Project Review Application Form

Information supplied in this application may be made public during consultation with adjacent municipalities, First Nations groups and other interested parties, as well as to other members of the public through the Access to Information Act. Please advise PMV of any commercially or financially sensitive information which you do not want provided to third parties.

**APPLICANT or CONSULTANT**

<table>
<thead>
<tr>
<th>Company</th>
<th>Lehigh Hanson Materials Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Sophie Mullen</td>
</tr>
<tr>
<td>No. &amp; Street</td>
<td>8955 Shaughnessy Street</td>
</tr>
<tr>
<td>City</td>
<td>Vancouver, BC</td>
</tr>
<tr>
<td>Postal Code</td>
<td>V6P 3Y7</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:sophie.mullen@lehighhanson.com">sophie.mullen@lehighhanson.com</a></td>
</tr>
<tr>
<td>Phone</td>
<td>604-269-6571</td>
</tr>
<tr>
<td>Fax</td>
<td>604-261-0362</td>
</tr>
</tbody>
</table>

**PROJECT INFORMATION**

<table>
<thead>
<tr>
<th>Location/Address/Legal Description</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot 1, Sections 27 and 23, Block 4 North, Range 5 West, NWD, Plan 74529 (PID 007-783-464)</td>
<td>Richmond</td>
</tr>
</tbody>
</table>

Project Description Summary (attach detailed description and rationale as necessary)

Lehigh is proposing to begin development of the first phase (Phase 1 – Aggregates) of its Construction Materials Terminal. This application is submitted to establish the aggregate processing and distribution facility with a wash plant, material stockpiles, reclaimer, truck loading and future rail loading facilities, with two marine berths for loading and unloading barges.

Complete details are provided in the attached Project Description.

<table>
<thead>
<tr>
<th>Floor Area</th>
<th>Height of proposed structure(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Describe in-water works if any</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

2 barge berths are proposed - one for the import and offloading of raw aggregate material and one for the loading and export of the finished aggregate material for distribution.

<table>
<thead>
<tr>
<th>Required utility connections:</th>
<th>power</th>
<th>gas</th>
<th>water</th>
<th>sanitary</th>
<th>storm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presently on site:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modifications required:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Other required approvals:</th>
<th>NWPP, Richmond ESA Development Permit, Site Alteration Permit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. construction value</td>
<td>TBD</td>
</tr>
<tr>
<td>Proposed start date</td>
<td>2014</td>
</tr>
<tr>
<td>Proposed completion date</td>
<td>2022</td>
</tr>
</tbody>
</table>
**PROJECT ENVIRONMENTAL IMPLICATIONS**

Include in-water works, discharges to land or water by pipe or surface run-off, potential leachates, soil contamination potential, air emissions, habitat impacts, etc. Attach a detailed description including drawings and plans, as well as proposed mitigation as appropriate.

- In-water works include 2 barge berths requiring pile driving and minimal dredging.
- Clean stormwater will be discharged to land or to the existing on-site wetland.
- 95% of aggregate wash plant process water will be recycled; 5% will be shipped with product.
- Air quality dispersion modelling does not indicate any impacts to surrounding Ambient Air Quality Objectives. Mitigative measures for point source particulate emissions are included in design.
- Site layout incorporates habitat protection and enhancement of existing wetland.
- On-site fuel storage will be minimal, stored in double-walled containment away from waterways.

| Will the proposal involve off-site impacts (e.g. traffic, noise, views, glare, dust)? | □ yes □ no |
| Comments: |

Facility is primarily marine-based therefore truck traffic not expected to be greater than existing. Majority of aggregate plant infrastructure is electric, therefore minimal noise levels and combustion emissions are predicted.

| Does the proposal affect any known historical or archaeological feature? | □ yes □ no |
| Comments: |

A documented archaeological site (DgRs-17) has been identified in the area; however, no significant ground disturbance is proposed and a Site Alteration Permit will be obtained.

| Does the proposal involve fill? If yes, please specify: | □ yes □ no |

| Length (m) | Width (m) | Volume (m³) |

**PROPERTY INFORMATION**

Do you have an existing lease/licence/easement with Port Metro Vancouver for the property or waterlot?

| □ yes □ no |

If yes to the above, is the proposal permitted under the terms and conditions of your agreement? Comments:

| □ yes □ no |

Is the proposal entirely within your leasehold area? If not, what arrangements have you made with Port Metro Vancouver or other landowners?

| □ yes □ no |

A small portion of the proposed marine infrastructure will be located within Lot K which Lehigh has purchased from the City of Richmond.

For in-water works, are you or Port Metro Vancouver the upland owner?

| □ yes □ no |

**If no, please attach letter of consent from upland owner.**
**DREDGING**
Complete this section only if dredging is proposed. If dredging is new ("capital dredging"), the Project Permit fee applies. For maintenance dredging, there is an environmental review with no fee.

<table>
<thead>
<tr>
<th>Type of dredging</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW (Capital)</td>
<td></td>
</tr>
<tr>
<td>RENEWAL (Maintenance)</td>
<td></td>
</tr>
<tr>
<td>OTHER Please Explain:</td>
<td></td>
</tr>
</tbody>
</table>

**DREDGE SITE**

Water Lot Use: 2 marine barge berths

<table>
<thead>
<tr>
<th>Site Address/Local Name:</th>
<th>City:</th>
<th>Postal Code:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjacent to Lot K - Fraser Port Properties (W of No. 7 Road)</td>
<td>Richmond, BC</td>
<td></td>
</tr>
</tbody>
</table>

**SITE SKETCH**

Sketch in proposed dredge area, showing all relevant features.
### DREDGING - SEDIMENT ANALYSIS INFORMATION

- All proposed dredging sites must be sampled and the material must meet the "Interim Contaminant Testing Guidelines" developed by Environment Canada - Disposal at Sea Program (http://www.ec.gc.ca/jem-das/Default.asp?lang=En&n=0047B595-1).
- Soil to be disposed of on land must meet BCMOE Contaminated Sites Regulations, and may require a soil deposition permit from the receiving municipality, if applicable.
- A copy of the sample analysis must be received prior to the project being reviewed.
- The analysis will be valid for four (4) years and kept on file at Port Metro Vancouver offices.

<table>
<thead>
<tr>
<th>Sample Date</th>
<th>No. of Samples</th>
<th>Tested for Disposal at Sea</th>
<th>Tested for Upland Disposal</th>
<th>Pass</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 14, 2008</td>
<td>18</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tested By**

D.B Technical Services Inc.

**Address**

4663 Woodridge Place

**City**

West Vancouver, BC

**Postal Code**

V7S 2X1

**Email address**

Duane_B@telus.net

### DREDGING METHODOLOGY

#### DREDGE METHOD

- Clamshell
- Cutter-Suction
- Hopper
- Other

#### DISPOSAL METHOD

- Disposal at Sea
  - Permit Holder
  - Permit Number
  - Max. Permit Volume
  - Expiry Date

- In-River Disposal
  - Disposal Site
  - Unloading Method

- Upland Disposal
  - Disposal Site TBD
  - Prov/Muni. Permit # TBD

- Habitat Compensation
- Habitat Site

- Beach Replenishment
- Site Description

**Proposed Commencement Date to be determined**

**Proposed Completion Date to be determined**

**Proposed Hours of Work**
DREDGING VOLUMES

Length (m) 60  Width (m) 10  Area (m²) 600

Existing grade (m LLW) -7  Proposed grade (m LLW) -8

Proposed volume (m³) 600  □ Per Year  □ Per Event

CROSS SECTION

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

Indicate the area affected using the diagram below as a guide to zones. Enter area affected in the appropriate space in the diagram.

HIGH TIDE

LOW TIDE

SUBMERGED  INTERTIDAL MUD / SAND FLAT  INTERTIDAL MARSH  RIPARIAN VEGETATION

Length (m) 60  Length (m)  Length (m)  Length (m)

Width (m) 10  Width (m)  Width (m)  Width (m)
The areas in front of the 2 barge berths will require some subtidal dredging to accommodate the raw and finished aggregate barges. The work will primarily take place in front of the Finished Aggregate Berth area and has been calculated to be approximately 60m long and 10m wide requiring dredging from an existing elevation of -7m LLW to -8m LLW.

As the anticipated volume is fairly minimal (~600m3), the material will be disposed on via suitable upland disposal.

---

**DREDGING CONTRACTOR**

<table>
<thead>
<tr>
<th>Contractor Name</th>
<th>To Be Determined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Postal Code</td>
<td></td>
</tr>
<tr>
<td>Contact Name (if different)</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
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<tr>
<td>Cellular</td>
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<tr>
<td>Fax</td>
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<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>Email address</td>
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</table>

---

**PREVIOUS DREDGING (IF ANY)**

*Use descriptions as per the Dredging Methodology section.*

<table>
<thead>
<tr>
<th>Date Dredged:</th>
<th>unknown</th>
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</thead>
<tbody>
<tr>
<td>Volume Removed:</td>
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</tr>
<tr>
<td>Dredge Method:</td>
<td></td>
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<tr>
<td>Disposal Method:</td>
<td></td>
</tr>
<tr>
<td>Dredge Grade:</td>
<td>Contractor:</td>
</tr>
<tr>
<td>Previous Dredge Approval / Permit No:</td>
<td></td>
</tr>
</tbody>
</table>
I/we certify that I/we have reached the age of majority and the information provided in this application and supporting documentation is correct to the best of my/our knowledge.

<table>
<thead>
<tr>
<th>Applicant Name</th>
<th>Tenant (when not applicant): Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sophie Mullen</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Environmental Manager</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 18, 2012</td>
<td>S. Mullen</td>
</tr>
</tbody>
</table>

This signature signifies the applicant may act on my behalf during the course of the permit review process.

<table>
<thead>
<tr>
<th>Application fee submitted: $ 0 (previously paid)</th>
<th>Documentation deposit submitted: $ 0 (previously paid)</th>
</tr>
</thead>
</table>

Please send all completed applications to:
Port Metro Vancouver
Planning and Development Department
100 The Pointe, 999 Canada Place
Vancouver, BC Canada V6C 3T4

Applications for Environmental EAP review will be redirected to the appropriate department.
PROJECT DESCRIPTION

Lehigh Construction Materials Terminal

Phase 1 – Aggregates

Lehigh Hanson Materials Limited
8955 Shaughnessy Street
Vancouver, BC V6P 3Y7

June 2012
EXECUTIVE SUMMARY

Lehigh Hanson Materials Limited (“Lehigh”) proposes to develop a marine bulk loading and transhipment facility for the transhipment of construction materials on industrial lands owned by Port Metro Vancouver (“Port”) in south Richmond. This facility, the Lehigh Hanson Construction Materials Terminal, would sustain and expand Lehigh’s business functions to supply construction materials in British Columbia.

The Construction Materials Terminal is a marine-oriented, multifunctional facility designed to allow Lehigh to efficiently produce, store and supply the Lower Mainland market with construction materials from within a small industrial footprint, while reducing greenhouse gas emissions from truck traffic. Material will be received mainly via marine access and will be distributed primarily by marine or rail carriers with some transhipment by trucks.

Lehigh has identified Lot 1 of the Port Metro Vancouver properties in south Richmond as an ideal site for the development of its proposed facility. The site allows for the future growth of Lehigh’s business in the Greater Vancouver area as it offers:

- water access for the transport of aggregates via marine barges;
- sufficient space for the development of an on-site aggregate processing facility;
- future access to rail facilities for the import of aggregates from the BC Interior Region via railcar; and,
- room for future expansion to include other construction materials and related products such as raw materials used in the manufacture of aggregate, cementitious and supplementary cementitious products (including transportation by truck and rail), ready-mix concrete production as well as future expansion of the foreshore for marine bulk loading and transhipment.

The proposed facility will be constructed in phases based on market demands and economic growth. Future plans for the additional phases to include supplementary cementitious materials storage and transhipment, as well as ready-mix concrete production will be developed at that time.

Lehigh is proposing to begin development of the first phase (Phase 1 – Aggregates) at this time to establish an aggregate processing and distribution facility with a wash plant, material stockpiles, reclaimer, rail and truck loading facilities and two marine berths for loading and unloading barges.

Aggregates processed at the terminal will be transported from coastal deposits as well as land and river-based sources from the BC Interior Region, which will be delivered by barge. The aggregate processing plant will operate up to 24 hours per day 7 days per week and 52 weeks per year. It is expected that construction will begin between 2017 and 2018 due to an extensive pre-loading requirement to achieve the required ground settlement across the entire site prior to construction.

Consistent with Lehigh’s commitment to sustainable development, the project has been designed to minimize the potential for environmental and archaeological impacts. Lehigh Hanson currently has business relationships with a number of First Nations in British Columbia, such as Sechelt and Skway, and is committed to ensuring that the consultation process is carried out in a respectful and thorough manner. Lehigh has also worked closely with the City of Richmond to provide a public trail system along the Fraser River fronting the project to safely connect the Hamilton and Riverport neighbourhoods with the existing trail network in Richmond.

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Figure 2 ..................................................................................................... Proposed Site Layout
1.0 INTRODUCTION

1.1 Proponent Identification & Corporate Information

Lehigh Hanson (Lehigh) comprises the North American unit of HeidelbergCement, one of the world's largest producers of construction materials, operating in over 55 countries and employing approximately 55,000 people. Their primary business areas are cement, aggregates, ready-mixed concrete, concrete products and dry mortars.

HeidelbergCement is a Core Member of the Cement Sustainability Initiative of the World Business Council for Sustainable Development. The corporation is committed to Climate Protection, Protecting Resources, Reducing Emissions, and Minimizing Local Impact along with Social Responsibility, Partnership and Dialogue in all of the countries that it operates, as published in their Sustainability Report. More information can be found on the company's Canadian operations web site at http://lehighhansoncanada.com.

In the Lower Mainland of British Columbia, Lehigh is represented by several companies with a long history of operation, in some cases more than 120 years, including:

- Cement
  - Lehigh Northwest Cement Limited
  - Pozzolanic International Limited
- Ready-mixed Concrete and Concrete Products
  - Rempel Bros. Concrete Ltd.
  - Ocean Construction Supplies Limited
- Aggregate & Transportation
  - Lehigh Materials Limited
  - Construction Aggregates Ltd.
  - Ocean Marine Towing Services Limited
  - ConAgg Quarries Limited
  - Steelhead Aggregates Ltd.

1.2 Contact Information

Communications should be sent to:

Address: 8955 Shaughnessy Street,
Vancouver, BC V6B 3Y7

Attention: Sophie Mullen, M.Sc., Environmental Manager
Telephone: 604.269.6571
Email: Sophie.Mullen@lehighhanson.com
2.0 PROJECT DESCRIPTION

2.1 General Background

Lehigh is proposing to construct a facility to receive, process, and distribute aggregates (Phase 1 – Aggregates) as the first phase of its Construction Materials Terminal. The aggregate processing and distribution infrastructure will occupy approximately 34 acres. Raw aggregate materials will be shipped to the site by barge and rail, stored in raw material stockpiles, processed in a wet screening plant to produce various grades of aggregates, and distributed via barge, rail, and truck.

2.1.1 Location

The facility will be located on Lot 1, Sections 27 and 23, Block 4 North, Range 5 West, NWD Plan 74529, at the south end of No. 7 Road in Richmond, BC. The centre of the site is at 49° 08' 47.35" N and 123° 03' 05.25" W.

The property is owned by Port Metro Vancouver (Port) and is approximately 69 acres in size (Figure 1). There are a variety of land uses within two kilometres of the site boundaries, including industrial and port operations, pre-load fill staging sites, a dredge sand stockpiling and sales operations, a landfill, farms and greenhouses, a golf course, container and automobile staging areas, a community centre, hockey rink, hotel, and some residential areas.

To develop the project on Lot 1, access to the Fraser River is essential to enable the offloading and loading of barges. This access is provided by Lehigh’s acquisition of Lot K, Section 27, Block 4 North, Range 5 West, NWD Plan 19680, situated between Lot 1 and the Fraser River, from the City of Richmond. Lehigh will acquire a lease for the provincially-owned riverbed adjacent to the water covered portion of Lot K from the Port to provide deeper water for the barge berthing facilities.

2.1.2 Land Use

Facilities built on the site would provide for the following operations:

- **Import of aggregate raw materials** – raw aggregate materials would be brought to the site by barge from various locations, offloaded, and then stored.

- **Processing of raw aggregates** - raw aggregate materials would be processed, washed and sorted to create a variety of value-added finished aggregate products from sand to gravel.

- **Distribution of finished aggregates** - finished products would be distributed to customers and to other Lehigh operations by barge and truck, with the largest percentage being by barge to minimize emissions and traffic impacts.

Key elements of the facility are shown on Figure 2 and summarized below:

- Barge berth for the offloading of raw aggregate materials
- Storage for aggregate raw materials
- Processing plant for aggregate production
- Conveyors for movement of aggregates
Process water capture, treatment and recycling facility
- Storage for aggregate finished product
- Barge berth for the loading of finished aggregate product for distribution
- Truck loading facility for finished aggregate products
- Rail loading facilities (when access available)
- Administration office
- Public waterfront trail and amenities

2.2 Project Purpose and Rationale

The local, regional and provincial economies are expected to experience significant growth in the future. This growth will require aggregates supply for new construction and maintenance of existing facilities. It is Lehigh’s objective to fulfill these needs by maintaining and expanding its business operations within the Lower Mainland as sustainably as possible.

This aggregates processing and distribution facility in the Lower Mainland will process raw aggregate materials sourced from coastal deposits in addition to land and river-based sources from the BC Interior and then distribute finished products on small barges to local customers. Currently, finished aggregate products are produced at nearby sources, transported to marine terminals in the Greater Vancouver area on small barges and then distributed to local customers by truck. As existing nearby aggregate resources are depleted, in the near future it will be necessary to transport raw aggregate materials from multiple and more distant coastal and inland locations.

2.3 Future Phases

Future development of the Construction Materials Terminal project will be largely market driven but will include, under separate permitting, infrastructure to support Lehigh’s other business functions, such as:

- access to future rail facilities (rail siding, rail bridge) for the import of aggregates from the BC Interior Region via train
- storage and transhipment of supplementary cementitious materials (including transportation by truck, and rail when available)
- additional berthing infrastructure to manage loading and unloading of large volumes of aggregates and/or supplementary cementitious materials onto marine vessels
- a new ready-mix concrete batch plant
3.0 PROJECT OVERVIEW

The Phase 1 - Aggregates component of Lehigh’s proposed facility will cover most of the site. Raw aggregate material (minus 75mm) in the form of mined “pit run” gravel will be shipped to the site by barge. The most commonly used barge will be self-unloading with an on-board conveyor to move raw material into a land based hopper. Aggregate will be conveyed from the marine offloading berth to the raw material stockpile via two conveyors in series. The first set of these conveyors will be fully contained within an enclosed gallery where it crosses over the intertidal shoreline, dyke, public trail and Dyke Road.

The raw aggregate will be transferred to a travelling, pivoting stacker conveyor that “builds” the raw aggregate storage pile.

Raw aggregate will then be reclaimed from the surface of the raw material stockpile by a travelling portal reclaimer and conveyed to the wet aggregate processing plant. The plant will consist of a series of wet, vibrating screens that separate the raw material into three stone products and three sand products. Aggregate that is larger than 25 mm will be directed to a cone crusher where it is reduced to 25mm or less and then fed back into the plant as raw aggregate. Aggregate fines smaller than 0.08mm will be collected in the wet process and sent to a dewatering tank and belt press, where water will be squeezed out leaving a cake that is transported off site.

Finished aggregate products will be conveyed to the finished aggregate stockpile storage area via a series of conveyors. The aggregate processing plant will operate up to 24 hours per day 7 days per week and 52 weeks per year. Finished aggregate product will be removed by a travelling portal reclaimer from the surface of the stockpiles and conveyed to a rewash station before being conveyed to the finished aggregate load-out berth. The conveyor transporting products from the finished aggregate stockpiles to the marine loading berth will be fully enclosed within a contained gallery where it crosses over Dyke Road, the public trail and intertidal shoreline. Aggregate products will be loaded onto barges via a pivoting loader.
The high moisture content and coarse gradation of all materials at any stage of the process from offloading of damp raw material to the loading of finished aggregate products minimizes the potential for dust generation. In addition, all processing is done with a considerable volume of water (8 US gpm / tonne per hour of aggregate produced), and finished aggregate product is wet and rewetted as it is loaded. The water is continuously recycled and reused to reduce air borne particulate and dust.

A river water intake will be installed at the raw aggregate unloading berth and designed to draw freshwater from the upper water column. The intake will be screened to prevent intake of fish and debris and will be designed and operated to meet DFO fish screen guidelines (includes setting a screen size appropriate for the species and size of fish expected in the area).

4.0 DEVELOPMENT SCHEDULE

To address the very challenging soil conditions underlying the project site which includes a very thick layer of new fill over soft underlying soils, extensive preloading will be required for nearly all proposed structures across the entire site. Heavy structures and equipment that may settle post construction must be placed on well compressed soil. Settlements in the order of 1.5m are expected for certain areas of the site and this will require long term preloads that exceed the ultimate ground bearing pressures to compress deep soft soils. In order to provide the geotechnical stability required for the proposed infrastructure, the entire site will be preloaded prior to construction of Phase 1–Aggregates.

As significant volumes of preload material are required, the material will be relocated several times to address all development areas of the site. The first stages of construction of the Phase 1 – Aggregates facility is to commence approximately 48 months after first area has been preloaded. The aggregates facility improvements, including the finished aggregate off loading facility and marine berths, are forecast to be operational approximately eight years after obtaining the Project Permit.

Development of future Project Phases at the site will be conducted under a separate permit application based on economic and market conditions.
5.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

Lehigh Hanson commissioned specialized consulting firms to assist with the identification of any environmental impacts that could pose a concern to the receiving environment and our stakeholders. To ensure that future development will comply with regulatory requirements and will not cause additional cumulative effects, the studies were conducted based on the possible future scenario where all three phases were in operation. This provided Lehigh with the necessary information to plan and design the facilities with the appropriate mitigative measures in place.

As this permit application is for Phase 1 Aggregates, only the information pertinent to this phase and its impacts are summarized below.

5.1 Air Emissions Assessment

An evaluation of the potential emissions for the facility was completed in 2008 by RWDI Air Inc. (RWDI, 2008). The report included future cement operations and a rail spur, which are not part of this Project Permit Application. Future expansion of the facility based on economic and market conditions will require amendments to the permit.

Metro Vancouver and BC Ministry of Environment ambient air quality objectives for particulate matter, dust fall and combustion-related contaminants were considered, as well as Port Metro Vancouver requirements.

Raw aggregate will be delivered to the site by barge. Both self-unloading barges and flat deck cargo barges will be used for marine transportation. The self-unloading barges will offload raw material via an onboard conveying system directly to a transfer hopper and conveyor. The conveyors transport the material to a raw material stockpile. Offloading from flatbed barges will be with a front end loader placing material into a hopper/conveyor system.

5.1.1 Dust/Particulate Emissions

Operations that were identified as having low potential for producing significant dust included:

- Conveyance of raw aggregate from unloading berth to the stacker
  - The material is damp and has a low fines content and is transferred on a covered conveyor.
- Open stockpiles of raw aggregate
  - The material is damp and has a low fines content.
- Operation of reclaimers at raw aggregate stockpiles
  - The material has a low fines content.
- Conveyance of raw aggregate to aggregate processing plant
  - The material has a low fines content and is still damp at this stage of the process.
- Separation and crushing of oversized material
  - A small portion of material will require crushing at this stage and water is used to control dust.
- Size separation and washing
  - This process uses a wet screen.
• Filter cake collection and storage
  o This process is a wet operation and no long-term storage of filter cake will take place at the site.

• Conveying and stockpiling of finished material
  o This material is still wet from the wash plant and has low fines content.

• Operation of reclaimers at finished aggregate stockpiles
  o These materials have low fines content and stockpiles are wet exposed surfaces.

• Conveyance of finished aggregate products
  o This material is damp and is transferred on a covered conveyor.

• Conveyance of finished product to rewash station
  o This material is leaving a wet process and is transferred on a covered conveyor.

• Barge loading of finished product
  o This material is still damp.

Operations that were deemed to have potential for producing particulate emissions if not managed properly (with recommended mitigation) are summarized below:

• Conveyor offloading of raw aggregate from barge to conveyor hopper – raw material moisture content will vary depending on the source and the weather. Percentage of fines will be low compared to dredge sand. Surface exposure will be low and water spray will reduce dust potential. RWDI recommended a water spraying system over the receiving hopper to limit dust escape.

• Stacking of raw aggregate onto stockpiles. A drop extension from the stacker will minimize the drop height onto the stockpile to reduce the potential for dust. RWDI recommended a water spray system from the underside of the conveyor drop to limit dust during windy periods.

• Truck traffic during the summer months can potentially produce dust emissions if a wet sweeping and/or flushing regime is not implemented. During most of the year, this is not an issue in Metro Vancouver. However, sweeping of paved surfaces in truck routes and watering unpaved areas are possible to mitigate dust.

### 5.1.2 Combustion-related Emissions

Usage estimates for tugboats of several sizes were estimated based on the time required for loading and offloading raw materials and aggregate. Emissions of front-end loaders were calculated using EPA models. An allowance of one hour per week of a loader was included to account for other miscellaneous equipment.

Emissions from tugboats were estimated to be the predominant source of combustion-related emissions although they are expected to be minimal as tugboats will be in operation only when a barge needs to be moved to and from the berths. Tugboats will not remain in operation during loading or unloading periods.

### 5.1.3 Conclusion and Recommendations

RWDI provided three conclusions:

1) Lehigh’s use of the Port site appears to be compatible with similar operations existing in the neighbourhood. The Port lands are likely to remain somewhat industrialized over the 60-year plus life of the Lehigh facility.
2) Most of the conveyor operations, storage and transfer points, and processing operations are unlikely to be a significant dust source due to the nature of the material and the equipment/methods used.

3) Given the characteristics of the material being processed, the wet nature of the aggregate processing and the planned use of mitigation controls, there is low potential for quantitative dust.

5.1.4 Air Quality Dispersion Modelling

Lehigh is currently working on further air quality dispersion modelling for the Port to identify and develop any additional mitigation plans for the potential cumulative effects on air quality in the area that may arise from this facility.

5.2 Vehicle Traffic Assessment

A traffic impact study was completed for the site by Delcan (Delcan, 2008). The report included traffic associated with a concrete batch plant, which is not part of this Project Permit application. As a result, the findings of the report are conservative, as actual traffic will be less than was anticipated in the report for Phase 1 - Aggregates.

Activities at the site that will generate traffic include:

- Off-loading and loading barges
- Shipment of aggregate by barge (90%)
- Shipment of aggregate by truck (10%)

Delcan’s report on the impact of Lehigh’s activities built on an earlier report (2005) that was conducted by Delcan on the development of the surrounding area. Based on the results of the study, Delcan provided the following recommendations:

1) For the opening day scenario, capacity analysis indicates that all study area intersections, with the exception of Portside/Blundell will operate at acceptable levels of service.

2) Key intersections are forecast to be approaching capacity by 2020, and further development on the Fraser Richmond or Kingswood/Beedie sites would require new road links. Note that for the 2015 and 2020 scenarios, the assessment included truck traffic related to a cement plant that is not part of the current development plans or lease/permit application.

3) Considered in isolation (site-generated traffic only) the Lehigh site would not trigger any modifications to adjacent intersections. The net impact of Lehigh’s traffic is less than 1% of the existing volumes at Number 6/Triangle and Number 6/Steveston.

5.3 Noise Assessment

A preliminary noise assessment was completed for the proposed facility in April 2009 by BKL Consultants Ltd. The purpose of the study was to determine if the proposed operations would be in compliance with the City of Richmond’s Noise Bylaw No. 6989.

Based on the assessment, BKL concluded that the operations would meet both the daytime bylaw limit as well as the night time bylaw limit, assuming 24 hours operations of the aggregate
plant. Should there be any noise complaints, BKL recommended some noise control measures, including enclosures, directional vents, and more frequent maintenance/replacement of conveyor rollers and/or bearings.

### 5.4 Habitat Assessment

A habitat inventory was completed for the site in March 2007 by GL Williams & Associates Ltd. (Williams, 2007). A site reconnaissance was completed on 20 February 2007 to coincide with a low tide and maximize the habitat exposed along the intertidal zone of the Fraser River shoreline. The No. 7 Road canal and Dyke Road ditch were also assessed.

Work included determining existing habitat types, dominant vegetation present, incidental wildlife and bird observations and taking photographs. The site is considered to be of moderate productivity (yellow FREMP colour-coded).

Recommendations to address impacts included:

- Most of the development proposed for along the Fraser River would span the intertidal zone or be in the subtidal zone, thereby minimizing fish habitat impacts. Since the shoreline currently has high wave exposure, some mitigation measures can also be used to improve habitat conditions.
- Impacts to the intertidal area should be addressed by creating intertidal marsh benches in protected areas, such as behind a wharf or berm.
- There is an opportunity to improve the habitat quality of the dyke by removing the invasive species and replanting with native species that provide food and/or cover for fish and wildlife.
- The No. 7 Road canal is rated as high value habitat and requires a 15 m set back, as per City of Richmond requirements. The main mitigation option for this area is to plant native trees and shrubs within the 15 m set back.
- The mitigation area is recommended to include open wetland or marsh in the southeast corner of the property, surrounded by a stand of mixed conifers and deciduous trees and understory shrubs. The cottonwood trees should be preserved as they provide eagle perching opportunity.
- If armouring (permanent protection of underwater structures) is required to stabilise the limited dredging within the subtidal and intertidal zones, and if rip rap is required, appropriate habitat compensation should be developed in consultation with DFO to ensure no net loss of habitat.

GL Williams & Associates also reviewed the site development plan and how it has been designed to avoid habitat impacts and incorporates several mitigation measures to minimize unavoidable habitat impacts.

Comments provided include:

- Berths are located in deep water to avoid impacting intertidal marsh habitat, and reducing berth dredging.
• The supply conveyors will be about 5 metres above the dyke so will overpass riparian vegetation, further reducing the impacts.

• A river water intake will be installed at the raw aggregate unloading berth to be used as process water required at the aggregate processing plant. The intake design will meet DFO fish screen requirements.

• The upland site plan was developed to minimize habitat impacts on the wetland pond adjacent to the No. 7 Road canal. This includes retaining forested areas along the No. 7 Road canal and provides for protection of the wetland pond to enhance habitat diversity and value to fish and wildlife.

• The site has been designed to provide permeable surfaces that allow retention and infiltration of water on-site. Paved surfaces have been minimized. Surface water is collected in swales along the northern boundary of the site and storm sewers are largely confined to the southwest corner of the site.

• The north border swale will convey excess surface water runoff towards the No. 7 Road canal.

5.5 River Sediment Assessment

A sediment assessment was completed at the site in August 2008 by D.B. Technical Services Inc. Twelve sediment samples were analyzed for metals, polycyclic aromatic hydrocarbons (PAH), and light and heavy petroleum hydrocarbon (LEPH/HEPH) content. The concentrations of PAH and LEPH/HEPH were below method detection limits for all samples analyzed. The metals concentrations (including chromium) meet the CSR Schedule 9 freshwater typical (SedQC_TS) sediment standard (CSR, 2011) at all locations.

A Disposal at Sea permit will not be obtained for the disposal of this dredged material; it will be disposed of at a suitable upland disposal landfill.

5.6 Dredging Plan

Limited dredging is required at the finished aggregate berth (dredge volume of 600 m^3 over 600 m^2 area to provide -8 m geodetic depth for the barges). Dredging will be done by typical commercial method such as a clam-shell bucket from a barge mounted crane and will be scheduled within the fisheries window.

Suitable upland disposal will be utilized by Lehigh for this dredged material in accordance with all applicable regulatory requirements.

5.7 Storm Water Management

A Storm Water Management Plan was prepared for the site in June 2009 and updated in April 2010 by Delcan (Delcan, 2009, Delcan 2010).

Delcan reported that all of Lot 1 (pre-development) drains to the City of Richmond’s No. 7 Road canal, where it is pumped to the Fraser River via the No. 7 Road pump station. Drainage from Lot 1 enters the canal via the former Dyke Road ditch and from a wetland pond on the eastern
property boundary. Most of the developed site will be unpaved and thus rain water will filter into the ground, thereby reducing stormwater runoff. The portion of Lot 1 that will not be leased by Lehigh was included in the analysis in order to mitigate for any potential future cumulative effects.

The storm water management plan included reference to a hydrological analysis for pre- and post-development scenarios. The modelling predicted 10-year/2-hour and 10-year/24-hour storm flows. The report also described the proposed storm water system (ditch and swale network, wet/detention ponds, parking areas, and process water handling).

Proposed sediment control measures were as follows:

- Berms and a large portion of the site will be seeded with rough grass to minimize erosion potential, thereby reducing the overall sediment load to the receiving environment.
- Perimeter ditches on the north and west property boundaries will be designed with check dams, sediment traps, and includes other best management practices to promote settlement of sediment in the ditch network.
- There will be no increase in sediment loading to the existing wetland/pond to the east of the site. This will be achieved with inlet controls and sedimentation ponds constructed upstream of the wetland area.

The stormwater management measures presented in the report would, when implemented, result in achieving the stormwater management objectives. Post-development design flows to the No. 7 Road Canal will be less than the pre-development levels by minimizing the amount of impervious surfaces, implementation of detention facilities, bio-filtration, and diversion of stormwater directly to the Fraser River to be re-used as much as possible.

The potential of sediment loading to the existing wetland pond within the east boundary of the site, the Fraser River, and the No. 7 Road Canal will be minimized with the implementation of upstream best management practices for sediment control including: seeding portions of the site; installing check dams and sediment traps within ditches; and, constructing on-site detention/sedimentation ponds.

Flood hazard risk to people, property, and natural resources within and adjacent to the project site will be minimized by constructing the site to a minimum of 4.5 m geodetic sea level (gsl) and designing on-site ditches, culverts, and outfalls to accommodate design flows.

### 5.8 Water Usage

The design of the aggregate plant includes recycling and re-use of process water, minimizing the amount of fresh water required. Over 95% of the water will be recycled; the remaining 5% will be absorbed in the shipped products.

Water will be collected from the aggregate plant and rewash station and directed to a clarifier tank to remove solids (which are sent to the belt press), then held in a fresh water storage tank for re-use in the plant. Water will also be collected from beneath the finished aggregate storage piles and pumped directly to the fresh water storage tank.
A river water intake (designed to meet DFO fish screen requirements) will be installed at the raw aggregate unloading berth to be used as process make-up water at the aggregate processing plant.

5.9 Lighting Assessment

Operational lighting will comprise three illumination levels depending on functional area, all in accordance with WorkSafe BC’s recommended minimums. All lighting luminaries located within sight of the site’s perimeter, in particular the south edge, will be equipped with sharp cutoff optics to minimize light trespass from the site. Where possible, luminaries would be directed downward.

The following six areas will have the highest illumination level of 100 LUX provided by the noted method:

- Raw aggregates barge offloading area
- Finished aggregates barge area
- Aggregate processing plant and water control (tank) area
- Administration building and security gate

The following five areas will have the medium illumination level of 54 LUX provided by the noted method:

- Finished aggregates barge loader tower structure
- Conveyor support structures
- Raw aggregate pivoting stacker conveyor and portal reclaimer
- Finished aggregate stacking conveyors, portal reclaimer and rewash
- Pole mounted luminaries on Main roadways

The balance of the site including remaining roadways will have the lowest illumination level of 22 LUX provided by pole mounted luminaries.

6.0 ENVIRONMENTAL MANAGEMENT

6.1 Sustainable Development

Lehigh has planned the development of the site in a sustainable manner. With a commitment to significantly limit its impact on the environment and any potential for effects to heritage areas through this project, it is expected that the project will result in the following:

- A large volume of existing aggregate truck traffic in the region will be reduced as the new facility will provide barge distribution of aggregates.
- Processing of aggregates at the facility will enable effective and cost efficient dredging of the upstream Fraser River. This will provide an increased measure of flood control to communities in the upper Fraser River.
- All process water will be treated and recycled to minimize usage of intake water.
- All supplemental aggregate process water requirements will be drawn from the Fraser River and not from the City of Richmond municipal water supply.
- All operations at the south Richmond facility will incorporate best practices for equipment selection and operations.
Site design for the south Richmond facility will protect and enhance existing cattail and grass wetlands and shrub/tree woodland habitat to support habitat for amphibians, waterfowl and nesting birds.

Construction will require limited excavation or subsurface works (other than utility trenches where required) to minimize potential disturbance of archaeological remains (see Section 6.3 below)

Site storm water runoff will be managed including bio-filtration by directing it through the wetland habitat areas to ensure water quality, with no additional discharge to the No.7 Road canal.

Current wetlands habitat at south Richmond will be increased and enhanced as part of development of the Terminal facility.

Locating a new heavy industrial activity in an existing heavy industrial area of south Richmond

Realization of City of Richmond’s plans for a trail system from the Hamilton neighbourhood to Riverport entertainment area

Development of the south Richmond facility will provide increased employment opportunities

6.2 Environmental Protection

A comprehensive and site-specific Environmental Management Plan (EMP) will be developed that will include:

- Policies & Procedures for activities at the site
- Staff Training and Awareness requirements
- Environmental Impact Identification and Mitigation Programs
- Emergency Response Plans
- Best Management Practices
- Spill Prevention and Response Plans
- Stormwater Management Plans

The EMP will identify any elements of the proposed facility that could present a risk to the environment, and describe how those risks can be mitigated through proper management.

6.3 Archaeological Heritage

An Archaeology Overview Assessment was conducted in June 2008 by Arcas Consulting Archaeologists (Arcas 2008)) for Lot K, along the Fraser River.

Arcas noted one documented archaeological site was listed in the Provincial Heritage Register (site DgRs-17) partly within the project’s development area. The site is described as a shell midden with associated cultural materials, and it extends from the foot of Williams Road (east of No. 6 Road) to the end of No. 8 Road.

The archaeological site has been adversely affected by development over the years, including by construction of the flood-control dykes along the Fraser River and fill placement north of the
dyke. Other disturbances to the area include that this part of Lulu Island was used as a landfill for the City of Richmond, and that there has been erosion along the shoreline.

Based on the project design plans, Arcas summarized that the only archaeological remains likely to be affected by the development are the fire-altered rocks reported between the No. 7 Road outfall and the end of Williams Road.

Arcas concluded that an archaeological impact assessment for the proposed development was not necessary. They proposed that the development proceed under a Site Alteration Permit, which would require as-needed monitoring of the development by an archaeologist in the event that unanticipated, significant archaeological remains are encountered.

There will be limited subsurface/ground disturbance or excavations (other than deep utility trenches below the thick layer of fill on the site where required) as part of the development. All monitoring would be conducted in accordance with the Site Alteration Permit.

7.0 OTHER PERMITS

Lehigh is working with the other federal and provincial agencies to ensure that it has obtained all of the additional required approvals and permits for the proposed works in addition to this Project Permit from Port Metro Vancouver. These additional approvals include, but are not limited to:

a. Authorization from the Department of Fisheries and Oceans Canada for Works or Undertakings Affecting Fish Habitat (HADD)

b. Approval from Navigable Waters Protection Program (NWPP) of anticipated marine functions to be carried out by Lehigh.

c. Environmentally Sensitive Area (ESA) Development Permit from the City of Richmond for construction within Lot K along the foreshore.

d. Approval from the Canadian Coast Guard that site improvements will not compromise the functionality of navigational aids (range lights) along the Fraser River.

e. Site Alteration Permit from the BC Archaeology Branch for work in and around a designated archaeological site.

f. Construction Permit (Building Permit) from Port Metro Vancouver for improvements erected within Lot 1 and the adjacent water-lots.

8.0 COMMUNICATION AND CONSULTATION

8.1 First Nations Consultation

Lehigh recognizes the importance of engaging fully, respectfully, and transparently with the First Nations that may be impacted by this proposed project. There are three aspects to this engagement:

- Respectfully and openly communicating with the First Nations who have interests in the area where the proposed project is located;
- Ensuring that all lawful consultation obligations are satisfied, by working with the First Nations to determine what, if any impacts, proposed activities might have on their rights, and if so, what mitigation strategies can be implemented; and,
Exploring with First Nations whether there are current or future economic collaboration opportunities for Lehigh Hanson and First Nations(s).

Lehigh Hanson currently has business relationships with a number of First Nations in British Columbia, such as Sechelt and Shxwhay, and is committed to ensuring that the consultation process is carried out in a respectful and thorough manner. Lehigh has retained the services of an experienced aboriginal company, Indigenuity Consulting, to assist in carrying out this consultation process.

8.2 Communication

Lehigh Hanson has a long history of open and honest engagement with our neighbours and stakeholders and look forward to collaboratively working together to ensure that we continue to be a leader in our industry through partnership and dialogue in any area that we operate.
9.0 REFERENCES


BC Environmental Management Act, Contaminated Sites Regulation (B.C. Reg 375/96), (including amendments to 2011)


