure developed root systems and increase the likelihood of survival. Once plant stock is received onsite, specimens should be stored in a cool, shady location and watered regularly.


Planting should be undertaken during the fall (Sep - Oct) or spring (Mar - Apr) for maximized probability of survival. Prior to planting, it should be ensured that adequate soil structure and nutrient content exist through appropriate storage of existing onsite material or import of organic growing medium. If growing medium is to be retained from onsite, consideration should be given to organic stockpile depth (no greater than 1.0m) and length of storage time (ideally less than 1 month) to maintain nutrient cycling, microbial activity and viability of native seed stock. Once placed, factors affecting soil compaction (i.e. traffic, machine movement, material storage) should also be considered. If material import is required for growing medium, it should be inert and certified free of invasive or noxious weed species. Holes should be dug 2-3 times larger than the size of the roots and soil should be non-compacted. Root ball untangling, pruning, splitting and burlap sack removal should be done in a means suitable to allowing the newly planted roots to spread and avoid root girdling. If in doubt, supplier planting prescriptions should be consulted. Regular watering and/or fertilizer application may also be required to ensure adequate recruitment.

The following plant spacings are included as a guideline, and clustering of plants around preferred microsites (e.g., woody debris, large trees, wetted depressions on dry sites, drier mounds on wet sites, etc.) is preferred to a standard grid formation. **Coniferous Trees** should be 2.0m (Min) height and planted 3.0 - 5.0m away from other coniferous trees. **Deciduous Trees** should be 1.2m (Min) height and planted 1.5 - 3.0m away from other coniferous and deciduous trees. **Shrubs** should be purchased in minimum 1 gallon pots and planted 0.25 - 1.0m away from other vegetation.

All acquired plant materials shall be healthy, with well developed root systems and top growth, and shall be free of disease, insect infestation and the following defects at all times: broken tops, torn roots and abrasions of bark on trunk and branches; dried out root systems; prematurely opened or damaged buds; dry, loose or broken ball of earth; evidence of heating, moulding, or freezing damage; thin, poor root or top systems, and abnormal leaf colour.

Invasive plant species removal should be conducted prior to replanting. An extensive proliferation of Japanese Knotweed (*Fallopia japonica*) is present directly adjacent to and within the watercourse. A minimum three-year treatment program is typically recommended for the eradication of this noxious weed. Refer to the EDP report regarding recommendations for invasive plant species removal.



	2859 BELLEVUE AVENUE RIPARIAN PLANTING PLAN ENVIRONMENTAL DEVELOPMENT PERMIT FIGURES	
	DATE 2018-11-13 DRAWN BY S.W.	FIGURE 2: RIPARIAN PLANTING PLAN SCALE 1:200

PRIOR TO THE START OF DEMOLITION SNOW FENCING/ CONSTRUCTION FENCING WILL BE INSTALLED ALONG THE ROCK WALL AT ToB. INSTALL ENVIRONMENTALLY SENSITIVE SIGNAGE ALONG THE FENCE DELINEATING THE AREA FOR DEMOLITION CREWS.

ALL POOL, DECK AND HARD SURFACE DEMOLITION SHOULD BE PULLED AWAY FROM ToB TO ENSURE TO MATERIALS ENTER THE CREEK.

SUPPRESS DUST CREATED IN THE POOL DEMOLITION WITH WATER. ALL ALKALINE WATER GENERATED DURING CONCRETE CUTTING SHOULD BE CONTAINED AND REMOVED OFF-SITE.



**EROSION AND SEDIMENT CONTROL NOTES**

1. THIS EROSION AND SEDIMENT CONTROL (ESC) PLAN HAS BEEN PREPARED FOR 2859 BELLEVUE AVENUE, WEST VANCOUVER.
2. UNDER THIS ESC PLAN, IT IS THE RESPONSIBILITY OF THE OWNER, CONTRACTOR OR DEVELOPER TO ENSURE THAT ALL OF THE EROSION AND SEDIMENT CONTROL FACILITIES DESCRIBED UNDER THIS ESC PLAN ARE CONSTRUCTED, IMPLEMENTED, INSTALLED AND MAINTAINED FOR THE DURATION OF DEMOLITION, AND UNTIL REMOVAL/DECOMMISSIONING IS RECOMMENDED BY THE ESC MONITOR (SEE ESC MONITORING SECTION BELOW).
3. THE CONSTRUCTION CONTRACTOR, AND ALL OTHER SUB-CONTRACTORS OR PERSONS INVOLVED WITH SITE DEMOLITION SHALL COMPLY WITH FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT LAWS AND REGULATIONS PERTAINING TO THE PROTECTION OF FISH AND AQUATIC HABITAT AND EROSION AND SEDIMENT CONTROL, AND IN PARTICULAR DISTRICT OF WEST VANCOUVER'S WATERCOURSE PROTECTION BYLAW NO. 4364, 2005 SCHEDULE A, ADDITIONAL ESC RESOURCES ARE AVAILABLE IN SECTION 3.7.3 EROSION AND SEDIMENT CONTROL WITHIN DEVELOP WITH CARE (2014), SECTION 3 - SITE DEVELOPMENT AND MANAGEMENT (<http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare/DWC-Section-3.pdf>).
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND ANY SUB-CONTRACTORS TO ENSURE THAT WATER DISCHARGING FROM THE SITE SHALL NOT EXCEED THE WATER QUALITY STANDARD OF 75 MG/L FOR TOTAL SUSPENDED SOLIDS (TSS) FOLLOWING A SIGNIFICANT RAINFALL EVENT. A SIGNIFICANT RAINFALL EVENT IS DEFINED AS A PRECIPITATION EVENT THAT MEETS OR EXCEEDS THE INTENSITY OF 20 MM OF TOTAL RAINFALL OVER A 24 HOUR PERIOD.
5. DEPENDENT ON SITE CONDITIONS, WEATHER CONDITIONS, OR UNFORESEEN OBSTACLES DURING CONSTRUCTION ACTIVITIES, THE ESC MONITOR OR PROJECT MANAGER, AT THEIR DISCRETION, MAY RECOMMEND THAT ESC FACILITIES AND MITIGATION MEASURES BE ADDED TO THE SITE, OR RECOMMENDED ESC FACILITIES BE MODIFIED AS REQUIRED TO COMPLY WITH BYLAW NO. 6515. THE CONTRACTOR SHALL COMPLY WITH THE DIRECTIONS OF THE ESC MONITOR AND THE PROJECT MANAGER, AND SHALL ENSURE THAT ESC FACILITIES ARE CONSTRUCTED, IMPROVED, REPAIRED AND MAINTAINED AS A PRIORITY AHEAD OF ALL OTHER SITE CONSTRUCTION ACTIVITIES.

**EARTHWORKS & GRADING**

6. REFER TO THE ADJACENT SITE PLAN AND ATTACHED DETAILS FOR RECOMMENDED SITE-SPECIFIC ESC MEASURES. ALTERATIONS TO THE PLAN SHOULD BE IN CONSULTATION WITH THE APPROVED ESC MONITOR.
7. STRIPPING, PRELIMINARY EXCAVATION, AND TRENCHING WORKS ARE TO BE CONDUCTED DURING FAVORABLE WEATHER TO MINIMIZE EROSION AND GENERATION OF SEDIMENT-LADEN DRAINAGE.
8. TRUCK AND VEHICLE ACCESS TO THE WORKS AREA IS TO BE CONFINED, AS MUCH AS POSSIBLE, TO DEFINED ACCESS POINTS FROM PUBLIC ROADS TO PREVENT SILT TRACKING TO PAVED SURFACES. PAVED ACCESS ROADS SHOULD BE EMPLOYED TO PREVENT UNNECESSARY SEDIMENT TRACKING TO PUBLIC ROADS FROM MACHINERY AND VEHICLES.
9. THE CONSTRUCTION CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING CLEAN PUBLIC ROADS ADJACENT TO THE SITE THROUGH PERIODIC SWEEPING AND SCRAPING AS REQUIRED.
10. ALL CATCH BASINS ADJACENT TO ACTIVE WORKS AND CONSTRUCTION ACCESS ROUTES ARE TO BE PROTECTED AS REQUIRED WITH CATCH BASIN PROTECTION DEVICES IF SEDIMENT DEPOSITION IS OBSERVED (DETAIL D).
11. NO SITE DRAINAGE IS TO FLOW DIRECTLY TO THE MUNICIPAL STORM SYSTEM, WITHOUT PRIOR TREATMENT (e.g. SEDIMENT CONTROL POND).
12. EXPOSED CUT AND/OR FILL SLOPES ARE TO BE COVERED WITH DENSE APPLICATION STRAW, COMPOSTABLE MATTING, STAKED-IN POLYETHYLENE TARPING, OR EQUIVALENT TO PREVENT EROSION WHILE POOR WEATHER EXISTS.
13. STOCKPILES OF ERODABLE MATERIALS (e.g. EXCAVATION SPOIL, CLAYS, PIT RUN, TOPSOIL, etc.) WILL BE COVERED WITH STAKED-IN POLYETHYLENE TARPING OR EQUIVALENT WHEN NOT IN USE AND ALWAYS PRIOR TO AND DURING FORECAST PRECIPITATION. NON-ERODABLE MATERIALS WILL BE STOCKPILED ON PAVED SURFACES.

**ESC MONITORING PROGRAM**

14. AN ESC SUPERVISOR WILL BE CONFIRMED PRIOR TO ISSUANCE OF THE ESC PERMIT THROUGH A CONFIRMATION OF COMMITMENT BY ESC SUPERVISOR. THE ESC MONITOR WILL IMPLEMENT THE FOLLOWING MONITORING SCHEDULE:
  - a. JUNE 1 TILL SEPTEMBER 30 - BIWEEKLY OR AS REQUIRED IF PRECIPITATION EXCEEDS 20MM IN 24HRS.
  - b. OCTOBER 1 TILL MAY 31 - WEEKLY OR AS REQUIRED IF PRECIPITATION EXCEEDS 20MM IN 24 HRS.
15. THE OWNER/DEVELOPER IS REQUIRED TO CONTACT THE CONFIRMED ESC MONITOR BY EMAIL AT MINIMUM 72 HRS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO SET-UP A SITE KICK-OFF MEETING. AT THIS TIME, AND THROUGHOUT CONSTRUCTION, THE ESC MONITOR WILL ADDRESS POTENTIAL CONFLICTS BETWEEN THIS ESC PLAN AND ACTUAL SITE CONDITIONS. THE ESC MONITORING WILL CONTINUE UNTIL ALL SITE SURFACES ARE AT FINAL GRADE, BUILDING IS CONSTRUCTED AND DISTURBED SURFACES ARE VEGETATED.
16. THE ESC SUPERVISOR WILL INSPECT AND MONITOR THE ESC FACILITIES TO ENSURE SEDIMENT AND SEDIMENT LADEN WATER DO NOT REACH THE MUNICIPAL DRAINAGE SYSTEM WITHOUT TREATMENT AND THE FACILITIES HAVE BEEN INSTALLED AS DESIGNED, ARE OPERATING EFFECTIVELY, AND TO DETERMINE IF ANY REPAIR OR MAINTENANCE OF THE FACILITIES ARE REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE OF ALL ESC FACILITIES OVER THE COURSE OF WORKS. THE ESC MONITOR MAY MODIFY OR ADJUST ESC FACILITIES AS REQUIRED IN ORDER TO ASSURE COMPLIANCE WITH THE MUNICIPAL BYLAW.
17. AT THE DISCRETION OF THE ESC MONITOR, SITE SAMPLING (TURBIDITY SAMPLING) MAY BE CONDUCTED DURING EACH SITE VISIT. IF HIGH TURBIDITY ( $\geq 65$ NTU) IS OBSERVED, A TSS WATER SAMPLE MAY BE COLLECTED AND SUBMITTED TO THE LABORATORY FOR ANALYSIS. LABORATORY ANALYSIS WILL BE MADE AVAILABLE UPON REQUEST.
18. THE ESC MONITORING PROGRAM SHOULD CONTINUE FROM THE START OF CONSTRUCTION TO SUCH A TIME THAT THE ESC MONITOR DETERMINES THAT FURTHER MONITORING IS NO LONGER REQUIRED AS CONSTRUCTION PROGRESS HAS REACHED FINAL STAGES AND THE RISK TO THE SURROUNDING ENVIRONMENT IS NEGLIGIBLE. THE ESC MONITOR WILL PROVIDE THE DISTRICT OF WEST VANCOUVER'S ENVIRONMENTAL STAFF WITH CONFIRMATION VIA EMAIL THAT THE MONITORING PROGRAM HAS CEASED.

**TREE PROTECTION**

19. NATIVE TREES TO BE RETAINED THROUGH DEVELOPMENT SHOULD BE ADEQUATELY PROTECTED DURING CONSTRUCTION PHASES TO SATISFY REQUIREMENTS OF DISTRICT OF WEST VANCOUVER INTERIM TREE BYLAW, NO. 4892, 2016. TREES MUST BE PROTECTED DURING ACTIVITIES (I.E., EXCAVATION, DEMOLITION, ETC.) THAT HAVE THE POTENTIAL TO IMPACT THE ABOVE GROUND OR ROOT STRUCTURE OF THE TREE. THE CRITICAL ROOT ZONE (CRZ) OF ANY TREE MAY EXTEND BEYOND THE VISUAL DRIP LINE, AND THEREFORE TREE PROTECTION BARRIERS MUST BE INSTALLED IN ACCORDANCE WITH THE TALUS CONSULTING ARBORIST REPORT (OCTOBER 24, 2018).
20. ANY EXCAVATION OR MACHINE ACTIVITY THAT IS REQUIRED WITHIN THE CRZ OF A TREE SHOULD BE COMPLETED BY HAND, AND UNDER THE DIRECTION OF A CERTIFIED ARBORIST OR APPROPRIATELY QUALIFIED ENVIRONMENTAL PROFESSIONAL.
21. TREE PROTECTION FENCING SPECIFICATIONS MUST BE IN ACCORDANCE WITH THE ARBORIST REPORT RECOMMENDATIONS.
22. IF OBSTACLES EXIST TO TREE BARRIER PLACEMENT, ALTERNATIVE PROTECTION FENCING ALIGNMENT AND PLACEMENT, OR ALTERNATIVES TO PROTECTION METHODOLOGY MUST BE APPROVED BY SARTORI ENVIRONMENTAL INC PRIOR TO IMPLEMENTATION.

**SILT FENCING (DETAIL A)**

AFTER DEMOLITION AND BACKFILL INSTALL SILT FENCE ALONG ToB TO ENSURE NO DELETERIOUS MATERIALS ENTER THE CREEK DURING CONSTRUCTION AND LANDSCAPING PHASES.

A COLLECTION SUMP AND SUBMERSIBLE PUMP SHOULD BE INSTALLED TO CONVEY SITE WATER FROM WITHIN THE FOUNDATION EXCAVATION TO THE SEDIMENT CONTROL POND. SUMP SHOULD BE SURROUNDED BY CLEAN GRAVELS TO MINIMIZE PUMP CLOGGING DUE TO COARSE SEDIMENTS. CONTRACTOR SHOULD DETERMINE THE PRACTICALITY OF INSTALLING A FLOAT SWITCH IN THE SUMP VERSUS MANUAL PUMP OPERATION.

A SEDIMENT CONTROL POND (DETAILS B & C) SHOULD BE CONSTRUCTED, IF RECOMMENDED BY THE ESC MONITOR, TO TREAT POTENTIALLY SEDIMENT LADEN WATER DURING SITE EXCAVATION AND GRADING PHASES OF CONSTRUCTION. CLEAN, TREATED WATER SHOULD BE DISCHARGED PASSIVELY OR BY SUSPENDED PUMP SYSTEM TO VEGETATION, THE WATERCOURSE OR A STORMWATER INTERCONNECTION. POND DESIGN, IMPLEMENTATION AND REMOVAL SHOULD BE DISCUSSED WITH THE ESC MONITOR IN THE FIELD TO ADDRESS ISSUES OF EFFICIENCY AND FEASIBILITY DEPENDENT ON BOTH SITE AND WEATHER CONDITIONS.

TEMPORARY ARMoured ACCESS/EGRESS ROUTE: COMPACTED 4" [MIN] MINUS ROAD BASE, 8" [MIN] LIFT (DETAIL E), OR MAINTAIN EXISTING ASPHALT SURFACE

BELLEVUE AVENUE CATCH BASINS ADJACENT TO SITE ACCESS ROUTE TO BE PROTECTED WITH SILT SACS (TYP) (DETAIL D)

**Ground Disturbance Calculations**  
 Potential ground disturbance: 800 m<sup>2</sup> (0.08ha)  
 Recommended pond volume (Min.): 150m<sup>3</sup>/ha of disturbed soil (Construction Area)  
 Recommended pond volume for site (Min.): 12 m<sup>3</sup>  
 Proposed pond dimensions: 3=8.0m(L) x 3.0m(W) x 0.5m(D)  
 Proposed pond volume: 12 m<sup>3</sup>



SILT FENCING




SNOW/ CONSTRUCTION FENCING

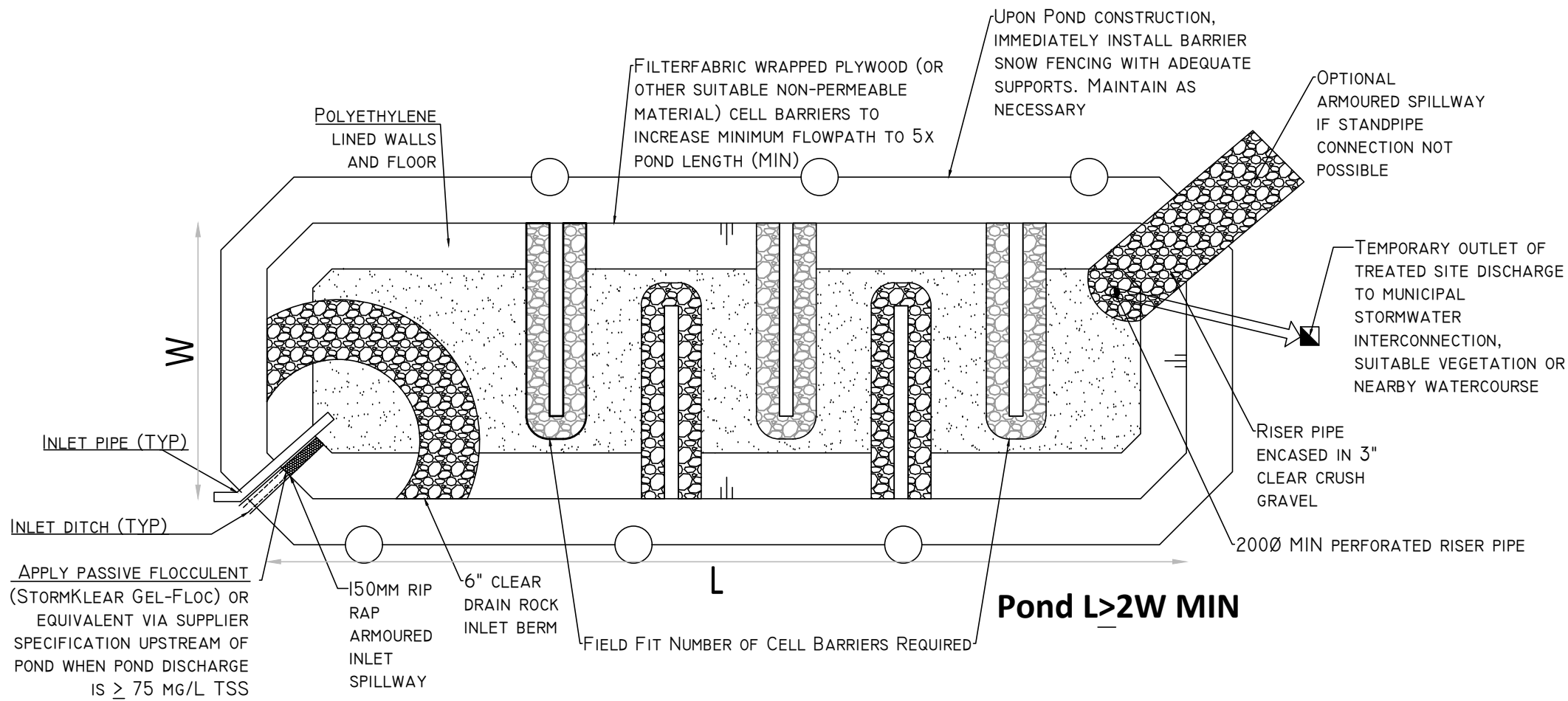


SUMP AND PUMP

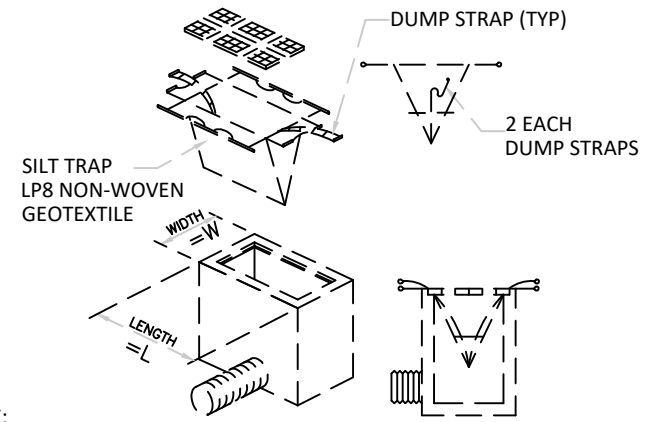


ANTICIPATED RUNOFF PATH

		2859 BELLEVUE AVENUE EROSION AND SEDIMENT CONTROL SITE PLAN (1 OF 2) DWV ENVIRONMENTAL DEVELOPMENT PERMIT FIGURES	
DATE 2019-05-01	FIGURE 3: ESC SITE PLAN		REV 01
DRAWN BY A.M.	Scale 1:200		

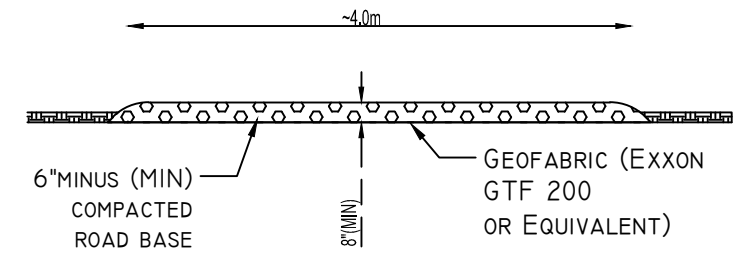


DETAIL B: TYPICAL SEDIMENT CONTROL POND DETAILS (FIELD FIT REQUIRED)

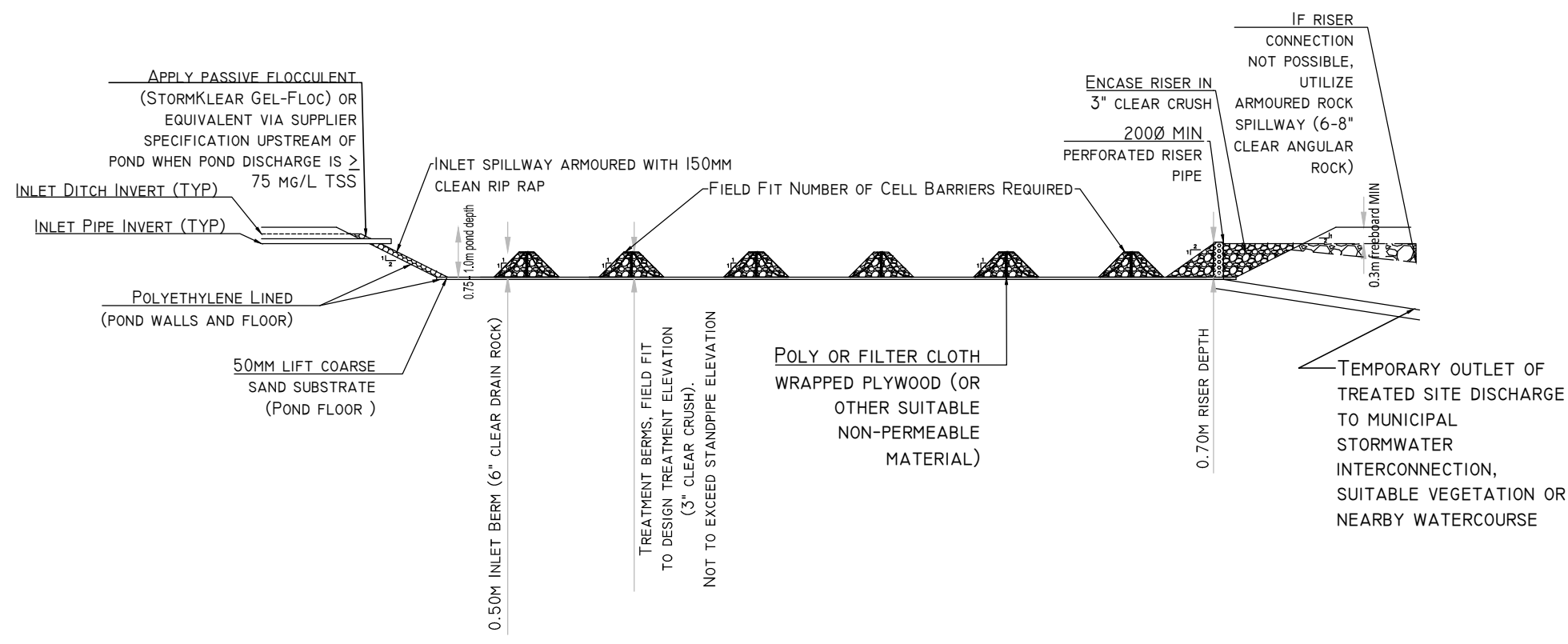


NOTE:  
LAYFIELD (OR EQUIVALENT) CATCH BASIN SILT SACS TO BE USED. STOCK SUPPLY FITS 9"X36" MAX OR 16"X24" MAX CATCH BASINS (TYP).

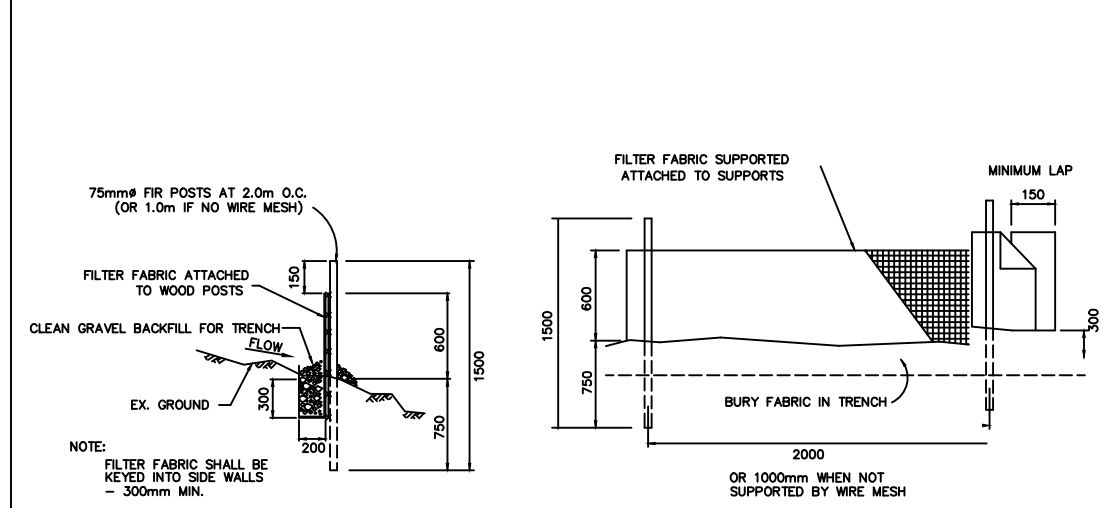
DETAIL D: CATCH BASIN "SILT SAC" TYP



DETAIL E: ACCESS/EGRESS ROAD X-SEC



DETAIL C: TYPICAL SEDIMENT CONTROL POND DETAILS (FIELD FIT REQUIRED)



DETAIL A: SILT FENCE INSTALLATION (TYP)



2859 BELLEVUE AVENUE  
EROSION AND SEDIMENT CONTROL  
DETAILS (2 OF 2)  
DWV ENVIRONMENTAL DEVELOPMENT PERMIT FIGURES

DATE 2018-11-13  
DRAWN BY S.W.

FIGURE 4: ESC DETAILS  
Scale: NOT TO SCALE  
REV 00