CITY OF NANAIMO
THE HARBOUR CITY

DEVELOPMENT PERMIT NO. DP001052

MICHAEL SEAN HARRIS / AMANDA JUDITH HARRIS
Name of Owner(s) of Land (Permittee)

3712 POLARIS DRIVE
Civic Address

1. This development permit is issued subject to compliance with all of the bylaws of the municipality applicable thereto, except as specifically varied or supplemented by this permit.

2. This development permit applies to and only to those lands within the municipality described below, and any and all building structures and other developments thereon:

   Legal Description:

   LOT 1, DISTRICT LOT 39, WELLINGTON DISTRICT, PLAN 32002

   PID No. 001-115-235

3. The land described herein shall be developed strictly in accordance with the following terms and conditions and provisions of this permit and any plans and specifications hereto which shall form a part thereof.

   Schedule A Location Plan
   Schedule B Proposed Site Survey
   Schedule C Environmental Assessment

   a) If the applicant does not substantially commence the development permitted by this permit within two years of the date of this permit, the permit shall lapse.

4. This permit is not a building permit nor does it constitute approval of any signage. Separate applications must be made for a building permit and sign permit.

PERMIT TERMS

5. The City of Nanaimo "ZONING BYLAW 2011 NO. 4500" is varied as follows:

   Section 6.3.1.2 – to reduce the watercourse setback measured from the natural boundary of the sea from 15m to 10.3m.

CONDITIONS OF PERMIT

1. The subject property shall be developed in accordance with the proposed Site Survey prepared by Turner Land Surveying dated 2017-MAY-15 as shown on Schedule B.

2. The subject property shall be developed in accordance with Figure 3 - Planting Plan, as contained within the Environmental Impact and Revegetation Assessment prepared by Aquaparian Environmental Consulting Ltd., dated 2017-DEC-08 as shown on Schedule C.

3. A 5-year maintenance period is required to ensure works are carried out in accordance with the recommendations contained in the Environmental Impact and Revegetation Assessment prepared by Aquaparian Environmental Consulting Ltd., dated 2017-DEC-08 as shown on Schedule C.

   Dead plants are to be replaced until 100% cover is achieved. Weeding and invasive removal is expected to occur three times a year. A certified letter of completion is required from the Qualified Environmental Professional at the end of the 5-year maintenance period.

4. A landscape bond is required at building permit for 100% of the Landscape Bond Estimate as contained within the Environmental Impact and Revegetation Assessment prepared by Aquaparian Environmental consulting dated 2017-DEC-08 as shown on Schedule C (Item 4.2).

AUTHORIZING RESOLUTION PASSED BY COUNCIL
THE **15TH** DAY OF **JANUARY**, **2018**.

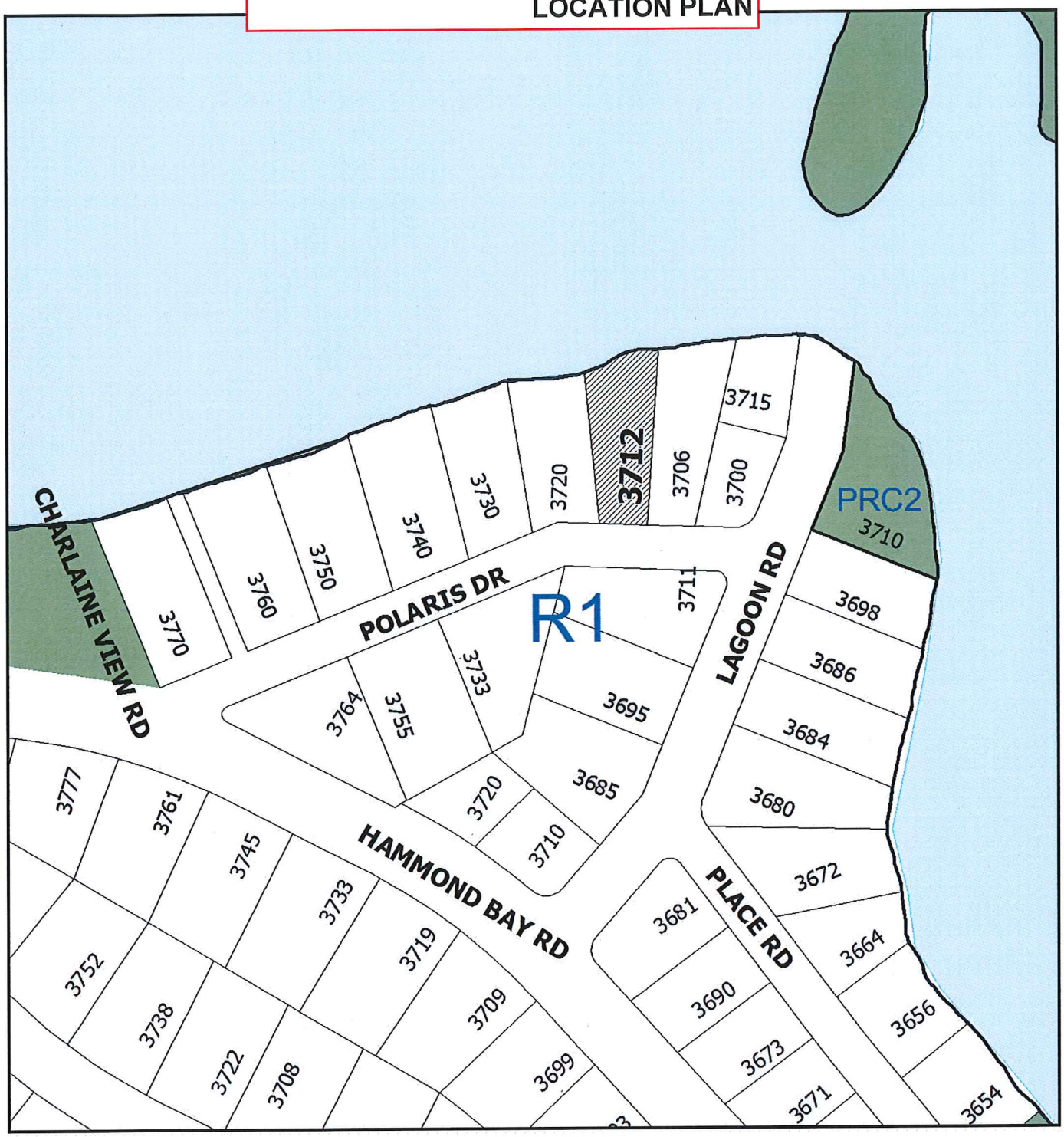
Sheila Gerrie
Corporate Officer

2018-JAN-19
Date

DS/ln
Prospero attachment: DP001052

Development Permit DP001052 **Schedule A**
3712 Polaris Drive

LOCATION PLAN



DEVELOPMENT PERMIT NO. DP001052

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LOCATION PLAN

Subject Property

Civic: 3712 Polaris Drive
Lot 1, District Lot 39, Welington District,
Plan 32002

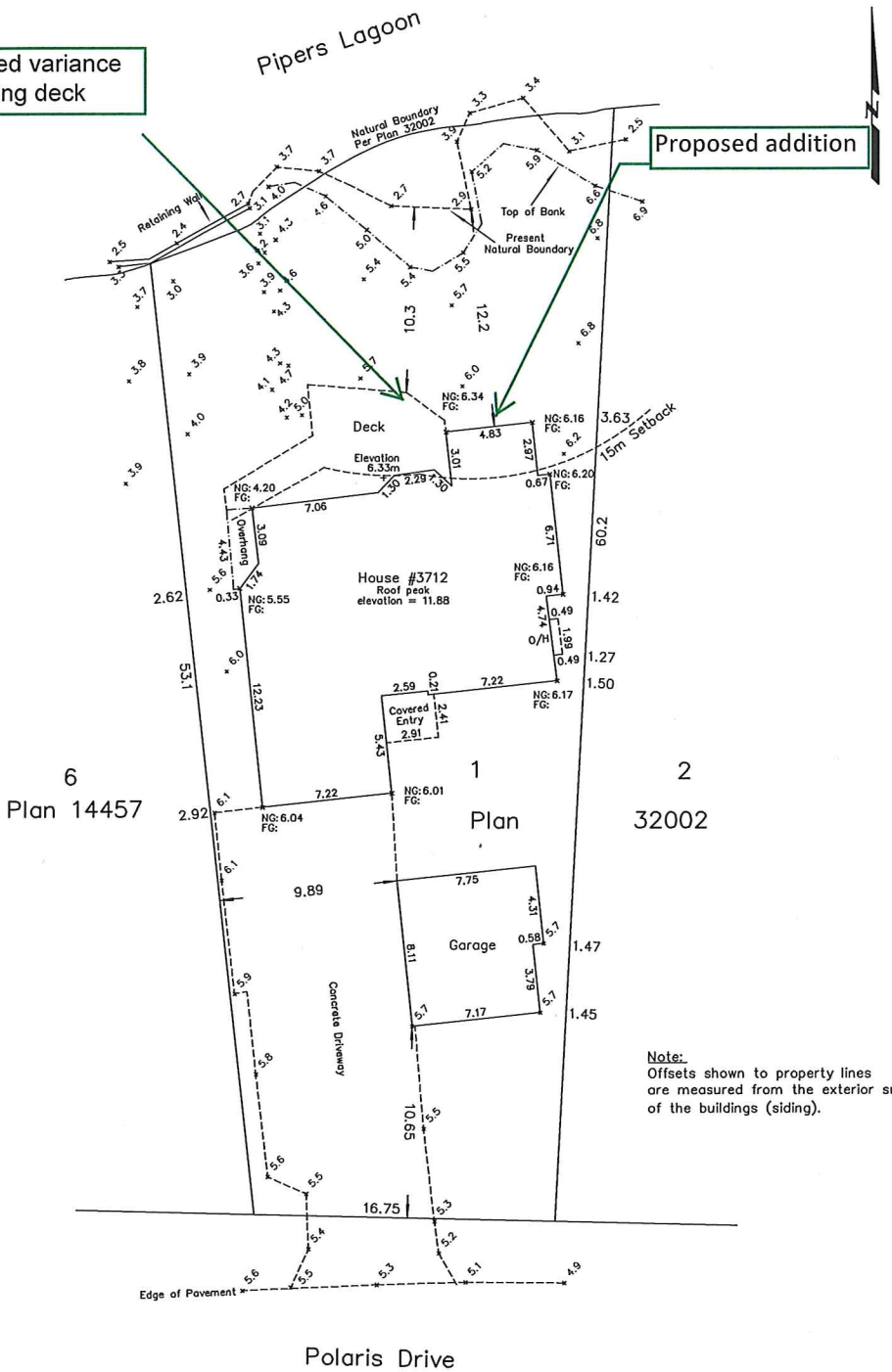
Site Plan showing:
Lot 1, District Lot 39,
Wellington District, Plan

Development Permit DP001052 **Schedule B**

3712 Polaris Drive

PROPOSED SITE SURVEY

h, 2017 | Drawn by: DRW



Note:
Offsets shown to property lines are measured from the exterior surface of the buildings (siding).

0 10 20

Scale 1: 250
Distances and elevations are in metres.
Geodetic elevations are derived from control monument 90H6361.

Note:
This property is affected by the following registered documents:
M76300.

Turner + land surveying

250.753.9778
605 Comox Road
Nanaimo, BC V9R 3J4

Certified correct this 15th day of May, 2017.

B.C.L.S.

(This document is not valid unless originally signed and sealed.)

AQUAPARIAN
Environmental Consulting Ltd.

December 8, 2017

Mike & Amanda Harris
3712 Polaris Drive
Nanaimo BC

Via Email: mike.harris@harrisauto.ca
Cc: Jack Anderson, jack@greenplan.ca

RE: ENVIRONMENTAL IMPACT & REVEGETATION ASSESSMENT (REVISED)
3712 POLARIS DRIVE, NANAIMO BC (REVISED)

1.0 INTRODUCTION

Aquaparian Environmental Consulting Ltd (Aquaparian) was retained to complete an Environmental Impact Assessment and Revegetation Plan for 3712 Polaris Drive, Nanaimo BC. The subject property is waterfront to the Strait of Georgia and is located adjacent to Piper's Lagoon in the City of Nanaimo. The legal description of the property is Lot 1, District Lot 39, Wellington District, and Plan 32002.

Aquaparian understands that the existing house is to be renovated and a second story will be added to the house but no change to the house footprint will result from the proposed renovation. The City of Nanaimo's waterfront Development Permit Area (DPA) extends 15m from the natural boundary of the ocean. Previous encroachment into the DPA with a sunroom and sundeck as well as a new patio requires an adjustment to the setback to bring the development into conformance. The sunroom extends to 12.2m from the Present Natural Boundary (PNB) of the ocean, which is an 18.6% linear encroachment into the DPA. A few centimeters of a bay window fronting onto the sundeck also extends into the DPA. A sundeck attached to the house is also within the DPA and was constructed by the by previous landowners which extends 10.3m from the PNB, which is a 27% linear encroachment into the setback. A small concrete and paving stone patio was recently been added by the current landowners within the DPA up to the top of bank of the foreshore where the retaining wall is located which is a 100% encroachment into the DPA.

This report has been prepared as supporting documentation for the Development Permit application package to bring the property development into conformance and offset the impact to the DPA area. A site location map has been included as Figure 1. The site plan showing the 15m DPA line has been included in Figure 2 and the planting plan diagram for revegetation has been included as Figure 3. A selection of site photographs has been included as Appendix A.

2.0 SITE CONDITIONS

Aquaparian completed a site assessment on April 28, 2017. The existing house has been on the parcel for decades and is in the long established neighbourhood adjacent to Piper's Lagoon Park. Piper's Lagoon Park is comprised of a tombolo and a small group of bedrock islets enclosing an intertidal lagoon with a narrow, shallow opening on the western end. A tombolo is formed by a deposition of gravels and sand forming a spit connecting the mainland to a small island.

The property is located immediately west and outside the entrance of the lagoon and the beach forms the north boundary of the parcel. It is bounded on the south by Polaris Drive. Residential parcels are located on the east (undeveloped, treed) and west sides (developed). The site is sheltered from wind and wave by the islets and shallow intertidal area at the entrance to the lagoon and the shoreline is not subject to erosion.

At least a portion of the house and lawn appears to have been constructed on bedrock. Approximately three quarters of the shoreline fronting the house is formed by a small vertical bedrock cliff (~3m high) with a gravel cobble beach in front. A lawn area extends from the house and deck area to the top of the bedrock cliff. The lawn slopes gradually from east to west ending in a rock retaining wall followed by a lower level terrace of paving stones and a fire pit as well as a paved walkway to the beach fronted by a low concrete seawall; three steps in the walkway access the beach.

Some vegetation is growing on the bedrock comprised of ornamental shrubs and invasive species including some Himalayan blackberry and one large patch of English ivy. A small pocket beach supports some beach vegetation including grass and entire leaved gumweed. A minor amount of native stonecrop is growing on the bedrock face. The site has low to no habitat value.

3.0 IMPACT ASSESSMENT

A review of Google Earth images identified the 50m^2 area where the patio was constructed was previously vegetated with a few ornamental shrubs and grass species between the beach access pathway and lawn. The area of the sundeck and sunroom within the DPA is approximately 63m^2.

Aquaparian recommends native tree, shrub and groundcover compensation plantings for the impacted areas within the DPA. The total impacted area including the patio, sundeck and sunroom footprint is approximately 113m^2. The restoration area is divided into three areas within the DPA: Area A - the bedrock cliff (~50m^2) to remove invasive species and plant with native groundcover species; Area B - the rock garden (~15m^2) to plant with native

groundcover species; and, Area C - the lawn and garden area located near the eastern property boundary (~50m^2) to be planted with native tree, shrub and herbaceous species. The entire restoration area will total 113m^2.

4.0 VEGETATION REMEDIATION PLAN

The following remediation plan is intended to offset the previously impacted areas within the DPA in support of an application for renovations within existing footprints of the 15m DPA.

4.1 Planting Plan:

The bedrock cliff (Area A) that is set back approximately 1-3m from the present natural boundary of the ocean is to have ornamental and invasive plant species removed including English ivy and Himalayan blackberry. Native stonecrop species are to be planted along the top of the cliff and within pockets along the cliff face. Dunegrass should be planted along the toe of the slope to enhance the dunegrass that has naturally established there.

Remove the gravel from the small rock garden (Area B) located at the top of bank in the northeast corner of the property and plant with native stonecrop species interspersed around the existing ornamental grass species. Stonecrop can grow on thin soils over bedrock. The lawn and garden (Area C) along the eastern property boundary is to be planted with two Garry oaks and tall shrubs near to the house. Locate the trees as far from the house foundations as possible and toward the sides of the parcel so as not to obstruct the view and to avoid future impacts to the trees such as limbing. The taller shrubs (i.e. oceanspray, tall Oregon grape) then transition to lower growing native shrubs becoming thinner with interspersed herbs towards the top of bank (i.e. white fawn lily, nodding onion, camas, thrift). These plants are suited to the grassy, rocky hilltops with thin soils overlying bedrock that are characteristic of the site and adjacent coastal bluff areas (see Figure 4 – Terrestrial Herbaceous Habitat Design Concept). Saskatoon berry is suited to dry, rocky areas and can be interspersed among the herbaceous species.

Native beach groundcover plantings along the foreshore slope and the re-establishment of natural shrub and tree vegetation along the backshore will help to stabilize the slope and improve natural habitat. No mowing is to occur within the restoration areas therefore the boundary is to be visually demarcated to prevent encroachment with something suitable to fit the landscaping (i.e. landscape ties at the edge of the lawn, low hedge planting, planters, small boulders or logs etc). The project is expected to commence upon approval of permits and plantings are to be carried out in the wet season (fall or early spring) to maximize survival.

Plant species were selected based on existing native tree, shrub and herb species present on the site and adjacent to the site and suitability to the site conditions (see Table 1). Overall

planting density to be achieved is a minimum of two shrubs per meter, and 10 herbaceous plants per 1m^2 patches with the goal of 100% cover within 2-3 years. Refer to Figure 3 for an illustrative planting plan.

Table 1. Restoration Area Calculation

DESCRIPTION	CALCULATION	AREA
DPA Area	(15m setback)	**~400m^2**
Impacted area within the DPA	Patio, sundeck and sunroom	**~113m^2**
Restoration Area	A) 2m x 25m = 50m^2 bedrock cliff + B) 15m^2 top of bank rock garden (interplant) + C) 48m^2 backshore lawn and garden area	**~113m^2**

Table 2. Planting Plan

Common Name	Species	Spacing	Size	No.	cost per	total
A) Cliff 50m^2						
Dunegrass	*Elymus mollis*	0.25 m^2	1 Gal	120	$2.25	$270
Broad-leaved stonecrop	*Sedum spathulifolium*	0.1 m^2	9 cm	100	$2.25	$225
Sub-total				**220**		**$495**
B) Rock Garden 15m^2	(Interplant with grass)					
Lance-leaved stonecrop	*Sedum lanceolatum*	0.1 m^2	9 cm	30	$2.25	$67.50
Broad-leaved stonecrop	*Sedum spathulifolium*	0.1 m^2	9 cm	45	$2.25	$101.25
Sub-total				**75**		**$168.75**
C) Backshore lawn & garden 50m^2	(2 trees, 45 shrubs, 100 bulbs)					
Garry oak	*Quercus garryana*	5 m^2	1 Gal	2	$6	$12
Nootka rose	*Rosa nutkana*	0.5 m^2	1 Gal	15	$4.75	$71.25
Snowberry	*Symphoricarpos albus*	0.5 m^2	1 Gal	15	$4.75	$71.25
Oceanspray	*Holodiscus discolor*	1 m^2	1 Gal	3	$4.75	$14.25
Tall Oregon grape	*Mahonia aquifolium*	0.5 m^2	1 Gal	2	$5.50	$11
Red-flowering currant	*Ribes sanguineum*	0.5 m^2	1 Gal	4	$4.75	$19
Saskatoon berry	*Amelanchier alnifolia*	1 m2	1 Gal	6	$4.75	$28.50
Dull Oregon grape	*Mahona nervosa*	0.5 m^2	1 Gal	20	$5.50	$110
Salal	*Gaultheria shallon*	0.5 m^2	9cm	20	$2.25	$ 45
White fawn lily	*Erythronium oregonum*	0.1 m^2	10 cm	15	$8.95	$ 134.25
Thrift	*Armeria maritima*	0.1 m^2	9 cm	20	$2.75	$ 55
Nodding onion	*Allium cernuum*	0.1 m^2	9 cm	15	$2.75	$ 41.25
Common camas	*Camassia quamash*	0.1 m^2	9 cm	10	$4.95	$ 49.50
Sub-total						**$662.25**
TOTAL						**$1326.00**

***Note: cost estimates are based on the Streamside Native Plants Wholesale Price Guide. Cost may differ based on source.**

4.2 Bond Estimate

As per the City of Nanaimo landscaping standard, a Bond is to be posted for the value of the plants, mulch and labour to ensure the remediation plan is carried out as planned. The Bond is released following the required maintenance period to ensure survival, for this project a 5 year maintenance period is required. A completion inspection report is required following planting with a final inspection report submitted after the end of the maintenance period.

The standard labour calculation is based on two times the cost of the plants and mulch. Apply 10cm deep mulch comprised of 5 cubic yards of 50% composted large organic woody debris and 50% organic composted soils for the 50m^2 backshore planting area. The cost will vary by the supplier but a conservative estimate of $30/yrd has been used in the calculation.

Plants $1326
Mulch $150
Labour $2730
Total = $4206

4.3 PLANT SOURCES

Streamside Native Plants
7455 Island Highway West, Bowser, British Columbia V0R 1G0
Phone/Fax: 250-757-9999 / Toll Free: 877-570-3138
HTTP://MEMBERS.SHAW.CA/NATIVEPLANTS/STREAMSIDE_HOME.HTML
E-mail: RICHARD@STREAMSIDENATIVEPLANTS.COM
The nursery is located at 7455 Island Highway West (Highway 19A) Bowser B.C.

Green Thumb Nurseries
6261 Hammond Bay Road
Nanaimo BC V9T 5M4
250-758-0808 / E-mail: GRNTHUMB@SHAW.CA

Nanaimo & Area Land Trust
140 Wallace Street,
Nanaimo BC, V9R 5B1
(250)714-1990 / plants@nalt.bc.ca
Nursery open Wednesday 10am-3pm; Saturday 11am-3pm

4.4 INSTALLATION & MAINTENANCE RECOMMENDATIONS

- Remove the Himalayan blackberry by digging out as much of the roots as possible which will need to be completed every year for the maintenance period to keep it from becoming more established;

- Remove the English ivy from the shoreline preferably in the late summer when the roots will be the most stressed by drought. This will also need to be repeated annually for the maintenance period;

- Installation of vegetation will be completed either in the fall or early spring and must be maintained and irrigated as necessary through at least two summer seasons to optimize survival. Any existing native shoreline vegetation should be retained.

- Install a silt fence at the extent of the planting areas on the ocean side prior to the start of landscaping works. Leave it in place until the restoration is completed.

- Topsoil is to be added to the backshore area where native shrub species plantings are to occur; a layer of top soil (~1ft deep) will be required for the planting area with 3" composted bark mulch on top to prevent moisture loss and soil erosion. Place the mulch after the plants are installed leaving a gap around each plant.

- Overall shrub density should be a minimum of two plants per m^2 along the backshore planting area, four plants per m^2 for the dunegrass and 10 plants per m^2 for the herbaceous groundcover species. Plant placement should mimic a natural growth pattern i.e. clusters of same species.

- For backshore plantings, add a handful of bone meal (reduces transplant shock). Water plantings immediately and as necessary until established. Planting in cool wet weather will reduce transplant shock and allow the plants to establish root systems without drought stress. Stagger the plantings so that tree plantings are as close to the house as possible without impacting foundations and along the eastern property boundary. Taller shrubs (i.e. Oceanspray) can be planted nearer to the house and can transition to lower shrubs then herbaceous species towards the foreshore.

- The restoration area boundary is to be visually demarcated to prevent encroachment with something suitable to fit the landscaping (i.e. landscape ties at the edge of the lawn, low hedge planting, planters, small boulders or logs etc).

- The City is requiring a 5 year maintenance period to ensure the works are carried out as intended in the DP. Dead plants are to be replaced until 100% cover is achieved. Infill is expected to occur from the selected species.

Summary of Maintenance Activity Schedule:

ACTIVITY	FREQUENCY
Watering	~1 per week through dry summer seasons until plants are established (2-3 years).
Replacement	Inspect for die off in early spring (April) and late fall (October), replace dead plants.
Weeding	Inspect and remove by hand invasive species shoots at least 3x / year. April, August, October. No pesticides are to be used.
Mulch	Reapply composted bark mulch after year 2 if weeds are difficult to control.

***activity timing may be adjusted based on weather.**

5.0 CONCLUSION

The patio construction was completed within the DPA without a permit and the previously constructed sundeck and sunroom fall within the DPA. The current homeowners propose to renovate the sunroom and to add a second floor within the existing building footprint.

The City typically requires some habitat improvements to be completed for works within a DPA as an opportunity to restore habitat value either from the proposed project if an impact is likely to result, or from past development impacts though no additional impact is likely to result. Aquaparian recommends re-vegetation with native species within a 113m^2 portion of the property to compensate for 113m^2 of previously impacted area within the DPA.

Negative impacts to the environment caused by the implementation of this work include removal of vegetation within the DPA that has already been completed and the risk of sediment entering the marine environment. If all mitigation measures are implemented as recommended in this report, the risk of further negative impacts to foreshore habitat will be minimized and impacted riparian conditions will be improved over existing conditions with the intent of improving the shoreline habitat buffer in the long term.

The City typically requires an assurance Bond based on the value of plants and labour to guarantee the habitat improvement projects are carried out. For this project Aquaparian expects the total cost of the project to be approximately $4206. The Bond is released after the maintenance period final inspection.

6.0 CLOSURE

This report has been completed in accordance with generally accepted biological practices. No other warranty is made, either expressed or implied. Aquaparian trusts that the information provided in this report meets your requirements. Any questions regarding information provided in this document, please contact the undersigned at (250) 591-2258.

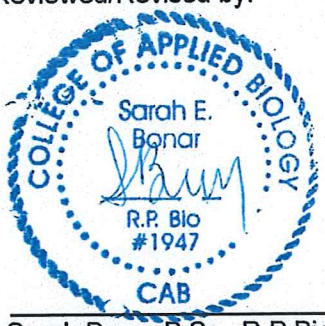
Respectfully submitted,

AQUAPARIAN ENVIRONMENTAL CONSULTING LTD.

Prepared by:

Crystal Campbell
Environmental Technician

Reviewed/Revised by:



Sarah Bonar B.Sc., R.P.Bio
Biologist/Principal

\\AQUAPARIAN-NAS\Documents\Projects\Projects\N295 Polaris Drive\Polaris Drive DPA - revised Oct 6; 2017.docx

FIGURE 3. PLANTING PLAN
3712 POLARIS DRIVE

LEGEND:

- Garry oak tree
- Tall shrub (Oceanspray)
- Native shrubs (Nootka rose, snowberry, red-flowering currant, Saskatoon)
- Stonecrop
- Dunegrass
- Herbaceous groundcover (salal, dull Oregon grape)
- Herbaceous bulbs (white fawn lily, nodding onion, camas, thrift)