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Glossary

“Arms” of the Fraser
There are four “arms” of the Fraser River as shown on Map 1
- The North Arm running north of Sea Island from the trifurcation at New Westminster;
- The Middle Arm running off the North Arm and flowing south of Sea Island;
- The South Arm running south from the trifurcation at New Westminster, often referred to as the Main Stem for navigational purposes; and
- The Main Arm which carries all waters flowing from the region upstream of the New Westminster trifurcation.

Authorization
Any document issued by the Lead Agency authority to undertake dredging.

Available Sand
The non-dredged volume of the annual allowable sediment budget for the Fraser River as established by the responsible agencies.

Borrow Dredging
Dredging for the purposes of providing material to be used for commercial purposes (as fill or construction materials at another location).

Coarse Sand
See definition under “sand”.

Coordinated Project Review (CPR)
The process through FREMP whereby all development applications are reviewed in tandem by all appropriate regulatory agencies.

Deep Sea Channel
Length/width/depth of the deep sea channel as defined on the maps in this document.

Dredging
Removal of sediments from the riverbed.

Estuary
The region in which fresh and salt water mix when a river meets the sea.

Fine Sand
See definition under Sand.

Gravel
See definition under Sand.

Lead Agency
Any body which has the responsibility for issuing dredging permits. In the Fraser River Estuary downstream of Kanaka Creek, the Agencies will be one of: the Fraser River Port Authority, the North Fraser Port Authority, and the B.C. Assets and Land Corporation.

Navigation Channel
Any channel used for vessel traffic.

Regulatory Agency
Any government body that has legal authority to set regulations related to dredging. The regulatory agencies are: Fisheries and Oceans Canada (both Canadian Coast Guard and the Habitat and Enhancement Branch); Environment Canada; the Ministry of Environment, Lands and Parks; the British Columbia Assets and Land Corporation; the Fraser River Port Authority; and, the North Fraser Port Authority.
**Sand**
Material of a particular grain size that is deposited on the riverbed. In the Fraser River, sand (also referred to as coarse sand) is considered to be any material that has a grain size between 0.177mm and 2.00mm. Material larger than 2.00mm is referred to as gravel. Material finer than 0.177mm is referred to as fine sand. Also called wash load, this fine material does not deposit in the river; it is carried out of the river system and deposits on sandbanks beyond the mouth of the river. The term sand is often used interchangeably with the term sediment. In the FREMP area, the budget measures deposits and removals of material between 0.177mm and 2.00mm.

**Sandheads**
Kilometre marker 0.0: the seaward end of the South Arm Navigation Channel.

**Sand Registry**
A database located at the FREMP office and which contains a yearly record of the date and amount of coarse sand (see definition under Sand) deposited and/or removed and/or redistributed within the river.

**Sediment**
A general term to describe all material deposited on the river bottom. Sediment may be composed of fine sand and/or coarse sand and/or gravel (see definition for Sand above).

**Sediment Budget**
A measure of the net change in sediment stored in the river as a function of total inflow of sediment at Mission less the outflow into Georgia Strait. The sediment budget in any year represents the maximum permissible amount of material that may be removed from the estuary for any reason. In the FREMP area, the budget measures deposits of material between 0.177mm and 2.00mm.

**Wash Load**
For the Fraser River, any sediment with a particle size smaller than 0.063mm.
**Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Name</th>
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<tr>
<td>BCAL</td>
<td>British Columbia Assets and Land Corporation</td>
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<td>CCG</td>
<td>Canadian Coast Guard</td>
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<td>CPR</td>
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<td>EC</td>
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<tr>
<td>ERC</td>
<td>Environmental Review Committee</td>
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<td>FREMP</td>
<td>Fraser River Estuary Management Program</td>
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<tr>
<td>FRPA</td>
<td>Fraser River Port Authority</td>
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<tr>
<td>MELP</td>
<td>Ministry of Environment, Lands and Parks</td>
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<tr>
<td>NFPA</td>
<td>North Fraser Port Authority</td>
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<td>PWGSC</td>
<td>Public Works and Government Services Canada</td>
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<tr>
<td>RODAC</td>
<td>Regional Ocean Disposal Advisory Committee</td>
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<tr>
<td>WLUC</td>
<td>Water and Land Use Committee</td>
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Part 1: Introduction
The Fraser River

The Fraser River Estuary is a natural resource that is home to some of the most productive biological systems in the world. In addition, the river serves as an important transportation route for British Columbians and plays a key role in the economy of one of North America's fastest growing metropolitan areas.

The Fraser River Estuary Management Program and the Estuary Management Plan

FREMP is a partnership among federal, provincial, and regional government bodies that has been established to foster coordinated and sustainable management of activities in the Fraser River Estuary (from Sandheads to Kanaka Creek and the mouth of Pitt Lake). FREMP was established in 1985 and expanded in 1991. FREMP is now a partnership among:

- Fisheries and Oceans Canada;
- Environment Canada;
- the Ministry of Environment, Lands and Parks;
- the Fraser River Port Authority;
- the North Fraser Port Authority; and
- the Greater Vancouver Regional District.

FREMP's work is guided by FREMP's Estuary Management Plan (EMP). Entitled A Living Working River, the EMP outlines a shared vision, goals, and action plan for improving the environmental, economic, and social health of the Fraser River estuary. The plan was developed with input and support from a variety of stakeholders, including private residents, land owners, industry and business associations, environmental advocacy groups, federal and provincial government agencies, municipalities, First Nations, and the Greater Vancouver Regional District. It contains a number of tools – Area Designations, the habitat classification system, and the Coordinated Project Review Process – that enable FREMP partners to deliver on the goals and actions in the EMP. FREMP's plan reflects a consensus among a broad range of stakeholders concerning how the water, shoreline and upland resources in the estuary should be managed.

The EMP contains an Action Program on Navigation and Dredging. A key target of this action program is to "manage the removal of sand from the river in a manner that balances with the sediment budget of the river system".

The Rise of Dredging as an issue

Dredging has been an issue for many years. With the continued demand by the shipping industry for navigation channel maintenance and the increased demand by the construction industry for dredged material, it has become clear to agencies responsible for managing the Fraser River Estuary that better tools and practices for managing dredging are needed.

In 1996, the FREMP Water and Land Use Committee charged a Task Group to develop guidelines for dredging in the Fraser River estuary which accommodate the need for continued navigation (and the needs of the construction industry to the extent possible) while maintaining the environmental and structural integrity of the estuary as a whole, as a means to deliver on the EMP target.
Guiding Principles for Dredging Task Group

In scoping the issues associated with developing the budget and reviewing existing guidelines, the Task Group used the following principles to guide their deliberations.

Dredging must be managed to ensure that:

· habitat values and fishery resources are preserved. This will involve continued habitat protection and enhancement throughout the estuary.

· navigation channels are maintained in such a way that reliable channel depths are available on a consistent basis to serve the evolving coastal and deep sea shipping markets. This will require a managed dredging program.

· industry's demand for sand is met on an environmentally sustainable basis. This will require monitoring sediment inflow and controlling sand withdrawals on an annual basis in order to evaluate the effects of dredging and other development activities.

· disposal of contaminated dredge material is properly managed and appropriate upland and offshore disposal sites are used. Testing of dredge material for contaminants using defined testing procedures and standards will be needed to assess the impacts and fate of contaminants that may be found.

· public health and safety needs are met. This will require that all efforts are taken to maintain the structural integrity of utility crossings and river dykes.

Task Group Conclusions

In order to better assess and manage dredging projects in the FREMP Area of Interest, the Task Group recommended that:

· annual sediment budgets be established to guide dredging activities;

· annual reports be produced describing the previous year’s dredging activity. This requires the ability to track removals through a Sand “registry”.

· that a technical group be made available to advise FREMP’s ERC on the technical merits of any proposal, as needed.

The Dredge Management Advisory Committee is now responsible for these tasks. Their Terms of Reference are included in the appendices to this document.
Purpose of this Document

The purpose of this document is to:

1. provide a framework for managing sediment removals to work towards sustainability;
2. describe the FREMP Sediment Budget;
3. describe the FREMP Sand Registry; and
4. compile the guidelines and regulations of agencies responsible for dredging in the Fraser River.

Structure of this document

These guidelines are intended to provide the dredging industry and others with information on the new sediment budget and the existing guidelines for dredging in the Fraser River. The document is organized as follows:

Part I the sediment budget, how it will be developed, and how the amount of future dredging within the estuary will be determined;

Part II the existing dredging application process and the types of information that are expected from dredging applicants; and

Appendices the existing guidelines and regulations of agencies responsible for dredging in Fraser River.

How this document will affect dredging projects

The new sediment budget process outlined in this document, when coupled with the existing guidelines found in the appendices to this document, will move FREMP partners a significant step towards the goal of balancing sand removals with the river’s sediment budget.

Note that this document does not change the existing agency guidelines (which are found in the appendices to this document) that have been developed by the various regulatory agencies responsible for dredging in the Fraser River. It merely establishes a process for setting the limit on how much material may be removed from the river.

At some future date, regulatory agencies may develop additional guidelines governing dredging in order to limit impacts on habitat or other impacts associated with dredging.

The material contained in this report reflects a consensus among the regulatory agencies\(^1\) regarding the general approach to dredging within the estuary. Individual projects, however, will continue to be reviewed on their own merits. Special exceptions to the budget may be made for emergency navigation, health, or safety reasons.

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\(^1\) The regulatory agencies are: Fisheries and Oceans Canada (both Canadian Coast Guard and the Habitat and Enhancement Branch); Environment Canada; the Ministry of Environment, Lands and Parks; the British Columbia Assets and Land Corporation; the Fraser River Port Authority; and, the North Fraser Port Authority.
PART 2: THE FRASER RIVER SEDIMENT BUDGET AND SAND REGISTRY
What is a Sediment Budget?

A sediment budget for the Fraser River Estuary is a measure of the net change in sediment stored in the river as a function of total inflow of sediment at Mission minus the outflow into Georgia Strait. The objective of the budget is to manage removal of sand from the River on a sustainable basis. At present, that means that it will be managed to ensure that annual removals will not result, on average, in a net change (degradation or aggradation) to the shape of the river bed.

The Fraser River Estuary sediment budget will measure and budget deposits and removals of coarse sand. As indicated in the glossary, coarse sand (often referred to simply as sand and sometimes referred to as sediment) is material that has a grain size between 0.177 and 2.00mm. Material smaller than this size does not generally deposit in the FREMP area in large quantities; material larger than 2.00mm (usually referred to as gravel) generally deposits upstream of the FREMP area of interest and is thus not being covered by FREMP work.

The area the Sediment Budget covers

The budget is calculated based on the amount of coarse sand entering and depositing in the Fraser River below Mission.

The amount of material that may be removed according to the budget is counted as a removal from the system regardless of where it is removed. Specifically, material removed from upstream of the Patullo Bridge will reduce the amount of material available for removal downstream of the Patullo bridge.

Generally speaking, material may only be removed from the navigation channel (i.e. the deep sea channel downstream of the Patullo Bridge) unless an environmental assessment demonstrates to the satisfaction of the environmental agencies responsible for dredging that no adverse impacts (or no unacceptable adverse impacts) result from the removal. Necessary data have not been analyzed to establish a budget for the North Arm. Further work will be required to develop a budget for this portion of the river.

Generally speaking, material should only be removed where it is actively deposited each year unless an environmental assessment demonstrates to the satisfaction of the environmental agencies responsible for dredging that no adverse impacts (or no unacceptable adverse impacts) result from the removal.

Any proposed sand removal outside the deep sea channel between Sandheads and Port Mann and any proposed removal in the North and Middle Arms or between Port Mann and Kanaka Creek will be reviewed through FREMP on a case-by-case basis. FREMP will take into consideration the sand allocations for adjacent areas of the deep sea channel. Successful projects outside the deep sea channel will, as indicated above, be counted as withdrawals from the sediment budget and may change the amount of sand available in other reaches.

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2 Upstream of Kanaka Creek the appropriate authority is BCAL. FREMP is not usually involved in these applications. Any sediment removed upstream of Kanaka Creek must be authorized by BCAL on a case-by-case basis. Such removals will be factored in when setting the downstream budget.
How the Sediment Budget is determined

A sediment budget for any reach of the Lower Fraser River may be written as:

\[ S_{\text{out}} = S_{\text{in}} - S_{\text{dredge}} + S_{\text{spoil}} - \Delta S_{\text{channel}} \]

where:

- The sediment monitoring station is at Mission. The predicted sediment budget will be calculated for the river each year with the objective of using the budget to manage for the long-term sustainability of the river. The budget period will be calculated on a calendar year but will be adjusted to reflect the fact that a “dredging year” extends from August of one year to March of the following year.

What is the Sand Registry and What is its Role?

The Registry is a database containing records of the amount of sand removed and/or added to the river each year. The Registry is maintained by FREMP at the FREMP office.

The Registry will help monitor dredging performance against the budget in order to ensure that sediment removal remains within the river’s budget. The Registry will also be used to refine periodically the dredging budget to ensure that the model continues to reflect the hydrological reality in the river. The Registry will occasionally be able to identify when excess sand may be available for use by various industries. An example of when this might occur would be a year in which a large flood was expected.

What the Registry Contains

The Registry will contain the following information:

- number of dredging licenses issued;
- actual amount of sediment removed;
- date and location from which sediment was removed;
- particle size distribution of removed sediment; and
- date, location, and type of disposal used.
PART 3: THE APPLICATION PROCESS
Dredging and Project Review in the Estuary

Any project that has the potential to affect the Fraser River is already subject to the approval of a variety of regulatory agencies. For instance:

- Fisheries and Oceans Canada (Habitat and Enhancement Branch) is responsible for ensuring that fish and fish habitat are protected.
- Fisheries and Oceans Canada (Canada Coast Guard) ensures that navigable waters are protected.
- Environment Canada regulates ocean disposal.
- Ministry of Environment Lands & Parks is also responsible for ensuring that fish and fish habitat are protected and is responsible for regulating the environmental quality of sediments disposed on Crown and private land.
- British Columbia Assets & Land Corporation is responsible for all upland, foreshore, and riverbed Crown Land, including issuing dredging permits upstream of Kanaka Creek, and is responsible for tenuring disposal of sediment on Crown land.
- The Port Authorities (the North Fraser Port Authority and the Fraser River Port Authority) are responsible for managing port activities, port properties, lands granted to them by the federal and provincial governments, channel maintenance, and issuing dredging permits downstream of Kanaka Creek.

In the FREMP Area of Interest, FREMP coordinates the environmental review of all dredging projects. Any person or organization interested in undertaking a project that may have an environmental impact on the river must proceed through the Coordinated Review process.

The guidelines and regulations of agencies responsible for dredging in the Fraser River are found in the Appendices. During the Coordinated Project Review process the various agency representatives refer to these documents when assessing dredging proposals.

Overview

The following flow diagram outlines the general application and environmental review process for dredging projects in the FREMP area. This process is discussed at greater length in the appendices. Lead Agencies are outlined in the glossary and in the appendices.
Part 3: The Application Process

Project Review Process for Dredging

1. Proponent applies to Lead Agency for Dredging Permit
2. Proponent and/or Lead Agency checks with FREMP to determine possible sand location and availability
3. Pre-application discussions with FREMP ERC if appropriate
4. Formal Application to FREMP through Lead Agency
   - Lead Agency refers application to ERC members for review
   - Application made available for public review and comment
   - Comments received
   - ERC Recommendations
   - FREMP coordinates Environmental Response to Lead Agency
     - Lead Agency Decision Statements returned to Applicant
       - Lead Agency approves project subject to blanket approval conditions
         - Project proceeds
       - Project Rejected
         - Project proceeds with modifications
         - Environmental monitoring (as appropriate)
Engaging in the Project Review Process

When you are applying for a dredging permit, you must:

1. Fill out the FREMP Common Application Form, available at the Lead Agency and FREMP offices.
2. Submit completed application to the appropriate Lead Agency. To determine the appropriate Lead Agency, see Appendix 1.

Application requirements

Depending on the nature and location of the proposed project, the Lead Agency will follow one of two procedures and require one of the two following sets of information:

Dredging in the Deep Sea Channel

*The horizontal and vertical limits of the deep sea channel are defined on the maps in this document*

In the FREMP area, a general environmental approval for dredging projects in the deep sea channel may be held by the authorizing agency or agencies for a specified term. When applying to dredge in these areas, proponents must provide the authorizing agency with:

- the location to be dredged;
- the volume and type of material to be dredged;
- hydrographic survey information for the period following the most recent freshet; and
- biological impact assessments.

Dredging Elsewhere

Any dredging proposal that is outside the deep sea channel; or, is destined for upland disposal sites; or, is destined for an unapproved transfer pit, will be subject to an individual review by FREMP’s Environmental Review Committee (which may also consult the Dredge Management Advisory Committee). For these projects, proponents may be required to provide additional information. This may include:

- pre-dredge hydrographic information;
- hydraulic information;
- habitat inventories; and/or
- contaminant studies.

For these projects, it is suggested that proponents meet with the ERC prior to submitting an application (a “pre-application meeting”) to discuss the nature of the project.

Post-Approval Requirements

Once a dredging project is approved, proponents are expected to meet permit or license requirements and royalty payments as stipulated in the dredging authorization. Exceeding the boundaries may be subject to penalties imposed by authorizing agencies. Proponents may be required to conduct post-dredge surveys to demonstrate compliance with their permit or license.

Post-Approval Requirements

Post-dredge surveys may also be required. The timing of these surveys will be determined by the ERC. Proponents must meet permit or license requirements and royalty payments as stipulated in the dredging authorization. A performance bond may be required to ensure satisfactory completion of dredging works.
In either case, the proponent is responsible for:

- identifying, through the pre-application process, that a sustainable sand load is available for removal;
- demonstrating that the project meets the applicable guidelines intended to ensure mitigation of negative environmental impacts;
- ensuring that the material meets the applicable standards for transfer pit storage, upland use, and/or ocean disposal as required and obtaining applicable disposal permits;
- ensuring that all necessary permits have been received prior to commencement of dredging;
- ensuring that dredging does not compromise the structural integrity of dykes, utility crossings and bridge abutments; and
- ensuring that municipal regulations regarding upland disposal and return-water routing are met.

A list of relevant guidelines and requirements can be found in the Appendices as follows:

<table>
<thead>
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<th>Map/Appendix</th>
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<td>Map 1</td>
<td>Agency Jurisdiction(s)</td>
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APPENDICES
Deep Sea Navigation Channel Maps
(Source: Fraser River Port Authority)

Maps are provided for reference only. For more detailed information contact the FRPA.
Appendices
Deep Sea Navigation Channel Maps
(Source: Fraser River Port Authority)
Maps are provided for reference only. For more detailed information contact the FRPA.
Deep Sea Navigation Channel Maps
(Source: Fraser River Port Authority)
Maps are provided for reference only. For more detailed information contact the FRPA.
Appendix 1

Project Review in the Fraser River Estuary

(source: FREMP)

The Fraser River Estuary Project Review Process

A process for project review in the Fraser River estuary has been established under the Fraser River Estuary Management Program (FREMP). The area covered by the Project Review Process is shown on map C-1.

Types of Projects Reviewed

Any project that has the potential to affect the surrounding environment must be reviewed. Common examples are:

- Dredging
- Moorage facilities
- Filling for land area and breakwaters
- Log storage
- Habitat development and restoration
- Shoreline protection works

Project Review Agencies

The FREMP Environmental Review Committee (ERC) is responsible for reviewing all projects. This committee is made up of representatives from:

- Environment Canada;
- Department of Fisheries and Oceans;
- BC Ministry of Environment, Lands and Parks;
- Vancouver Port Authority;
- Coast Guard;
- North Fraser Port Authority; and
- Fraser River Port Authority.

This Committee, with FREMP staff support, reviews all project applications, considers all environmental comments for each application, and compiles a coordinated set of recommendations.

Representatives of the Lead Agencies generally attend the bi-weekly ERC meetings to give and receive clarifications in order to expedite the review process. Representatives of municipalities may also periodically attend these meetings to discuss projects of concern to their communities.

Neither FREMP nor the ERC are government agencies, and have no legal authority of their own. All responses by the ERC are founded on the authority of one or more of its member organizations.

Lead Agencies have been authorized to control the right to occupy or lease land or water lots which are not privately owned. These Lead Agencies serve as prime contacts with the proponent throughout the Project Review Process.
Applications for new projects within the review area must be made to one of the following agencies:

- Fraser River Port Authority
- North Fraser Port Authority
- BC Assets and Land Corporation

The Fraser River Port Authority (FRPA) receives applications for any new or expanded development projects occurring on land and water lots within the areas shown in the black on the map.

The North Fraser Port Authority (NFPA) exercises similar authority for areas shown in white on the map.

The BC Assets and Lands Corporation has jurisdiction over all BC Crown land, shown in grey on the map.

The application is referred to the ERC for environmental review and recommendation(s) prior to the Lead Agencies making a decision on an application.

**The Project Review Process**

The key step for a new project is the submission of an application to the appropriate Lead Agency.

The fastest way for a proponent to obtain project approval is to ensure full compliance with applicable guidelines, and to submit a fully and accurately completed application. An incomplete application will not be accepted by the Lead Agency, resulting in significant delays to the project.

A Common Application Form has been developed for Lead Agencies to acquire a standard set of information to be examined through the FREMP Project Review Process. This form contains all the basic information requirements of the many agencies reviewing projects in the Fraser River estuary.

Before the application is submitted to the Lead Agency, it can be very useful to discuss a project with one or more ERC members. These “pre-application” discussions can help determine:

- if the project is in the review area;
- which Lead Agency receives the application;
- if the project will likely require detailed environmental studies;
- what information should be provided to avoid delays;
- if the project concept and proposed site are consistent with applicable criteria; and/or

Applicants are encouraged to consult the available guidelines for development within the FREMP area. These include:

- Area Designations;
- Habitat Classification;
- Log Storage Guidelines;
- Dredging Guidelines; and
- Exclusion List.

Once an application is accepted by the Lead Agency, it is forwarded to the FREMP office.

FREMP distributes the application to all agencies with regulatory authority over the project. They are requested to provide a response within 30 days. After 30 to 45 days, the ERC reviews all environmental referral comments and prepares a coordinated environmental response. This response contains all the environmental recommendations from regulatory agencies.
The ERC-coordinated environmental response is then sent to the Lead Agency, which considers this response as well as non-environmental factors (e.g., municipal zoning consideration) relating to the application. The Lead Agency then issues a Decision Statement reflecting FREMP's environmental, economic, and social objectives. All comments received during the Project Review Process will be passed on verbatim to the applicant.

For approved projects, the Decision Statement may be accompanied by a lease, dredging permit, or other approval documents.

The applicant is responsible for obtaining any other required approvals (e.g., ocean dumping or waste management permits).

To assist Lead Agencies in screening and approving certain types of development applications or exclusion, the Lead Agency will give approval without referral to the ERC and provide FREMP with Decision Statements for the public record. The future expansion of the exclusion list will help ensure that agencies can allocate their resources to reviewing the more specific proposals.

Options available to ERC
Using the regulatory authority that each participating agency contributes through the ERC as a committee, the following options are available:

- recommend approval of the project (specifying environmental recommendations);
- recommend rejection of the project on environmental grounds;
- ask for more information to help reach a decision;
- set up a special Task Force to deal with unresolved issues prior to making a recommendation; or
- determine that another formal project review process should be followed (e.g., the Province’s Major Project Review Process or a Federal Environmental Assessment Panel).

The Applicant’s Role
The applicant should determine whether the project is in the review area, and what applications are needed. The Lead Agency and the FREMP office can provide advice. Pre-application discussion with the Lead Agency and the ERC can help the applicant determine what issues may be encountered.

Once the application has been submitted to the Lead Agency, the applicant may be contacted for clarification by one or more of the reviewing agencies. The ERC will make every effort to complete its coordinated environmental response in 30 to 45 days. Applicants should plan on this time period as a minimum for the ERC’s response.

As well, the applicant should allow for additional time for the Lead Agency to consider the ERC’s recommendations and other comments in reaching a final decision (environmental as well as economical and social factors are considered in the decision making process). In 1991, for example, an average period of 80 days was required from the time the application was signed to the Lead Agency Decision Statement.

The applicant may be asked to provide additional information, or conduct a specific study in support of the project.

The applicant may request a copy or the ERC-coordinated environmental response as soon as it is finalized.

The project recommended for approval should be started and be substantially underway within one year of the date of approval by the Lead Agency. Otherwise, a new application would be required.

Under no circumstances should the applicant begin work on the project until all approvals from the Lead Agency are confirmed in writing. Verbal or interim indications that a project may be acceptable should not be construed as approval to proceed with the project.
Public Access to Information

Information about a project is available to the public at the FREMP office. The office keeps a quick Referral Log that contains a list of all projects under review to help interested parties stay informed.

Opportunities for Public Input

Public input at any time is welcomed by FREMP. FREMP will ensure that public input or requested information is directed to the most appropriate source for response.

The public can provide written comments to the FREMP office. As long as these comments are submitted during the ERC response period, all relevant environmental input from the public will be factored into coordinated environmental response. The public may also submit written requests for a meeting with the ERC to discuss environmental issues arising from a particular project. Non-environmental issues may also be brought to the attention of the Lead Agency for consideration.

It is the responsibility of concerned members of the public to keep abreast of events as they unfold during the review process to ensure that their views are heard. The FREMP office is available to provide assistance and advice.

Questioning the Final Decision

Anyone disagreeing with the environmental recommendations provided by the ERC can request a review of those recommendations. This is also the case for the Lead Agency Decision Statement.

The request must be submitted to the FREMP office, listing the reasons for disagreement. The office will notify the person(s) making the request as promptly as possible as to whether a review of the recommendations will proceed, and if so, in what manner it will be carried out.
Appendix 2

Environmental Dredging Guidelines for the Lower Fraser

(source: FREMP)

1. From March 1 to March 15, there shall be no suction dredging in water which is less than five (5) metres deep at daily low water in order to protect juvenile salmonids.

2. From March 15 to June 15, there shall be no dredging (clamshell or suction) of dredge material volumes greater than 4000 m³ in order to protect eulachon.

3. From June 15 to July 15, in the lower Fraser River Estuary, there shall be no suction dredging in water which is less than five (5) metres deep at daily low water in order to protect juvenile salmonids.

4. Pumps for suction dredging shall not operate when the suction-head is within one and one half metres (1.5 m) of the bottom.

5. If the dredge material is intended for ocean or in-river disposal, the dredge spoil must comply with Environment Canada’s Ocean Disposal Regulations and Interim Contaminant Testing Guidelines found in Appendix 5 of these Guidelines. If upland disposal is planned, the dredge material must comply with the provincial Ministry of Environment, Lands and Parks’ Contaminated Sites Regulation under the Waste Management Act. These are found in Appendix 3 of these Guidelines.

6. The works shall be conducted utilizing water-based machinery or equipment (e.g. boat, barge, etc.) which shall be firmly moored in deep water, far enough offshore to prevent any grounding onto the intertidal foreshore or riverbed of the Fraser River. The only exception is the use of vertical spuds or other anchors to keep the machinery or equipment firmly moored in place.

7. All works and activities riverward of higher high water, including works on the foreshore conducted in the dry during periods of low water, works in, over or adjacent to the water or works discharging to the water shall be conducted in a manner that prevents or minimizes the direct or indirect release of sediment or sediment-laden water into the aquatic environment. In this regard, the works should address the applicable water quality criteria as described in the British Columbia Water Quality Guidelines (Criteria): 1998 Edition produced by BC Ministry of Environment, Lands and Parks (the “water quality criteria). For particulate matter, the water quality criteria includes the following specific criteria:
   i. When background is less than or equal to 50 nephelometric turbidity units (NTU), induced turbidity should not exceed 5 NTU above the background value.
   ii. When background is greater than 50 NTU, induced turbidity should not exceed the background value by more than 10% of the background value.
   iii. When background is less than or equal to 100 milligrams per litre (mg/L), induced non-filterable residue (NFR) should not exceed 10 mg/L above the background value.
   iv. When background is greater than 100 mg/L, induced NFR should not exceed the background value by more than 10% of the background value.

For the purposes of these guidelines, background is defined as the level at an appropriate adjacent reference site that is affected neither by works at the site, nor sediment-laden or turbid waters resulting from works at the site.

Should the works result in NTU or NFR levels in excess of the criteria outlined above, then those works and activities that might be contributing to the turbidity shall be halted until measures are put in place to ensure compliance.
8 All works must be undertaken and completed in such a manner so as to prevent the release of substances deleterious to fish and other aquatic life onto the upland and/or intertidal foreshore of or into any watercourse or water body. The proponent is hereby reminded of its obligation to comply at all times with Section 36 of the Fisheries Act, which specifically prohibits the deposit of deleterious substances into fish bearing waters. Due diligence is required at all times to prevent such deposits, and adherence to the terms and conditions of this letter does not of itself relieve the proponent of this ongoing obligation.

9 The proponent shall ensure that appropriate spill prevention, containment, and clean up contingency plans for hydrocarbon products (e.g. fuel, oil, hydraulic fluid, etc.), and other deleterious substances are in place prior to work commencing and that appropriate spill containment and cleanup supplies are kept available onsite whenever works are occurring. Further, all personnel conducting the works should be familiar with implementing the spill clean up plan and the deployment of spill response materials.

10 Works shall be carried out in such a manner so as to prevent any adverse impact to fish or fish habitat. If the proposed works result in any such impact the Department of Fisheries and Oceans reserves the right to immediately suspend or alter operations and the proponent shall undertake, at their own expense, any compensatory and/or remedial works deemed necessary by Fisheries and Oceans Canada to ensure a no net loss of productive fish capacity.

11 The appropriate Fisheries and Oceans Canada Field Supervisor shall be contacted and advised at least five (5) days in advance of the start of the proposed works as follows:

<table>
<thead>
<tr>
<th>For works located</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downstream of Alex Fraser Bridge (Delta/Richmond) and Queensborough Bridge (New Westminster)</td>
<td>Fisheries and Oceans Canada Field Supervisor in Steveston 604 664 9250 tel</td>
</tr>
<tr>
<td>Downstream of CPR Rail Bridge (Mission) and upstream of Alex Fraser Bridge and Queensborough Bridge</td>
<td>Fisheries and Oceans Canada Field Supervisor Fraser Valley West (Langley) 604 607 4150 tel</td>
</tr>
</tbody>
</table>

12 It should be made clear to dredging applicants that non-compliance with the above guidelines could harm fish and/or fish habitat and accordingly, may be the subject of an investigation under the Fisheries Act.

13 Final determination of the applicability of the above guidelines is at the discretion of the FREMP Environmental Review Committee.
Appendix 3

Fraser River Port Authority Transfer Pit Operating Guidelines
(Source: Fraser River Port Authority)

1 All transfer pits will be backfilled to nominal riverbed grades as determined by the Fraser River Port Authority.

2 Backfill material will be only sand supplied from deep sea channel maintenance dredging projects and/or approved borrow/transfer dredging sites. Sand quality must meet the Ocean Dumping requirements (see Appendix 5).

3 Backfill schedule of transfer pits will be within a 30 day period as per Fisheries and Oceans Canada Guidelines or as determined by the Fraser River Port Authority unless sufficient reason can be presented to the Port Authority and Fisheries and Oceans Canada to alter the specified period.

4 No transfer pit applications will be activated during high river flows (freshet conditions) above 4000 cms Hope discharge.

5 Transfer pit dredging will be subject to FREMP Environmental Dredging Guidelines for the Lower Fraser found in Appendix 2 of this document.

6 Methods of positioning and control of the backfill program must be submitted and approved by the Fraser River Port Authority.

7 Confirmation of backfill source and quantity must be provided to the Fraser River Port Authority before approval is granted.

8 Applicants must provide to the Fraser River Port Authority, upon completion of the transfer pit backfill operation, an approved source bathymetric survey plan of the transfer pit area. The survey must be completed according to the Hydrographic Survey Guidelines in Appendix 6. The plan must be submitted to the Fraser River Port Authority within 30 days of completion of backfill operation.

9 Transfer pits that are proposed in critical or sensitive areas of the river as determined by the Port Authority will be subject to an independent river hydraulic study (see Appendix 7) by a recognized hydraulic engineering firm. A list of recognized firms in the Lower Mainland is available from the Port Authority.

10 In the event the Fraser River Port Authority is concerned that an applicant may fail to return the transfer pit to its original condition or may use questionable backfill, a performance bond may be required.

11 On completion of backfilling, the applicant will advise the Fraser River Port Authority. On receipt of notification the Authority will then advise interested agencies who will have 90 days to provide comments regarding the final condition of the site.
Appendix 4

Upland Disposal Requirements

(Source: Ministry of Environment, Lands & Parks)

A map is required that clearly indicates the area to be dredged and the accompanying text must note the amount of material to be removed, the method of removal, and potential sources of contamination in the vicinity of the work.

The number of samples required to characterize quantities of materials to be excavated is based on recommendations in the Environment Canada document Interim Contaminant Testing Guidelines for Ocean Disposal Pacific and Yukon Region dated March 2000 (see Appendix 5) as follows:

<table>
<thead>
<tr>
<th>Quantity (m³)</th>
<th>Number of Samples Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 5000</td>
<td>3</td>
</tr>
<tr>
<td>5000 – 20000</td>
<td>6</td>
</tr>
<tr>
<td>20000 – 100000</td>
<td>8</td>
</tr>
</tbody>
</table>

This intensity of sampling is intended to “screen” for contaminants and more intensive sampling may be required should significant contamination be suspected or encountered. It should also be noted that the samples obtained are expected to be surface sands and representative for the area to be dredged (i.e. sampling locations spaced across the dredge area). Should contamination at depth within the sands be suspected then sand core samples may be required.

Analytical tests performed on the sand samples should be done at the proponent’s laboratory of choice and at cost borne by the proponent. The results of these tests must be summarized in a Contaminant Testing Report and submitted to MELP. Tests should be chosen to reflect potential contamination from local sources. For screening purposes it is suggested that a metals package test (analyzes for about 20 metals) and a hydrocarbon test (PAHs are fine but the TEH test - total extractable hydrocarbons - would likely be more cost effective) be done. Other tests, such as for antisapstain chemicals as may be used at sawmills, may be required depending on sources of contamination in the vicinity of the area to be dredged.

The question typically being asked is whether the material being dredged is suitable for disposal onto land. The indicated sand quality is evaluated against the Contaminated Sites Regulations. By these values it is determined whether the material is suitable as landfill and/or is consistent with municipal zoning and Official Community Plan designations.

Proponents should refer to the Contaminated Sites Regulation (CSR) Technical Guidance documents titled Site Characterization and Confirmatory Testing and Statistical Criteria for Characterizing a Volume of Contaminated Material. Further proponents seeking to deposit sediments to the uplands need to be aware of the CSR standards in Schedules 4, 5, and 6 of the CSR and must obtain a Soil Relocation Agreement if the sediments are to be moved off site and exceed limits in Schedule 7 of the CSR.
Appendix 5

Interim Contaminant Testing Guidelines For Ocean Disposal
Pacific and Yukon Region

(Source: Environment Canada, March 2000)

In response to growing concern over the biological implications of contaminants in marine sediments along the Canadian coastline, Environment Canada (EC), Pacific and Yukon Region, in consultation with the Regional Ocean Disposal Advisory Committee, has developed the following guidelines for sampling, analysis and reporting associated with proposed ocean disposal activities.

Under Schedule 6 (Assessment of Waste or Other Matter) of the Canadian Environmental Protection Act (CEPA), EC and permit applicants must consider the availability of practical alternate disposal options. To satisfy this requirement the applicant must provide a written record of the decision-making process used in selecting ocean disposal as the alternative of choice for disposal of materials. Disposal at sea is only permitted for materials where it is the environmentally preferable and practical alternative.

To assess the potential for environmental impacts of ocean disposal, EC requires chemical analyses to be performed on any material where there is a lack of chemical data, or a reason to believe that contaminants such as selected trace metals or organics are present. Guidance for the number of samples required may be obtained through Environment Canada's Regional Ocean Disposal Offices. A proposed sampling program should be developed by the applicant, based on information provided in the following tables, and submitted to the appropriate Regional Office for approval prior to commencement of loading or ocean disposal activities.

Materials found to contain substances of concern at, or higher than, the regulated or guideline concentrations identified in the following tables may be considered for ocean disposal under CEPA Schedule 6. A substance may be considered for ocean disposal if tests show that it can be disposed at sea so as not to cause acute or chronic effects on marine organisms or human health, whether or not arising from their bioaccumulation in marine organisms. A tiered assessment approach using biological testing is used for this determination. Ocean disposal options such as capping, containment, and side-casting will be considered by EC, but their acceptance will be conditional on compliance with Schedule 6.

Sampling and Analysis Requirements

The following pages identify the minimum sampling and analytical requirements for dredged and excavated materials based on the size of the project, as well as rejection/screening limits currently used by EC. Sampling requirements will be tailored on a site specific basis at the discretion of EC, and analysis of other parameters may be requested when EC has reason to believe that other contaminants are present.

Minimum Requirements for Dredged Material

Sampling Requirements

The following are the minimum sampling requirements for disposal of dredged material. Additional guidance may be obtained from the Users’ Guide to the Application Form for Ocean Disposal (Report EPS 1/MA/1, 1995) available from Regional Ocean Disposal Offices. Projects involving disposal of less than 4 000 cubic metres of material resulting from maintenance dredging are eligible for disposal under a valid general permit (Pacific and Yukon Region).

Parentheses indicate the number of composite samples to be analysed initially for dioxins/furans, if requested by EC.
Table 1 Minimum sampling requirements for dredged material

<table>
<thead>
<tr>
<th>Project Quantity</th>
<th>Permit Type</th>
<th># of Samples</th>
<th>Type of Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4,000 m³</td>
<td>General</td>
<td>3 (1)</td>
<td>Surface sampling prior to loading.</td>
</tr>
<tr>
<td>0 - 10,000 m³</td>
<td>Site-Specific</td>
<td>6 (1)</td>
<td>Surface sampling prior to loading.</td>
</tr>
<tr>
<td>10,001 - 30,000 m³</td>
<td>Site-Specific</td>
<td>5 (1)</td>
<td>Surface sampling prior to loading.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 (1)</td>
<td>Sampling to depth prior to loading.</td>
</tr>
<tr>
<td>OR</td>
<td>Site-Specific</td>
<td>9 (2)</td>
<td>Surface sampling prior to loading.</td>
</tr>
<tr>
<td>10,001 - 30,000 m³</td>
<td>Site-Specific</td>
<td>5 (2)</td>
<td>Surface sampling prior to loading.</td>
</tr>
<tr>
<td>30,001 - 60,000 m³</td>
<td>Site-Specific</td>
<td>5 (2)</td>
<td>Sampling to depth prior to loading.</td>
</tr>
<tr>
<td>≥ 60,000 m³</td>
<td>Site-Specific</td>
<td>-</td>
<td>Sampling requirements will be determined on a project specific basis.</td>
</tr>
</tbody>
</table>

Should the site history reveal cause for environmental concern, an increased number of samples and/or analysis of additional metals and/or organics may be requested.

Analysis Requirements
Details of minimum analytical requirements may be obtained through Environment Canada's Regional Ocean Disposal Offices.

Table 2 Minimum analysis requirements for dredged material.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limit of Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace Metals</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>0.2 µg/g</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.2 µg/g</td>
</tr>
<tr>
<td>Organics</td>
<td></td>
</tr>
<tr>
<td>PAH</td>
<td>0.1 µg/g</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td></td>
</tr>
<tr>
<td>Particle Size</td>
<td></td>
</tr>
</tbody>
</table>

For Polynuclear Aromatic Hydrocarbons (PAH), the analytical methodology and quality assurance protocol must conform to that outlined in the *Interim Quality Assurance Guidelines for Determination of Polynuclear Aromatic Hydrocarbons in Marine Sediments for Ocean Disposal*, a copy of which is available from EC.

For dioxin/furan, the analytical methodology and quality assurance protocol must conform to that outlined in the *Internal Quality Assurance Requirements for Analysis of Dioxins in Environmental Samples*, a copy of which is available from EC.

The analysis results are to be reported on a dry weight basis with detection limits less than or equal to those stated above. The precision of the test method should be indicated by reporting analyses on five replicate sub-samples on 10% of the trace metal samples, and two replicate sub-samples on 20% of the organics samples, with a minimum of one replicated sample. Sub-sampling should be done following homogenizing but prior to digestion of the sample and the replicates should not be run consecutively. The accuracy of the test method should be indicated by reporting the results of certified reference materials analysed at the same time as the test samples.
Minimum Requirements for Excavation Material

Sampling Requirements

The following are the minimum sampling requirements for disposal of excavated material. Additional guidance may be obtained from the Users Guide to the Application Form for Ocean Disposal (Report EPS 1/MA/1, 1995), which is available through Environment Canada’s Regional Ocean Disposal Offices.

Projects involving ocean disposal of undisturbed, native till material may be completed under a valid general excavation permit (Pacific and Yukon Region). For other excavated materials, a site specific permit will be required.

Table 3 Minimum sampling requirements for excavated material.

<table>
<thead>
<tr>
<th>Project Quantity</th>
<th># of Samples</th>
<th>Type of Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10 000 m³</td>
<td>6</td>
<td>Composite of surface native till to 1 metre depth.</td>
</tr>
<tr>
<td>10 001 - 30 000 m³</td>
<td>9</td>
<td>Composite of surface native till to 1 metre depth.</td>
</tr>
<tr>
<td>30 001 - 60 000 m³</td>
<td>12</td>
<td>Composite of surface native till to 1 metre depth.</td>
</tr>
<tr>
<td>≥ 60 000 m³</td>
<td>-</td>
<td>Number of samples to be determined on a project specific basis.</td>
</tr>
</tbody>
</table>

Should the site history reveal cause for environmental concern, an increased number of samples and/or analysis of additional metals and/or organics may be requested.

Analysis Requirements

Details of minimum analytical requirements may be obtained through Environment Canada’s Regional Ocean Disposal Offices.

Table 4 Minimum analysis requirements for excavated material.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limit of Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace Metals</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>0.2 µg/g</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.2 µg/g</td>
</tr>
<tr>
<td>Organics</td>
<td></td>
</tr>
<tr>
<td>PAH</td>
<td>0.1 µg/g</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon Particle Size</td>
<td></td>
</tr>
</tbody>
</table>

For PAH, the analytical methodology and quality assurance protocol must conform to that outlined in the ‘Interim Quality Assurance Guidelines for Determination of Polynuclear Aromatic Hydrocarbons in Marine Sediments for Ocean Disposal’, a copy of which is available from EC.

For dioxin/furan, the analytical methodology and quality assurance protocol must conform to that outlined in the ‘Internal Quality Assurance Requirements for Analysis of Dioxins in Environmental Samples’, a copy of which is available from EC.

The analysis results are to be reported on a dry weight basis with detection limits less than or equal to those stated above. The precision of the test method should be indicated by reporting sub-samples on 20% of the organics samples, with a minimum of one replicated sample. Sub-sampling should be done following homogenizing but prior to digestion of the sample and the replicates should not be run consecutively. The accuracy of the test method should be indicated by reporting the results of certified reference materials analysed at the same time as the test samples.
Rejection/Screening Limits

Material found to exceed the following regulated and guideline limits will not be considered for ocean disposal unless tests show it can be disposed at sea within the criteria established under Schedule 6, Canadian Environment Protection Act.

Environment Canada may impose more stringent limits if the site history indicates cause for environmental concern.

**Table 5 Rejection/screening limits for ocean disposal**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rejection/Screening Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>0.6 mg/g dry weight</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.75 mg/g dry weight</td>
</tr>
<tr>
<td>Chlorophenols (PCP) (penta and tetra isomers)</td>
<td>1.0 mg/g dry weight</td>
</tr>
<tr>
<td>Polychlorinated biphenyls (PCB)</td>
<td>0.1 mg/g dry weight</td>
</tr>
<tr>
<td>Total PAH</td>
<td>2.5 mg/g dry weight</td>
</tr>
<tr>
<td>Dioxin/Furan</td>
<td>“Quantifiable” 2,3,7,8 TCDD</td>
</tr>
</tbody>
</table>

Steps Required for Collecting Samples and Submitting Analytical Data

The applicant is required to prepare the following information to be included with the proposed sampling program:

1. A location map for the dredge/excavation site with the street address of the proposed excavation or dredge site;
2. A site map showing the proposed excavation or dredge site relative to known landmarks and/or streets;
3. A list of any known possible contaminant input sources in the vicinity of the proposed works;
4. A written record of the decision making process used in selecting ocean disposal as the preferred materials disposal option, explaining why other disposal methods are not being used;
5. A site use history for the site from which the material destined for ocean disposal will originate; and
6. A proposed sampling plan of the site showing the proposed sampling locations, and a list of proposed analyses. The proposed sampling plan should be developed based on information presented in this document and the Users Guide to the Application Form for Ocean Disposal. Assistance in designing a sampling program can be provided by Environment Canada. The sampling program must be approved prior to taking the samples.

The information identified above should be sent to EC. If the project does not qualify for completion under the terms and conditions of a general permit, this information should be submitted with a completed ocean disposal application. For information on how to apply, please contact EC.

If the project qualifies for completion under a general ocean disposal permit, this information must be submitted to EC with a covering letter describing the proposed activities in detail, and the proposed schedule for the work. Upon completion of the sampling and analyses program, the test data, together with all QA/QC data as identified in the foregoing information, must be sent to EC.

No work may proceed under a general permit until written approval for the specific site has been received from EC, and a copy of the approval letter is posted at the work site.

For further information on this document, or any other matter relating to the Ocean Disposal Program, please contact Environment Canada.
General Guide to Soil and Sediment Sample Collection

Containers for the samples should be obtained from the laboratory contracted to conduct the required analyses. Avoid unnecessary contact with clean glassware and utensils. A clean stainless steel or teflon spoon or scoop is ideal for transferring samples. Handle containers by the outsides only. Do not touch the inside of the jar, or teflon (or foil) liners, and use spoons or scoops by the handles only. When removing a foil or teflon liner and lid from a jar, remove as one piece and put down on a piece of foil or other clean surface while filling the jar.

If using a grab sampler, remove the water from the surface of the grab, taking care not to disturb the contents if possible. Use the clean scoop to remove a portion of the sediment from the middle of the sampler down to the depth of the material caught in the grab. The material in the sample jar should be representative of the material to be loaded for ocean disposal.

Alternatively, the sample may be taken by removing the lid, holding the jar by the sides and scooping the sample from the sediment without the use of other utensils. The threads of the jar may then be wiped with a paper towel before replacing the lid. Do not fill the jar more than about 3/4 full, allowing plenty of room for mixing/stirring, and expansion during freezing. When the sample is in the jar, replace the teflon/foil liner and lid, and label the jar with project identification, sampling site number and sampling date.

To clean the sampling spoon or grab in between samples, wipe with a paper towel to remove any solids, then rinse with water. Clean the tray in this manner as required.

If three samples are required for analysis, three small jars of sediment should be taken for each sampling station, for a total of nine jars. The three jars per sample will be composited by the analytical lab by taking equal aliquots of sample from each jar for a single analysis of most parameters of concern. The samples may be further composited for other testing as required but would otherwise be maintained as discrete samples.

Keep the samples in a refrigerator or on ice for short term storage (1-2 days); freeze the sample as soon as possible or store over dry ice for long term storage. The laboratory responsible for the analyses should be asked to freeze the samples after removal of sufficient material to complete the required analyses. These samples should remain frozen until the permit, or approval under a general permit, has been issued by EC.
Appendix 6

Fraser River Hydrographic Survey Guidelines
(Source: Fraser River Port Authority)

**Accuracy**
Horizontal: ± 3 metres NAD83 grid; Vertical: ± 0.1 metre / 10 cm to LLWL

**Coverage**

**Density of Soundings** Minimum 50 metre cross line spacing with soundings every 20 metres

**Longitudinal Check Lines** Minimum of two longitudinal check lines at a suitable spacing should be run through the length of the area to confirm the accuracy of the cross lines. These lines should extend at least one third of the length of the area beyond the upstream and downstream boundaries of the area to track potential migration.

Survey coverage should always address the potential impact of side slope stability from the dredge cut to structures and environmental concerns.

**Calibration of Equipment**
All positioning equipment shall be field calibrated so that the deviation of the calibrated value shall not exceed the least count of the equipment system.

**Echo sounder calibration** Prior to the commencement of a survey project, the echo sounder and transducer shall be calibrated for draft and the system bar-checked. The bar-check should be performed in the vicinity of the intended survey and repeated as required. Velocimeters can be substituted for bar-checks with requirements as per bar-check guidelines.

**Data Presentation**
When possible, the chart scale shall be 1:2000 using PWGSC base plan format. Soundings are in metres relative to LLWL with negative values representing elevations above Low Water Datum. The Local Low Water Datum used to reduce the sounding data is to be noted on the drawing. The horizontal datum (e.g. NAD83, local grid or selected reference points) as well as projection used (UTM) will also need to be noted on the drawing. Other information required would be project title, date of survey, survey personnel, site location, water level reference points and other pertinent information.
Appendix 7

Source: PWGSC

Fraser River Hydraulic Study Requirements

This section outlines requirements for conducting hydraulic studies for the purposes of assessing Dredging Applications. These Terms of Reference are intended to establish consistent modelling methodologies and practices when using hydraulic models to assess impacts of dredging proposals. This should assist with expediting the review process of the study and assessment of the dredging license application.

It is suggested that proponents or their consultants call Public Works & Government Services Canada (PWGSC) before initiating hydraulic studies to discuss details of the study methodology. This would ensure that the information requirements are established for the technical review of specific dredging proposals. PWGSC is the technical reviewer (for FREMP Lead Agencies) of dredging license applications.

The following outlines details of hydraulic study requirements:

Study Methodology
The study must include an assessment of impacts to the local and downstream Fraser River hydraulic characteristics that may occur from conducting the dredging.

Impacts to the following hydraulic characteristics to be considered:
- Local water levels
- Local flow velocities
- Sandation, Deposition/Accretion Patterns (local and downstream)
- Shoreline/Foreshore Erosion (local and downstream)
- Undermining of existing local marine structures

Model Used
Consultants are not limited to any specific model, but the model must be capable of providing water surface elevations, velocities, and erosion / accretion information at sufficient scale (or grid size) to quantitatively assess the impacts of the dredging using varying flow conditions.

Calibration
Hydraulic models must be calibrated using historic prototype site information from existing records (unless consultants are obtaining new field data for calibration purposes). Available velocity and hydrographic survey records can be obtained from PWGSC. The model must show similarity of hydraulic characteristics of pre and post freshet conditions to prototype records to establish reliability.

Model Extents
Model area to be sufficient for assessing local and downstream impacts. Upstream area to be sufficient for ensuring model stability of flow.

Surveys
Hydraulic model must use current hydrographic survey data for baseline condition (e.g. Taken since previous freshet).
Boundary conditions
Must use boundary conditions that are provided from Institute of Ocean Sciences and/or Canadian Coast Guard (when it is available) Fraser River models for calibration and assessing varying flow scenarios and their impacts.

Flow conditions
Impacts of the proposed dredging must be assessed for low, average, and higher than average conditions to establish the range of potential impacts.

Report
Report must be provided outlining the following:

- Study methodology
- Model description
- Calibration process
- Modelling program
- Quantitative assessment of impacts on hydraulic characteristics
- Summary

Study requirements established in this document are considered to be a minimum. Depending on the specific dredging location and extent, more information may be required to conduct an assessment of the dredging.
Appendix 8

Future Habitat Inventory Requirements
(Source: FREMP)

Proponents may, in future, be required to provide some or all of the following information in order to allow the Environmental Review Committee to better assess the impacts of dredging. Note that different sampling may be required depending on whether a proposed project is:

- inside or outside the deep sea channel, or
- dredged annually or dredged infrequently.

The Environmental Review Committee may ask dredging applicants to provide some or all of the following information:

**Physical Information**
- bathymetry and river velocity information measured before and after dredging.

**Biological Information**
- suction dredge entrainment in the River.
- fish species presence/absence
- population assessments of species utilizing borrow and adjacent areas
- substrate sampling for benthic invertebrate composition
- larval fish surveys. Species may include sturgeon and eulachon.
Appendix 9

Particle Size Analysis Guidelines
Proponents are required to follow:

- the Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis outlined in ASTM standard D421-85, and
Appendix 10

Dredge Management Advisory Committee Terms of Reference
(Source: FREMP)

The DMAC will:

■ hold meetings each year in March, July, and November to project annual allowable dredging volumes (an annual Sand Budget) and to oversee the production of an annual dredging report.

■ oversee the creation and maintenance of a “Sand Availability Registry” which will track the yearly removal of sand and will help dredging proponents determine the amount of dredged material they can apply for.

DMAC membership will be:

■ Fisheries and Oceans Canada
  ~ Coast Guard
  ~ Habitat and Enhancement Branch

■ Public Works and Government Services Canada

■ Environment Canada

■ The Ministry of Environment, Lands & Parks
  ~ Fish, Wildlife & Habitat Protection

■ The British Columbia Assets and Land Corporation

■ The Fraser River Port Authority

■ The North Fraser Port Authority

The responsibility for carrying out DMAC actions will be shared among the government agencies identified as members of the DMAC. Secretariat functions to this group will be filled by the FREMP Water and Land Use Coordinator.
Appendix 11

Dredging Application Form

Coordinated Project Review Common Application Form

5945 Kathleen Avenue, Suite 501
Burnaby, BC V5H 4J7
775 5756 tel
775 5198 fax

Instructions to the Applicant
The common application form is designed to provide the basic information about your proposed project required by most regulatory agencies in the Fraser River Estuary. However, certain of these agencies may require additional specific information not contained in this form. The general information requirements of all relevant federal and provincial agencies are included. This does not include information that may be required for municipal or regional government approvals. Early contact with the appropriate municipality or regional district is strongly recommended.

Lead Agency Details
To be filled out in conjunction with the Lead Agency.

CPR 

Proponent

Lead Agency

Lead Agency Contact

Application
☐ New
☐ Renewal

Purpose
☐ Foreshore Lease
☐ Use / Occupy Permit
☐ Dredging Licence
☐ MELP Waste Management Permit
☐ MELP Pesticide Permit
☐ Construction Approval

Previous CPR 

Use / Occupancy Permit

MELP Waste Management Permit

MELP Pesticide Permit

Construction Approval

Ocean Disposal

Federal Fisheries Act Authorization

MELP Water Licence

NWPA Approval

Other (Specify)

Required Attachments

Please note that the following attachments are required. Failure to provide accurate and complete information will result in significant delays as a new or revised application will be required.

1 Folded copies of all relevant Plans must accompany the Application. The Plans must delineate the following:

Legal high water mark (must be delineated on all plans)
Proposed structures
Existing structures
Structures to be removed
Structural detail
Higher high water mark and lower low water mark
Cross-sectional view with higher high and lower low water marks
Lease boundaries
Lease dimensions (where tenure is applicable)
Ingress/egress
Set backs from property line
Property boundary
Services to property: Water, Hydro & Sewage
Dredge area boundaries (where boundary is top of dredge cut)

2 A copy of the FREMP Habitat Classification Map with location indicated

3 Riparian Consent
Letter of Consent and Proof of Ownership from the Land Titles Office
Dredging Application Form
Coordinated Project Review Common Application Form
5945 Kathleen Avenue, Suite 501
Burnaby, BC V5H 4J7
775 5756 tel
775 5198 fax

I, __________________________, (Please PRINT) certify that all information contained herein is true to the best of my knowledge.

Applicant or Representative’s Signature

Date Signed

A. Applicant
Name
Address
Contact

A. Applicant
Postal Code
Email
Telephone
Cellular
Fax

B. Applicant’s Representative
If the applicant is being represented by another individual or organization (e.g. consultant, contractor, engineering, survey or law firm, etc.), the name of the firm and name of the individual within the firm who can best supply information on the project should be provided.

B. Applicant’s Representative (if different from above)
Name
Address
Contact

B. Applicant’s Representative
Postal Code
Email
Telephone
Cellular
Fax

C. Riparian Owner
Name
Address
Contact

C. Riparian Owner
Postal Code
Email
Telephone
Cellular
Fax

D. Surveyor
This area to be completed only if the application is for tenure.

D. Surveyor
Name
Address
Contact

D. Surveyor
Postal Code
Email
Telephone
Cellular
Fax

E. Proposed Use of Area upon Completion of Works
Briefly describe the proposed use of the area after construction works have been completed. (e.g. log storage, boat or barge moorage, marina, boat repairs, habitat compensation, sewage outfalls, etc.) Attach a separate sheet if necessary.

E. Proposed Use of Area on Completion of Works

Please sign and date your application before submitting the completed form.
### F. Project Location

Give the legal description and Upland municipal address of the project, if applicable, or some reference to allow inspecting personnel to find the site. Include the FREMP Habitat Classification Map number and Habitat Classification Colour Code. If you have GPS information for your site, please include coordinates, coordinate system, datum, and zone.

### G. Project Details

Be sure to answer every question by checking the appropriate response. If “yes”, please provide a concise explanation.

*Items marked with asterisk (*) may require a separate application to the agency indicated*

<table>
<thead>
<tr>
<th>Does the Project…</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Involve the construction of new structures or expansion/improvement of existing facilities?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Involve demolition or removal and disposal of existing structures?</td>
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<td></td>
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<tr>
<td>c. Require municipal servicing?</td>
<td></td>
<td></td>
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<tr>
<td>d. Involve moorage of float home(s) or live aboard vessels?</td>
<td></td>
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<tr>
<td>e. Involve dyke construction or affect existing dykes?</td>
<td></td>
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</tr>
<tr>
<td>f. Involve diversion or consumption of water? (BCEL Water License Application)</td>
<td></td>
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<tr>
<td>g. Generate wastes requiring disposal? (BCEL Waste Management Permit Application)</td>
<td></td>
<td></td>
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<tr>
<td>h. Involve use, production or handling of hazardous materials? (BCEL Waste Management Permit)</td>
<td></td>
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<tr>
<td>i. Involve lands which are included in the Site Registry established under Contaminated Sites legislation and administered by the Ministry of Environment, Lands Parks?</td>
<td></td>
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<tr>
<td>j. Involve use or application of pesticides or herbicides? (BCEL Pesticide Permit Application)</td>
<td></td>
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<tr>
<td>k. Involve ocean disposal of material? (DOE Ocean Disposal Permit Application)</td>
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<tr>
<td>l. Involve use of land in the Agricultural Land Reserve?</td>
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</table>

<table>
<thead>
<tr>
<th>Street Address</th>
<th>FREMP Habitat Classification Map #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Habitat Classification</td>
</tr>
<tr>
<td></td>
<td>GPS Coordinates (if available)</td>
</tr>
</tbody>
</table>

If yes, explain

If yes, describe type and quantity

If yes, provide relevant SITE #(s)

If yes, explain

If yes, explain

If yes, explain

If yes, explain

Indicate Municipal or Regional district zoning
H. Proposed Works and Construction Methods

Describe all activities or construction works involved in your project (e.g. inwater works, foreshore works, debris control, dredging, pile driving, log debris removal, etc.)

Include a concise description of the methods, equipment, and materials used for construction. Attach a separate sheet if necessary.

If the following materials are to be used, include the appropriate details:
- Fill – volume, nature and source
- Piles – number to be removed or added, material, and proposed treatment. (e.g. timber, steel, concrete, plastic, green stick, creosote, sheet pile bulkhead or timber bulkhead, etc.)
- Rip rap – size and slope, linear shoreline length, and area

I. Details

On the cross-section diagram, indicate the biological zones affected and calculate the surface area to be affected by construction.

Does this Project Require...
If you answer “yes” to any of these categories, please make sure you have completed section H completely and fill in the appropriate blanks.

- Fill
  Area = ___ m x ___ m
  Volume = ___ m³

- Dredging
  Area = ___ m x ___ m
  Volume = ___ m³

- Rip rap
  Area = ___ m x ___ m
  Linear Shoreline Length = ___ m

- Piles
  Number ___
  Type ___
J. Location Map

With an arrow, indicate the location of the project on the following map. Please add any additional references, which will help to locate your project. (e.g. street names, landmarks, etc.)

If you have GPS coordinates for your project site, please include this information in Section F.

If your project is not within the white area of the map, you are not in the FREMP boundaries.