Environment Canada
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Re: Canadian Environmental Assessment Act
Deltaport Third Berth Project - Environmental Assessment Application
Environment Canada Comments

Environment Canada (EC) has reviewed the Environmental Assessment Application for the Deltaport Third Berth (DP3) Project, along with its technical appendices.

We understand that DP3 Project consists of construction of a wharf to accommodate an additional berth, and approximately 20 hectares of fill to create an expanded container storage yard. It will also include dredging to lengthen the existing ship channel and to create a tug moorage area adjacent to the terminal. Rail and other infrastructure improvements will also be required.

We thank you for the opportunity to review the DP3 Application and present our technical review comments are in the attached document. We look forward to reviewing the proponent's response to our comments.

It should be noted that the advice provided does not constitute an approval. The proponent shall ensure that all work associated with the subject project complies with the requirements of the *Fisheries Act*, the *Canadian Environmental Protection Act, 1999,* the *Migratory Birds Convention Act*, the *Species at Risk Act* and all other applicable laws, legislation, and best management practices.

The proponent should be aware that Section 36(3) of the federal *Fisheries Act*, administered by Environment Canada, prohibits the discharge of deleterious substances to waters frequented by fish, or to a place where those substances might enter such waters. Therefore, the proponent must ensure that, at all times during the project, deleterious substances are prevented from entering into fish-bearing waters or

any tributaries. Due diligence is required at all times to prevent such discharges, and adherence to the proposed courses of action suggested in this letter does not relieve the proponent of the requirement to comply with the *Fisheries Act.*

If you have any questions, please feel free to contact me at 604-666-3567, or at adam.larusic@ec.gc.ca.

Yours truly,

{original signed by}

Adam La Rusic, P.Eng
Senior Environmental Assessment Engineer

cc: Jan E. Hagen, BC Environmental Assessment Office

attach.: Environment Canada - Technical Comments
Air Toxics Emission Inventory and Evaluation

1.0 Air Quality

The application's conclusion that there are no significant air quality effects from the project depends on a number of emissions inventory assumptions, mitigation measures, and air quality modelling approaches outlined in the application and technical appendices. We require resolution of the following items prior to being in a position to determine the significance of air quality effects.

1.1 *Emissions Inventory*

a) General

- When comparing project emissions to regional study area (RSA) emissions (as is done for example in Tables 4-19 and 4-22 of Technical Volume 8), all emissions within the RSA, not just the Local Study Area (LSA), from Project-related ships, trains and vehicles should be included in the Project emissions estimates. This was done in Table 13.23 of the application and Table 4-31 of Technical Volume 8. Technically this RSA-to-RSA approach should also be used in comparing existing baseline (and Project construction) emissions to RSA emissions, as in Table 13.11 of the application and Tables 4-13 and 4-16 of Technical Volume 8, however this is not essential to the assessment of the project's potential impacts.

- PM emissions in the LSA and from the project are virtually all "diesel PM." Diesel PM is an air toxic of particular concern for cancer and non-cancer health effects. Project diesel PM emissions (anywhere in the airshed) should be compared to regional (RSA) diesel PM emissions, for example in Tables 13.11 and 13.23 of the application and Tables 4-13, 4-16, 4-19, 4-22 and 4-31 of Technical Volume 8. In 2005, diesel PM emissions for the entire Lower Fraser Valley (LFV) (including Whatcom County) were estimated by Levelton Consulting (in an air toxics inventory for GVRD) as 2,664 tonnes in 2000, 2,608 tonnes in 2005, 2,479 tonnes in 2010 and 2,314 tonnes in 2015.

b) Vessels

- The emissions inventory (and the subsequent determination of health and environmental effects and their significance) depends to a large extent on the estimate that the project will result in an additional 66 vessel calls per year over the 2011 baseline. We require more information about the reasonableness of this estimate as a conservative estimate of worst-case air emissions. It represents only a 20% increase (over the 2011 baseline) in vessel calls and in total capacity of calling vessels, despite the 44% increase in terminal throughput capacity and approximately 50% increase in land-side traffic

(dockyard equipment, rail, etc.). It is also not clear how the estimate of 66 calls relates to the terminal operator's estimate of 52 calls (baseline unclear but likely 2011) referred to in the Batchelor, 2004, navigational impacts study, or the cited Moffat and Nichol estimate of 25 calls (baseline also unclear). Alternatively, project design criteria or environmental assessment (EA) approval conditions ensuring no more than 66 additional vessel calls per year resulting from the project would remove any doubt as to the reasonableness of the estimate.

- Section 13.3.8 of the application includes a table describing the assumption of an additional 66 vessel calls per year over the 2011 baseline as conservative compared to a forecast of 28 vessel calls. Where does the forecast of 28 come from?

- Please clarify how far offshore (west) ship (and ferry) emissions are included in the emission inventory. Are the emissions only those which take place within the LSA?

- For some parameters, different emission factors were used for ships underway versus manoeuvring. Where were ships assumed to be underway and where were they assumed to be manoeuvring?

- What sulphur content was assumed for fuel used during ship manoeuvring? Our understanding is that most ships use fuel oil during manoeuvring. Note that this is different from the assumption made in the Levelton marine vessel emission inventories prepared for GVRD in 2002.

- Regarding the reasonableness of assuming increased average vessel capacity in 2011 (and therefore fewer vessels and emissions): How speculative is the estimate of 4,650 TEU versus the current 4,065 TEU? Is it a sufficiently conservative estimate of worst-case air emissions?

- Will the expected increase in average capacity of calling vessels from 4,065 TEU to 4,650 TEU between 2003 and 2011 (even without the project) increase the average hours at berth per vessel call? Was this taken into account in the ship hotelling portion of the emissions inventory?

- The 2003 baseline emissions for ship emissions do not appear to be appropriately proportional to the container vessel emissions estimated in the Levelton 2002 marine vessel emission inventory for the Lower Fraser Valley (LFV). Please explain the reason for the difference. For example, 40 tonnes of PM are estimated for the 2003 baseline. The Levelton inventory attributed 156 tonnes to container vessels in the year 2000, and container traffic to Vancouver Port Authority (VPA) as a whole grew by 33% from 2000 to 2003. If Deltaport handled 45% of the container volume in the LFV in 2003, then one would expect the 2003 container ship emissions from Deltaport to be in the vicinity of 94 tonnes. Please explain the reason for the apparent discrepancy.

- For future reference only, in late 2004 EC released a "Review of Methods Used in Calculating Marine Vessel Emission Inventories" by SENES Consultants Ltd., which recommends methods for future marine vessel emission inventories. For example, it recommends the use of Entec, 2002, emission factors instead of those used by Levelton in 2002. We generally accept the use of Levelton's emission factors for this assessment (exceptions noted herein), and we do not expect that project emission inventory results would differ substantially using the SENES recommended methodology.

c) Other Sources

- The assumed sulphur contents for nonroad, locomotive and ferry diesel, which were based on 2001 data, may be overly conservative (especially for 2006 and 2011) in light of expected reductions in the sulphur content of various diesel fuels. For example, the 2011 baseline and Project emissions inventories could assume 15 ppm sulphur diesel use by dockyard equipment and on-road vehicles, because the Minister of the Environment has proposed regulations to require non-rail and non-marine diesel fuels to meet this limit by 2010. For more information, see: http://www.ec.gc.ca/CEPARegistry/regulations/detailReg.cfm?intReg=90

- What is the source for the assumption that container trucks idle 50% of the time while at Deltaport?

- What is the source for the assumption that trains idle for an average of 24 hours while at Deltaport?

- Will an additional switcher locomotive be required in the project operation scenario? If not, will the duty cycle of the switcher locomotive change to meet the new activity requirements, and was this taken into consideration in the inventory?

- Table A-18 shows the age distribution of locomotive engines. There appears to be an error in the equipment age categories for 1966-2001 and/or 1974-2001.

- Please explain why project locomotive PM2.5 emissions are 22% over the 2011 baseline locomotive PM2.5 emissions despite a 50% increase in locomotive activity.

- Why are no emissions from container trucks or employee/service vehicles included in the baseline scenarios for 2003 and 2011?

- Tables S-6 and 4-35 of Technical Volume 8 rates the impact of "project emissions to the atmosphere" as "Low," despite "High" magnitudes of emissions of some parameters. Table 4-23 states that the increase in PM2.5, VOC, and CO emissions is "High" in magnitude. Please explain how the Final Rating is "Low".

- Table 4-23: The Geographic Extent impact attribute should note that the emissions and effects will occur within an international airshed.

1.2 *Mitigation Measures*

a) General

As per the *Canada-wide Standards for Particulate Matter (PM) and Ozone*, agreed to in 2000 by the Ministers of the Environment of the governments of Canada and British Columbia, EC applies a policy of "Continuous Improvement" to matters of particulate matter and ozone air quality and precursor emissions. According to the Canada-wide Standards (CWS):

> *There are numerous locations across Canada that have ambient levels of PM and/or ozone below the CWS levels but still above the levels associated with observable health effects. There is a need to ensure that the public recognizes that the CWS levels are only a first step to subsequent reductions towards the lowest observable effects levels. It would be wrong to convey the impression that no action is required in these areas or that it would be acceptable to allow pollutant levels to rise to the CWS levels. Jurisdictions should take remedial and preventative actions to reduce emissions from anthropogenic sources in these areas to the extent practicable.*

Therefore even in the absence of predicted Canada-wide Standards exceedences, EC expects the project to minimize emissions of particulate matter and ozone precursors to the extent practicable. As any new source of substantial emissions within a highly populated or sensitive airshed would be expected to, the project should make use of the best available practices and technologies for minimizing air emissions. This is generally-applicable EC and Canadian Council of Ministers of the Environment policy aimed at reducing the potential for human health effects.

Further, it is particularly important that best available practices and technologies for minimizing air emissions are applied in the Georgia Basin / Puget Sound International Airshed. EC and several other Canadian and US partners are collaborating on an International Airshed Strategy which includes application of the "Continuous Improvement" concept to proposed new sources of emissions, and also includes actions to reduce emissions from marine vessels.

The application describes many potential emissions mitigation measures. However, the proponent commits to implementing few of them. Based on the limited information provided in the application, the overall package of mitigation measures the proponent has committed to for project operation, does not appear to represent best available practices and technologies to

minimize air emissions. The application should explain the best practices or technologies that the Project will *certainly* include to minimize air emissions from the main sources associated with the Project. This could take place in the project description or in the section on mitigation measures.

Though in some cases further study of a promising option may be appropriate and may represent the best available practice, generally speaking simply committing to study an option is not implementation of best available practices or technologies.

It is our understanding that emission reduction options are available for sources associated with container terminal operations at a greater cost effectiveness than options that have been implemented for other industrial and transportation sources in this airshed. Note that the Canada-wide Standards language does not restrict actions to only those with low or no economic cost. Further, it would be inappropriate for emissions resulting from this project to negate costly emission reductions achieved from land-based sources.

Finally we note that other container terminals and ports on the west coast of North America are implementing emission mitigation measures that may be considered best available practices or technologies.

b) Vessels

As per the above discussion, EC expects the project proponent to implement the best available emission-reducing practices or technologies within its control. Therefore, while VPA's support of a SO_x Emission Control Area application is noted, other complementary emission reduction options that constitute best practice/technology should be considered and implemented as part of the project. Options that are worthy of consideration include:

- A Port-imposed, or EA approval condition, limit on vessel calls to Deltaport (Terminal 1) per year (e.g. 393 vessel calls per year) would limit the increase in ship emissions and reduce concerns about the potential for such an increase.

- Speed reductions have been successfully implemented at Los Angeles / Long Beach, and are credited with significantly reducing ship emissions. This may constitute a best available practice for reducing emissions from ships while underway, both inbound and outbound.

- The use of lower-sulphur fuel (e.g. 0.2% sulphur MDO or MGO) by ships as a condition of terminal use could be similar to requirements to be implemented at European ports, and may constitute a best available practice for reducing ship emissions at berth.

- The use of shore power may constitute a best available practice to minimize emissions from ships while at berth. This is being successfully implemented in Los Angeles for

container vessels and is being studied elsewhere. We note TSI's planned feasibility study, however a study alone is not implementation of a best available practice or technology. Some commitment to implement best available practices or technologies to minimize ship emissions while at berth is necessary. What measure will be implemented if shore power proves to be infeasible?

- Does the text on page 96 of Technical Volume 8 suggesting that shore power is not practical for Deltaport need to be updated to reflect that the option is still under serious consideration?

Pages 92-96 of Technical Volume 8 make several references to information from draft reports prepared by Genesis Engineering (2003 and 2004) and BMT Fleet Technology Ltd. (2004) under contract to EC. These references should indicate the author of the report (i.e. Genesis or BMT) and also indicate that the referenced reports referenced are draft reports. The BMT report has now been finalized and will be publicly available once its executive summary is translated into French. An advance copy is attached.

c) <u>Dockyard Equipment</u>

EC expects the project proponent to implement the best available emission-reducing practices or technologies not only for the ships but also for dockyard equipment. Emission reduction options that constitute best practice/technology should be considered and implemented as part of the project. For example:

- The project's diesel-electric hybrid rubber-tired gantry is a best available technology.

- Fuel additive use may constitute a best available practice. Please provide more specifics of the program to implement the use of these additives. What total emission reductions are expected?

- The use of ultra-low sulphur on-road diesel would constitute the implementation of a best available practice. On-road diesel fuel will be ultra-low sulphur as of 2006. Is the proponent committing on page 475 to use on-road diesel in shore-based terminal equipment? (i.e. Is "will undertake a program to use" the same as "will use"?)

- The Port of Los Angeles has retrofitted 600 shore-side diesel engines with diesel oxidation catalysts (DOCs), and has converted 35% of its fleet to electric or low-emitting fuels. These measures likely constitute best available practices or technologies to reduce emissions from existing diesel dockyard equipment.

d) Other Emissions Sources

- The use of ultra-low sulphur diesel in construction equipment would constitute a best practice. On-road diesel fuel will be ultra-low sulphur as of June 2006. Will the project commit to the use of on-road diesel fuel in construction equipment?

- Emission reduction options that constitute best practice/technology should be considered and implemented as part of the project. For example, the use of anti-idling devices or hybrid locomotives may be considered best available practices or technologies for minimizing emissions from locomotives. How will the proponent require or influence railway companies to implement best available practices or technologies while at Deltaport?

- Please provide a reference for the statement that idle reduction technologies are not cost-effective for smaller yard locomotives (p.101 of Technical Volume 8). Our understanding is that these technologies are being implemented in the United States, and presumably this statement does not apply to the Roberts Bank diesel switch engine described on page 476 of the application.

1.3 *Air Quality Modelling*

- Project operation emissions could peak significantly with ship arrivals or departures, which might potentially coincide with peaks in ferry and/or rail emissions within the LSA. Please provide some discussion or analysis regarding whether the assumptions that ship, tug, dockyard equipment and rail emissions will occur uniformly throughout the day, and that ferry emissions will occur uniformly between 5 a.m. and 1 a.m., led to genuinely worst-case modelled ambient air quality concentrations over short-term averaging periods (e.g. 1-hour averages). An alternative approach would have been to model a worst-case scenario such as the departure of two container ships, two ferries and a train, all within an hour of high truck and dockyard activity. Would this have led to significantly different modelled ambient concentrations for short-term averaging periods?

- The LSA domain was shifted north and east to include more on-land receptors. Please provide an estimate of the relative quantity/importance of ship emissions that were left outside of the modelling domain as a result of this shift.

- It is not clear how far offshore (west) ship (and ferry) emissions are included in the application's analyses. In most cases the emissions appear to be only those emissions which take place within the LSA. Some justification for this approach should be included.

- As discussed above, the Canada-wide Standards for PM and ozone state that "*It would be wrong to convey the impression that… it would be acceptable to allow pollutant levels to rise to the CWS levels."* This would be worth stating in the application wherever Canada-wide Standards levels for PM and ozone are discussed or presented.

- As stated above, PM emissions in the LSA and from the Project are virtually all "diesel PM" and diesel PM is an air toxic of particular concern for cancer and non-cancer health effects. Please compare modelled Project diesel PM concentrations to ambient diesel PM concentrations, estimated by Levelton Engineering in a draft Air Toxics Emission Inventory as follows:

    - 0.72 µg/m^3 in Delta and other areas of the GVRD;
    - 0.38 µg/m^3 in the FVRD; and
    - 0.66 µg/m^3 in Whatcom County.

1.4 *Cumulative Effects Assessment*

The application rules out a cumulative effects assessment for air quality, based on the absence of significant air quality effects (and no residual effects) from the project. It is our understanding that an absence of significant effects does not remove the obligation to assess cumulative effects.

Given the substantial additional proposed container capacity expansion at Roberts Bank (Terminal 2), a cumulative air quality effects assessment is appropriate.

Technical Volume 8 does include such an assessment, however it states that insufficient information is available about the Deltaport Terminal 2 project and the South Fraser Perimeter Highway project to include them in quantitative an air quality modelling.

Because Terminal 2 is expected to be a large project, and because it is generally the same type of project as the current project, we think it necessary to undertake a more thorough cumulative effects assessment including Terminal 2. For example, Terminal 2 emissions from dockyard equipment, rail traffic, truck traffic, ships and tugs might reasonably be estimated based on the anticipated increase in container throughput resulting from Terminal 2. At a minimum, these emissions could be compared to 2011 baseline plus Project operation emissions. Further, while the exact location (to within metres) of these emissions may not be known at this time, the approximate location (to within tens of metres) may be known with accuracy sufficient for worst-case dispersion modelling.

1.5 *Human Health Effects*

Technical Volume 8

- Page 120 of Technical Volume 8: Pre-school and school aged children, individuals with compromised health and sensitive life styles are identified as the high risk receptors for carcinogenic effects, but the elderly are not. A composite receptor (all life stages from infant to adult, representing cumulative exposure over a lifetime), was used for the assessment of carcinogens. High risk receptors were not identified for carcinogens. The proponent must ensure that Health Canada (HC) is satisfied with the selection of receptors for carcinogenic health impacts.

- Page 145: Please provide the basis for the risk characterization: ER/CR ≤1.00 = Low, ER/CR >1.00 and < 10 = potential risk, ER/CR >10 = higher potential risk. If based on an existing criteria/framework, what were the assumptions used that enabled this characterization to be applied to this particular health risk assessment? It is mentioned that there is generally some uncertainty introduced at each stage of the risk assessment – how does this affect the accuracy of the data being provided? The proponent must ensure that HC is satisfied with the rationale for the risk characterization.

- Page 147/158: Short term (acute) and long term (chronic) concentration ratios. Statement "findings reveal that CR values were uniformly less than 1.0 (with and without background) signifying negligible acute health risks for all development scenarios". This same statement is repeated for long term (chronic) health effects (page 158). The proponent must provide a clearer basis for their conclusions, particularly in light of recent studies which indicate that PM levels (below current standards such as Canada-wide Standards and GVRD standards) have known health effects, especially PM 2.5. To look only at the numerical target is not in keeping with the full intent of the Canada-wide Standards, which urges jurisdictions to take remedial and preventative actions to reduce anthropogenic emissions to the extent practicable in areas where ambient levels are below the Canada-wide Standards but still above levels associated with observable health effects.

- A draft report by Levelton Consultants titled "Air Toxics Emission Inventory and Evaluation" (attached) estimates that the lifetime cancer risk from Diesel Particulate Matter in the GVRD is 227 per million people, and accounts for over half of the cancer risk from all air toxics. This report should be useful for the health risk assessment, since the particulate matter emissions from this project are considered to be Diesel PM. The final report will be available by May 2005, and an advance draft report is attached for

reference. The proponent should note that California EPA has gone beyond that and the US EPA and now calculates the health burden of diesel exhaust as a human carcinogen, and this is what the Levelton report was based on.

2.0 Wildlife

EC has substantive concerns with the Deltaport Third Berth Project proposal, in particular because of the risk that it will act cumulatively and negatively with existing project impacts upon the marine habitats and fish and wildlife assemblages of Roberts Bank. Insufficient data limits our understanding of the current health and trajectory of habitats, which are known to support internationally significant populations of waterfowl, shorebirds, and seabirds. Information gaps need to be addressed to remedy impact uncertainty and undue ecological risk. The Vancouver Port Authority (VPA), in collaboration with EC, DFO, and other agencies and stakeholders, needs to commit to, and ensure implementation of, monitoring and science-based adaptive management to assess ecosystem trajectory. Following this, VPA will be in a position to develop a mitigation and compensation strategy to address likely negative cumulative effects.

Underlying the above is need for Vancouver Port Authority to develop a vision for Roberts Bank, reflected in a sustainability strategy that addresses past and present projects. This vision should recognize the responsibilities of tenants to sustaining the ecosystem that supports a diverse and abundant avifauna on Roberts Bank.

EC does not have the expertise to fully review the Application with respect to the concern for eutrophication; as such, relevant sections of the Application and associated Technical Volumes were forwarded to Dr. Cliff Robinson, an expert on near-shore marine ecosystems, for his review and comment.

2.1 Technical Volume 3 Water Quality, Technical Volume 5 Marine Environment, and Application Chapter 10 Marine Environment

Background temporal and spatial variability in water quality, particularly turbidity and nutrients, have not been adequately assessed. Turbidity and nitrate are the two most important environmental factors determining the survival of the Zostera marina beds. Changes in these two parameters are important because they lead to reduction in light levels reaching the eelgrass, albeit by different mechanisms. Increased turbidity causes increased light scattering, whereas higher nitrate levels increases epiphyte, macroalgae, and phytoplankton biomass which reduces light levels. In this study, the monthly point samples collected are insufficient to allow for a reasonable determination of the variability in background levels of nutrients and turbidity within the study area. Increased temporal and spatial coverage is needed to fully document 'natural' background variability, so as to be able to detect future changes and trends in these (primarily) parameters. Important water quality parameters have not been adequately assessed, and consequently how water quality may in turn impact adjacent eelgrass beds during project construction and operation.

Other missing items (as it appears) include:

- an analysis of eelgrass bed epiphyte load;
- maximum eelgrass depths from SIMS surveys; and,
- an analysis of linkages between existing water data quality and measured eelgrass properties, such as maximum depth or density.

The proponent has not adequately assessed the potential impact of the proposed expansion on two key coastal food web species found to forage in eelgrass, namely the Pacific sand lance and Surf smelt. The occurrence of a surf smelt spawning population (p. 265 of the Application), and the mention of sand lance raises a concern over the use of shallow subtidal 'sand' habitats (Figure 10.3) by both of these species. Given the extensive sand areas shown in 10.3, and the importance of sand lance in coastal fob webs, for example, it is important that to assess the extent to which habitat is being used by sand lance, so as to ensure that its habitat is not destroyed as a result of the port expansion. Pacific sand lance should be identified as a Valued Ecosystem Component (VEC) because of its importance in coastal food webs.

2.2 *Technical Volume 6 – D3B Coastal Seabirds and Waterfowl Resources Impact*

The author undertook a very limited literature review for the purposes of providing a context for the studies undertaken in Technical Volume 6 (report). Roberts Bank receives continuous use across the seasons by migratory bird populations whose numbers, in some instances, represent significant proportions of their global populations. These visitations occur across Roberts Bank, including within the area between the Deltaport Causeway and BC Ferries causeway (referred to hereon in as the 'inter-causeway area'), within which is located the proposed Deltaport Third Berth Project ('DP3'). An extensive body of literature has developed around the ecology of the Fraser River. It appears that an in-depth literature review was not undertaken in the development of the report, which is a substantive shortcoming.

(i) Section 3.2 Methodology

(a) Section 3.2.1 Field Survey (page 13)

The fieldwork data collection procedure was developed in consultation between VPA and EC. EC followed this protocol for Transects 1, 4 and 5.

This protocol differs from that described in Section 3.2.1 of the report in that, for 'Transect 2' and 'Transect 3', birds beyond 500 m were included in the analysis. EC is of the view that data collected beyond the 500 m delineation 'contour' be treated with caution and treated as descriptive and anecdotal. Given this, the report needs to be

clear that data beyond 500 m cannot be treated in the same manner as that collected closer to shore. Also, it appears that surveys were not replicated up to four times. As such, protocol was not adhered to as frequently as we might have expected. The report needs to explain why this was the case.

EC rarely used range-finding binoculars to identify the distance of bird species from the observer, for several reasons:

- The equipment could not estimate the distances of species smaller than a swan or large gull, as the target provided was simply too small to obtain a 'fix'; and,
- Distances recorded on the diagonal do not represent distance from shore.

The above concerns will be picked up in more detail in the next section on data analysis.

With reference to the intensive data collection protocol described in Section 3.2.1 for the two transects along the north and south of the Deltaport causeway (Transects 2 and 3), EC notes that the counts during the low tide surveys were completed in the same direction each time, from the end to the base of the causeway. Given that particular species, like Brant, for example, likely use the area in a systematic way according to daylight and tide level, the consistent survey direction may have introduced a bias in the data collection by sampling these species in the same location each time. The data collected may therefore fail to fully characterize seasonal abundance, distribution and habitat use patterns of species utilizing the survey areas. The direction should have been randomized or systematically altered to avoid misrepresenting these patterns.

(b) Section 3.3.2 Data Analysis (page 15)

There are a number of major flaws associated with the data analyses presented in this section. Firstly, the guilds presented could more accurately be described as taxonomic groupings, rather than as foraging guilds. Brant, Snow Geese and Trumpeter Swans, for example, are grouped under the Geese and Swans guild. This is satisfactory from a taxonomic point of view; however, each species' has a very different pattern of habitat use on Roberts Bank, as well as requirements for food and energy. This similarly applies to the approximately twenty species of shorebirds that are identified in the report. The approach taken of grouping certain species fails to recognize the important differences in bird behaviour, such as differences in foraging strategies and roosting requirements, and therefore likely misrepresents the seasonal abundance and distribution of species in the areas surveyed. There are some anomalies in these groupings that also require explanation, such as, for example, why it is that the Hooded Merganser, a fish eating species, is grouped with the herbivorous dabbling ducks(?).

Secondly, and along the same vein, seasonal abundance and distribution in the study area throughout the year was likely underestimated because:

The entire 'Study Area' was not sampled by the point counts, particularly within the inter-causeway area (see Appendix A, Technical Volume 6);

The methodologies were not consistent across transects (see comments on Section 3.2 above);

Data for 'Transects 4' and 'Transect 5' from June-August were not included in the analyses; and,

- There were only two survey days each month, with one survey at high tide and one at low tide for each survey day. At particular times of the year, especially in April, species like Western Sandpiper, Brant, and scoters, move through the area in large numbers during migration. A survey sample size of two would not have been adequate to determine seasonal abundance and distribution for these species. As such, it should be noted that the bi-weekly sampling regime provides a snap-shot in time only of species abundance and distribution.

Thirdly, putting aside for the moment our concerns for the methods used to calculate habitat use, EC has little confidence in the ability of the data collected to actually determine habitat use. The sampling method is limited in its capability to measure long distance measurements. This is most apparent with respect to determining distances from the shore when surveying on the diagonal. Other confounding factors include instances where heterogeneous habitats are encountered within the sample units. As such, the data cannot be extrapolated for the purposes of deriving habitat use to the entire study area. Rather than the lengthy descriptions provided, the analyses would have benefited from concise descriptions of distribution and abundance of a few representative species, and could, for example, be as follows:

- Western Sandpiper for migrating shorebirds;
- Dunlin for wintering shorebirds;
- Brant for wintering and migrating Arctic Geese;
- Surf Scoter for wintering and migrating sea ducks;
- Scaup for wintering and migrating diving ducks; and,
- Mallards for wintering dabbling ducks.

These above descriptions would then be considered within the limits of the data, which are relevant to each sample area, but cannot be used to drawn inferences of the larger study area.

(ii) Section 3.3 Survey Results

(a) Section 3.3.1 Survey Dates (page 16)

Data for the months of June-August for the TFN Reserve Land Transect and the Tsawwassen Ferry causeway transect (Transects 4 and 5) were provided to the consultant. Why were these data not included in the analyses?

(b) Section 3.3.5 Foraging Guilds (page 44)

See comments above.

(c) Sections 3.3.5.1 – 3.3.5.6 (pages 45-78)

The summaries provided for each guild indicate the total number of 'individuals' recorded during the survey period. As it would have been exceptionally difficult to distinguish individuals with the chosen methodology, it is highly unlikely that all records were of new individuals. The numbers presented for each guild refer to the total number of 'sightings', or 'bird-use days', or some other equivalent term, rather than 'individuals'.

Within each of the summaries provided for each guild, there is consistent reference made to 'favourable habitat' and the percentage use of favourable habitat by each guild in the study area. Putting aside that 'favourable' is not defined, and that there are no information or data provided at all on how 'favourable' habitat was determined, the bi-weekly sampling regime undertaken did not, and could not, detect how the birds used or did not use habitats in the study area. Further, this sampling effort could not have been used, in and of itself, to determine favourable habitat (see detailed comments above).

(iii) Section 4.2 Valued Ecosystem Components (page 85)

EC is of the view that the internationally recognized groups of waterfowl, shorebirds and seabirds that utilize the habitats at Roberts Bank throughout the year should have identified as Valued Ecosystem Components (VEC's) for the purposes of this environmental assessment review (representatives from each of these bird groups could have been described, using a few representative species as described earlier) For example, although not listed by either the Province or under the *Species at Risk Act* (2002), there is considerable evidence that western sandpiper numbers have declined significantly since monitoring began in 1992 along the Pacific flyway. Computer simulations of the migration of sandpipers along the Pacific Coast indicate that a decline in food availability on the Fraser River Delta will have measurable effects on reproduction and survival of Western Sandpipers (Clark and Butler 1999). Each of these factors signals the critical importance of the area to the species, their susceptibility to anthropogenic disturbances, and likely their ability to recover to viable or manageable levels if disturbed.

(iv) Section 4.4 Assessment of Environmental Impacts

(a) Section 4.4.3 Footprint Impacts and Mitigation (page 104)

Although impacts to the foreshore are not outlined, it is stated that this habitat will be replaced on a 1:1 ratio through the placement of additional riprap, in existing subtidal rocky habitat. What are the expected impacts to the foreshore in association with the proposed third berth that would justify compensation being proposed here?

(b) Sections 4.4.3.8 – 4.4.3.16 (pages 106-118)

The Report includes calculations of percentages of total Study Area. Given the previously noted concerns respecting survey methodology, these calculations must be treated with caution.

(c) Section 4.4.4 Construction Impacts and Mitigation (page 118)

Page 119 - what evidence does the proponent have that existing populations of Brant have become accustomed to the existing noise and events of the Deltaport activities, in particular considering the statement on page 126 that there is very little information available, in general, on the effects of noise on waterfowl with regard to port and harbour operations especially?

Page 126 – similarly, what evidence does the proponent have that birds have become acclimated to the existing lighting of the Deltaport? There exists a large body of literature on the negative impacts of lighting on birds in general. Were these sources reviewed for the purposes of this Report?

What evidence is there that birds will become accustomed to both noise and light during the construction and operation of the Deltaport Third Berth project? Continued presence within an area does not necessarily imply that there are or will be no adverse impacts. Although difficult to quantify, the potential exists for sub-lethal impacts to species as a result of consistent disturbance. Disruptions causing changes in foraging behaviour could have significant consequences to fitness over time. Birds in migrations are particularly vulnerable, as they rely on specific stop-over sites, such as the Fraser River Estuary, in north- and southward migrations to breeding and wintering grounds respectively.

Section 7.0 Cumulative Effects

The title of this is a little misleading and should be changed so that this section is not construed as the project environmental cumulative effects assessment.

Appendix H Construction Timetable

Dredging in April to July coincides with the time that herons are nesting as well as the period of spring migration of Western Sandpipers. It is important that the dredging window not overlap with high bird sensitivity periods. The project construction schedule should be developed in consultation with EC.

2.3 *Application Chapter 11 – Waterfowl and Coastal Seabirds*

Section 11.3 Methodology

Refer to the earlier above comments for the Methodology sections of Technical Volume 6.

Section 11.3.1 Literature Review

Given the international significance of Roberts Bank (see below), and the body of literature that exists for this area, the literature review described in this section is inadequate for the purposes of this environmental impact assessment.

Section 11.4 Existing Environment

It is important to identify federal and provincially listed species, the report includes a search of BC Conservation Data Centre. The Application, however, has made a glaring omission, and in this section in particular, by failing to suitably describe and put into context the internationally recognized populations of, and habitat for, shorebirds, geese and ducks on the Fraser River Estuary and Delta, including on Robert's Bank. Species of note occurring in the Roberts Bank area include Brant Geese (both Black Brant and the more vulnerable Western High Arctic (WHA) or grey-bellied subspecies), much of the world's population of Western Sandpiper, about 10% of the world population of the coastal subspecies of Great Blue Heron, and a few hundred Caspian Terns. All of these species are of high conservation concern because of either small or declining populations. Both the Black and WHA Brant sub-species have declined in recent years and there is much concern over the conservation of their winter populations throughout the Pacific Flyway. The heron's reproductive success has dropped by about 50% over the past decade largely from eagle disturbances of colonies. About 400 pairs nest on the TFN lands and feed in eelgrass meadows between the jetties. The subspecies of heron at Roberts Bank is *Ardea herodias fannini*, which is largely confined to the Strait of Georgia and Puget Sound. In addition, the banks support tens of thousands of other waterfowl and shorebirds, thousands of grebes and loons, and hundreds of seabirds.

In recognition of the significance of the Fraser River Estuary and Delta, including Robert's Bank, the area was designated as a premier Important Bird Area in Canada in 2000 (IBA 2000), and most recently as a Hemisphere Site for shorebirds under the Western Hemisphere Shorebird Reserve Network (WHSRN 2004). These designations represent the highest level of

importance in each of the respective programs, and highlight the significance of the Delta and Robert's Bank at an international level.

(a) Table 11.1 (page 322)

The list of species identified as potentially occurring within the Study Area contains a few absurdities. Short-tailed albatross and horned puffin, for example, are exceedingly rare in BC, and it is highly unlikely they would be in the Strait of Georgia, let alone at Roberts Bank.

Given that it is notoriously difficult to differentiate Short from Long billed Dowitchers, particularly from the survey distances involved, it should not be concluded that Short-billed Dowitchers were not seen. Similarly, given the difficulties with differentiating Canada Goose subspecies, it should not be concluded that the *leucopareia* and *occidentalis* subspecies were not seen.

(c) Section 11.4.2 Federal and Provincially Listed Bird Species (page 324)

It is concluded that, although identified as a potential breeder in the area, the American Bittern is not expected to be impacted because it is only associated with the Brunswick and TFN marshes. This conclusion assumes that the project will not impact these habitats. Considering that the marine habitats of Roberts Bank are in a state of flux, as geomorphological processes respond to past development and related expansion projects, the area surrounding the terminal has yet to equilibrate. The assumption therefore that will be no impacts is not well supported by the evidence presented.

(d) Section 11.4.3 Foraging Guilds (page 324)

In addition to the comments provided above on report, the foraging guilds presented in the Application are further complicated by the addition of the Great Blue Heron to the group containing piscivorous diving ducks. This grouping leads to the glossing over of the fact that some 800 herons forage in the eelgrass meadows (page 328).

(e) Section 11.4.4 Nesting Birds (page 329)

There is a large, c. 400 pairs, heronry – currently the largest heron colony in British Columbia - just outside the study area on lands owned by the Tsawwassen First Nation. Given that Roberts Bank and the heron colony are inextricably linked, this colony should have been identified in the application regardless of its location "outside" of the study area.

(f) Section 11.4.5 Waterfowl and Coastal Seabird Habitat (page 331)

In addition to providing important habitat for waterfowl and coastal seabird prey items, the eelgrass beds are also critical to the presence and nesting success of the largest heron colony in British Columbia, as mentioned above. Again, the importance of the area to a variety of migratory birds of conservation concern is not being appropriately recognized in the Application.

Sections 11.5 – 11.8 Assessment of Impacts

Refer to the comments above on the Assessment of Impacts for the report.

Section 11.9 Mitigation Measures

Section 11.9.1 Habitat Compensation

EC has little confidence that the compensation strategy as currently proposed will be successful, and is also of the view that the creation of a 3.7 ha island eelgrass bed in the intercauseway area to compensate for the permanent loss of 21.7 ha of existing intertidal mud/sand flat, subtidal habitat, and 3.55 ha of eelgrass bed is not acceptable. The proposed compensation will be created at the expense of existing productive subtidal mudflat. Similarly, the loss of salt marsh area, that was originally created for the existing Deltaport terminal (page 90), will be compensated for by the creation of a 600 m^2 marsh at the base of the footprint, again over existing productive habitat. The project, as it is currently envisioned, will impact productive habitat for migratory birds directly and as a result of the proposed compensation strategy. EC recommends that:

- The proponent submit revised compensation options, including, for example, the development of spits for Brant and shorebirds, to EC in this harmonized environmental assessment process for review and comment; and,
- That a strategic-level agreement is reached between the proponent and EC with respect to a migratory habitat compensation plan. EC recommends that any such agreement be made a condition of project approval.

Chapter 12- Terrestrial Wildlife and Vegetation

Section 12.7 Assessment of Impacts – Construction

(a) Section 12.7.2 Construction Impacts – General

Wildlife (page 398) - What data/evidence exists to support the conclusion that many wildlife species have become acclimated to certain re-occurring sensory disturbances associated with both Deltaport Way and the BC Rail right-of-way? EC requests that:

- The proponent provides evidence to substantiate this conclusion.

(b) Wildlife Mortality (page 399)

With reference to the statement that no mitigation measures are proposed to address the issue of wildlife mortality, the proponent should be aware that the *Migratory Birds Convention Act* (1994) prohibits the taking or killing of migratory birds, their nests and eggs, and the deposition of harmful substances in areas frequented by migratory birds. Although the construction schedule for upland areas, as indicated in Section 12.9.1 (page 402, bullet 1), avoids the general bird breeding period, EC recommends that:

- Vegetation clearing be completed outside of the general breeding bird season from March 15 to July 31;
- Proposed variances to the above, and site specific issues, such as the presence of early nesters, be in consultation with EC

Section 12.9 Mitigation Measures

Section 12.9.2 Operation

The value and effectiveness of such measures as placing barn owl nest boxes in areas where they are less vulnerable to major motorways should be evaluated. Placement of nest boxes requires consideration of factors, including:

- The foraging habitat requirements of the species; and,
- Potential mortality risk associated with placement of next boxes to foraging habitat.

EC can provide advice on this mitigation strategy if so requested.

2.4 *Chapter 23 Cumulative Effects Assessment*

A notable deficiency of the cumulative effects assessment is the lack of historical data for each ecosystem receptor. While the proponent acknowledges this, the fact remains that, given that the system is in state of flux, trend data is required to reliably assess the trajectory of the current system, and the intercauseway area in particular. The proponent needs to monitor the annual amount of nutrient/organic input into the intercauseway area in relation to the amount of export to the Strait, the chemistry of the sediment, and the health and extent of the eelgrass beds. Otherwise, the long term effects resulting from the cutting off of estuarine flow from the Fraser River to the intercauseway cannot be predicted.

The proponent predicts in this assessment that any cumulative effects arising from the Deltaport Third Berth project upon the trajectory of intercauseway habitats will be immeasurable or very low level. Without the necessary data to support this prediction, however, it is not possible to ascertain the extent to which this may be accurate. No ‘snap shot’ analysis of habitat trajectory,

which requires the collection and analysis of the linkages between water quality, sediment chemistry, and flushing rate data, has been conducted. Based on the present lack of data, the predictive power to reasonably assess the potential for this project to cumulatively impact intercauseway marine habitats cannot be completed.

Section 23.5 Coastal Geomorphology Analysis – Marine Habitats

Marine habitats – Historic trends and conditions due to existing projects (page 745)

Eelgrass beds on Roberts Bank have expanded by approximately 33% in area, from 377 ha in 1967 to 500 ha in 2003. What has been the rate of increase? Has the rate of increase changed over time?

EC has been aware of the large area of deposition near the head of the trunk channel since the 1990s, and has observed the continuing extension and growth of this feature over time, such that it now covers a large area of eelgrass habitat. As the proponent states, both the trunk channel and the area of deposition continues to grow in both a seaward and landward direction. Areas of deposition smother and consequently destroy areas of eelgrass. How will future dredging, and construction of new crest protection for the proposed Deltaport Third Berth, address the dynamics of these features?

The eelgrass beds of the intercauseway area support large numbers of migratory birds during and across the seasons. The rapid morphological changes presently underway represent major uncertainty to their long term stability. Alterations in bank morphology and composition have major implications in terms of habitat composition and use.

The report states under, Marine Habitats – Mitigation of Effects, that, *'the need for mitigation will be avoided if developments do not alter current and water patterns such that sediment distributions are changed'*. Hydraulic studies were undertaken as a requirement of previous port expansion (Final Report of the Roberts Bank Environmental Review Committee, 1996). Briefly, those studies concluded that:

- minimal changes to flow velocities over the intercauseway eelgrass beds as a result of the proposed enlarged shipping channel and turning basin:
- no effects to eelgrass beds as a result of the expansion pods; and,
- minimal effects of port expansion upon flushing rates and water quality of the intercauseway area.

VPA has similarly conducted studies to those above for the purposes of this review, and similarly concluded that, amongst other things, current flows and water velocities will only be marginally impacted. Despite this, the turning basin has affected the hydraulics of the system, as a result of changes in bank morphology, in such a way as to cause the

formation of the dendritic channels. Sediments are being redistributed over the bank above the crest protection, as evidenced in distinct areas of deposition and mounding, and channel expansion. Subsequent mitigation, in the form of the basin crest protection has, unfortunately, has not been effective in these continued aforesaid changes.

Section 23.6 Water Quality Analysis – Marine Eutrophication

(a) Marine Eutrophication – Mitigation of Effects (page 754)

The proponent states that, '*In addition, other existing and known future activities with nutrient inputs to the study area do not exceed thresholds that are likely to lead to eutrophication.*' In Section 23.6.3 (page 754), the proponent states that *'all discharges to the area are within water quality objectives, and are understood to be under the threshold likely to cause a concern'*. Information provided on pages 751-753 on Roberts Bank Nutrient Input Sources, indicate that nutrient levels from 5 of the 8 identified input sources are either not monitored, have in the past exceeded objectives, are currently not well characterized, or are completely unknown. How then does the proponent reach the conclusion identified in the aforementioned sentences?

(b) Section 23.6.3 Water Quality – Significance of Cumulative Effects (page 754)

The proponent states that the intercauseway area appears to have adequate tidal flushing and mixing. There is evidence, however, that the eelgrass beds, that continue to expand within this area, tend to retain water on the ebb tide reducing flow velocities over the tidal flats (page 751). What impact does this reduced flow have on the system? How does this relate to the potential for eutrophication in these localized areas?

In general, Section 23.6 acknowledges that eutrophication is a potential problem, and indicates what evidence would be required to draw a conclusion on the likelihood that eutrophication would be an issue. Chronic water quality problems are also indicated, and several potential sources, including the port, TFN sewage plant, and pump stations are identified. However it is then concluded that, because of high flushing rates, eutrophication is not a problem. The data available by which to support such a conclusion is limited. EC is of the view that there are too few data to make a definitive conclusion on whether eutrophication is, or will or will not be, a problem.

EC has adopted the position that the risk of eutrophication within the intercausway cannot be dismissed. If it does occur, the state of eutrophication is predicted to result in such massive environmental change between the causeways that there would be public outrage as well as agency embarrassment on an international scale, not to mention the loss of productive habitat for a very large and diverse assemblage of biota. We can predict that in a eutrophied state the current intercauseway eelgrass system would switch to a bare, anoxic mudflat situation. The biota supported by such a system would be largely composed of bacteria and nematodes. A further expression of the system

would be production of sulphurous gases, within smelling distance of both the TFN Reserve and the BC Ferry Terminal.

Section 23.7 Ecology Analysis

(a) Section 23.7.3 Birds (page 760)

Please see comments provided for Sections 3.3.5.1 – 3.3.5.6 of Technical Volume 6 on use of the term "favourable habitat".

(b) Birds – Historic trends and conditions due to existing projects

It is true that the developments on Roberts Bank have created habitats that may not have been present to the extent that they are today. It should, however, not be overlooked that these habitats have been created largely at the expense of existing habitats. Intertidal sand and mudflats, in particular are being impacted through processes of erosion and redistribution, and these habitats are of critical importance to migrating Western Sandpipers and over-wintering Dunlin.

That there is no historical information on the distribution and presence of bird species for Roberts Bank is not entirely true. Roberts Bank is known to have supported internationally significant populations of shorebirds long before the development of the port. For example, on December 13, 1824 John Wark wrote "*Immense flocks of plover were observed about the sandflat at Point Roberts off Lulu Island*." (Pearse 1968). In the 1800s, plover was used as a generic term for all shorebirds and he likely was referring to Dunlin that is the only abundant shorebird to occur on Roberts Bank in winter.

(c) Birds – Contributions of Deltaport Third Berth and other future projects (page 761)

EC looks forward to reviewing the results of the current overhead power line impact assessment.

(d) Birds – Mitigation of Effects

Please see comments provided for Section 11.9.1 of Section 11 (Waterfowl and coastal seabirds) on the proposed habitat compensation.

(e) Section 23.7.5 Ecology – Significance of Cumulative Effects

Given the flaws associated with both the data collection methodologies and analyses presented in Technical Volume 6 and Section 11 of the Application (as per our comments above), EC does not accept the conclusions presented in this section. Specifically, given that:

- There are limitations of the data to accurately determine habitat use in the Study Area;
- There are problems associated with grouping taxonomically similar species and calling them foraging guilds; and,
- There is a lack of a definition for 'favourable habitat',.

the proponent cannot conclude that bird guilds are not limited by habitat availability, or that none use more than half of what is regarded to be 'favourable' habitat. Similarly, given that species were grouped into foraging guilds, the proponent cannot conclude that there are very few examples of species that have exclusive requirements for one particular habitat type, and particularly in the absence of a literature review. We point the proponent to recent studies that suggest, for example, that biofilm on the mud surface is a vital source of food for sandpipers (Elner, et al. 2004).

Further, given our lack of confidence in the effectiveness or adequacy of the habitat compensation strategy currently proposed, EC does not consider that potential impacts associated with the construction and operation of the Deltaport Third Berth Expansion will be appropriately mitigated. We consider the proposed compensation to be a further loss of productive habitat for migratory birds.

2.5 *Conclusion and Recommendations*

Vancouver Port Authority has stated that the proposed Deltaport Third Berth Project will not have significant environmental (ecological) impacts on Roberts Bank. EC does not share this view, for the followings reasons:

- The footprint of the development, and the proposed mitigation, will directly impact productive habitat for migratory birds and other biota;
- The studies presented in support of the finding of no significant ecological impacts do not provide sufficient evidence to support that conclusion. As already discussed, the conclusions are based on data and analyses for which there exist major flaws; and,
- Perhaps most importantly, the evidence cannot show that the project footprint impacts will not act cumulatively with historical changes to the bank that have resulted from construction of the Deltaport and ferry causeways.

The construction of the Roberts Bank Terminal and BC Ferry Terminal has altered coastal geomorphology processes on Roberts Bank, which, in turn, has altered the proportions of marine habitat in the intercauseway area, as well as areas either side of the causeways. Eelgrass continues to expand at the expense of intertidal mud flats, intertidal mudflats are

eroding and becoming deeper relative to sea level, and salt marshes may continue to develop against the causeways. The impacts associated with these changes remain unresolved and, as acknowledged by the proponent, the ecosystem remaining between the causeways has yet to attain equilibrium.

The proponent states that there is no adequate way to mitigate for habitat changes on biota as a result of ongoing effects of the terminals, causeways and other changes in and around Roberts Bank. The turning basin constructed for the first Deltaport expansion initiated the formation of dendritic channels as well as the resultant and on-going redistribution of sand and mud in the intercauseway bank above and below the crest protection. Expansion of the turning basin, ship access channel, and tug basin, increases the potential for further dentritic channel formation and sand redistribution above the crest protection. Despite the hydrodynamic analyses completed to date, the effects of the first expansion were not predicted, and the mitigation efforts in response to dentritic channel formation have been unsuccessful. Without mitigation to address dendritic channel formation and sand redistribution, proposed expansion must be considered in the context of potential negative cumulative environmental effects.

While the footprint of the proposed Deltaport Third Berth project is small relative to historical factors and previous development, the development will become part of this larger, clearly altered, and still evolving system.

Given the international significance of Roberts Bank for migratory birds, and fish and wildlife generally, EC urges caution, and recommends a more detailed understanding of ecological impacts of past, present, and future planned projects, before any further changes are made to the system.

EC has raised the issue of eutrophication to VPA over the course of many years, and perhaps more intensively over the past 2-3 years during informal meetings (so to speak) as VPA contemplated expansion of the Deltaport. EC, in its comments on the Application draft work plans, indicated, amongst other things, a need to address potential impacts to intercauseway habitats in the context of an assessment of the influences of, and linkages between, water chemistry and geomorphology. Our view was that at that time the work plans were incomplete.

The Application's economic analyses and justification (i.e. 'Purpose of' and 'Need for') for the expansion of the Deltaport are persuasive indeed. VPA argues that it must expand so as to remain competitive in the market place, something which they have been, to date, successful at doing. The arguments made resound with social and economic implications. We are concerned that the "chain" of the Pacific Flyway could be broken for shorebirds at some point given the ongoing economic development in the Delta. This constitutes a major risk for Canada's environmental reputation and the economic and social benefits derived from wildlife. It is somewhat surprising, and disappointing then, that VPA has not made a similar investment

to address the long term ecological functioning and sustainability of Roberts Bank ecosystems. Sustainability requires that all three of the legs of the stool be addressed. Social and economic considerations seem to have been thoroughly addressed. We are pointing out shortcomings on the environment side.

Accordingly, EC has the following main recommendations on the basis of our review of the Deltaport Third Berth Environmental Assessment Application and supporting documents:

- Firstly, that the proponent commit to working with agencies, including EC and DFO, and stakeholders, to instigate ongoing monitoring and adaptive management / research to assess the trajectory of this system. The former RBERC model could be reconstituted to credibly accomplish this end; and
- As part of the Vancouver Port Authority commitment to a sustainable environment, a commitment from the proponent to work with regulatory agencies to define 'sustainability', develop a vision for this on Roberts Bank, and take action on the results of the adaptive management and research described above. This vision should recognize the responsibilities of tenants to sustaining the ecosystem that supports a diverse and abundant avifauna on Roberts Bank.

The above recommendations need to be developed and implemented prior to further expansion, to address the critical information gaps that have been described herein. Further, EC recommends that:

- The proponent establish a multi-partnered science mechanism to ensure measures are taken to ensure these visions are realized; and
- A like-for-like, long term approach to compensation for loss of habitat as a result of the construction of the Deltaport Third Berth Project that takes climate change and possible sea level changes into account (to the extent that this is technically feasible).

3.0 Disposal at Sea

Upon review of the Environmental Assessment Application and the supporting technical documents (Hemmera's Deltaport Third Birth Sediment Sampling Program) for the Delta Port Third Berth Project, the Disposal at Sea Program has the following comments:

For consistency purposes:

> **Statute**: *Canadian Environmental Protection Act, 1999* or CEPA, 1999
> **Regulation**: Disposal at Sea Regulations, 2001
> **Interim Contaminant Testing Guidelines (ICTG)**: are used by the Pacific and Yukon Region Disposal at Sea Program to screen potential sediments.

A discussion should be provided on the designated disposal site(s) to be used in this project, including location; the size and depth of the sites. Should the proponent request reactivation of inactive disposal sites, a rationale should be provided. Focus should be on how environmental impacts will be reduced by using the proposed site(s) over another designated site (i.e. Point Grey).

It is important that the proponent establish and discuss the reasons why disposal at sea is the environmentally practical alternative to alternatives such as land based disposal for these sediments (see http://www.pyr.ec.gc.ca/disposal_at_sea /alternte_e.htm).

EC would like the opportunity to comment on the proposed Construction/Dredging Timing Plan (referred to on pg. 703) prior to issuing a permit for Disposal at Sea. This should be attached to the proponent's Disposal at Sea Permit application which will be the main document for the Disposal at Sea Program to review regarding potential impacts to the environment as a result of loading/disposal at sea. An Environmental Protection Plan (EPP) should also be outlined for the installation and use of the submerged pipeline for sediment transfer to the disposal site.

Ch.2 Pg.45 – Section 2.7.1 – The proponent should state that **if** the material is approved for disposal at sea, it will be disposed of by pumping to a designated disposal at sea site(s).

Ch.2. Pg. 52 – Section 2.7.8 – The proponent should state that the material is unsuitable for fill, and meets EC's testing guidelines.

Ch.10 Pg. 278 – The proponent needs to be specific about the disposal sites and their locations, due to the proximity of Sand Heads, Pt. Grey, etc.

3.1 *Clarification*

- Throughout the document – If the proponent chooses to refer to “deep water disposal” for future documentation they should include “at a designated disposal at sea site”.

- The Disposal at Sea Program evaluates cadmium and mercury levels in sediments as these elements are on the CEPA 1999, National Action List and the Pacific and Yukon (ICTG) (see http://www.pyr.ec.gc.ca/disposal_at_sea_/ictg3_e.htm). Consistent citation of these criteria should be made in all future documentation.

- Throughout the document – “Disposal at Sea Permit for Dredged Material” – should just be referred to in future documentation as a “Disposal at Sea Permit”.

- *Ch.8/9 Pg. 235* – The disposal location in future documentation should be referred to as ‘designated disposal at sea’ sites – not ‘ocean disposal’ sites.

- *Ch. 8/9 Pg. 238* – The sediments don’t “require” disposal at sea, it is simply the preferred alternative. In future documentation CEPA should be referred to as CEPA,1999.

- *Ch.8/9 Pg. 244* – Future documentation should refer to the Disposal at Sea Regulations, 2001 not Ocean Disposal Regs. Also in Section 9.4.1 – the samples were compared to EC’s “regulated limits” and the ICTG (not disposal at sea criteria).

- *Table 9.1, 9.2, 9.3 Pg. 245/6* – The only regulated levels are cadmium and mercury. Future documents containing these column headings should be changed to reflect this.

- *Ch. 8/9 Pg. 248* – For future documentation it should be noted that the ICTG are not a part of CEPA.

- *Ch. 22-24 Pg. 766 and Ch. 25-27 Pg. 850* – The proponent refers to the Canadian Standards for ocean disposal (what are these?). In future documentation please refer to the regulated limits and ICTG used by the Program.

4.0 Accidents and Malfunctions

The following comments relate to the emergency prevention, preparedness and response aspects of the project from pre-construction through to and including, the operation of the third berth. Additional comments relating to storm sewer piping have been made as this is the conduit by which many spills enter receiving waters.

4.1 Drainage and Storm Sewer Systems

Stormwater runoff quality is highly variable, but is known to frequently contain relatively high concentrations of pollutants capable of posing a threat to the health of aquatic receiving environments. Typical constituents of stormwater runoff include suspended solids, oil and grease, pesticides, nutrients and pathogens from sources such as vehicles (leaks, spills, maintenance and general wear and tear). Stormwater treatment, in addition to the proposed oil interceptors and sedimentation tanks, must be installed and be designed with specific pollutant removal efficiencies in mind to mitigate these anticipated pollutants. Responsibility for inspecting and maintaining the oil-water separator should be clearly assigned to a responsible party. A maintenance plan describing the required inspection and clean-out frequency for the oil-water separator system should be developed and a record of all maintenance activities, including those required as a result of spills or accidents should be maintained with the plan.

The Canadian Council of Ministers of the Environment (CCME) has established Canadian Water Quality Guidelines for the Protection of Aquatic Life (http://www.ccme.ca/publications/can_guidelines.html). The guidelines, which are expressed as concentration values for specific pollutants, apply in the receiving environment. The pollutant removal efficiency of any stormwater treatment facility should be designed with these guidelines in mind.

The decommissioning of the existing storm sewer system must be done in such a way as to prevent any existing contaminated sediments from being introduced into the marine environment.

The proposed new storm sewer system must have catch basins of an appropriate size to allow for containment of minor spills and discharges of materials suspected to be deleterious to fish. The proposed shut off valves, in addition to being manually operated, should be electronically linked to allow timely remote operation in the event of an accidental discharge of materials suspected to be deleterious to fish.

The proposed new storm sewer system must have sampling ports or similar means of access to facilitate the collection of environmental samples. The stormwater sampling ports should be

situated at a location not subjected to tidal influences so that environmental samples will be representative of the stormwater discharged rather than stormwater and marine water.

4.2 *Environmental Management and Monitoring*

Copies of the Construction Environmental Management Plan and the Operational Environmental Management Plan prepared for the proposed D3B Project should be sent to the Emergencies Section of EC for review and comment. In addition, the environmental monitoring plan should also be submitted for review and comment.

4.3 *Reporting Requirements*

All spills or discharges, regardless of volume, that have the potential to be deposited into waters frequented by fish or to any place that may be further introduced to waters frequented by fish should be reported immediately. EC endorses a "one window" approach to the reporting of spills. The Provincial Emergency Program maintains a 24 /7 spill reporting line **1-800-663-3456**.

4.4 *Accidents and Malfunctions*

The potential for accidents and malfunctions during the project construction phase and for the long term operation of Deltaport's Third Berth is considerable and only through diligent prevention and preparedness initiatives will incidents be appropriately managed. To that end, EC would like to see and comment on the Contractor's spill response plan and Deltaport's updated spill response plan for post construction Operation.

The Contractor and Deltaport personnel should both be trained together for the correct use of spill countermeasures equipment and be familiar with all emergency plans and procedures. Joint training records should be kept with the contingency plans and be available for review.

4.5 *Construction*

Should the project be approved, the following recommendations should be adhered to during construction:

1. All machinery used at the site should be clean, in good operating condition and free of excess oil and grease.
2. Construction and excavation wastes, overburden, soil or other substances deleterious to fish or aquatic life should be placed and/or stored in such a manner as to prevent their entry into watercourses. Any material stockpiled at the site should be covered with polyethylene and surrounded with silt fencing if the potential exists for erosion and/or the

release of soil, soil-laden water, sediment, or sediment-laden water into any watercourse.

3. All debris and other deleterious substances generated by the works shall be appropriately contained in the immediate work area, collected, and appropriately disposed of in accordance with all applicable legislation, guidelines and best management practices.

4. Work shall be undertaken and completed in such a manner as to minimize the release of silt, sediment or sediment-laden water into any ditch, watercourse, ravine or storm sewer system in accordance with the general provisions of the sediment and erosion control section of the "Land Development Guidelines for the Protection of Aquatic Habitat" available at:
http://www.stewardshipcentre.bc.ca/sc_bc/stew_series/bc_stewseries.asp#ldg

5. All work and activities at the site should be carried out such that there is no discharge, either direct or indirect, of construction waste, excavation waste, overburden, soil, dewatering effluent, oil, grease or any substances deleterious to fish or aquatic life onto the bank of or into the waters of any watercourse.

6. All works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials shall be conducted so as to ensure that sediments, debris, concrete, concrete fines and concrete wash water are not deposited, either directly or indirectly into any watercourse. Where concrete work is carried out near watercourses such that there is a potential that concrete wash water could enter the receiving environment, then containment facilities shall be provided at the site for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment as required.

7. All petroleum products (e.g., fuel, oil, lubricants), used in association with the construction of the subject works should be stored and handled at an appropriate location and in compliance with all applicable legislation, regulations, guidelines and best management practices.

8. An appropriate spill prevention, containment and clean-up contingency plan for hydrocarbon products (e.g., fuel, oil, hydraulic fluid, etc.), and other deleterious substances and contaminants should be put in place prior to work commencing, and appropriate spill containment and clean-up supplies should be kept available onsite.

9. Workers on site should all be trained in the safe use of spill countermeasures equipment and associated personal protective equipment. Records of such training must be kept on site with the spill contingency plan.