



DEVELOPMENT PERMIT NO. DP000884

DUKE POINT PROPERTY COMPANY ULC

Name of Owner(s) of Land (Permittee)

850/870 JACKSON ROAD

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 13, SECTIONS 3 AND 4, RANGE 8, DISTRICT LOTS 370 AND 429,
NANAIMO DISTRICT, PLAN VIP63717
PID No. 023-493-291**

**LOT 14, SECTION 4 AND 8, RANGE 8, SECTION 9 AND DISTRICT LOTS
370 AND 429, NANAIMO DISTRICT, PLAN VIP63717
PID No. 023-493-305**

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 Site Plan

**Schedule C 5m Marine Riparian Planting and Jackson road Frontage
Landscape Plan**

Schedule D Office Building

Schedule E Maintenance Building

Schedule F QEP Report

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

Watercourse Setback – Section 6.3.1.2

The required setback from the Northumberland Channel is 15.0m. The setback is reduced to 0m to accommodate a 2-barge ramp facility, a variance of 15.0m.

AUTHORIZING RESOLUTION PASSED BY COUNCIL
THE 2ND DAY OF MARCH, 2015.



Corporate Officer



Date

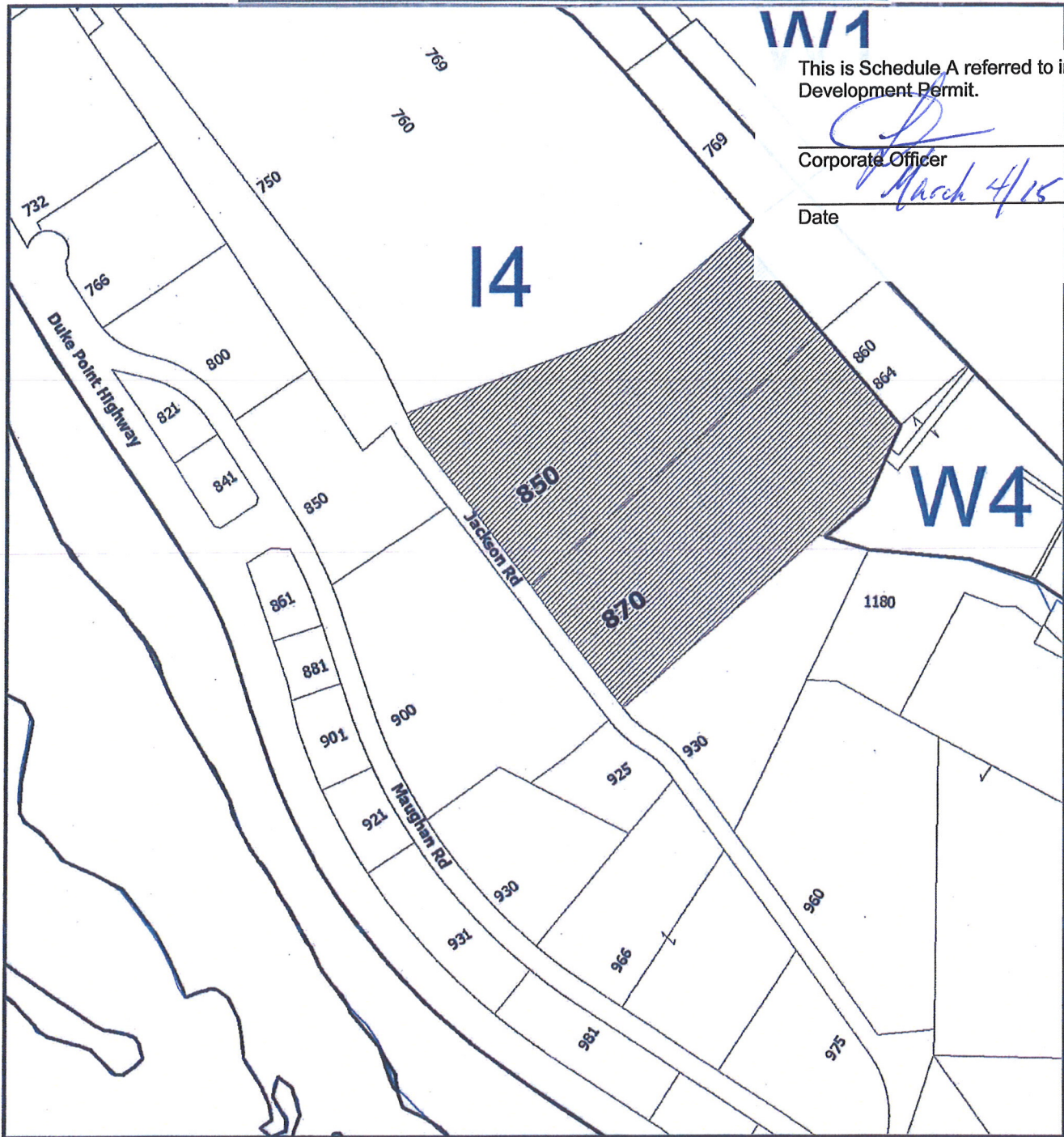
GN/b

Prospero attachment: DP000884

Development Permit DP000884
850/870 Jackson Road

Schedule A

Location Plan



This is Schedule A referred to in the Development Permit.


Corporate Officer

Date

[Signature]
March 4/15

DEVELOPMENT PERMIT NO. DP000884

LOCATION PLAN

 Subject Property



Civic: 850 and 870 Jackson Road
Lots 13 and 14, Sections 3 and 4, Range 8,
District Lots 370 and 429, Nanaimo District,
Plan VIP63717

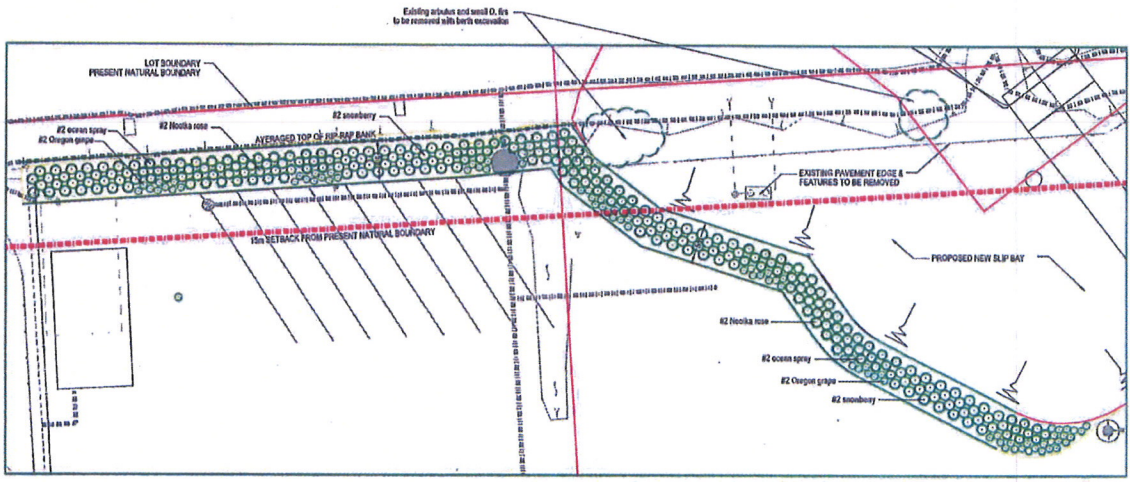
Development Permit DP000884

Schedule C

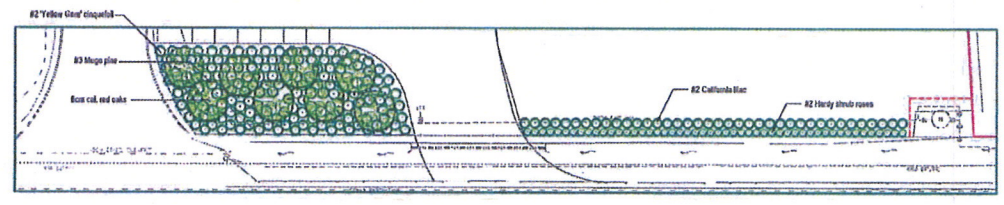
850/870 Jackson Road

5m Marine Riparian Planting and Jackson Road Frontage Landscape Plan

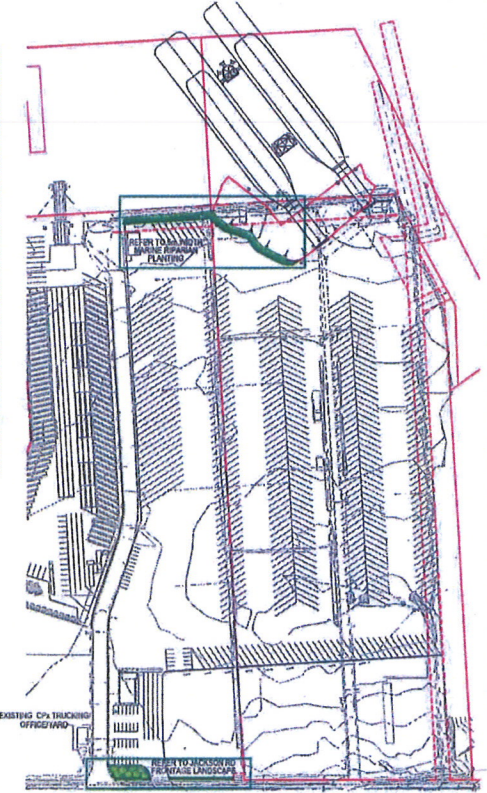
NO.	DATE	ISSUES
01	2014/14	DP Submission
02	2015/15	Revised Landscape DP Submission



5m Marine Riparian Planting 1:250



Jackson Rd Frontage Landscape 1:200



Landscape General Arrangement 1:1500

GENERAL LANDSCAPE NOTES

1. This drawing: Not For Construction
2. Make riparian and Jackson Rd frontage landscape areas to be irrigated for 2 growing seasons.
3. Plants to be stored as indicated. Shrub spacing: 1.2m O.C. (opp); trees @ 5m O.C.
4. Refer to plan for proposed plant varieties.
5. All planting levels to be matched with 15m' grade bank.
6. Constructed landscape to be maintained and guaranteed for 2 years from substantial completion of the landscape.

DUKE POINT TERMINAL
UPLANDS ENGINEERING - PHASE 2A
LANDSCAPE PLAN

NANAIMO, BC
SEASPAN

HEROLD ENGINEERING
2301 Shafter Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: info@heroldengineering.com

RECEIVED
By Loretta Allison at 1:08 pm, Feb 16, 2015

DESIGNED	ENGINEER'S SEAL
JPH	
DESIGN REVIEW	
EG	
DRAWN	
JPH	
DRAFTING REVIEW	
JPH	
PROJECT No.	CLIENT/OWNER No.
SCALE	PERMIT No.
AS SHOWN	
REL. DRAWING No.	REVISION
L1	1 of 1



RESULTS INC
2015 FEB 16 PM 1:08

This is Schedule C referred to in the Development Permit.

Corporate Officer

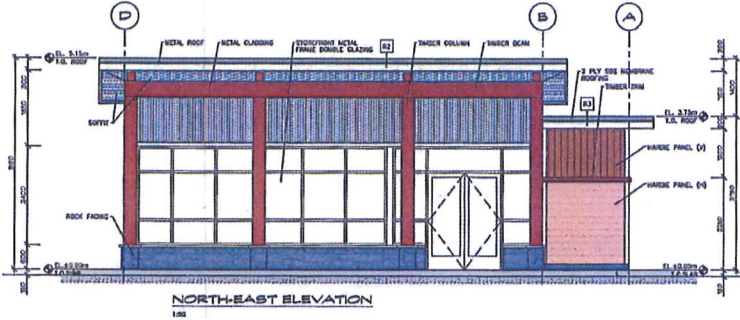
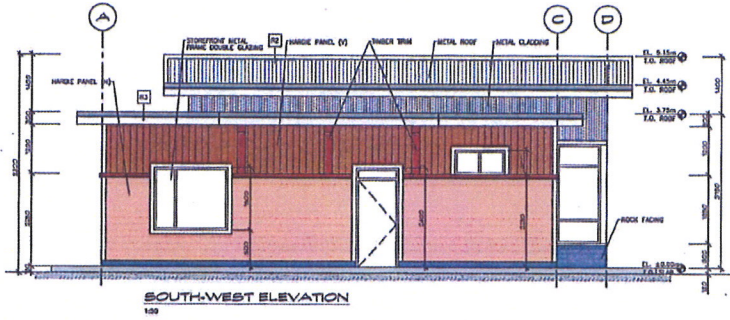
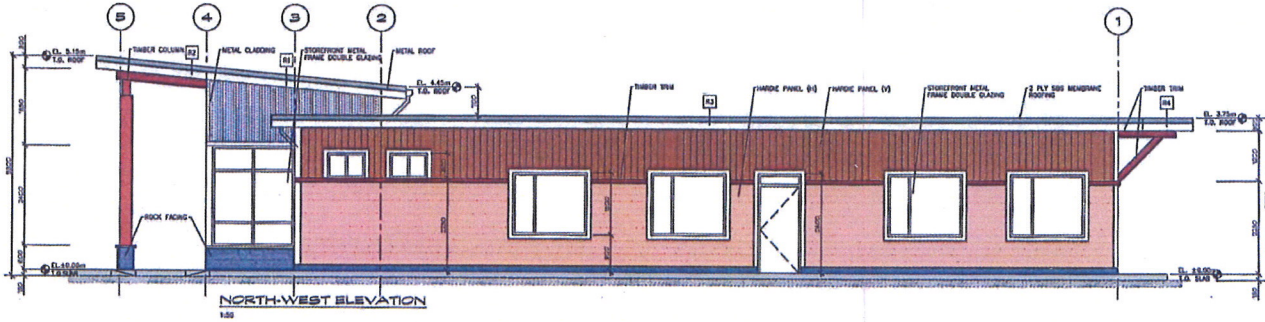
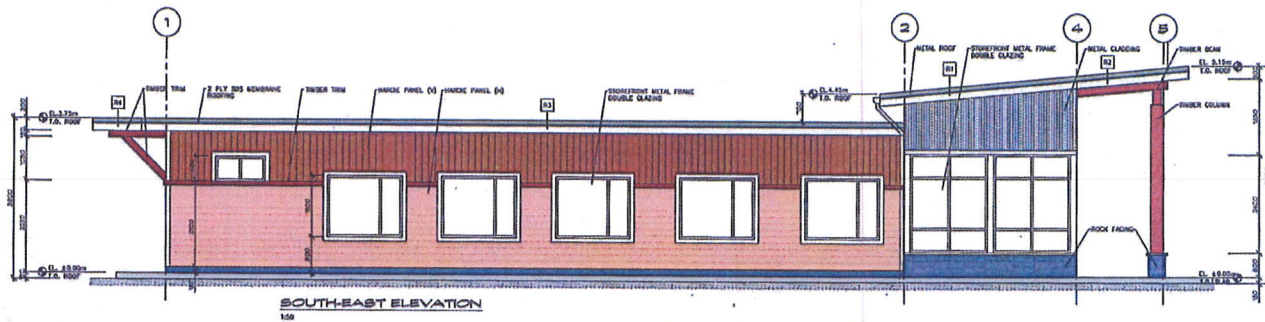
Date

Mark 2/15

D:\15-0000-2014\00000000\00000000 - DP - 160215.dwg Plot: Phase Plan, 2, 15, 2-14, PM, Date: Feb 16, 2015

Development Permit DP000884
850/870 Jackson Road

Schedule D
Office Building



ISSUES	
NO.	DATE
1	ISSUES TO BE RESOLVED FOR
2	ISSUES TO BE RESOLVED FOR
3	ISSUES TO BE RESOLVED FOR

DUKE POINT TERMINAL
UPLANDS ENGINEERING-PHASE 2A
NANAIMO, BC
SEASPAN

HEROLD ENGINEERING
3781 Skelton Rd, Nanaimo, BC V9E 3H1
Tel: 250-751-0558 Fax: 250-751-0559
Email: herold@heroldengineering.com

OFFICE BUILDING ELEVATIONS

RECEIVED
By Leslie Hinton on Feb 18, 2015

REVISION	ENGINEER SEAL
DESIGN REVIEW	
DRAWN	
DRAWING REVIEW	
DATE	
PROJECT No.	CLIENT DRAWING No.
2070-000	n/a
SCALE	FIGURE No.
A30	n/a
VEL DRAWING No.	FIGURE No.
A301	2

This is Schedule D referred to in the Development Permit.

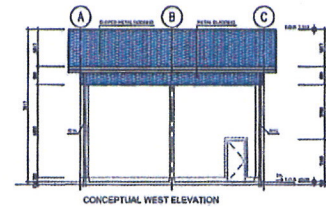
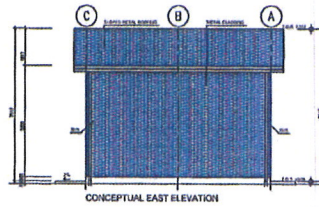
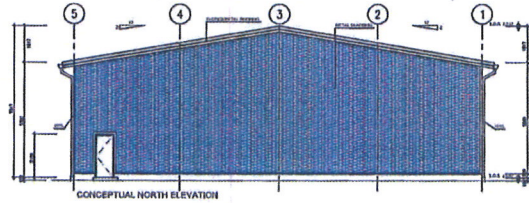
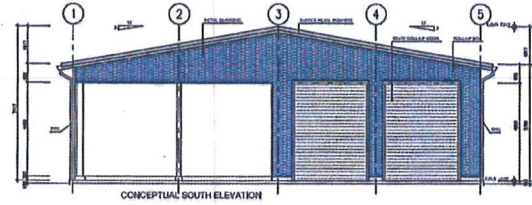
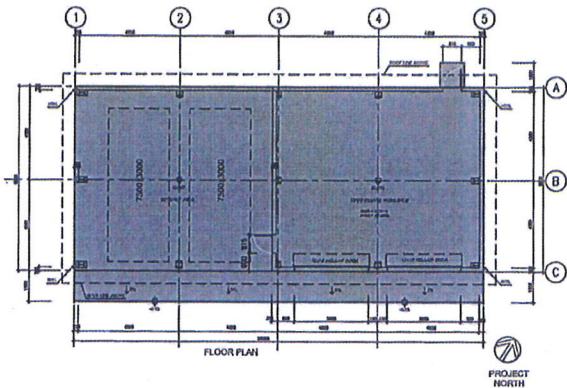
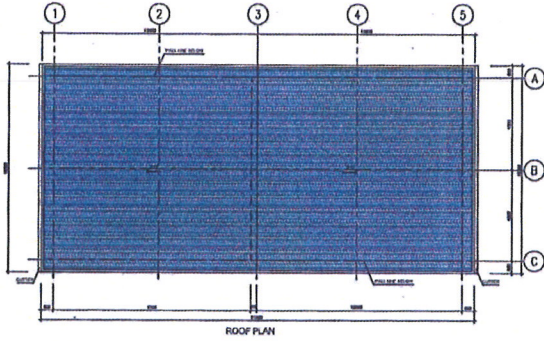
Corporate Officer

Date *March 4/15*

Development Permit DP000884
850/870 Jackson Road

Schedule E

Maintenance Building



ISSUES	
NO.	ISSUE
1	2014.01.13 CLIENT REVIEW
2	2014.04.11 CLIENT REVIEW
3	2014.04.29 (P. SUBMISSION

DUKE POINT TERMINAL
 UPLANDS ENGINEERING
 NANAIMO, BC
 SEASPAN

HEROLD ENGINEERING LIMITED
 Consulting Engineers
 2781 Shoolen Rd, Nanaimo, BC V9T 2H1
 Tel: 250-759-8388 Fax: 250-751-8259
 Email: info@heroldengineering.com

MAINTENANCE WORK SHOP PLANS/ELEVATIONS	
DESIGNED BY	ENGINEER'S SEAL
CHECKED BY	
DRAWN BY	
DATE	
PROJECT NO.	CLIENT DRAWING NO.
SCALE	FOLIUM NO.
DATE SHOWN	NO. OF SHEETS
SCALE	REVISION
A2.5	3

This is Schedule E referred to in the Development Permit.

Corporate Officer

Date

March 4/15



SNC-Lavalin Inc.,
Environment & Water

8648 Commerce Court
Burnaby, British Columbia
Canada V5A 4N6

Telephone: 604-515-5151
Fax: 604-515-5150

MEMORANDUM

This is Schedule F referred to in the
Development Permit.

Corporate Officer

Date

Date: November 5, 2014

TO: David McWalter, Project Manager
SNC-Lavalin Inc., Ports & Marine

C.C.: Shawn Hilton, R.P.Bio.
SNC-Lavalin Inc., Environment & Water

FROM: Andrea Paetow, R.P.Bio.
SNC-Lavalin Inc., Environment & Water

Ref.: 614819

Subject: Duke Point Marine Terminal Modification - Vegetation Assessment, including
Options for Invasive Species Management and Restoration

INTRODUCTION

At the request of the Ports & Marine business unit of SNC-Lavalin Inc. (SNC-Lavalin P&M), the Environment & Water business unit of SNC-Lavalin Inc. (SNC-Lavalin E&W) has completed a vegetation assessment for the proposed re-development work at the Duke Point Marine Terminal located at 850/870 Jackson Road, Nanaimo, BC (the Project).

The vegetation assessment has been prepared in support of a Development Permit, which meets development requirements of the City of Nanaimo. The vegetation assessment addresses the upland portion of the proposed Project within the existing marine riparian setback along the foreshore, with emphasis on priority invasive species. The City of Nanaimo has agreed to a 5 m wide marine riparian setback from the high water mark (HWM) for permanent structures, and requires restoration and maintenance of a minimum of 50% of the shoreline length for the 5 m setback.

This report includes options for invasive species management and restoration of the marine riparian setback.

BACKGROUND

The Project area has a long history of industrial activity. The Project is located on two industrial lots (Lots 850 and 870, zoned Industrial 4), both of which have been previously developed (in 2006 and 2000, respectively) for marine transfer operations, and include marine terminal, launch facility, storage containers, trailers, lay-down areas, access roads, parking lots and utility servicing (Drawing 614819-001).

The two lots encompass a total area of 34 acres, and will be shared as common-use site for the new Duke Point terminal. Approximately 18 acres and 200 m waterfront will be re-developed as terminal maneuver yard, and the remaining upland property (16 acres), with 75 m waterfront, will continue to be used as marine loading/unloading area as currently exists.

Site works are proposed to include demolition of structures, concrete works, earth works, paving and signage. Existing utilities and paved areas will be reused to the maximum extent possible; however, some additional paving is required for the terminal maneuver yard.

SCOPE AND OBJECTIVES

The vegetation assessment was based on the preliminary design provided by SNC-Lavalin P&M for the Project, and has the following objectives:

- Identify existing upland vegetation species within the marine riparian setback along the foreshore;
- Identify locations of any priority invasive plants found in the marine riparian setback, based on the City of Nanaimo Invasive Plant Management website: www.nanaimo.ca/goto/invasives; and
- Develop options for invasive species management, restoration and monitoring, including details on how restoration can be accomplished to enhance existing habitat quality.

METHODOLOGY

A desktop review of existing reports and databases was initially conducted to collect background information regarding the Project site and surrounding area. The following sources were reviewed:

- Herold Engineering. 2014. Duke Point Terminal Uplands Development, Seaspan Ferries Corporation, Preliminary Design Site Report, HEL No. 2070-004, May 28, 2014.
- Herold Engineering. 2014. Duke Point Terminal Uplands Engineering – Phase 2A, Key Plan, Drawing Lists & General Notes (Drawing C01) and Site Grading (Drawing C06), May 28, 2014.
- SNC-Lavalin E&W. 2014. Marine Vegetation foreshore survey for Seaspan Ferry Corporation's Duke Point marine terminal modification, May 1, 2014.
- City of Nanaimo Invasive Plant Management website.
- British Columbia Ministry of Environment Biogeoclimatic Ecosystem Classification System.
- iMap BC - Data BC Online Mapping Application.
- Aerial imagery.

The vegetation assessment was conducted using vegetation plot sampling and searches along transects. Vegetation was sampled to establish a baseline of species presence and relative abundance (recorded as percent cover) within the marine riparian zone. The vegetation plots were geo-referenced by hand-held GPS. Transects were walked between plots at a slow pace to record any additional plant species of interest.

The plant inventory was conducted based on Resources Information Standards Committee (RISC) standards (RISC, 1998; MoE and MoFR, 2010), and data were recorded on ecosystem field forms (Ground Inspection Forms [GIF]). Plant species and percent coverage were determined for each plot. The dominant plant species on each plot were identified to the species level. Given the advanced fall season (October), deciduous shrub, herb and grass species were only recorded by species when readily discernible (i.e., not dormant). Plant identification guides were used to confirm species (Pojar and MacKinnon, 1994; Ralph et al, 2007) as needed.



RESULTS AND DISCUSSION

Environmental Setting

The Project is located on a thin peninsula to the east of the Nanaimo River estuary, and west of Northumberland Channel and Gabriola Island. The Project site is situated within Duke Point Industrial Park. The industrial park includes sawmills and a pulp mill, as well as a major BC Ferry terminal. There are industrial properties directly adjacent to the Project site, including a log-sort to the west.

There are no parks or protected areas (including environmentally sensitive areas), in the vicinity of the Project site. The nearest parks/protected areas are Biggs & Jack Point Park (>2 km to the northwest) and the Nanaimo River foreshore conservation area (>1 km to the west).

The Project site consists largely of reclaimed land, which has been created by fill from various sources. The approximately 430 m long frontage along the foreshore is constructed of engineered, erosion-resistant fill materials of large-size rip-rap. Approximately 250 m of the frontage is currently vegetated.

Vegetation and Habitat

The biogeoclimatic ecosystem classification (BEC) system of BC places the Project site in the Nanaimo Lowland Ecoregion, which is part of the Eastern Vancouver Island Ecoregion (Demarchi, 2011). The Project site falls within the moist maritime Coastal Douglas Fir biogeoclimatic subzone (CDFmm). The CDFmm is restricted to low elevations (sea level to approximately 150 m asl) along southeast Vancouver Island, part of the Gulf Islands and a narrow strip along the Sunshine Coast. This subzone lies in the rain shadow of the Vancouver Island and Olympic mountains, and has the mildest climate in Canada. This results in warm, dry summers and mild, wet winters, with very long growing seasons and pronounced water deficits on drier sites (Green and Klinka, 1994).

Historically, tree species of the CDFmm included Douglas fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), grand fir (*Abies grandis*), and the understory was dominated by salal (*Gaultheria shallon*), dull Oregon grape (*Mahonia nervosa*), ocean-spray (*Holodiscus discolor*), and Oregon beaked moss (*Kindbergia oregana*), with less prominent species including baldhip rose (*Rosa gymnocarpa*), snowberry (*Symphoricarpos albus*), western trumpet honeysuckle (*Lonicera ciliosa*), vanilla-leaf (*Achlysa triphylla*), and Cat's tail moss (*Rhytidiadelphus triquetrus*).

However, the Project site has been modified from its historical state, and the original vegetation communities have been removed.

Vegetation Inventory

The vegetation assessment was conducted on October 23, 2014. Vegetation species identified during the plot sampling are presented in Attachment 1. Three vegetation plots were established (plot AP1, AP2 and AP3) within the riparian setback, and the locations are shown in Drawing 614819-002. Photographs of the vegetation plots and the riparian vegetation along the foreshore are provided in Attachment 2.

A summary of the vegetation cover on the three plots is provided in Table A.

TABLE A: Vegetation Cover Summary for Three Sampling Plots

Plot ID / Size*	UTM (Zone 10)**		Percent cover (%)				
	Northing	Easting	Trees (A layer)	Shrubs (B layer)	Herbs (C layer)	Mosses (D layer)	Invasive Plants^
AP1 / 2.5 x 15 m	5443956	436254	0	60	20	0	42
AP2 / 4.9 m x 45 m	5443845	436340	0	80	20	1	20
AP3 / 3.0 m x 35 m	5443713	436412	1	70	30	0	40

*Size (length and width) measured in the field or estimated from drawing.

**UTM points taken at the SW corner of the vegetation plots (with 2 m to 10 m accuracy).

^Percentage of invasive plants includes those prioritized by the City of Nanaimo

The sampled plots were of varying sizes, selected to include all areas where shrub or tree cover was dominant. All three plots had their upland boundary on relatively flat terrain at the top of the slope. Between the start of the rip-rap and the shoreline, the slope increased (negatively) to approximately 60%. Vegetation was present between the rip-rap and the upland paved/hardened areas. The width of the vegetated marine riparian setback ranged from approximately 2.5 m to 5 m (measured in the field).

- Plot AP1 was established in a small patch of shrub-herb vegetation on the west side of the Project site boundary, including a small vegetated strip on the neighbouring property (log sort).
- Plot AP2 was near the centre of the Project site, in a 45 m long patch of vegetation consisting of small (shrub size) trees (below 10 m in height), shrubs and herbs east of the proposed terminal, adjacent to a paved parking lot.
- Plot AP3 was on the east side of the Project site, next to a concrete ramp, in an approximately 35 m long shrub-herb dominated area.

Dominant tree species were Douglas fir and Arbutus (*Arbutus menziesii*), which occurred largely in the shrub layer on plots AP2 and AP3. Dominant shrub species included scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), willow (*Salix* sp.), and butterfly bush (*Buddleia davidii*). Red-flowering currant (*Ribes sanguineum*) was present only on plot AP1.

The herb layer was largely dormant, and only prominent species (e.g., evergreens or plants identifiable through flowers and/or seed pods) were identified. These included wild carrot (*Daucus carota*), sword fern (*Polytrichum munitum*), common dandelion (*Taraxacum officinale*), and western trumpet honeysuckle.

Scotch broom, Himalayan blackberry, willow, and butterfly bush were also the dominant shrub species in areas between the plot locations, as identified during the transect walk. In addition, the following herb species (all considered weedy) were identified: common plantain (*Plantago major*), yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), common tansy (*Tanacetum vulgare*), and tansy ragwort (*Senecio jacobaea*).

Invasive Vegetation

The vegetation inventory particularly targeted the identification of priority invasive plant species identified by the City of Nanaimo. The City of Nanaimo invasive species management website lists the following priority invasive species: Himalayan blackberry, English ivy (*Hedera helix*), scotch broom, English hawthorn (*Crataegus monogyna*), gorse (*Ulex europaeus*), Daphne (*Daphne laureola*), Japanese knotweed (*Polygonum cuspidatum*), Policeman's helmet (*Impatiens glandulifera*), garlic mustard (*Alliaria petiolata*), carpet burweed (*Soliva sessilis*), giant hogweed (*Heracleum mantegazzianum*), and poison hemlock (*Conium maculatum*).



Vegetation sampling identified two invasive shrub species that are considered a priority for management by the City of Nanaimo: scotch broom and Himalayan blackberry. These species occur along the entire upland shoreline length within the Project boundaries, and represent 20% to over 40% of plots sampled. These species also frequent neighbouring properties (e.g., the log sort to the west).

Applicable information from the City of Nanaimo invasive species management website (City of Nanaimo, 2014) and the Invasive Species Council of BC (ISC, 2014) regarding Himalayan blackberry and scotch broom ecology has been extracted below:

Himalayan blackberry is a medium to tall evergreen shrub, which spreads by seed dispersion and sprouts from root buds and stem tips (even a small section of root will regenerate). It is most common in the CDFmm, and out-competes low growing native vegetation and regenerating conifers through shading and build-up of leaf litter and stem fragments. It is mostly a biennial plant that flowers in spring and carries fruit in summer/fall. Birds and omnivorous mammals, such as foxes, bears, and coyotes, consume the berries and disperse seeds. Himalayan blackberry tolerates a wide range of soil moisture conditions and can grow on infertile soils of varying textures. It does best in full sun but tolerates a range of light conditions. It forms thickets on disturbed sites, including road sides, riparian areas and utility corridors.

Scotch broom is an escaped garden ornamental introduced from Scotland. In BC it is considered a highly invasive alien plant. Scotch broom is an evergreen woody perennial shrub that blooms in May and produces yellow flowers and flat brown seed pods. It spreads by seed and lateral bud growth, and mature plants can produce up to 3500 pods, each containing 5-12 seeds. Its photosynthetic stems enable year-round growth. Scotch broom has an affinity for light-dominated, disturbed areas, and any disturbance activity (such as construction near infested areas) can enhance spread.

Restoration/Enhancement Recommendations

The native vegetation on plots AP1, AP2 and AP3 should be retained. To control the re-establishment of invasive species, the entire riparian setback area within the Project site needs to be managed. This means, Himalayan blackberry and scotch broom need to be removed completely from the Project site, or they will spread from remaining untreated areas. The invasive species management options below include measures recommended by the City of Nanaimo.

Invasive Species Management – Himalayan Blackberry

Control of Himalayan blackberry is difficult especially of mature plants and established populations. Follow-up treatment is often required.

- Young plants should be hand-pulled;
- Mature plants should be grubbed (e.g., by excavator);
- Follow-up treatment will be necessary to prevent re-establishment (see monitoring section);
- Removed plants must be disposed of by transporting plant material in a covered dump truck to the nearest incinerator.



Invasive Species Management – Scotch Broom

Control of Scotch broom is easier than that of Himalayan blackberry, but it is important to prevent plants from going to seed as this is the major method of spread.

- Small seedlings can be pulled by hand;
- Larger plants must be cut down during flowering (May), prior to the setting of seeds;
- As scotch broom does not grow well in shade, the cut stumps should be covered with plastic to prevent light access, and so prevent mature stalks from re-growing;
- Old plant material will release toxins and therefore must be disposed of properly. Removed plants should be disposed of by transporting plant material in a covered dump truck to the nearest incinerator.

Restoration / Enhancement Options

The most successful method to restrict the re-establishment of invasive species onto the Project site will be to have well established native vegetation cover. To accomplish this, all disturbed areas need to be restored on the Project site, including areas where invasive plants have been removed.

The City of Nanaimo requires restoration and maintenance of a 5 m wide marine riparian setback for a minimum of 50% of the shoreline. As the existing riparian vegetation is less than 5 m wide in many areas, we recommend enhancement of all vegetated shoreline areas that have been/will be disturbed on the Project site. This will amount to approximately 60% of the shoreline (given a total shoreline length of approximately 430 m and a vegetated length of approximately 250 m).

Site restoration and enhancement options have been developed using the BC Ministry of Environment riparian restoration guidelines (MoE, 2008) as well as recommendations from the Invasive Species Council of BC (ISC, 2014).

Restoration will be accomplished to enhance existing habitat quality through the following measures:

- Planting of native shrub and/or herb species suitable for the CDFmm biogeoclimatic subzone.
- Plantings will occur at a density of 1 shrub per square metre.
- A minimum of 50% of shrubs will be fruit-bearing species.
- All shrub species will be of guaranteed nursery stock.
- Scientific names will be used to ensure desired native species are being purchased.
- Stock will be planted during fall (September through October) and/or in early spring (March through April) to increase survival of plants.
- Planting survival in a given area needs to be 80%; if more than 20% of plant stock dies, replanting will be required.

A list of recommended species for restoration planting is provided in Table B.

TABLE B: Recommended Plant Species

Scientific Name	Common Name
<i>Amelanchier alnifolia</i>	Saskatoon
<i>Mahonia nervosa</i>	dull Oregon grape
<i>Holodiscus discolor</i>	ocean-spray
<i>Rubus parviflorus</i>	Thimbleberry
<i>Rosa nutkana</i>	Nootka rose
<i>Rosa gymnocarpa</i>	Baldhip rose
<i>Ribes sanguineum</i>	Red-flowering currant
<i>Crataegus douglasii</i>	Black hawthorn
<i>Physocarpus capitatus</i>	Pacific ninebark
<i>Sambucus racemosa</i>	Red elderberry
<i>Symphoricarpos albus</i>	Common snowberry
<i>Salix sitchensis</i>	Sitka willow

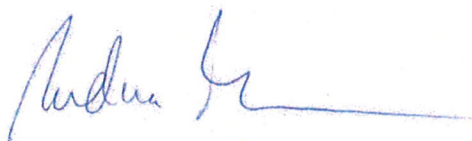
Monitoring and Follow-up Treatment

Monitoring should occur to track invasive species encroachment into the area, and to determine the success of the restoration plantings.

Encroachment and restoration monitoring should be carried out once a year (concurrently, in May or June) for three years following restoration to determine viability of the planted areas and suppression of invasive species within the Project site.

Successful restoration will be defined as 80% survival of planted material over three years. Successful invasive species management will be defined as no more than 10% encroachment by invasive species. This will be measured by percentage cover on predetermined vegetation test plots within the riparian setback.

We trust this provides you with the information required at this time. Please contact the undersigned in our Burnaby office at 604-515-5186 should you have any questions or require further assistance.



Andrea Paetow, R.P.Bio.
Project Biologist

REFERENCES

DRAWINGS:

- 614819-001 – Duke Point Vegetation Assessment Site Layout
- 614819-002 – Duke Point Vegetation Assessment Riparian Area

ATTACHMENTS:

- 1: Vegetation Species identified during Plot Sampling
- 2: Photographs of Vegetation Plots and Foreshore Riparian Vegetation



REFERENCES

- City of Nanaimo. 2014. Priority Invasive Plants. Invasive Plant Management website: www.nanaimo.ca/goto/invasives. [Accessed October 22, 2014].
- Demarchi, D.A. 2011. The British Columbia Ecoregion Classification, 3rd Edition. Ecosystem Information Section, BC Ministry of Environment, Victoria, BC. Available at: <http://www.env.gov.bc.ca/ecology/ecoregions/index.html>. [Accessed October 24, 2014.]
- Green, R.N. and K. Klinka. 1994. A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. BC Ministry of Forests and University of British Columbia Forests Sciences Department. Province of British Columbia.
- iMapBC. 2014. Data BC online mapping application. Province of British Columbia. Available at: http://www.data.gov.bc.ca/dbc/geographic/view_and_analyze/imapbc/index.page. [Accessed: October 22, 2014].
- Invasive Species Council of BC (ISC). 2014. Himalayan Blackberry and Scotch Broom. Available at: <http://bcinvasives.ca/invasive-species>. [Accessed: October 28, 2014].
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- Ministry of Environment (MoE) and Ministry of Forests and Range (MoFR). 2010. Field Manual for Describing Terrestrial Ecosystems, 2nd Edition. Land Management Handbook 25. Province of British Columbia.
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DRAWINGS

- 614819-001 – Duke Point Vegetation Assessment Site Layout
- 614819-002 – Duke Point Vegetation Assessment Riparian Area



LEGEND

- Property Boundary
- Cadastral Boundaries
- Proposed Paved Areas
- 5m Setback
- High Water Mark
- Road
- Highway
- Railway

NOTES

1. Original in colour
2. Numerical scale indicates full-size print. Final scaling will distort this scale, however scale bar will remain accurate
3. Accuracy for navigation purposes, accuracy has not been verified for navigation or navigational purposes.

REFERENCES

1. Imagery - Google Earth Online
2. BCOPY LULU Crown Registry and Geographic Base Branch (CRGB) data accessed 10/10/2014
3. CRGB Data Collected into a 1 Year Accuracy expected to be approximately +/- 3.5m.

CLIENT
SNC Ports and Marine

PROJECT LOCATION
Duke Point,
Hastings, BC

**Duke Point Vegetation Assessment
Site Layout**

BY: LH	SCALE: 1:5,000	DATE: 2014/11/03	REV: 0
CHG: AP	PROJECT CODE: 075	PROJ CODE: 075_MAD 1883 LUTM Zone 10N	REV: 0
			614819-001

Project Path:

ATTACHMENT 1

Vegetation Species identified during Plot Sampling

VEGETATION BY PLOT

Plot Name (ID)	Vegetation Layer	Scientific Name	English Name	% Cover
AP1				
	B	<i>Salix sp.</i>	Willow	5
	B	<i>Ribes sanguineum</i>	Red-flowering currant	10
	B	<i>Buddleia davidii</i>	Butterfly bush	2
	B	<i>Cytisus scoparius</i>	Scotch broom	40
	B	<i>Rubus armeniacus</i>	Himalayan blackberry	2
	C	<i>Daucus carota</i>	Wild carrot	1
	C	Unknown	Grasses	5
	C	Unknown	Herbs	10
AP2				
	B	<i>Arbutus menziesii</i>	Arbutus	25
	B	<i>Salix sp.</i>	Willow	5
	B	<i>Buddleia davidii</i>	Butterfly bush	20
	B	<i>Rubus armeniacus</i>	Himalayan blackberry	10
	B	<i>Cytisus scoparius</i>	Scotch broom	10
	B	<i>Pseudotsuga menziesii</i>	Douglas fir	10
	C	<i>Polystichum munitum</i>	Sword fern	1
	C	<i>Daucus carota</i>	Wild carrot	2
	C	<i>Taraxacum officinale</i>	Common dandelion	2
	C	Unknown	Grasses	10
	C	Unknown	Herbs	5
	D	Unknown	Mosses	1
AP3				
	A2	<i>Pseudotsuga menziesii</i>	Douglas fir	1
	B	<i>Salix sp.</i>	Willow	5
	B	<i>Arbutus menziesii</i>	Arbutus	20
	B	<i>Cytisus scoparius</i>	Scotch broom	20
	B	<i>Rubus armeniacus</i>	Himalayan blackberry	20
	B	<i>Alnus sp.</i>	Alder	1
	B	<i>Populus balsamifera trychocharpa</i>	Black cottonwood	2
	B	<i>Lonicera ciliosa</i>	Western trumpet honeysuckle	2
	C	Unknown	Grasses and herbs	30
	C	<i>Daucus carota</i>	Wild carrot	1

ATTACHMENT 2

Photographs of Vegetation Plots and Foreshore Riparian Vegetation



Photograph 1: Vegetation plot AP1, east side facing northwest (NW).



Photograph 2: Shrub vegetation on plot AP1 is dominated by scotch broom.



Photograph 3: Sparse vegetation between plot AP1 and AP2, near west corner of proposed parking lot, facing northwest. Himalayan blackberry dominant throughout.



Photograph 4: Sparse vegetation between plot AP1 and AP2, near west corner of proposed parking lot, facing southeast. Note low growing Himalayan blackberry.



Photograph 5: Vegetation plot AP2, west side facing southeast.



Photograph 6: Shrub and herb vegetation in riparian setback of plot AP2 (west side).



Photograph 7: Vegetation plot AP2, east side facing northwest.



Photograph 8: Sparse vegetation between plot AP2 and AP3 on east side of Project site, facing southeast.



Photograph 9: Sparse vegetation between plot AP2 and AP3, east of ramp and launch facilities, facing northwest.



Photograph 10: Vegetation east of ramp and launch facilities, at east corner of property, facing southeast. Himalayan blackberry and grasses dominate.



Photograph 11: Vegetation plot AP3, north side facing south.



Photograph 12: Vegetation plot AP3, south side facing north.



Photograph 13: Herb dominated riparian area south of plot AP3, facing south.