STAFF REPORT

Date: January 26, 2011 **File No.:** TH/04-1.3

To: Thetis Island Local Trust Committee

For meeting of February 9, 2011

From: Courtney Campbell, Island Planner

CC: Chris Jackson, Regional Planning Manager

Re: Marine Shorelands Development Permit Area and Sea Level Rise

1. PROPOSAL:

The Thetis Island Local Trust Committee (LTC) endorsed draft official community plan (OCP) content for the creation of a development permit area (DPA) for marine shorelands at their January 12, 2011 meeting. At this meeting, the LTC also requested information on how the DPA could address sea level rise, which is the purpose of this staff report.

Earlier reports should be referred to for a complete understanding of the proposal. A staff report dated November 18, 2010 reviews background studies that classify Thetis Island shorelines. A report dated January 6, 2011 provides background on DPAs and recommends draft text.

2. BACKGROUND:

Global climate change represents a threat to coastal development through the following:

- predicted sea level rise and with it, more extensive coastal inundation;
- higher wave heights and storm surge flooding;
- increased shoreline erosion; and
- increased rainfall and runoff compounded by drainage problems due to higher downstream sea levels.

All of these threats should be considered in planning for coastal communities, and this is an emerging area in the land use planning field.

The Islands Trust has recently partnered with San Juan County and the City of Seattle to pilot the Green Shores for Homes Coastal Development Rating System. This rating system builds upon the existing Coastal Development Rating System which provides a voluntary rating certification process modeled after the highly successful LEED Green Building rating system. Green Shores for Homes would provide a rating system for individual homes rather than larger developments. Thetis Island is expected to be the pilot area for this initiative, which would begin in 2012.

The Coastal Development Rating System[1] includes credits for having a Climate Change Adaptation Plan. Although this rating system is incentive-based, it contains valuable information for considering a regulatory approach to adapting to sea level rise in DPA guidelines.

2.1 Sea Level Rise Predictions:

Credit 4 of the Coastal Development Rating System summarizes the currently accepted predictions of sea level rise by 2100 based on 2007 levels. Different scenarios, low, mean and extreme high, are provided in the document, with an explanation that most climate scientists now consider that the high estimate should be used for climate change adaptation planning.

For the Nanaimo tide station, the estimate is a 0.8 m increase by 2100 from 2007 levels.

2.2 Coastal Development Rating System for Climate Change Adaptation:

The Coastal Development Rating System identifies four categories of strategies and technologies for adapting to climate change: avoid, protect, accommodate, and retreat.

For land use planning, the most relevant are avoid and accommodate. Measures to avoid impacts from sea level rise include setbacks based on the projected natural boundary, and restricting development in portions of the site that would be inundated by predicted sea level rise and storm flooding. Accommodation measures include:

- designing restoration or rehabilitation works for rising sea level (e.g. constructed intertidal marshes);
- entering into appropriate covenants that acknowledge the potential hazard and limit liability of public agencies, and
- raising structures above projected climate change-induced flood levels in ways that meet Green Shores principals (may not be as relevant to Thetis Island but more relevant in a flood plain).

3. CURRENT PLANNING STATUS OF SUBJECT LANDS:

3.1 Islands Trust Policy Statement: The Islands Trust Policy Statement does not refer to climate change or sea level rise. However, other objectives and policies are in accordance with the proposal and are reviewed in the January 6, 2011 staff report.

3.2 Official Community Plan: The Thetis Island Official Community Plan Bylaw No. 50, 1995 was amended in 2010 to add targets, policies and actions for greenhouse gas emissions reduction, and also addresses other aspects of climate change adaptation and mitigation. Adaptation to sea level rise is not mentioned in this section.

3.3 Land Use Bylaw The Thetis Island Land Use Bylaw No. 56, 1997 is currently being reviewed. The January 6, 2011 staff report itemizes relevant sections to this proposal.

[1] www.greenshores.ca

3.4 Sensitive Ecosystems: The recently completed Sensitive Ecosystem Mapping (SEM) for Thetis Island identifies numerous areas of terrestrial sensitive ecosystems along the Thetis shoreline. A DPA that extended landward of the natural boundary of the sea could offer protection to these sensitive ecosystems.

The Islands Trust does not have any mapping that identifies sensitive marine environments, but information from the Thetis Pilot Study refers to plant and animal communities that are commonly associated with different shore types.

Sensitive ecosystem data could be useful in identifying areas at risk of sea level rise, and locations were ecosystem rehabilitation measures could improve resilience to sea level rise.

4. SITE CONTEXT

The January 6, 2011 staff report describes the site context for the draft shoreline DPA. Further data analysis would be required to identify specific sites susceptible to sea level rise.

5. RESULTS OF CIRCULATION / COMMUNITY INFORMATION MEETING(S):

Preliminary information on the concept of a shoreline DPA was presented at the December 13, 2010 community information meeting (CIM). Poster boards from the UBC Pilot Study (2009) that classifies Thetis Island shorelines were displayed. These poster boards were first presented to the community at the August, 2009 CIM.

The draft DPA has been referred to the Advisory Planning Commission (APC), and will be included in a mail out to the community.

6. ISSUES SUMMARY:

a) Compliance with Islands Trust Policy Statement
b) Compliance with Thetis Island OCP
c) Mapping of areas susceptible to sea level rise
d) Including consideration of sea level rise in the OCP or LUB
e) Including consideration of sea level rise in the draft Marine Shorelands DPA

7. STAFF COMMENTS:

a) Compliance with Islands Trust Policy Statement:

The Policy Statement supports protection of natural processes, habitats and species in the marine environment, maintenance of public access to the shore. As the effects of climate change on the marine environment are a relatively new area of concern, the fact that the Policy Statement does not address this should not prevent the LTC from considering policies and regulations to adapt to sea level rise.

b) Compliance with Thetis Island OCP:

The current OCP section on Climate Change Adaptation and Mitigation supports “consideration of the impacts of climate change in all land use decisions”.

c) Mapping of areas susceptible to sea level rise:

In order to accurately understand the impact of sea level rise to Thetis Island and the areas it would affect based on the current prediction of approximately a 0.8 m rise by

2100 from 2007 levels (based on Nanaimo), it would be valuable to map the areas that would be impacted.

The Ministry of Environment has recently developed a model to do just this, and has tested it in three BC Parks locations[2]. Planning staff has asked the mapping department if any Islands Trust mapping work has been done on sea level rise, and if the methodology described in the Ministry of Environment presentation (footnote 2) is something that can be repeated for the Islands Trust area. At the time of writing this report planning staff had not heard back from the mapping department.

d) Including consideration of sea level rise in the OCP or LUB:

Without mapping to identify locations that are vulnerable to sea level rise, it is still possible to address it in the OCP or LUB. There are a range of approaches that could be taken, from background to objectives, to policies, to regulations such as setbacks or DPA guidelines.

Background: The Background to the OCP section, Climate Change Adaptation and Mitigation, could include reference to coastal impacts of climate change and could read something such as:

> *"Global climate change represents a threat to coastal development through the following:*
>
> - *predicted sea level rise and with it, more extensive coastal inundation;*
> - *higher wave heights and storm surge flooding;*
> - *increase shoreline erosion; and*
> - *increased rainfall and runoff compounded by drainage problems due to higher downstream sea levels."*

Objectives: an objective could be added to the OCP Climate Change Adaptation and Mitigation section. An objective could read something like:

> *"To adapt to sea level rise through land use regulation and ecosystem restoration"*

Policies: a policy or policies could be added to the OCP Climate Change Adaptation and Mitigation section. Policies could read something like:

> *"The Local Trust Committee should identify and map areas vulnerable to sea level rise."*
>
> *"The Local Trust Committee should establish setbacks in the land use bylaw to protect development from sea level rise predictions for 2100."*
>
> *"The Local Trust Committee should encourage ecosystem restoration or rehabilitation works to accommodate rising sea levels."*

Setbacks: Another approach to addressing sea level rise, outside of DPA guidelines, is through the use of setbacks from the sea in the LUB. Setbacks could be increased based on predicted sea level rise for 2100, however it may be difficult to do so without first having mapped the locations susceptible to sea level rise. Modeling areas of susceptibility can includes consideration of ShoreZone data (physical, oceanographic and biological features), ecosystem data and slope, and may not simply be based on

[2] http://www.ccea.org/Downloads/en_2010agm_Plenary_Wright1.pdf

elevation above current sea level. This approach it not currently recommended, although would be a good approach once areas of susceptibility were mapped.

Building elevations: The Halifax Regional Municipality is working on an adaptation plan for sea level rise, and as an interim measure, requires that the ground floor elevation of any new development must be a minimum of 2.5 m above the ordinary high-water mark[3].

e) Including consideration of sea level rise in the draft Marine Shorelands DPA:

Area of Application: Draft 2.2 of the OCP includes the endorsed draft Marine Shorelines DPA. The DPA area extends 15 m upland from the natural boundary of the sea, and seaward to the boundary of area of bylaw application. In order to create guidelines for adapting to sea level rise, it may be necessary to increase the area of application. Some shoreline DPAs in other jurisdictions extend 30 m inland from the natural boundary of the sea (District of North Cowichan and Nanaimo).

Guidelines: There are numerous guidelines throughout the draft DPA that involve a qualified professional establishing a setback for a building or structure, or considering future erosion and the need for shoreline protection in the future. A general guideline could say that recommendations from a qualified professional had to take into account a 0.8 m sea level rise by 2100.

There are a few cautions with this approach. Firstly, although the prediction of 0.8 m rise by 2100 is based on data widely accepted by climate scientists, our knowledge is changing all the time and this may underestimate or overestimate the actual rise. Secondly, professionals may not be familiar with taking sea level rise into account, and there is a risk that the requirement could be confusing, and they may not have training or experience with it.

8. SUMMARY OF OPTIONS

In summary, the LTC has a range of options including doing nothing at this time, advocating for sea level rise impact mapping at the level of Trust Council, adopting OCP background, object and / or policy language, requiring planning for sea level rise the draft Marine Shorelines DPA guidelines, and adopting LUB regulations for setbacks or minimum grade height of buildings above sea level. The draft DPA is already a significant step in shoreline planning, and has an ability to mitigate the effects of climate change to shoreline development already.

In attempting to strike a balance between waiting for supportable data, and moving forward quickly to adapt to sea level rise given the importance of action, staff recommends:

- adopting OCP background, objective and policy language regarding sea level rise as drafted in this staff report;
- extending the area of application of the draft DPA from 15 m above the high water mark to 30 m in order to allow for future consideration of sea level rise, and
- adding mapping impacts of sea level rise to the work program and / or advocating for this work at the level of Trust Council.

Staff is recommending this approach because of all the case studies reviewed, specific regulations are not enacted prior to background data to support them. Even in the Halifax case

[3] http://adaptation.nrcan.gc.ca/mun/halifax_e.php

study referred to where a minimum elevation above sea level was set, local factors for the Halifax waterfront were specifically accounted for first. The 0.8 m by 2100 prediction for Nanaimo is made relative to the Nanaimo tide station, and may be different for Thetis Island. It will be important to made regulatory change based on credible data. On the other hand, the precautionary principle would advocate for not allowing an absence of complete scientific understanding to prevent action.

In the "Projected Sea Level Changes for British Columbia in the 21st Century" report that presents this data[4], it states that

> *"projected sea level rise rates vary significantly along the BC coast. Decisions regarding land use, economic development and major long-term infrastructure projects must consider local sea level change to effectively manage risks and reduce vulnerabilities… Estimates of sea level rise at the global scale will remain highly uncertain as the rate of melting of the polar ice caps is difficult to predict… Estimates of sea level rise at the regional scale can be improved by investigating vertical land movement, the effect of changes in coastal runoff and projected changes in climate patterns."*

RECOMMENDATIONS:

Based on the above considerations, Staff recommends that the Local Trust Committee:

1. direct staff to add to the draft OCP, in the background section to Climate Change Adaptation and Mitigation, the following text:

   "Global climate change represents a threat to coastal development through the following:

   - *predicted sea level rise and with it, more extensive coastal inundation;*
   - *higher wave heights and storm surge flooding;*
   - *increase shoreline erosion; and*
   - *increased rainfall and runoff compounded by drainage problems due to higher downstream sea levels."*

2. direct staff to add to the draft OCP, a new objective to the Climate Change Adaptation and Mitigation section as follows: *"To adapt to sea level rise through land use regulation and ecosystem restoration";*

3. direct staff to add the following three new policies to the draft OCP in the Climate Change Adaptation and Mitigation section:

   "The Local Trust Committee should identify and map areas vulnerable to sea level rise."

   "The Local Trust Committee should establish setbacks in the land use bylaw to protect development from sea level rise predictions for 2100."

   "The Local Trust Committee should encourage ecosystem restoration or rehabilitation works to accommodate rising sea levels";

4. direct staff to extend the area of application of the draft Marine Shorelines DPA from 15 m above the high water mark to 30 m; and

5. add "mapping impacts of sea level rise" to the work program.

[4] http://www.env.gov.bc.ca/cas/pdfs/sea-level-changes-08.pdf

Respectfully submitted by:

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Reviewed by:

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