

ORCA SAND AND GRAVEL PROJECT

COMPREHENSIVE STUDY REPORT

WITH RESPECT TO
THE REQUIREMENTS OF A COMPREHENSIVE STUDY PURSUANT TO THE
CANADIAN ENVIRONMENTAL ASSESSMENT ACT

JUNE 30, 2005

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EXECUTIVE SUMMARY

PROJECT

Orca Sand and Gravel Ltd. (the Proponent) proposes to construct, operate and decommission a sand and gravel quarry and associated ship loading facilities for the production and export of construction aggregates (the Project), approximately 4 kilometres west of Port McNeill, on Northern Vancouver Island (the Project).

The Project was subject to review under both the *Canadian Environmental Assessment Act* (CEA Act) and the *BC Environmental Assessment Act* (BCEAA). A single coordinated environmental assessment was conducted pursuant to the *Canada-British Columbia Agreement for Environmental Assessment Cooperation*.

The Project includes the following on-site and off-site components:

- ship loading facility and associated conveyor;
- gravel/sand deposit extraction;
- processing plant;
- land-based conveyor system; and
- all other works associated with the construction, operation, and decommissioning of the Project (e.g. settling ponds, stockpile area, water supply, site access, power supply and any off-site or on-site compensation and mitigation works as required).

The Project would be located on private lands owned by Western Forest Products Ltd, with the exception of the ship loading facility, which is proposed for provincial Crown foreshore and nearshore in Broughton Strait. The Project's lifespan is anticipated to be 30 years, with annual production capacity estimated at 4-6 million tonnes. The Proponent anticipates that construction aggregates from the quarry will be shipped to Pacific coast markets, particularly California. The Project location is shown in Figure 1.

The scope of the environmental assessment included: hydrology and water resources; geology and soils; vegetation; species at risk; fish and fish habitat; wildlife and wildlife habitat; waste management; air quality, visuals, noise, navigation, and public health and safety; and, social, economic, cultural and heritage values. The following were also included to meet CEA Act requirements: alternative means of carrying out the Project; effects of the Project on the environment; environmental effects of accidents and malfunctions; cumulative environmental effects; and, the requirements of a follow-up program.

Capital cost of the Project was estimated by the Proponent as approximately \$55 million, which would be invested during a one year construction program, with annual expenditures in the local economy estimated at \$11 million. The Project is expected to create 50 direct, non-seasonal jobs over the anticipated 30-year lifespan.

Orca Sand and Gravel Ltd. is a private company, incorporated in British Columbia in 2004, and is the vehicle through which the Project's co-proponents Polaris Minerals Corporation and the 'Namgis First Nation hold their partnership interests in the Project.

INFORMATION DISTRIBUTION AND CONSULTATION

Orca Sand and Gravel Ltd., and its predecessor, Polaris Minerals Corporation conducted a consultation program over a period of more than three years with relevant levels of government, First Nations, community organizations, and the general public. Public consultation included the operation of a Port McNeill office / information centre, provision of field tours and presentations, and numerous meetings to collect local knowledge and information. During development of the Application and its review, the Proponent continued to meet with these interests and agencies.

Since 2002, the Proponent has maintained dialogue and sought advice from federal, provincial, and local government agencies. An inter-agency / First Nations project working group was established as the primary source of policy and technical expertise for assessment of the Project. The Orca Sand and Gravel Project Working Group (WG) was comprised of representatives of federal, provincial and local government agencies and the First Nations. WG meetings were held in August and September of 2004, and in February and March of 2005 to identify specific issues and concerns, provide information, and resolve issues.

The Project area lies within the Douglas Treaty area, the asserted traditional territory of the Kwakiutl First Nation (Fort Rupert) and the 'Namgis First Nation. The two First Nations were invited to, and participated in the Project Working Group and thereby provided with opportunities for formal review and comment on the Application.

PUBLIC ACCESS TO INFORMATION

Relevant information, meeting records, and correspondence related to the Project were made available electronically through the EAO electronic Project Information Centre (ePIC) and on the Proponent's web site (www.orcasand.ca) and the federal Canadian Environmental Assessment Registry. The public was notified of the availability of information and the opportunity to comment on the Scoping Document, the Application and the Comprehensive Study Report.

During the Application Review stage, the public was invited to provide comments on the Application during a formal public comment period. In general, the public comments expressed support for the Project. The few expressions of public concern, primarily made at the open houses, were focused on possible impacts on the Cluxewe River, on ground water levels, on foreshore marine habitat and marine mammals, on public health, on the Cluxewe Resort, and on the nature of job creation and economic benefits. Responsible authorities are satisfied that public comments received during the environmental assessment review have been properly considered.

Appendix B of this report contains a complete list of issues identified by the public during the review of the Proponent's Application, as well as the Proponent's response to those issues. All issues raised by the public during the review of the Project, that were deemed to be within the scope of the review, were considered in the Application review process and the documents generated became part of the review.

SUMMARY OF KEY ISSUES CONSIDERED DURING THE REVIEW

Key issues considered during the Project review are described below.

Environmental Effects and Mitigation for the Biophysical Environment (see Part B – Section 2.1)

The primary issues raised were related to water and freshwater ecosystem effects, marine ecosystems and marine mammals, and terrestrial ecosystem components. Water and freshwater ecosystem issues included: effects on groundwater levels, and on water levels in the Cluxewe River and Mills Creek; impacts on Cluxewe River and Mills Creek fisheries and habitat; effects on other groundwater users; and the quality and quantity of water used in operations and possible effects of it being discharged into the environment.

Commitments were made to ensure pit excavation remains above the groundwater table; to undertake monthly groundwater level monitoring during construction and operation; to maintain buffers along the Cluxewe River; to monitor groundwater quality on an annual basis; to regularly assess bank stability of the Cluxewe River; and to discharge process water only into sediment control ponds or other on-site locations for infiltration and not into the Cluxewe River or Mills Creek.

Marine ecosystems and marine mammal issues included: design for minimizing effects on the inter-tidal and sub-tidal habitat; requirements for construction of marine works; requirements for marine habitat compensation; noise effects from the conveyor system and ship loading activities on fish and marine mammals and their migration routes; refuelling, sewage and bilge water discharge from ships at the loading facility, and the potential effect on shellfish harvesting; and effects on *Species at Risk Act* (SARA) marine protected species and their ecosystems, and monitoring requirements.

Commitments were made to: utilize pile drilling, as opposed to pile driving, during construction of the ship loading facility; to conduct Project construction in the marine environment using marine construction methodology approved by DFO, including timing windows, mitigation, and monitoring; to provide underwater noise monitoring; to adapt construction to avoid noise impacts on marine mammals; to design mooring buoys to minimize underwater noise; and to discuss additional orca monitoring requirements associated with SARA.

Terrestrial ecosystem issues included: effects of the conveyor system on large mammal migration and RC ecosystem (poorly drained sitka spruce-skunk cabbage ecosystem);

effects on habitat fragmentation; effects on migratory birds and bird habitat; and effects on SARA protected species, and rare, endangered or threatened species.

Commitments were made to design the conveyor system to minimize effects on the RC ecosystem; to monitor drainage and vegetation changes and alter conditions if noticeable ecosystem changes occur; to allow for large mammal passage at two locations along the conveyor; to conduct a bird nest survey prior to any tree clearing along the conveyor line taking place between April 1 and July 31; to comply with the BC *Wildlife Act* and the federal *Migratory Birds Convention Act* regarding protection and buffering of inactive and active nests of protected bird species along the conveyor line; and to monitor the presence of Harlequin Ducks. It is noted that the pit area being cleared by the land owner, Western Forest Products (WFP), is also governed by provincial and federal laws respecting timber harvesting and fish and wildlife management.

Environmental Effects and Mitigation for the Socio-Economic and Cultural Environment (see Part B – Section 2.2)

The primary issues raised were related to: air quality impacts to human health, noise effects, visual effects, economic effects, navigation effects, effects on archaeological resources; and effects to First Nations current use of lands and resources for traditional purposes.

The air quality issues included: dust from the Project, and its potentially adverse effect on the Cluxewe Resort; and airborne emissions from plant machinery.

Commitments were made to use the wet processing plant to control dust emissions, and use water sprays during hot weather, if necessary; and to operate the plant with low emission engines on site, and encourage similar equipment to be used by contractors.

The noise issue was focussed on a potential noise level increase and its effects on the Cluxewe Resort and on residents of Pulteney Point on Malcolm Island.

Commitments were made to undertake an independent baseline noise study at these locations; and to implement further noise mitigation measures when operations commence, if pit and ship loading noise becomes an issue at these locations.

The visual effects issue related primarily to ship loader lighting and its potential effects on visual quality at the Cluxewe Resort and on residents of Pulteney Point on Malcolm Island.

Commitments were made to design the ship loader to minimize use of lighting especially over water; and to minimize lights on the ships.

Economic effects issues included: effects on local employment and contracting opportunities; potential adverse effect on local commercial fisheries activities; and potential adverse effects on private property values on land near Pulteney Point.

Commitments were made to recruit the majority of employees from the North Island; to provide training for operational positions where necessary; to give preference to North Island businesses for contracting opportunities; to uphold First Nations employment agreements; to avoid effects on fisheries through design of the ship loader; and to minimize property value effects through noise and visual impact mitigation measures.

Regarding navigation, the primary issue raised was the possible effect of the ship docking and loading facility on navigation and traffic in Broughton Strait.

Commitments were made to avoid adverse navigational effects through design and location of the ship loader, and to comply with Transport Canada NWPA requirements.

The primary issues raised by First Nations that related to environmental, public safety and health, socio-economic, navigable waters, and other aspects of the review were incorporated into those sections. Related issues raised by First Nations outside of these specific topics included: inclusion of plants traditionally used by First Nations in reclamation and potential for dust from conveyor system to negatively affect the quality and palatability of traditionally harvested edible seaweed..

The Proponent committed to agreements with First Nations respecting employment opportunities and other matters; to encourage WFP to consult First Nations on replanting of native plant species; to provide opportunities for possible First Nation companies to salvage native plants ahead of operations; to provide an archaeologist to monitor the two areas of moderate archaeological potential; and to follow protocol and legal requirements if artefacts or human remains are found during earth moving.

The 'Namgis First Nation provided a letter on March 24, 2005 indicating that it had been adequately consulted and accommodated by the Proponent and the federal and provincial governments with respect to the Project. On March 23, 2005 the Kwakiutl First Nation provided a letter of support for the Project and confirmed that it had been adequately consulted and accommodated by the Proponent and that federal and provincial Crown obligations related to consultation and accommodation had been fulfilled with respect to the Project.

Additional CEA Act Requirements
(see Part A – Section 2.3 & Part B – Sections 3, 4, 5 & 6)

The CEA Act has specific requirements that also must be considered in the environmental assessment, including: effects of the Project on the environment; environmental effects of potential accidents or malfunctions; and cumulative environmental effects. As well, a comprehensive study under the CEA Act has further

requirements for consideration, including: the purpose of the Project, alternative means of carrying out the Project; and the requirements of a follow-up program. These topics were discussed by the Working Group, and in some cases, the public and First Nations also raised a number of issues. Where appropriate, the Proponent has made commitments to minimize or mitigate associated effects to address these issues.

CONCLUSIONS

Based on the information contained in the Application; communications with agencies and First Nations, and the public; and the Proponent's responses and commitments, the responsible authorities concluded that the Project is not likely to cause any significant adverse environmental effects.

Part A – Comprehensive Study Background

1. Introduction

Orca Sand and Gravel Ltd. (the Proponent) proposes to construct, operate and decommission a sand and gravel extraction operation and associated ship-loading facilities for the production and export of construction aggregates on northern Vancouver Island (the Project).

The Project includes the construction and operation of a 15,000 to 22,000 tonnes per day processing plant (4 to 6 million tonnes per annum) and an associated marine terminal designed to handle vessels larger than 25,000 tonnes deadweight (DWT). The extraction site and marine terminal are located immediately alongside Highway 19, the Island Highway, 3.8 kilometres west of Port McNeill (see Figure 1). The proposed Project lies within the asserted territories of the Kwakwilt and 'Namgis First Nations.

Transport Canada initiated the federal environmental assessment process pursuant to the *Canadian Environmental Assessment Act* (the CEA Act) in relation to the Project. The CEA Act triggers and the associated responsible authorities include: a possible subsection 5(1) approval pursuant to the *Navigable Waters Protection Act* from Transport Canada for the construction of the marine terminal; a possible subsection 35(2) authorization pursuant to the *Fisheries Act* from Fisheries and Oceans Canada (DFO) for works associated with the marine terminal; and, possible funding under the Major Business Projects Program from Indian and Northern Affairs Canada (INAC). To assist in the environmental assessment process, Environment Canada has provided expert advice in relation to the Project. The proposed Project was also subject to review under the B.C. *Environmental Assessment Act*.

1.1 Purpose of the Comprehensive Study Report

In accordance with sections 16 and 21 of the CEA Act, when a project is described in the Comprehensive Study List Regulations, the responsible authorities must ensure that a Comprehensive Study Report (CSR) is prepared in relation to the project. The CSR must identify the potential environmental effects of the project including the environmental effects of any malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out. The Report must also describe measures that are technically and economically feasible to mitigate any significant adverse environmental effects of the project.

The responsible authorities must also report on all public concerns raised in relation to the project and how they have been addressed. Based on the CSR and the public comments the responsible authorities must then provide conclusions with respect to whether the project is likely to result in significant adverse environmental effects. Responsible authorities must also assess the need for and requirements of any follow-up program, as defined by the CEA Act.

The Minister of the Environment then reviews the CSR and any public comments filed in relation to its contents. If the Minister is of the opinion that additional information is necessary or actions are needed to address public concerns, the Minister may request the responsible authorities or the proponent address these concerns. Once any concerns are addressed, the Minister issues an environmental assessment decision statement that includes:

- the Minister's opinion as to whether the project is likely to cause significant adverse environmental effects; and
- any additional mitigation measures or follow-up program that the Minister considers appropriate.

The Minister then refers the project back to the responsible authorities for a course of action or decision.

If it has been determined that the project is not likely to cause significant adverse environmental effects, a responsible authority may exercise any power or perform any duty or function that would permit the project, or part of the project, to be carried out. With respect to the Orca Sand & Gravel Project, DFO may issue its *Fisheries Act* authorization for potential impacts to fish habitat associated with the marine terminal, Transport Canada may issue its *Navigable Waters Protection Act* approval for construction of the marine terminal, and INAC may release the funding under the Major Business Projects Program.

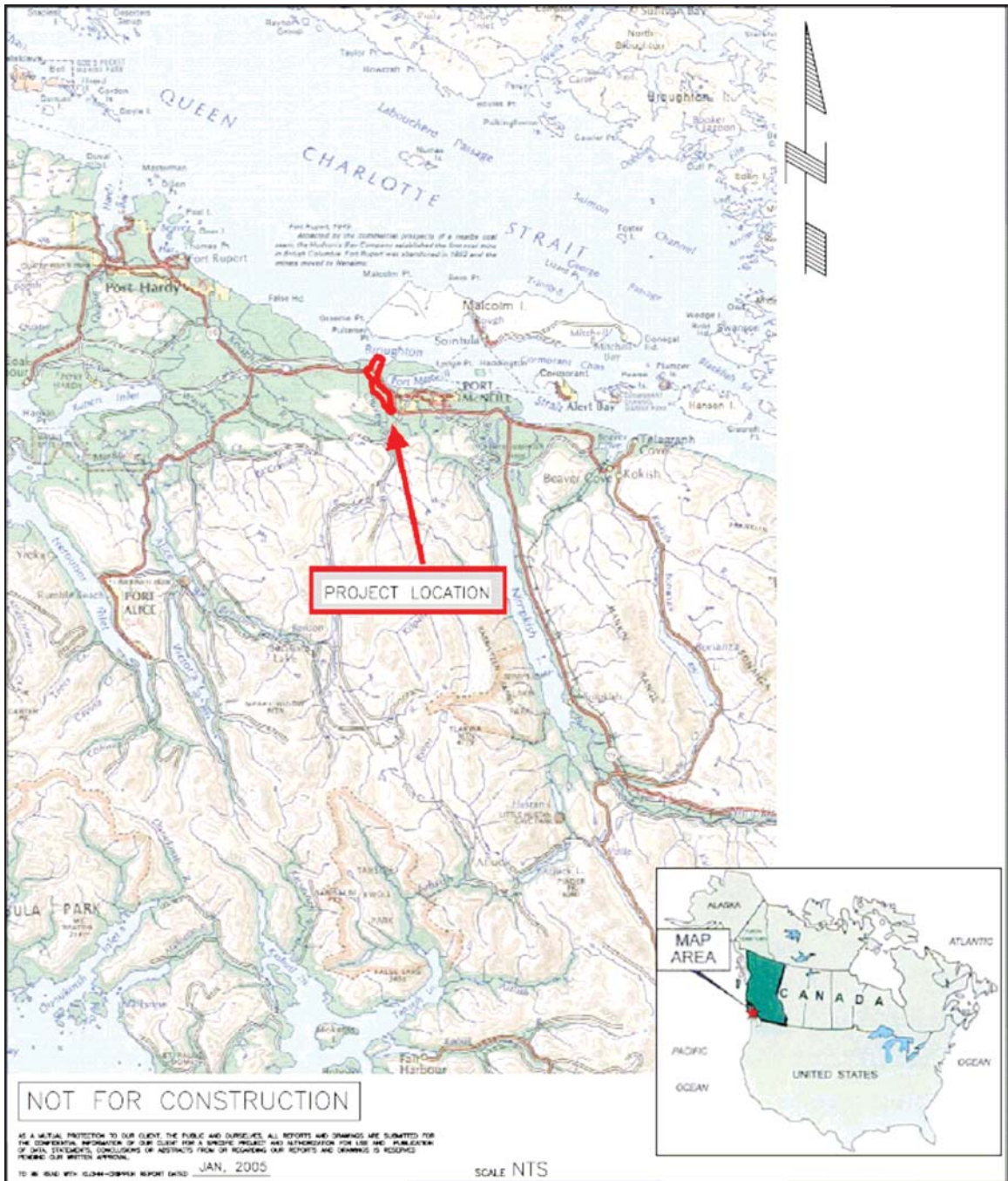


Figure 1. Project Location Map (Orca Sand & Gravel Ltd., 2004).

1.2 The Federal Review Process

An environmental assessment (EA) of a project is required under the CEA Act, if a federal authority will be required to exercise certain powers or perform certain duties or functions in respect of a project for the purposes of enabling the project to be carried out, in whole or in part.

Transport Canada, DFO and INAC will be required to exercise the following powers or perform the following duties or functions with respect to the Project:

- the proposed ship loading facility will require a formal approval by Transport Canada pursuant to paragraph 5(1)(a) of the *Navigable Waters Protection Act*;
- any disturbance to fish habitat from construction of the ship loading facility will require formal approval from the Department of Fisheries and Oceans under ss. 35(2) of the *Fisheries Act*; and,
- a federal funding request under the Major Business Projects Program to Indian and Northern Affairs Canada (INAC) from the ‘Namgis First Nation.

By triggering the CEA Act, Transport Canada, DFO and INAC became responsible authorities thus requiring them to undertake an environmental assessment of the Project. A comprehensive study under the CEA Act is required when a proposed project meets at least one of the requirements in the Comprehensive Study List Regulation. In this case, the Project meets two sections of the regulation because it proposes to construct, decommission or abandon both:

- a stone quarry or gravel or sand pit with a production capacity of 1 000 000 t/a or more (s.18(i)); and,
- a marine terminal designed to handle vessels larger than 25 000 DWT unless the terminal is located on lands that are routinely and have been historically used as a marine terminal or that are designated for such use in a land-use plan that has been the subject of public consultation (s.28(c)).

The comprehensive study process requires public consultation with respect to the proposed scope of project for the purpose of the EA, the factors proposed to be considered, the proposed scope of those factors, and the ability of the comprehensive study process to address the issues relating to the project. To accomplish this, responsible authorities prepare a “project scoping document” that is made available to the public for review and comment. Following public consultation, responsible authorities prepare a report and recommendation, which is submitted to the federal Minister of the Environment. The Minister then determines whether the assessment will continue as a comprehensive study or whether the project will be referred to a mediator or a review panel.

If the assessment is continued as a comprehensive study, responsible authorities must ensure that a CSR is prepared. The CSR is submitted to the Canadian Environmental Assessment Agency, which administers a public comment period on the report. Upon completion of public review, the CSR and the comments filed in relation to it are forwarded to the Minister of the Environment for a decision.

For the Orca Sand and Gravel Project, Transport Canada and DFO, in consultation with the CEA Agency, prepared the Project scoping document, and advertised its availability for public review. A 21 day public review period ended on October 20, 2004. The ensuing report to the Minister of the Environment led to confirmation, on January 13, 2005, that the environmental assessment under the CEA Act would continue as a comprehensive study. Indian and Northern Affairs declared itself a responsible authority on April 7, 2005.

1.3 The Provincial Review Process

On September 30, 2003, the B.C. Environmental Assessment Office (BCEAO) issued an order under section 10(1)(c) of the British Columbia *Environmental Assessment Act* (BCEA Act), designating the Project as reviewable under the BCEA Act, and requiring the Proponent to obtain an environmental assessment certificate before proceeding with the Project.

On November 24, 2004, the BCEAO issued an order under section 11 of the BCEA Act outlining the scope, procedures and methods to be applied in the pre-Application and Application review stages of the BCEA Act assessment.

Terms of Reference for the Application were developed by the Proponent, with input from the BCEAO, federal and provincial agencies, local governments and First Nations. These Terms of Reference were approved by the BCEAO in November 2004 as the information required under section 16(2) of the BCEA Act. Federal agencies provided approval-in-principle only at that time, pending the outcome of a public review of the proposed scope of the review, as required under the CEA Act and final confirmation by the federal Minister of the Environment of the appropriate level of review.

In December 2004, the Proponent submitted an Application to the BCEAO. The Application was screened against the Terms of Reference, and accepted by the BCEAO with minor revisions on January 17, 2005.

1.4 The Federal/Provincial Cooperation Agreement

The Canada-British Columbia Agreement for Environmental Assessment Cooperation (2004) provides for a coordinated environmental assessment process to avoid uncertainty and duplication where a project is subject to review under both the BCEA Act and the CEA Act.

The cooperative assessment of the Project was conducted in accordance with a joint federal-provincial work plan.

During the cooperative review process, the BCEAO developed an Assessment Report (AR) to report on the results of the EA. That report was developed collaboratively to meet the requirements of an AR under the BCEA Act and to inform the Comprehensive Study Report (CSR) under the CEA Act. The federal responsible authorities considered the provincial AR and used it as a basis for the CSR. The CSR is meant to fully describe the federal environmental assessment process that was undertaken and the conclusions of the federal responsible authorities with respect to whether the Project is likely to result in significant adverse environmental effects.

2. Project Description and Scope of Assessment

2.1 The Proponent

Orca Sand and Gravel Ltd. (the Proponent) is a private company incorporated in British Columbia in 2004. It is the vehicle through which the Project's co-proponents (Polaris Minerals Corporation and the 'Namgis First Nation) hold their partnership interests in the Project. Polaris is a private company based in Vancouver, incorporated in 1999 to pursue the establishment of a coastal aggregates export business. The Kwakiutl First Nation (Fort Rupert) and 'Namgis were offered equal equity partnership interests in the Project by Polaris. An Impacts and Benefits Agreement (IBA), dated March 9, 2005 was negotiated between the Kwakiutl and the Proponent, and ratified by Kwakiutl community members on February 26, 2005. The Kwakiutl provided a formal letter of support for the Project on March 23, 2005.

2.2 Project Overview

The Project is located 4 kilometres west of the town of Port McNeill, on North Vancouver Island, British Columbia on private lands owned by Western Forest Products Ltd, with the exception of the ship loading facility, which is proposed for provincial Crown foreshore and nearshore in Broughton Strait. The area is shown in **Figure 1**.

The Project site is adjacent to and accessed from the Island Highway (Highway 19), a paved provincial highway that runs the length of Vancouver Island from Victoria to Port Hardy. Products will be transported under Highway 19 by conveyor to the stockpile and ship loading facilities which will be situated north of the Highway.

The sand and gravel lies in a terrace approximately 3,000 metres in length by 800 metres wide. The proposed quarry site is forested with second growth and covered with organic overburden 1 to 3 metres thick. An initial forest area will be cleared, organic overburden carefully removed and stockpiled for future progressive reclamation, exposing the high quality sand and gravel deposit.

The quarry will be mined at a rate of up to 15 - 22,000 tonnes per operating day. The exposed sand and gravel will be removed with mobile equipment, such as scrapers and loaders, and placed onto a field conveyor system for delivery to the processing plant. During normal operations the production operations will operate on a two-shift basis, totalling 16 hours per day and up to seven days per week.

Processing will consist of using water to liberate the sand from gravel, which will then be screened with any oversize gravels being crushed. The sand will be classified and dewatered to remove silt size fractions with the wash water being sent to sedimentation ponds for settling out of any silt and recycling of water. This water will be recycled through a settling pond and filtration system to remove fine particulate matter prior to any excess water discharge into the receiving environment. The source of process water will be natural precipitation retained in settling ponds. Any additional make-up water during the dry summer period will be obtained from boreholes within the resource area. There is very little silt material in the deposit and the site lends itself to progressive reclamation of the land back to productive forest cover.

Products will be stored in individual stockpiles in preparation for shipping. A conveyor reclaim system will deliver the product to Panamax class ships for distribution. At maximum production rates, the operation will expect to load two vessels per week each being at berth for up to 24 hours.

The ship loading facility has been located so that it is a) east of a developed campground (Cluxewe Resort) on Kwakiutl Indian Reserve #7 and b) largely hidden from line of sight by the topography of the shoreline. The ship loading facility will be visible from Broughton Strait, part of the "Inside Passage", a deep water navigable channel used extensively by large vessels, particularly during the cruising season.

All products will be shipped from the operation in ocean going bulk carriers, although small quantities could be utilized to maintain the local road network. The Proponent anticipates that construction aggregates from the quarry will be shipped to Pacific coast markets, particularly California.

BC Hydro power lines run throughout the area, and electrical power to the plant site is anticipated to be directly available from the BC Hydro power grid.

The Project's lifespan is anticipated to be 30 years, with annual production capacity estimated at 4-6 million tonnes.

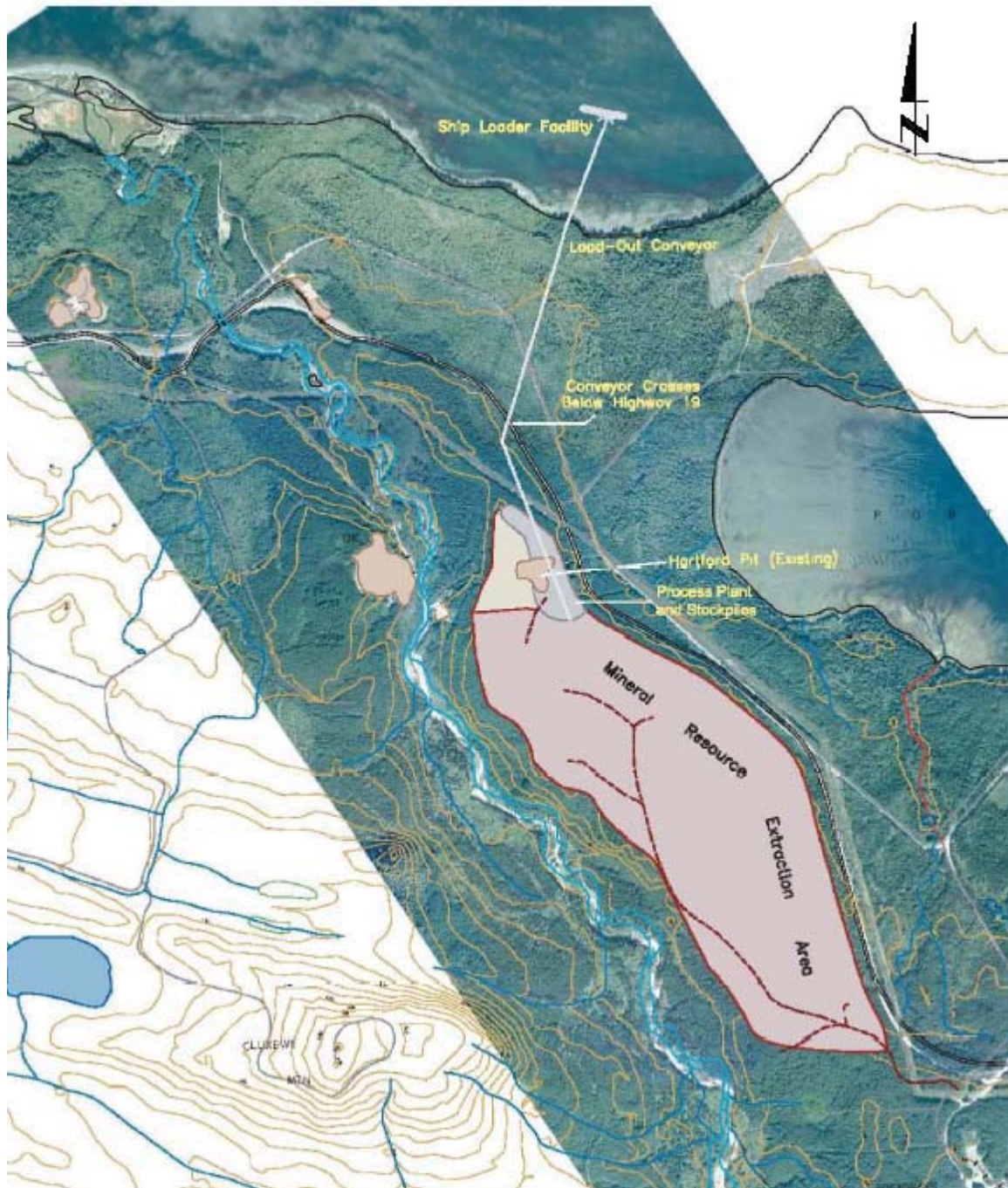


Figure 2 – Project Overview (Orca Sand & Gravel Ltd., 2004)

2.3 Project Need/Alternatives Assessment

2.3.1 Project Need/Purpose

The Proponent described the need for the Project as being directly related to the emerging market for imported construction aggregates, particularly sand and gravel, along the western seaboard of the United States. Aggregate demand in California was described as growing by over four million tonnes per year, driven principally by the continuing growth in population. The Proponent contended that this increased demand, when coupled with the accelerating depletion of the local aggregate resources in California, will force the need for a significant increase in the external supplies of aggregate products to the California markets.

The Proponent stated that the purpose of this Project was to develop a sand and gravel export business capable of winning a significant market share of the identified demand along the U.S. western seaboard.

2.3.2 Alternatives To the Project

Based on the ongoing need for construction aggregates in the California market, alternatives to undertaking the Project would include moving sand and gravel to coastal California markets from inland California sources via truck or train, or shipping from alternative sources along the western Canada, U.S. or Mexico coastline.

The Proponent conducted an extensive site selection study of a large number of potential aggregate producing sites from Alaska to Mexico, and selected Vancouver Island as the most favourable source area on the Pacific coast of North America. The site selection study included:

- evaluation of the markets for aggregates in California;
- considerations relating to the development of reception docks in the San Francisco Bay and Los Angeles markets;
- review of the geological and resource data, and physical testing of samples;
- review of the options for shipping;
- review of the appropriate quarrying, processing and reclamation plans; and,
- review of the social, economic, infrastructure and environmental planning factors.

The Proponent focussed on development of a coastal resource that would deliver aggregates to its intended markets via large ocean freighters. The Proponent described how, in many areas of the developed world, including the eastern coast of the United States, local aggregate supplies had been supplemented or replaced entirely by aggregates delivered by ocean-going vessels. Low shipping costs, using large self-discharging bulk carriers, had made this an economically competitive and viable option compared to land transportation in the major coastal urban centers of California. In fact, the Proponent

noted that aggregate exports by sea from British Columbia to the western United States were already underway. Shipments of sand and gravel commenced in 2000 from Sechelt, British Columbia to San Francisco Bay, and crushed rock was being shipped from quarries on Texada Island to the ports of Los Angeles and Long Beach. As well, British Columbia had serviced much of the Puget Sound area (Washington State) demand with shipments of these materials for years.

During the site search, the Proponent enlisted local consultants to help evaluate potential sites in Mexico, particularly the Baja California peninsula, which was judged to be within economic shipping distance of the target markets. During this evaluation, it was quickly determined that the geology was unsuitable and that there was little established infrastructure, compounded by a severe shortage of the fresh water required for washing aggregate. The evaluation of potential sites in Alaska identified the economic disadvantages of much greater shipping distances, the complications of the U.S. *Jones Act* (which requires that cargo moving between U.S. ports be carried in ships which are U.S.-owned, U.S.-built and U.S.-crewed) and by significant adverse weather and infrastructure considerations.

The Proponent determined that the coast of British Columbia had several good quality sand and gravel deposits that could potentially meet the emerging demand from the California markets. However, the number of economically viable and commercially competitive sites was determined to be severely limited. To be capable of successful development by the Proponent, a site needed to meet the following criteria:

- the deposit must be adjacent to the ocean shoreline;
- the location must have deep and safe water which allows for loading large ocean-going bulk vessels up to Panamax Class (75,000 DWT);
- the deposit must be large enough to achieve economies of scale and justify large-scale and long-term investment;
- the deposit must be relatively consistent and homogeneous;
- the operation must have minimal impact on the environment;
- the site topography must allow for low cost open pit extraction methods;
- the project must produce a product that meets all California and US national specification requirements;
- the project must have local support;
- the project area must have appropriate infrastructure and labour availability; and
- the project must satisfactorily address and accommodate any Aboriginal title and rights.

A small number of potential deposits were identified on the B.C. mainland coast, but initial screening eliminated all of them from further consideration due to problems with tenure or serious environmental concerns. The Orca Sand & Gravel Project site was the only potential resource identified which met all of the site selection criteria and was considered by the Proponent to have the best potential to be a viable investment.

The Proponent selected the Project site for the following principle reasons:

1. The sand and gravel was adjacent to navigable tidewater suitable for large vessels with a capacity of up to 75,000 Deadweight (DWT) tonnes.
2. The site lent itself to minimizing effects on the environment. There were no habitations within close vicinity and the Project area did not contain any surface water flows and therefore no fish-bearing streams. Logging of old growth had already taken place over the entire Project area.
3. Bathymetric surveys subsequently confirmed that the area was an ideal location for the ship loading facility.
4. The topography of the site was ideal for the intended purpose.
5. The quality of the sand and gravel significantly exceeded all California and U.S. national specifications. Products would include concrete sand and two sizes of gravel up to a maximum diameter of 1 inch (25 mm).
6. The identified resource would have a life expectancy of approximately 30 years, sufficient to justify the required capital expenditure.
7. Positive relationships with First Nations, in whose asserted traditional territory the Project lies, were established at the outset. No significant cultural or traditional use values were identified.
8. Port McNeill and its surrounding area had an established industrial base offering a labour force and all necessary services. In addition, it was seeking new industries to diversify the industrial base and reduce the dependency on the logging industry.

2.3.3 Alternative Means of Carrying Out the Project

The CEA Act considers alternative means of carrying out a project as the various ways, which are technically and economically feasible, that a project can be implemented or carried out. This could include alternative locations, routes and methods of development, implementation and mitigation.

Given that the location of the resource was fixed, the Proponent considered whether or not there was an alternative development possible by relocating the ship loader. Studies of the cost of aggregate production at coastal locations have consistently confirmed that the economics demand that the vessels be loaded by conveyor directly from the processing plant. To the west of the chosen ship loading site in Soldier Bay is the Cluxewe Resort and estuary and further west is an environmental conservation area. The

presence of these areas prevents consideration of moving the ship loading facility further west. To the east is Port McNeill which has only shallow water depths and is quite unsuitable for the self-discharge vessels essential to the Project. To move further east than the port would require the use of a large fleet of highway trucks which would add significant costs to the Project, making it uneconomical for the Proponent. Therefore it was concluded that the use of Soldier Bay was the only acceptable means to undertake the ship-loading aspect of the Project.

Table 1 outlines the various alternative means of carrying out the Project that were examined by the Proponent. A brief description of the economic feasibility and potential environmental effects associated with each alternative is also included.

Table 1 Alternative Means of Carrying out the Orca Sand & Gravel Project

ALTERNATIVE MEANS	ECONOMIC FEASIBILITY	POTENTIAL ENVIRONMENTAL EFFECTS
Extend extraction area closer to the Cluxewe River	Economically feasible	Potential effects on bank stability. Potentially reduced important riparian zone for aquatic resources and wildlife (such as elk).
Extraction to a shallower depth than proposed	Not as economically viable	No change in environmental effect.
Extraction to a deeper depth than proposed	Economically feasible	If extraction is below groundwater table, remediation would not allow for reforestation.
Extraction of water from the Cluxewe River rather than groundwater	Economically feasible	Year-round reduction in flows in the Cluxewe River.
Trucking from stockpiles to existing port (Port McNeill)	Project not economically viable as port is too shallow.	Increased traffic, noise, emissions and dust plus possibilities for collisions.
Conveyor moved to east or west of current location	Economically feasible	Potential to cross wetland area west of conveyor near shore.
Ship loading facility moved	Cannot be moved to shallower water east, south or west of proposed location. Could move to deeper water, but at greater cost.	Moving facility to deeper water would result in a longer conveyor over the water and greater changes to habitat with more piles.

Based on the above exercise, the Proponent concluded that the proposed means of undertaking the Project was the most economically feasible of the options outlined. As well, all of the other economically feasible options outlined would result in greater environmental, and in some cases social, impacts than the proposed Project.

2.4 Scope of Project

Transport Canada's regulatory trigger under the Law List Regulation of the CEA Act for the Project was the need for a subsection 5(1) approval under the *Navigable Waters Protection Act* for construction of the marine terminal and conveyor system.

DFO's regulatory trigger was the need for a subsection 35(2) authorization under the *Fisheries Act* for the potential Harmful Alteration, Disruption or Destruction (HADD) of fish habitat in the intertidal and subtidal marine environment that would result from construction of the marine terminal and conveyor system. INAC also became a responsible authority due to a federal funding request under the Major Business Projects Program with respect to the Project from the 'Namgis First Nation.

As noted previously, Transport Canada evaluated information provided by the Proponent and determined that the Project met the thresholds of two of the sections of the Comprehensive Study List Regulations, and therefore required that a comprehensive study assessment track be undertaken.

In accordance with section 15 of the CEA Act, the responsible authorities determined that the scope of the proposed Project would be the following physical activities not associated with physical works, and the construction, operation, maintenance / modification and decommissioning of the following physical works:

- *Ship Loading Facility and Associated Conveyor:* The conveyor would carry product from a land-based storage area, across the intertidal and subtidal area to the ship berth, which would have the capacity to handle vessels up to or larger than 75 000 DWT. At maximum production rates the operation is expected to load two vessels per week, each being at the berth for up to 24 hours.
- *Gravel/Sand Deposit Extraction:* 200 hectares of second growth forest and organic overburden layers will be removed in phases for sand and gravel extraction.
- *Processing Plant:* A processing plant will be constructed for washing and sizing of extracted gravel, and limited crushing of oversized gravel.
- *Land-based Conveyor System:* A land-based conveyor system will be used to transport washed and sized products from the processing plant to the stockpile area; another system will be used to transport products from the stockpiles to the ship loader.
- All other works associated with the construction, operation, and decommissioning of the Project (e.g. settling ponds, stockpile area, water supply, site access, power supply and any off-site or on-site compensation and mitigation works as required,

and any other physical works or activities which form an integral part of the Project).

2.5 Scope of Assessment

2.5.1 Factors to be Considered

As defined under the CEA Act, “environmental effect” means, in respect of a project:

- a) *any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act*
- b) *any effect of any change referred to in paragraph (a) on*
 - i. *health and socio-economic conditions*
 - ii. *physical and cultural heritage*
 - iii. *the current use of lands and resources for traditional purposes by aboriginal persons, or*
 - iv. *any structure, site or thing that is of historical, archaeological, palaeontological or architectural significance, or*
- c) *any change to the project that may be caused by the environment*

The factors considered in the environmental assessment, pursuant to section 16 of the CEA Act, were the following:

- *the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;*
- *the significance of the environmental effects referred to above;*
- *comments from the public that are received in accordance with this Act and the regulations;*
- *measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;*
- *the purpose of the Project;*
- *alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;*
- *the need for, and the requirements of, any follow-up program in respect of the Project; and,*
- *the capacity of renewable resources that is likely to be significantly affected by the Project to meet the needs of the present and those of the future.*

2.5.2 Scope of Factors to be Considered

The following outlines the scope of the factors considered in the environmental assessment.

- hydrology and water resources;
- geology;

- soils;
- vegetation;
- species listed on Schedule 1 of SARA;
- fish and fish habitat;
- wildlife and wildlife habitat;
- waste management;
- noise;
- air quality;
- current use of lands and resources for traditional purposes by Aboriginal persons;
- land and resource use;
- local communities;
- worker health and safety;
- public health and safety;
- navigation;
- heritage and historical cultural resources;
- palaeontological resources.

Malfunctions and Accidents

The probability of possible malfunctions or accidents associated with the Project, and the potential adverse environmental effects of these events (e.g. accidental spills, contingency measures for responding to emergencies, and risks of facility malfunctions).

Effects of the Environment on the Project

The environmental hazards that may affect the Project and their predicted effects, including: seismic activity, icing and winter operations, erosion, fire, flooding, and slope stability.

Cumulative Environmental Effects

The cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out.

Spatial and Temporal Boundaries

Spatial boundaries:

The main Project site was bounded to the west by the Cluxewe River, to the east by the Island Highway, to the north by Broughton Strait, and to the south by the southern extent of private lands under the administration of Western Forest Products Ltd. The environmental assessment covered the ecological footprint of the Project.

Temporal boundaries:

The temporal boundaries encompassed the lifespan of the Project (expected to be approximately 30 years). The environmental assessment examined potential effects of the Project beginning with the construction phase and throughout the operations phase

(including maintenance and/or modifications) and through to the completion of the decommissioning phase.

Follow-up Program

The environmental assessment included the consideration of the need for and requirements of an environmental monitoring and follow-up program.

3. Information Distribution and Consultation

3.1 Federal Coordination

Transport Canada initiated the federal environmental assessment process on August 10, 2004 by posting the Notice of Commencement on the Canadian Environmental Assessment Registry. Federal Coordination Letters were also sent out on August 10, 2004 to DFO, INAC, Natural Resources Canada, Health Canada and Environment Canada. The CEA Agency acted as the federal environmental assessment coordinator for the Project.

On August 17, 2004, DFO declared itself a responsible authority for the Project as it would likely be required to authorize, under subsection 35(2) of the *Fisheries Act*, the potential HADD of fish habitat in the intertidal and subtidal marine environment that would result from construction of the Marine Terminal and Conveyer system. Within the overall scope of project and assessment, DFO focused its assessment on project components that would require DFO regulatory approvals.

Environment Canada provided specialist knowledge and information which informed the federal-provincial harmonized environmental assessment.

On April 7, 2005, INAC declared itself a responsible authority for the Project, as defined in Section 5 of the CEA Act resulting from the 'Namgis First Nation applying for funding under the Major Business Projects Program. INAC determined that the scope of project undertaken by Transport Canada and DFO was satisfactory and it was not necessary to redefine the scope of project or scope of assessment.

3.2 Public Consultation in Accordance With The CEA Act

3.2.1 Section 21 – Public Participation Regarding Proposed Scope of Project

Under subsection 21(1) of the CEA Act, for a comprehensive study, responsible authorities must ensure public consultation on the proposed scope of the project, the proposed factors to be considered in the environmental assessment, the proposed scope of those factors and the ability of the comprehensive study to address issues relating to the Project. An invitation for members of the public to review and comment on a scoping document was advertised in community newspapers, during the weeks of September 27 through October 11, 2004 and also placed on the Canadian Environmental Assessment

Registry (CEAR). At the same time, members of the public were made aware of the availability of Participant Funding for public participation in the comprehensive study process and review of the comprehensive study report. The notice appeared in the North Island Gazette, Victoria Times Columnist, and L'Express du Pacifique. The Project Registry included a notice for the public to contact Transport Canada for a copy of the scoping document. Copies of the scoping document were made available at the following locations: an Open House held September 23, 2004 in Port McNeill, the Proponent's project office in Port McNeill, the 'Namgis and Kwakiutl First Nations' Band offices, the Town of Port McNeill office and the local DFO office. A 21-day review period was provided which concluded on October 20, 2004.

Three sets of public comments on the scoping document were received. Most comments related to improving the wording of future scoping documents with one exception requesting that Mills (Bear) Creek be included within the scope of the assessment. As Mills (Bear) Creek was not specifically excluded from the originally proposed scope of assessment, this request did not result in any change to the scope, but the responsible authorities clarified that the potential effects of the Project on Mills (Bear) Creek would be considered during the conduct of the comprehensive study.

The Environmental Assessment Track Report was submitted to the Minister of the Environment on November 19, 2004. This report reflected the opinion of the responsible authorities, in consultation with the expert federal authorities, that the comprehensive study could fully address issues related to the Project.

Transport Canada and DFO received a letter dated January 6, 2005, from the Minister of the Environment, stating that the Orca Sand and Gravel Project review should continue as a comprehensive study pursuant to the CEA Act.

3.2.2 Section 21.2 – Public Participation in the Comprehensive Study

As part of the cooperative provincial/federal review of the Project, the responsible authorities shared the formal public comment period on the Application as prescribed in the BCEA Act. In the Application Review stage, the public was provided the opportunity to review and comment on the Application during a 30-day public comment period from January 29 to February 28, 2005. The BCEAO received 56 written comments from members of the public during this period, in addition to a number of comments provided during five open house meetings held in local communities. These comments were provided to the responsible authorities and the CEA Agency. In general, the public comments expressed support for the Project. The few expressions of public concern, primarily made at the open houses, were focused on possible impacts on the Cluxewe River, on groundwater levels, on foreshore marine habitat and marine mammals, on public health (dust and noise), on the Cluxewe Resort, and on the nature of economic benefits (job creation).

In written submissions and at public meetings, members of the public identified six issues about the Project description and potential accidents related to the Project; five issues about reclamation and potential Project-related impacts on wildlife and vegetation; nine issues about potential Project effects on rivers and groundwater; seven issues about potential Project effects on marine habitat and life; one issue related to the potential Project impacts on culture and heritage; and twelve issues on the Project's potential socio-economic effects.

Issues raised by members of the public during the environmental assessment were fully considered by the responsible authorities during the review of the Application. All issues raised by members of the public during the course of the review and the means by which those issues were addressed have been tabulated and included in Appendix B.

3.2.3 Section 22 – Public Access to Comprehensive Study Report

A third opportunity for public input on the Project and the associated environmental assessment is through commentary on this report. The CEA Agency will facilitate public access to the CSR, including administering a formal public comment period. All comments submitted will be provided to the responsible authorities and considered public and will become part of the public registry for the Project.

3.3 Provincial Consultation Measures

The BCEAO, as the provincial agency coordinating major project environmental assessment in British Columbia, also consulted with First Nations, the public and local, provincial and federal government representatives. The BCEAO established an inter-agency / First Nations project working group as the primary source of policy and technical expertise for assessment of the Project. The responsible authorities participated in the working group which provided a means to obtain the views of federal expert authorities, other government agencies and First Nations.

The BCEAO carried out public consultation in accordance with its November 25, 2004 section 11 order. The BCEAO made the certificate Application available for public comment during a 30 day review and comment period from January 29, 2005 until February 28, 2005, and participated in and monitored the February 7-11, 2005 open houses that it required the Proponent to hold. Representatives of the federal government (DFO, EC and CEA Agency) participated the open houses held in Alert Bay and Port McNeill on February 8 and February 9, 2005 respectively.

The BCEAO utilized its electronic Project Information Centre (ePIC) to post relevant information, meeting records and correspondence related to the Project. The Proponent also utilized a web site (www.orcasand.ca) and other means of public distribution throughout the process, in accordance with BCEAO requirements. Both BCEAO and the Proponent notified the public of the availability of information and opportunity to comment on the Application.