Thetis Island Local Trust Committee
Regular Meeting Addendum

Date:	July 26, 2016
Time:	9:30 am
Location:	Thetis Island Community Centre (Forbes Hall)
	North Cove Road, Thetis Island, BC

Pages

10. APPLICATIONS AND REFERRALS 10:15 AM - 11:00 AM

10.4 TH-RZ-2016.1 (West Vancouver Yacht Club)

10.4.1 *Staff Report Dated July 18, 2016* *2 - 34*

STAFF REPORT

Date: July 18, 2016

File No.: TH-RZ-2016.1 (West Vancouver Yacht Club)

To: Thetis Local Trust Committee
For the meeting of July 26, 2016

From: Marnie Eggen, Planner 2

CC: Ann Kjerulf, Regional Planning Manager

Re: Application to Rezone Lands to Permit Breakwater Improvements

Owner: Provincial Crown Land
Applicant: West Vancouver Yacht Club
Location: Adjacent to Lot 88, Kendrick Island, Valdes Island

INTERIM REPORT

The purpose of this report is the following:

1. Review the assessment report;
2. Review public submissions received to date;
3. Introduce Bylaw No. 98 for consideration of first reading;
4. Request LTC consideration of the Policy Statement Directives Only Checklist for the proposed bylaw amendments; and
5. Request LTC consideration of referrals to First Nations and Agencies.

BACKGROUND:

At the May 24, 2016 Thetis LTC meeting the following resolutions were passed:

TH-2016-012
It was MOVED and SECONDED
that the Thetis Island Local Trust Committee request staff to schedule a community information meeting for the application TH-RZ-2016.1 (West Vancouver Yacht Club) to gather public comments on the proposed breakwater prior to drafting a bylaw amendment.
CARRIED

TH-2016-013
It was MOVED and SECONDED
that the Thetis Island Local Trust Committee request staff to request additional information 1) from the applicant regarding potential impacts of the proposed breakwater on coastal processes and adjacent marine areas and shorelines, and 2) from the Archaeological Branch, archeological site and traditional uses information.
CARRIED

At the June 18, 2016 Community Information Meeting, the following resolutions were passed:

TH-2016-043
It was MOVED and SECONDED
that the Thetis Island Local Trust Committee direct Staff to ask the Applicant, West Vancouver Yacht Club, for more precise dimensions of the completed breakwater.
CARRIED

TH-2016-044
It was MOVED and SECONDED
that the Thetis Island Local Trust Committee direct Staff to create draft bylaws for the Kendrick Island breakwater application TH-RZ-2016.1 (West Vancouver Yacht Club).
CARRIED

COMMUNITY INFORMATION MEETING:
A community information meeting was held on June 18, 2016 in Ladysmith. One member of the public attended, representing the Valdes Island Conservancy. Draft minutes are included in the agenda package for the July 26, 2016 LTC meeting.

PUBLIC SUBMISSIONS:
One public submission was received from the Valdes Island Conservancy subsequent to the community information meeting. The following concerns regarding the rezoning for the breakwater were raised, along with staff comments:

- Impacts from the breakwater on the interruption of tidal flushing;
    - Staff comments – the assessment report concludes that the impacts of the breakwater are expected to be negligible (see below).
- Impacts of construction activities on resident and migratory waterbirds and their habitats (e.g. mitigation measures);
    - Staff comments – the application does not address impacts on waterbirds or their habitat.
- Impacts on culturally-significant areas.
    - Staff comments – staff are in communication with Lyackson First Nation about the impacts to culturally important areas, and with the Province with regard to archaeological sites.

The public submissions are posted on the Thetis Current Applications webpage of the Islands Trust website: http://www.islandstrust.bc.ca/islands/local-trust-areas/thetis/current-applications/ . All future correspondence related to substantive development applications for the Thetis Local Trust Area will be posted on this webpage.

ASSESSEMENT REPORT:
A geomorphic assessment of physical coastal and marine processes was conducted by Northwest Hydraulic Consultants Ltd. as requested by the Thetis LTC (see Attachments for report). In summary, the report concludes the following:

- The proposed breakwater is not expected to magnify or otherwise redirect waves.
- Localized direct changes to geomorphic conditions are expected to be negligible.

- The only measureable indirect change to geomorphic conditions is that there will be a decrease in waves on the lee side of the structure during wind events from the east and southeast, occurring at mid to higher tides, changing the physical conditions of the shoreline and seabed only in the shallower near-shore zone. Staff have confirmed with the geoscientist that the changes are expected to result in finer sediment buildup over decades and are not significant.
- Reduction in waves is expected to be difficult to measure at a distance of 300 metres from the breakwater.
- Eelgrass beds are outside of the zone of influence.
- Indirect effects of the breakwater structure are expected to be insignificant with regard to the Rockfish Conservation Area.
- The breakwater is not expected to have an influence on adjacent shorelines of Valdes Island.

STAFF COMMENTS:

Assessment Report

The assessment report concludes that impacts on coastal processes from the proposed breakwater are negligible. Since impacts on the coastal processes are negligible, staff expect that resulting impacts to sensitive marine and foreshore habitat are minimal. Staff doesn't recommend any changes to the bylaw resulting from this information.

Public Submissions

The information submitted regarding waterbirds is consistent with the wildlife species and habitat identified in the Wakes Cove Provincial Park Draft Management Plan. Staff suggest that the applicant should obtain a biological impact assessment specific to bird species in the area prior to construction to determine any impacts and mitigation measures associated with the breakwater, including construction activities. This information can be requested of the applicant at the same time that the bylaw progresses.

Bylaw No. 101

Bylaw No. 101 is a bylaw to amend the Valdes Island Rural Land Use Bylaw No. 42, 1998, to rezone the subject waters from Marine Conservation (W1) to a site specific zoning under Yacht Club Outstation (W2) to permit only a rock breakwater. This is consistent with the Licence of Occupation that was issued for the subject area; no other use is permitted, except a breakwater.

The draft bylaw amends "Schedule A" (Valdes Island Rural Land Use Bylaw Text) by adding a site specific marine zone – Yacht Club Outstation (W2 (a)) that allows only a rock breakwater. The site specific zone also limits the rock breakwater to 2 metres in height and 152 square metres as per the proposed dimensions on the site plan provided and recently confirmed with the applicant.

The proposed bylaw also amends "Schedule C" (Zone Classification and Designation) by rezoning the subject waters from Marine Conservation (W1) to Yacht Club Outstation (W2(a)). A copy of the proposed bylaw is attached.

Bylaw Referrals

In accordance with Section 475 of the *Local Government Act* (the *Act*), in the case of an amendment to an OCP (in this case a Rural Land Use Bylaw that is deemed to contain

provisions of an OCP), the LTC must consider whether to consult with certain agencies and First Nations, including:

- The board of the regional district in which the area covered by the plan is located and/or is adjacent to the area covered by the plan;
- The council of any municipality (or local trust committee of any Local Trust Area) that is adjacent to the area covered by the plan;
- First Nations;
- Greater boards and improvement district boards; and
- Provincial and Federal governments and their agencies.

Section 476 of the *Act* also requires consultation with the local school board.

Following first reading, staff recommends Bylaw No. 101 be referred to:

Local Governments:
• Cowichan Valley Regional District
• Nanaimo Regional District

Local Trust Committees:
• Gabriola Island Local Trust Committee
• Galiano Island Local Trust Committee
• Salt Spring Island Local Trust Committee

Provincial Agencies:
• Ministry of Environment, Parks
• Ministry of Forests, Lands and Natural Resource Operations – Ecosystems
• Ministry of Forests, Lands & Natural Resource Operations - Archaeology Site Inventory
• School District #68 (Nanaimo-Ladysmith)

Federal Agencies:
• Transport Canada
• Environment Canada
• Parks Canada

First Nations (as determined from the Provincial Consultative Areas Database and in consultation with the Ministry of Community, Sport and Cultural Development):
• Semiahmoo First Nation
• Stz'uminus First Nation
• Cowichan Tribes
• Halalt First Nation
• Lake Cowichan First Nation
• Lyackson First Nation*
• Penelakut Tribe
• Snuneymuxw First Nation
• Hul'qumi'num Treaty Group

**Note, on April 27, 2016, staff met with staff of Lyackson First Nation, where there was an opportunity for an early referral of the proposed rezoning. As noted in the Staff Memo dated April 16, 2016, Lyackson First Nation has concerns about the proposed rezoning. Staff is in communication with Lyackson regarding their concerns.*

The LTC should consider if it wishes to undertake additional consultation to that identified above and direct staff accordingly.

RECOMMENDATIONS:
Staff recommends the following:

1. THAT the Thetis Island Local Trust Committee Bylaw No. 101 cited as "Valdes Island Rural Land Use Bylaw, 1998, Amendment No. 2, 2016" be read a first time.

2. THAT the Thetis Island Local Trust Committee has reviewed the Islands Trust Policy Statement Directives Only Checklist and determined that Bylaw No. 101 cited as "Valdes Island Rural Land Use Bylaw, 1998, Amendment No. 2, 2016" is not contrary to or at variance with the Islands Trust Policy Statement.

3. THAT the Thetis Island Local Trust Committee request staff to refer Bylaw No. 101 cited as "Valdes Island Rural Land Use Bylaw, 1998, Amendment No. 2, 2016" to the following agencies and First Nations for comment:

   Local Governments:
   • Cowichan Valley Regional District
   • Nanaimo Regional District

   Local Trust Committees:
   • Gabriola Island Local Trust Committee
   • Galiano Island Local Trust Committee
   • Salt Spring Island Local Trust Committee

   Provincial Agencies:
   • Ministry of Environment, Parks
   • Ministry of Forests, Lands and Natural Resource Operations – Ecosystems
   • Ministry of Forests, Lands & Natural Resource Operations - Archaeology Site Inventory
   • School District #68 (Nanaimo-Ladysmith)

   Federal Agencies:
   • Transport Canada
   • Environment Canada
   • Parks Canada

   First Nations (as determined from the Provincial Consultative Areas Database and in consultation with the Ministry of Community, Sport and Cultural Development):
   • Semiahmoo First Nation
   • Stz'uminus First Nation
   • Cowichan Tribes
   • Halalt First Nation
   • Lake Cowichan First Nation
   • Lyackson First Nation
   • Penelakut Tribe
   • Snuneymuxw First Nation
   • Hul'qumi'num Treaty Group

Prepared and Submitted by:

M. Eggen

July 18, 2016

Marnie Eggen, Planner 2 | Date

Concurred in by:

Ann Kjerulf

July 22, 2016

Ann Kjerulf, Regional Planning Manager | Date

Attachments:

1. Draft Bylaw No. 101
2. Report from Northwest Hydraulic Consultants Ltd., dated July 5, 2016
3. Islands Trust Policy Statement Directives Only Checklist

DRAFT

THETIS ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. 101

A BYLAW TO AMEND VALDES ISLAND RURAL LAND USE BYLAW, 1998

The Thetis Island Local Trust Committee, being the Trust Committee having jurisdiction in respect of the Thetis Island Local Trust Area under the *Islands Trust Act,* enacts as follows:

1. Citation

   This bylaw may be cited for all purposes as "Valdes Island Rural Land Use Bylaw, 1998, Amendment No. 2, 2016".

2. Thetis Island Local Trust Committee Bylaw No. 42, cited as "Valdes Island Rural Land Use Bylaw, 1998," is amended as follows:

   2.1 Schedule "A", PART TWO, Section 5.2 ZONE SPECIFIC REGULATIONS, Subsection 5.2.8 Yacht Club Outstation (W2) Zone is amended by adding the following site specific zoning, and by making such alterations to Schedule "A" to Bylaw No. 42 as are required to effect this change:

   "Site-Specific Regulations:
   The following table denotes locations where, despite or in addition to the regulations in this Section, specific regulations apply. In the first column, the zone abbreviation and the lower-case letter refer to the notation on the zoning map. The second column describes the location where the specific regulations set out in column three apply:

Site-Specific Zone	Location Description	Site Specific Regulations
W2(a)	Kendrick Island – West Vancouver Yacht Club (Breakwater)	Despite the permitted uses described above for the W2 zone, a rock breakwater is the only permitted structure. The maximum height of a breakwater is 2 metres measured from the bottom of the rock shelf. The total combined maximum area covered by the breakwater is 152 square metres."

   2.2 Schedule "C" is amended by changing the zoning classification of a portion of the unsurveyed crown foreshore and land covered by water, adjacent to Kendrick Island from Marine Conservation (W1) to Yacht Club Outstation (W2)(a), as shown on Plan No. 1 attached to and forming part of this bylaw, and by making such alterations to Schedule "C" to Bylaw No. 42 as are required to effect this change.

READ A FIRST TIME THIS _____ DAY OF _____ , 20____

READ A SECOND TIME THIS _____ DAY OF _____ , 20____

PUBLIC HEARING HELD THIS _____ DAY OF _____ , 20____

READ A THIRD TIME THIS _____ DAY OF _____ , 20____

APPROVED BY THE EXECUTIVE COMMITTEE OF THE ISLANDS TRUST THIS

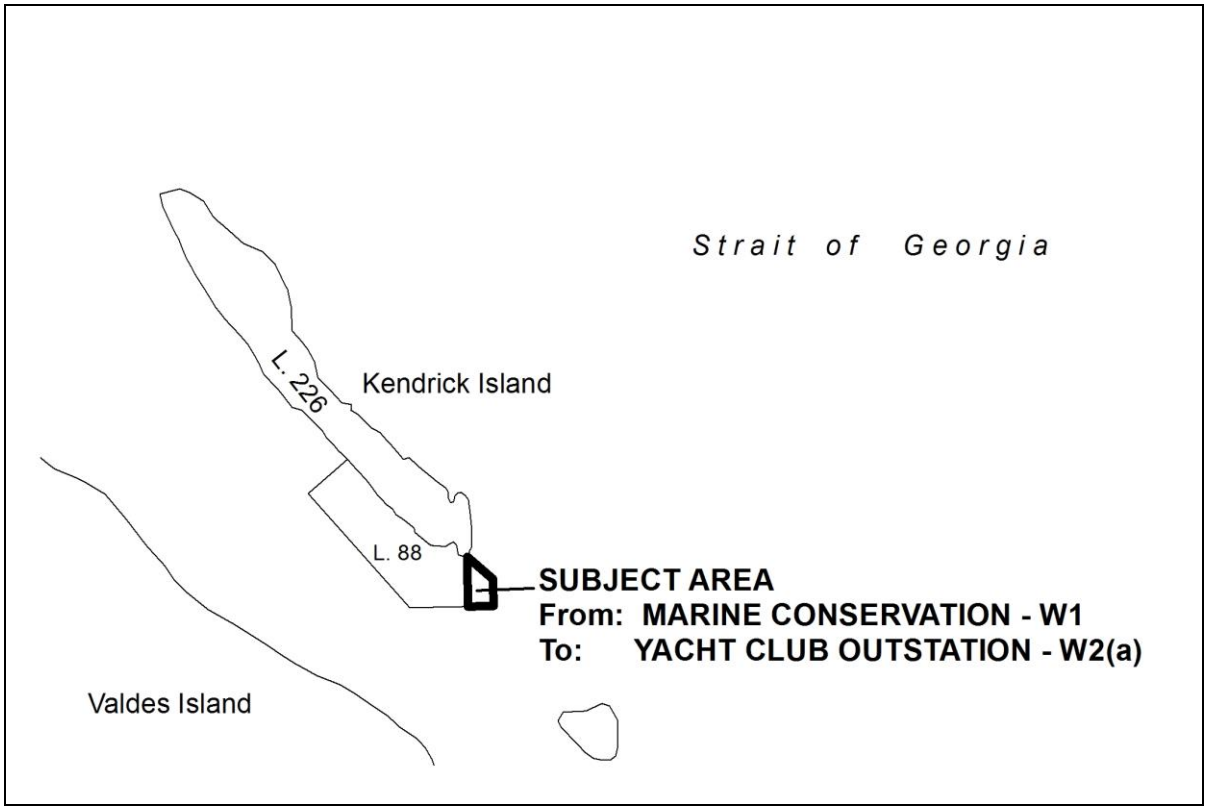
_____ DAY OF _____ , 20____

ADOPTED THIS _____ DAY OF _____ , 20____

Chair **Secretary**

THETIS ISLAND LOCAL TRUST COMMITTEE
BYLAW NO.101

Plan No. 1



nhc
northwest hydraulic consultants ltd

NHC Ref. No. 3001979

05 July 2016

West Vancouver Yacht Club
5854 Marine Drive
West Vancouver, BC
V7W 2S2

Attention: **Martin Wale**
General Manager

Copy to: **David Jones (Member)**

Via email: jones@bernardllp.ca

Re: **Kendrick Island Breakwater Expansion Project**
Geomorphic Assessment of Physical Coastal and Marine Processes

Dear Mr. Wale:

Northwest Hydraulic Consultants Ltd. (NHC) has been engaged by the West Vancouver Yacht Club (WVYC) to conduct a geomorphic assessment of physical coastal and marine processes in and around the general area of Kendrick Island and Valdes Island. The purpose of this assessment is for WVYC to respond to a request by the Islands Trust for information regarding potential impacts of a small breakwater project at Kendrick Island. Additional background information and details of the assessment are provided below. This assessment does not consider the effectiveness of the proposed breakwater for the purposes of reducing swell at the WVYC moorage site.

1 INTRODUCTION

1.1 Purpose

WVYC operates a small float and dock at Kendrick Island, located off the north east coast of Valdes Island. WVYC wishes to place additional rock boulders on an existing breakwater to provide additional protection to boats moored or docked at the facility. The purpose of this assessment is to respond to a request from the Islands Trust for an assessment of the potential impact of the breakwater project on coastal processes and adjacent marine areas and shorelines. Specific direction from the Islands Trust planner assigned to this file is as follows:

> "I would suggest obtaining a Qualified Environmental Professional with expertise in coastal geotechnical and environmental expertise to provide a report that provides information on the

existing geotechnical coastal processes in the marine & coastal areas in and around the general area of Kendrick and Valdes Island, and determine how those processes may be affected by the proposed rock breakwater. And how proposed changes to processes may affect sensitive marine and foreshore habitat in the area, such as (but not limited to) the Rockfish Conservation Area, nearby eelgrass habitat, and foreshore areas of Kendrick and Valdes Islands."

1.2 Approach

This geomorphic assessment is primarily conducted based on available materials, including photographs, satellite images, maps, charts, published wind data, reference material available through a web search, and other consultants reports and surveys. The author has also relied in part on personal experience of the area through past site visits, as well as on descriptions of the existing breakwater and history provided by members of the WVYC. A site visit was not conducted specifically for the purposes of this assessment.

2 BACKGROUND

2.1 Site Description

Kendrick Island is an outcropping of sandstone located off the northeast coast of Valdes Island with the longitudinal axis of the long, narrow island trending northwest to southeast (**Figure 1**). The northern half of the island is sufficiently elevated above sea level to support terrestrial vegetation in the form of trees, while the majority of the southern half of the island is devoid of vegetation except for two small patches of shrubs and grasses. The remainder of the island is of lower elevation, lying within the intertidal zone or exposed to breaking waves and wave run-up. The WVYC facility is located on the west side of the northern half of the island and the existing breakwater structure is located to the southeast of the facility in an area described as a rocky reef.

2.2 Breakwater History

According to WVYC members, a small breakwater was constructed in the 1970s, a short time after the Kendrick Island site was purchased in 1975, in order to reduce the effects of swell from the Strait of Georgia. Rocks were apparently placed in a small gap in the sandstone reef adjoining the two higher elevation portions of the island. The rock breakwater also benefited from the presence of a large log that formed part of the structure, but the log apparently eventually disintegrated and/or the rocks settled, resulting in the swell having a greater impact on the moorage area.

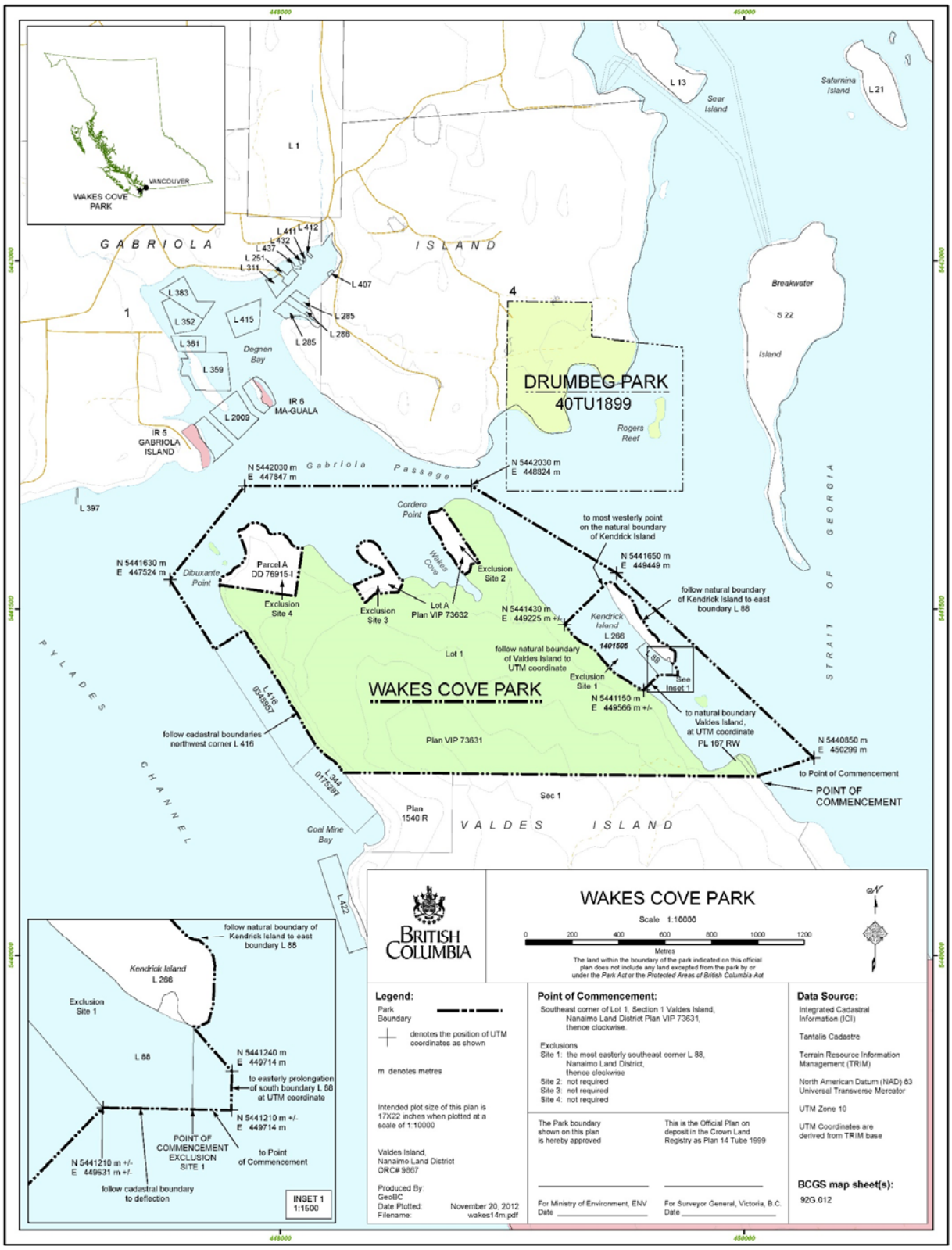


Figure 1. BCGS map sheet 92G.012 showing Wakes Cove Park and Kendrick Island.

2.3 Proposed Project

The dimensions of the existing breakwater and of the proposed expansion of the breakwater after deposit of additional sandstone rocks are shown on the J.E. Anderson and Associates plan #60469-1, which is included in **Appendix A** of this letter report. Elevations on the plan are referenced to approximate geodetic datum, and inferring from the plan notes, elevations were derived from interpretation of the high water mark, which was assigned a value of 2.6 m (Geodetic).

The footprint of the proposed breakwater expansion is shown on the plan as approximately 19 m x 8 m (approximately 152 m^2). The approximate height of the breakwater is interpreted from the plan, with the elevation of the base of the breakwater in the range between 0.9 m to 2.2 m, and the top of the breakwater to be between 2.6 m and 2.9 m, for an overall height of approximately 2 m. **Figure 2**, which was provided to NHC by WVYC, shows the proposed breakwater in both oblique plan view and section view superimposed on site photographs. The stated intention is to increase the height of the breakwater by approximately 0.5 m and attempt to slope and blend the sandstone rocks making up the breakwater into the existing sandstone reef.

In 2010, WVYC made application to DFO and Transport Canada, Navigable Waters, for approval for one barge of rocks (10 truckloads) to maintain the breakwater. Assuming a truckload to contain approximately 8 m^3 of rock, this amount of rock would have a thickness of approximately 0.5 m if spread over an area of 152 m^2.

2.4 Tidal Conditions

Tidal conditions for the area in the vicinity of Kendrick Island are similar to those at Point Atkinson near Vancouver, BC. Tidal statistics for Point Atkinson are summarised in **Table 1**, which shows that the typical tidal range is approximately 4.4 m.

Table 1. Tidal Statistics for Point Atkinson, BC from Canadian Tide and Current Tables, Volume 5, 2011). Elevations are in meters relative to Chart Datum.

Higher High Water Level		Lower Low Water Level		Recorded Extremes		Mean Water Level
Mean Tide	Large Tide	Mean Tide	Large Tide	Highest High Water	Lowest Low Water	
4.4	5.1	1.2	0	5.6	-0.4	3.1

The elevations included on the J.E. Anderson plan are referenced to Geodetic Datum (Geodetic), as interpreted from the high water mark, which was assigned an elevation of 2.6 m (Geodetic). Per the elevations shown in **Table 1**, Geodetic Datum can be approximately converted to Chart Datum (CD) by relating the HHWL (Mean Tide) elevation of 4.4 m CD to the assumed Geodetic high water mark – in other words, by adding 1.8 m to the Geodetic elevations. Based on this conversion, the base of the breakwater will be at approximately 2.7 m CD and so will be exposed above the tide slightly less than

half the time. The top elevation of the proposed breakwater will be approximately 4.7 m CD and will be completely inundated rarely but occasionally overtopped by large waves during storm events.

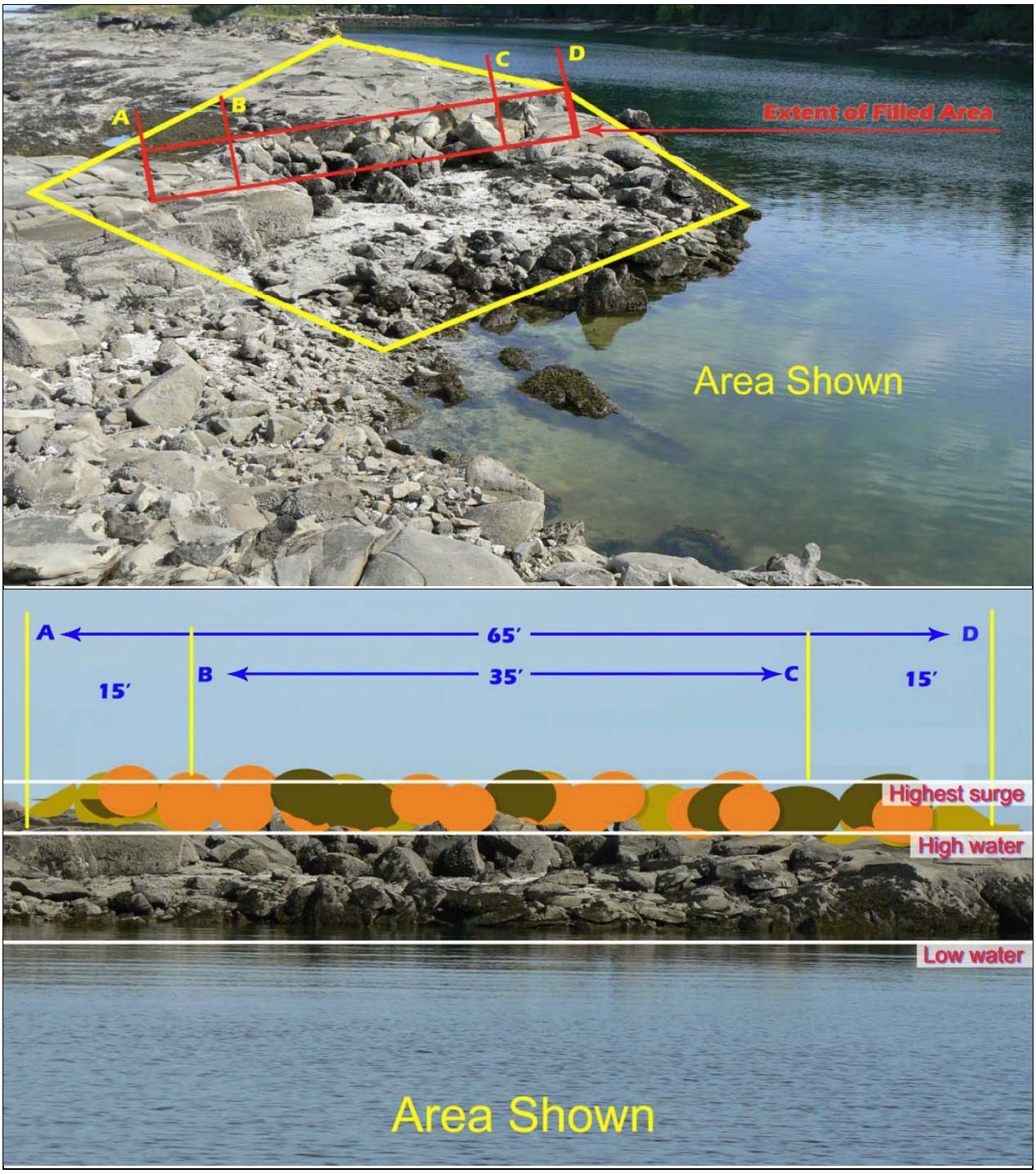


Figure 2. Proposed breakwater dimensions superimposed on marked photographs of the existing breakwater. Source: WVYC.

2.5 Local Habitat Conditions

The proposed project has the potential to have both a direct and indirect effect on habitat conditions in the vicinity of Kendrick Island. Direct effects are related to the "footprint" of the project, that is, the area immediately altered by the placement of rocks. The indirect effects occur outside the footprint, and are related to changes to physical conditions, such as waves, currents, and sediment transport, that may in turn result in changes to the surrounding habitat.

The direct effects of the proposed breakwater expansion on local habitat conditions have been considered by Envirowest Consultants Inc. and communicated in a letter report dated May 31, 2012 (see **Appendix B**). The main conclusions of this report appear to be that the placement of additional boulders may have a slight short-term negative impact on site productivity, but that the new boulders will be quickly colonized by similar organisms as those that are present now and that overall productivity will be unaffected.

Indirect effects of the project are described in **Section 4** and are assessed in specific relation to mapped areas of eelgrass (**Figure 3**), and the Rockfish Conservation Area (**Figure 4**).

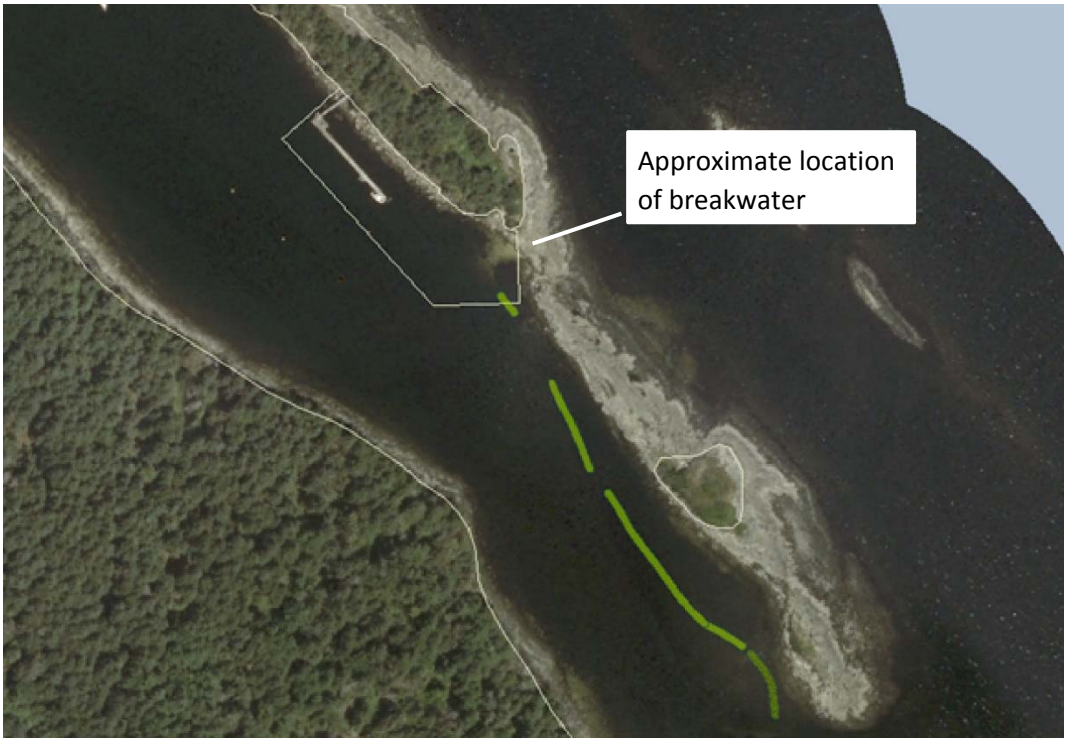


Figure 3. Location of eelgrass beds in the vicinity of Kendrick Island based on Islands Trust online mapping. Site accessed June 5, 2016.

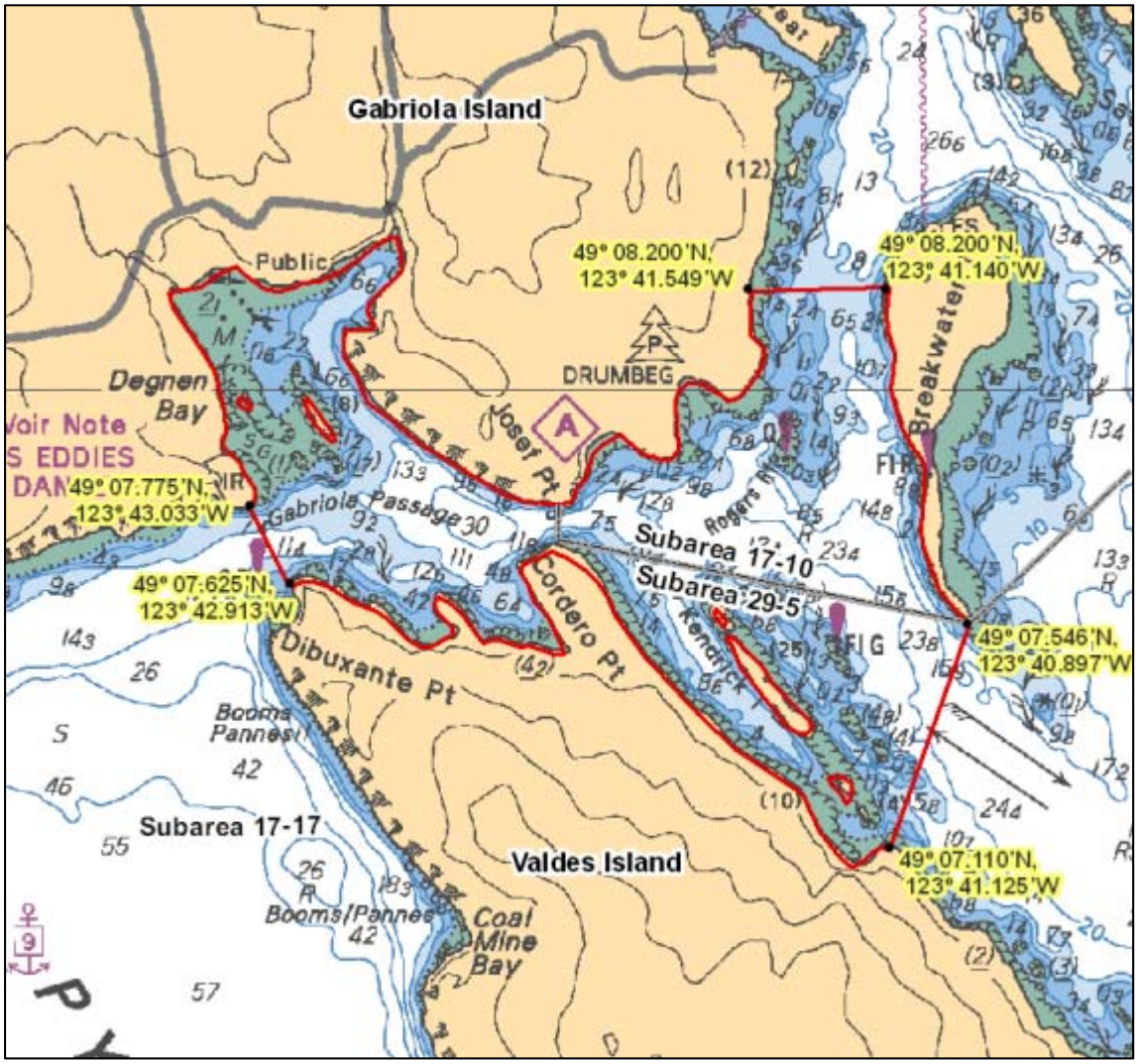


Figure 4. Rockfish Conservation Areas: Area 17, Gabriola Passage (Chart 3443). Downloaded from Fisheries and Oceans Canada website June 5, 2016.

3 GEOMORPHIC CONDITIONS

Coastal geomorphic processes in the vicinity of Kendrick Island are dominated by tidal currents and wind-driven waves. These in turn interact with the seabed and coastline that, over the long-term, results in the contemporary landscape forms. The following sections describe the general physical conditions as well as the existing landforms.

3.1 Tidal Currents

Tidal currents in the vicinity of Kendrick Island are driven by differential tide heights on either side of narrow passages or at either end of channels. For example, rising and falling tides drive currents through

Gabriola Passage (between the southern end of Gabriola Island and the northern end of Valdes Island) and between Gabriola Island and Breakwater Island. Local currents are generally aligned with the long axis of Kendrick Island.

While these currents are of interest to boaters due to navigation considerations, near-shore current velocities are relatively small and are relatively unimportant in terms of coastal geomorphology processes. The proposed breakwater would not be expected to measurably change the local currents.

3.2 Wind-Driven Waves

Winds generate waves in open water, with wave height being a function of wind strength, wind duration, and fetch (the distance over which the wind can act on the surface of the water). The long axis of the Strait of Georgia is aligned approximately northwest to southeast, which corresponds to the dominant direction of large winds. **Figure 5** shows wave statistics from Entrance Island, which is located just off the northern end of Gabriola Island, and Sand Heads which is located at the mouth of the Fraser River near Vancouver, BC. At Entrance Island, the dominant wind direction is from the southeast, with large winds also coming from the west, northwest and east. Similar statistics are shown for Sand Heads, with a slight dominance of winds from the east, although the strongest winds come from the southeast.

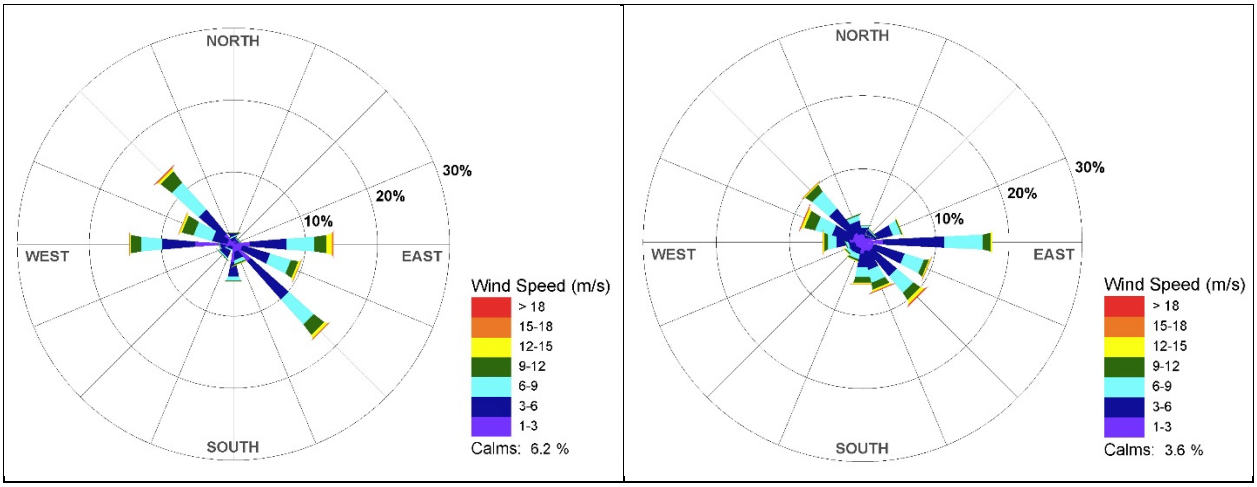


Figure 5. Wind statistics statistics summarized in the form of a wind rose for (left) Entrance Island near Nanaimo, BC for the period 1969 to 2009, and (right) Sand Heads near Vancouver, BC for the period 1991 to 2013.

Fetch lengths (the uninterrupted distance across open water) to the eastern side of Kendrick Island are approximately 30 km to the east and greater than 80 km to the southeast. Fetch lengths are very short to the west, north, and northwest because of protection by Valdes Island, Gabriola Island, and Breakwater Island (see **Figure 1**).

The proposed breakwater is therefore expected to change the wave climate primarily for waves arriving from the east through to the southeast. Changes to the local wave climate will be apparent only during periods of relatively large winds and during tides higher than approximately 2.7 m CD. The area over

which the wave climate is altered will depend on tide height and wave conditions, but due to the relatively small size of the structure, it would be difficult to measure a difference within 300 m of the breakwater.

3.3 Shorelines and Sediment Sources

The shorelines of Kendrick Island and northern Valdes Island are dominated by the presence of sandstone bedrock, which takes the form of relatively shallow angle shelves to steeper cliffs. There are few sediment sources other than the natural weathering and erosion of the sandstone, and mobile sediment is rare along the intertidal portion of this coastline, although sediment has accumulated in numerous areas of the nearshore shallow sub-tidal zone.

Figure 6 shows the existing breakwater structure within the area outlined by the yellow line. This image illustrates how the upper surface of the sandstone shelf (upper left of the image) is relatively free of sediment, while the rock along the lower edges of the island is fractured and contains a limited amount of cobble and gravel-sized pieces. Small boulders closer to the water line are covered in encrusted vegetation and marine life, indicating that they are stable. Long-shore sediment transport rates are considered to be very low.

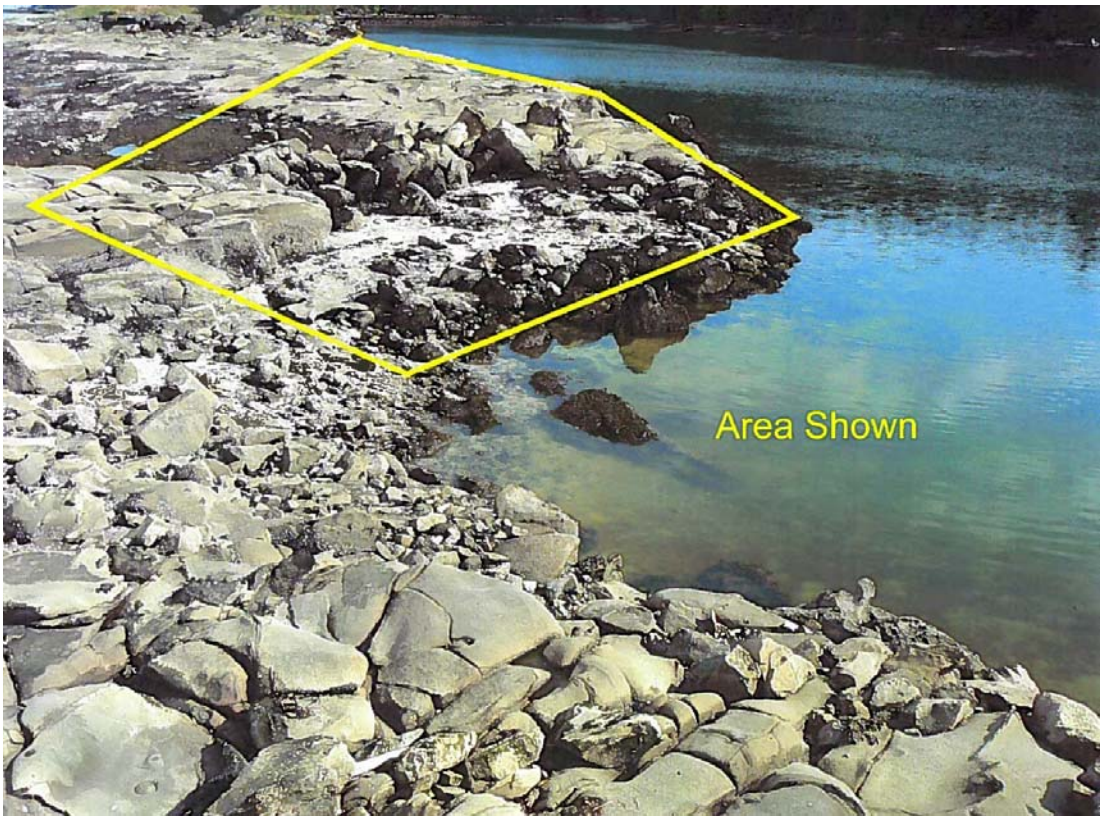


Figure 6. Photograph of the existing Kendrick Island breakwater during a lower tide condition. Note the existing breakwater is comprised of the larger boulders within the area outlined by the yellow line.

4 PROJECT ASSESSMENT

The effect of the proposed breakwater will be to reduce wave energy under specific tide and wind conditions through a process of wave shoaling and breaking. We would not expect that the structure will magnify, or otherwise redirect waves.

4.1 Localised Direct Changes to Geomorphic Conditions

The proposed expanded breakwater will interact with wind-driven waves from the east to southeast, primarily during mid- to higher tide conditions. During lower tide conditions the breakwater will have no effect on the local wave climate. Transport of sediment along the exposed sandstone-dominated shoreline is extremely low under existing conditions and is not expected to change. Over the very long-term, a small amount of mobile sediment may accumulate on the northeast (lee) side of the breakwater in response to the wave shadow effect. Given the accumulation rate is expected to be very slow, the effect of this change is expected to be negligible.

4.2 Indirect Changes to Geomorphic Conditions

Outside of the immediate footprint area of the proposed breakwater, the only measurable change to geomorphic conditions will be a decrease in waves on the lee side of the structure during wind events from the east through to the southeast. This decrease will be occur only during mid- to higher tide conditions and will change the physical conditions of the shoreline and seabed only in the shallower near-shore zone. In deeper water, wave effects on the seabed are minimal under existing conditions because the orbital velocity of passing waves is reduced at depth. At the surface, the reduction in waves would be difficult to measure at a distance of 300 m from the structure.

The proposed breakwater expansion will have no measureable change to the physical conditions at the location of the mapped eelgrass beds shown in **Figure 3**. These beds are downwind of the structure and therefore outside the zone of influence.

With respect to the Rockfish Conservation Area shown in **Figure 4**, the indirect effects of the breakwater structure are expected to be insignificant. During some wind and tide conditions, wave energy will be reduced downwind of the structure but this effect will change conditions only in the shallower near-shore zone. Per comments made in the Envirowest Consultants Inc. report, fish are not expected to be physically present in the immediate vicinity of the structure, except perhaps during brief periods at high tide. Long-shore sediment transport rates are very low and the structure would not induce a measureable change to sediments outside the immediate footprint area, which is in the inter-tidal zone.

With respect to adjacent shorelines on Valdes Island, the structure is not expected to have any influence.

5 CLOSURE

DISCLAIMER

This document has been prepared by **Northwest Hydraulic Consultants Ltd.** for the benefit of **West Vancouver Yacht Club** for specific application to the **Kendrick Island Breakwater Expansion Project**. The information and data contained herein represent **Northwest Hydraulic Consultants Ltd.** best professional judgment in light of the knowledge and information available to **Northwest Hydraulic Consultants Ltd.** at the time of preparation, and was prepared in accordance with generally accepted engineering practices.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by **West Vancouver Yacht Club**, its officers and employees. **Northwest Hydraulic Consultants Ltd.** denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this report or any of its contents.

Closing Statement

We trust this letter report meets your immediate requirements. Should you require additional information or wish to discuss this report, please do not hesitate to contact the undersigned.

Sincerely,

Northwest Hydraulic Consultants Ltd.

Prepared by:

Derek Ray, M.Sc., P.Geo.
Principal – Coastal Geomorphologist

ENCLOSURE

cc: David Jones – Member (jones@bernardllp.ca)

APPENDIX A

J.E. Anderson and Associates, Surveyors and Engineers, Drawing 60469-1 – Sketch Plan Showing Location of Proposed Breakwater Improvements and Extension to Lease in the Vicinity of Lot 88, Nanaimo District

SKETCH PLAN SHOWING LOCATION OF PROPOSED BREAKWATER IMPROVEMENTS AND EXTENSION TO LEASE IN THE VICINITY OF LOT 88, NANAIMO DISTRICT.

SOUTH END OF KENDRICK ISLAND
92G.012

ELEVATIONS ARE APPROXIMATE GEODETIC DATUM AND DERIVED FROM OBSERVATIONS ON APPARENT HIGH WATER MARK OF APPROXIMATELY 2.6 m.

BENCH MARK – ROCK POST – ELEVATION = 4.26 m.

All Dimensions are in Metres and decimals thereof

0 5 10 20 30 40 50

THE INTENDED PLOT SIZE OF THIS PLAN IS 560 mm IN WIDTH BY 432 mm IN HEIGHT (C SIZE) WHEN PLOTTED AT A SCALE OF 1:500

KENDRICK ISLAND
LOT 266

EXISTING LEASE
LOT 88
Area = 0.927 ha

PROPOSED EXTENSION TO LEASE
Area = 884 m²

48.77

144.94

57.91

Rock Post Found
4.66

6.61

Lead Plug Found
2.54

32.5

39.11

25.0

25.0

Bottom Rock Shelf
Top Rock Shelf

Outline of Proposed Breakwater 19 m x 8 m

Outline of Old Breakwater

Top Rock Shelf

Bottom Rock Shelf

Approx. L.W.M.

REEF

Approx. L.W.M.

STRAIT OF GEORGIA

N

D R A F T
JUNE 21, 2010

J.E. Anderson and Associates
SURVEYORS AND ENGINEERS
170 MORISON AVE., PO BOX 247
PARKSVILLE, B.C. V9P 2G4
TEL 248–5755 FAX 248–6199

OUR FILE : 60469–1

THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE AND IS CERTIFIED CORRECT THIS st DAY OF JUNE, 2010.

KG KYLER, BCLS

This document is not valid unless originally signed and sealed.

APPENDIX B
Envirowest Consultants Inc. letter report dated May 31, 2012

envirowest consultants inc.
Suite 130 - 3700 North Fraser Way
Burnaby, British Columbia
Canada V5J 5H4
office: 604-451-0505
facsimile: 604-451-0557

May 31, 2012

Mr. Martin Wale
General Manager
West Vancouver Yacht Club
5854 Marine Drive
West Vancouver, BC V7W 2S2

Dear Sir,

RE: PROPOSED EXPANSION OF EXISTING BREAKWATER
KENDRICK ISLAND – STRAIT OF GEORGIA

It is my understanding that the West Vancouver Yacht Club has proposed to expand an existing breakwater that occurs immediately beyond the southern tip of Kendrick Island, Strait of Georgia. The existing breakwater and the limits of expansion are depicted by a drawing by J.E. Anderson and Associates (Attachment 'A').

I visited the location of the breakwater between 1400 and 1500 hrs, May 08, 2012. Photographs of the breakwater and the surrounding area are presented within Attachment 'B'.

The existing breakwater occurs on the crest of a sandstone reef that connects Kendrick Island to an islet to the south (Photograph B1). The breakwater is constructed of large, angular sandstone boulders (Photograph B2). In general, the top of the reef appears to occur at the approximate mean tide higher high water elevation.

The interstices of the boulders provide habitat for a myriad of motile and sessile invertebrates. Invertebrates, such as shore crabs, seek protection from predators, such as gulls, within the voids. Drying within the voids is mitigated through protection from wind and sun, allowing encrusting invertebrates, most notably mussels and barnacles, that otherwise would not occur at these higher elevations, to establish modest cover. Similarly, shading along the northwestern margin of the breakwater facilitates a dense cover of rockweed.

The slopes of the reef, descending from the margins of existing breakwater and within the design footprint of the expanded breakwater, sustain an encrusting community of barnacles, mussels and rockweed. The design footprint is not inhabited by kelp.

The design footprint of the expanded breakwater and the sandstone reef did not display signs of use by marine mammals, such as sea lions or seals. Seals were observed resting on islets located immediately west of Kendrick Island. Seals were not observed on Kendrick Island, the reef, or the adjoining islet.

The crest of the reef, apart from the existing breakwater, displayed scattered droppings of sea birds, most likely gulls. Other signs of use by birds were absent.

The placement of sandstone boulders within the design footprint of the expanded breakwater will impact the existing encrusting community. However, as the new boulders will be an extension of the existing boulder assemblage, new habitat for the impacted community will be created. As such, impacts to the existing community will be offset through the creation of new habitat.

Fish rarely engage the intertidal environment impacted by the expanded breakwater; when they do, it is during higher high tide. The predominant value of the impacted intertidal community to fish is the provision of food organisms, such as gammarid amphipods. As the new boulders will create new habitat for the encrusting community and, hence, habitat for fish food organisms, residual impacts to fish or fish habitat are not associated with the expanded breakwater.

Thank you for your attention. Should you have any questions regarding the content of this correspondence, please contact me at 604-451-0505 or adams@envirowest.ca.

Yours truly,
ENVIROWEST CONSULTANTS INC.

Mark A. Adams, R.P.Bio.
Senior Project Manger/Biologist

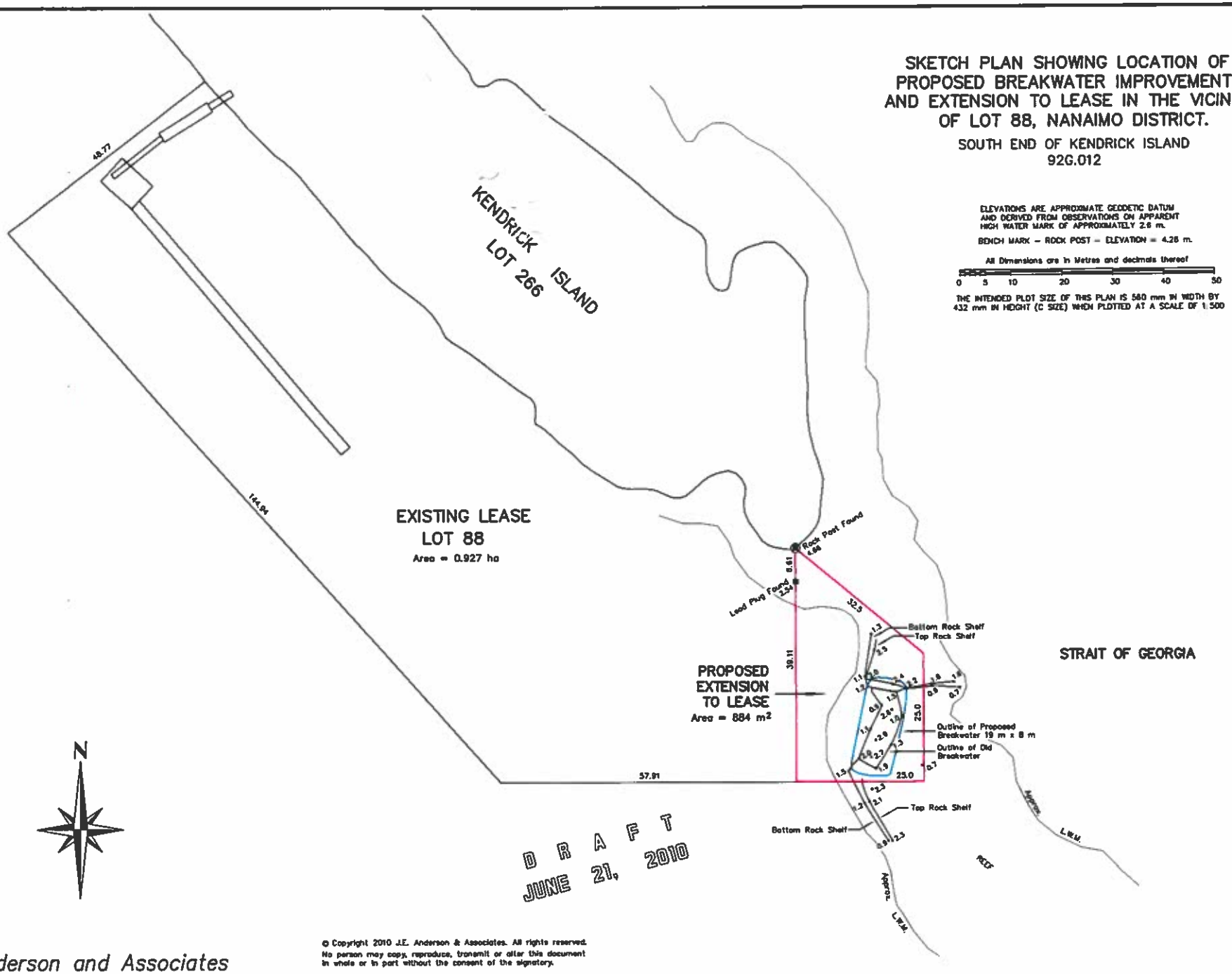
MAA

attachments

ATTACHMENT A:
Existing Breakwater and Expanded Breakwater Plan

SKETCH PLAN SHOWING LOCATION OF PROPOSED BREAKWATER IMPROVEMENTS AND EXTENSION TO LEASE IN THE VICINITY OF LOT 88, NANAIMO DISTRICT.

SOUTH END OF KENDRICK ISLAND
92G.012



ELEVATIONS ARE APPROXIMATE GEODETIC DATUM AND DERIVED FROM OBSERVATIONS ON APPARENT HIGH WATER MARK OF APPROXIMATELY 2.6 m.

BENCH MARK – ROCK POST – ELEVATION = 4.28 m.

All Dimensions are in Metres and decimals thereof

0 5 10 20 30 40 50

THE INTENDED PLOT SIZE OF THIS PLAN IS 560 mm IN WIDTH BY 432 mm IN HEIGHT (C SIZE) WHEN PLOTTED AT A SCALE OF 1:500

D R A F T
JUNE 21, 2010

J.E. Anderson and Associates
SURVEYORS AND ENGINEERS
170 MORISON AVE., PO BOX 247
PARKSVILLE, B.C. V9P 2G4
TEL 248-5755 FAX 248-6199

OUR FILE : 60469-1

THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE AND IS CERTIFIED CORRECT THIS st DAY OF JUNE, 2010.

KG KYLER, BCLS

This document is not valid unless originally signed and sealed.

ATTACHMENT B:
Site Photographs

Photograph B1. Sandstone reef between Kendrick Island and islet, looking north from islet. Existing breakwater depicted by arrow (1422hrs, May 08, 2012).

Photograph B2. Existing breakwater (1428hrs, May 08, 2012).

POLICY STATEMENT DIRECTIVES ONLY CHECK LIST

Bylaw and File No: TH-RZ-2016.1 (West Vancouver Yacht Club)

The following symbols in the table indicate:

✓ the bylaw is consistent with the policy from the Policy Statement, or
× **the bylaw is** inconsistent (contrary or at variance) **with a policy from the Policy Statement, or**
N/A the policy is not applicable.

Explanatory notes are added in bold and italics text

Part III Policies for Ecosystem Preservation and Protection

CONSISTENT	NO.	DIRECTIVE POLICY
	3.1	**Ecosystems**
✓	**3.1.3**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification and protection of the environmentally sensitive areas and significant natural sites, features and landforms in their planning area.
N/A	**3.1.4**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the planning, establishment, and maintenance of a network of protected areas that preserve the representative ecosystems of their planning area and maintain their ecological integrity.
N/A	**3.1.5**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the regulation of land use and development to restrict emissions to land, air and water to levels not harmful to humans or other species.
	3.2	**Forest Ecosystems**
N/A	**3.2.2**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the protection of unfragmented forest ecosystems within their local planning areas from potentially adverse impacts of growth, development, and land-use.
	3.3	**Freshwater and Wetland Ecosystems and Riparian Zones**
N/A	**3.3.2**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address means to prevent further loss or degradation of freshwater bodies or watercourses, wetlands and riparian zones and to protect aquatic wildlife.

	3.4	**Coastal and Marine Ecosystems**
✓	**3.4.4**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the protection of sensitive coastal areas
✓	**3.4.5**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the planning for and regulation of development in coastal regions to protect natural coastal processes

PART IV: Policies for the Stewardship of Resources

CONSISTENT	NO.	DIRECTIVE POLICY
	4.1	**Agricultural Land**
N/A	4.1.4	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification and preservation of agricultural land for current and future use.
N/A	4.1.5	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the preservation, protection, and encouragement of farming, the sustainability of farming, and the relationship of farming to other land uses.
N/A	4.1.6	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the use of adjacent properties to minimize any adverse affects on agricultural land.
CONSISTENT	**NO.**	**DIRECTIVE POLICY**
N/A	4.1.7	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the design of road systems and servicing corridors to avoid agricultural lands unless the need for roads outweighs agricultural considerations, in which case appropriate mitigation measures shall be required to derive a net benefit to agriculture
N/A	4.1.8	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address land uses and activities that support the economic viability of farms without compromising the agriculture capability of agricultural land.
N/A	4.1.9	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the use of Crown lands for agricultural leases.
	4.2	**Forests**
N/A	4.2.6	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the need to protect the ecological integrity on a scale of forest stands and landscapes.
N/A	4.2.7	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the retention of large land holdings and parcel sizes for sustainable forestry use, and the location and construction of roads, and utility and communication corridors to minimize the fragmentation of forests.
N/A	4.2.8	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the designation of forest ecosystem reserves where no extraction will take place to ensure the preservation of native biological diversity.
	4.3	**Wildlife and Vegetation**

	4.4	**Freshwater Resources**
N/A	4.4.2	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address measures that ensure neither the density nor intensity of land use is increased in areas which are known to have a problem with the quality or quantity of the supply of freshwater, water quality is maintained, and existing, anticipated and seasonal demands for water are considered and allowed for.
N/A	4.4.3	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address measures that ensure water use is not to the detriment of in-stream uses
	4.5	**Coastal Areas and Marine Shorelands**
✓	4.5.8	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the needs and locations for marine dependent land uses
✓	4.5.9	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the compatibility of the location, size and nature of marinas with the ecosystems and character of their local planning areas.
✓	4.5.10	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the location of buildings and structures so as to protect public access to, from and along the marine shoreline and minimize impacts on sensitive coastal environments
N/A	4.5.11	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address opportunities for the sharing of facilities such as docks, wharves, floats, jetties, boat houses, board walks and causeways.
	4.6	**Soils and Other Resources**
N/A	4.6.3	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the protection of productive soils***.***

PART V: Policies for Sustainable Communities

CONSISTENT	NO.	DIRECTIVE POLICY
	5.1	**Aesthetic Qualities**
✓	**5.1 3**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the protection of views, scenic areas and distinctive features contributing to the overall visual quality and scenic value of the Trust Area.
	5.2	**Growth and Development**
✓	**5.2.3**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address policies related to the aesthetic, environmental and social impacts of development.
N/A	**5.2.4**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address any potential growth rate and strategies for growth management that ensure that land use is compatible with preservation and protection of the environment, natural amenities, resources and community character.
N/A	**5.2.5**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address means for achieving efficient use of the land base without exceeding any density limits defined in their official community plans.
N/A	**5.2.6**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification of areas hazardous to development, including areas subject to flooding, erosion or slope instability, and strategies to direct development away from such hazards.

	5.3	**Transportation and Utilities**
N/A	**5.3.4**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the development of a classification system of rural roadways, including scenic or heritage road designations, in recognition of the object of the Islands Trust.
N/A	**5.3.5**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the impacts of road location, design, construction and systems.
N/A	**5.3.6**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the designation of areas for the landing of emergency helicopters.
N/A	**5.3.7**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the development of land use patterns that encourage establishment of bicycle paths and other local and inter-community transportation systems that reduce dependency on private automobile use.
	5.4	**Disposal of Waste**
N/A	**5.4.4**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification of acceptable locations for the disposal of solid waste.

CONSISTENT	NO.	DIRECTIVE POLICY
	5.5	**Recreation**
N/A	**5.5.3**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the prohibition of destination gaming facilities such as casinos and commercial bingo halls.
✓	**5.5.4**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the location and type of recreational facilities so as not to degrade environmentally sensitive areas, and the designation of locations for marinas, boat launches, docks and anchorages so as not to degrade sensitive marine or coastal areas.
N/A	**5.5.5**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification of sites providing safe public access to beaches, the identification and designation of areas of recreational significance, and the designation of locations for community and public boat launches, docks and anchorages.
N/A	**5.5.6**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification and designation of areas for low impact recreational activities and discourage facilities and opportunities for high impact recreational activities.
N/A	**5.5.7**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the planning for bicycle, pedestrian and equestrian trail systems.
	5.6	**Cultural and Natural Heritage**
✓	**5.6.2**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification, protection, preservation and enhancement of local heritage.
N/A	**5.6.3**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the preservation and protection of the heritage value and character of historic coastal settlement patterns and remains.
	5.7	**Economic Opportunities**

✓	**5.7.2**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address economic opportunities that are compatible with conservation of resources and protection of community character.
	5.8	**Health and Well-being**
N/A	**5.8.6**	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address their community's current and projected housing requirements and the long-term needs for educational, institutional, community and health-related facilities and services, as well as the cultural and recreational facilities and services
POLICY STATEMENT COMPLIANCE		
✓		**COMPLIANCE WITH TRUST POLICY**
		NOT IN COMPLIANCE WITH TRUST POLICY for the following reasons: