Project and Environmental Review Application
BHP Potash Export Facility
at Fraser Surrey Docks

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Executive Summary

Project and Environmental Review Application

BHP Potash Export Facility
at Fraser Surrey Docks

Executive Summary
Our Charter

We are BHP, a leading global resources company.

Our Purpose
Our purpose is to create long-term shareholder value through the discovery, acquisition, development and marketing of natural resources.

Our Strategy
Our strategy is to own and operate large, long-life, low-cost, expandable, upstream assets diversified by commodity, geography and market.

Our Values

Sustainability
Putting health and safety first, being environmentally responsible and supporting our communities.

Integrity
Doing what is right and doing what we say we will do.

Respect
Embracing openness, trust, teamwork, diversity and relationships that are mutually beneficial.

Performance
Achieving superior business results by stretching our capabilities.

Simplicity
Focusing our efforts on the things that matter most.

Accountability
Defining and accepting responsibility and delivering on our commitments.

We are successful when:
Our people start each day with a sense of purpose and end the day with a sense of accomplishment.
Our teams are inclusive and diverse.
Our communities, customers and suppliers value their relationships with us.
Our asset portfolio is world-class and sustainably developed.
Our operational discipline and financial strength enables our future growth.
Our shareholders receive a superior return on their investment.

Andrew Mackenzie
Chief Executive Officer

May 2017
Executive Summary

BHP Billiton Canada Inc. (BHP) is a leading global resources company with assets and projects in iron ore, petroleum, copper, and coal. BHP proposes to construct a potash export facility (Project) at Fraser Surrey Docks (FSD) in Surrey, British Columbia (BC) to export potash from the proposed Jansen Project in Saskatchewan. With a throughput of up to approximately 8 million tonnes per annum (Mtpa), the new facility would receive, store, load, and ship potash onto bulk ocean-going vessels to customers around the world.

The FSD terminal is an active port facility, located at 11060 Elevator Road in Surrey, BC, opposite the northern end of Annacis Island and adjacent to the South Westminster Heights residential neighbourhood. The Project is located on federal lands within the jurisdiction of the Vancouver Fraser Port Authority (VFPA) and is therefore subject to VFPA review and approval. The Application has been prepared to meet the Project-specific Project and Environmental Review (PER) Application Submission Requirements for PER No. 17-108 issued by VFPA on July 24, 2017. The Application includes engineering and environmental studies, effects assessments, and management plans to address anticipated construction and operation-phase effects.

BHP uses a rigorous environmental management approach to identify, assess, and control material risks, and strives to deliver lasting benefits to the environment and the communities in which it operates by improving natural resource management and enhancing biodiversity. BHP is committed to delivering responsible environmental management solutions for this Project while continuously pursuing conservation and other opportunities to achieve social and environmental benefits. Supporting conservation efforts and responsible development is integral to sustainability, identified as a core value in BHP’s Charter. Additional information about BHP is available on the corporate website at www.bhp.com.

What is Potash?

Potash, technically referred to as potassium chloride, is a naturally occurring mineral salt and a key ingredient in agricultural fertilizer, including common household garden fertilizers. Potash is non-flammable, non-combustible, and considered non-toxic to aquatic species. Similar to table salt, potash is mildly corrosive to metals and is water soluble, so requires a dry location for storage. The world’s largest known reserves of potash are located in Saskatchewan, Canada. Potash is processed into solid particles that are up to approximately 4 millimetres in size and range from pink to red in colour.

Canada exports potash to countries including the United States, Brazil, Indonesia, China, and India. Approximately 95 percent (%) of potash consumption is for use in fertilizers; the remaining 5% is used in a variety of chemical and manufactured products. Potash is a major contributor to improving crop yields and resilience, and helps to feed the growing global population.
Project Rationale

BHP anticipates that the world will require new supplies of potash in the next decade, as the market rebalances with demand growth absorbing current overcapacity and latent capacity. BHP anticipates that the world will require new supplies of potash to meet global demand after 2020, and has identified the FSD site as a potential location for the Project. FSD is considered a suitable location for the Project because of the existing rail and deep-water infrastructure.

Canada has the world’s largest known reserves of potash. BHP is investing in the long-term future of the potash market by developing a 100-year plan to develop its potash business and holdings in the Saskatchewan basin to meet the increasing global demand for potash. BHP’s proposed facility would receive potash via rail from the proposed Jansen Project in Saskatchewan, store the product, then load onto bulk ocean-going vessels for export. A permitted port site is required to seek approval of the proposed Jansen mine project.

Project Overview

The 29-hectare site is located entirely on VFPA property, and would occupy part of the existing FSD container yard and FSD’s Berth #9. The proposed facility would:

- Receive shipments of potash by rail from the proposed Jansen Project
- Offload product from railcars to the conveyor system
- Store potash in the storage building
- Transfer product from the potash storage building, or directly from rail, via the conveyors to the shiploader and to a waiting vessel for export.

The proposed Jansen Project is planned to initially produce 4 Mtpa of potash, and ramp-up over time to 8 Mtpa. At the eventual throughput of 8 Mtpa, 8 to 10 trains and 3 to 4 vessels per week would be servicing the facility.

To prepare the site and construct the new facility, the following activities are planned.

Site Preparation:
- Demolish existing structures and remove asphalt in select areas. Demolition will include the former Bekaert office building, the container truck gate, the diesel shop, portions of existing rail, and a portion of Shed 5.
- Relocate existing sewer main, watermain, and storm sewer utilities to accommodate new structure foundations.
- Preload the facility footprint using clean fill and conduct other ground improvements.

Construction:
- Install the railcar unloading facility and material handling and transfer system including dust collection units.
- Install the rail loop, and complete access improvements.
- Construct fully enclosed potash storage building, including materials handling equipment and the off-spec storage building.
- Conduct seismic upgrades at the berth.
- Install traveling shiploader with cascade-type spout to minimise dust and maintain product quality.
- Extensions to port authority rail yard rail tracks.

No development dredging is required to deepen the berth.
**Project Setting**

The Project site is located in Surrey, BC in an industrial area adjacent to Highway 17 (South Fraser Perimeter Road). Situated on the south shore of the Fraser River’s Main Arm, the site has been an industrial port facility since the early 1930s. Land use west of Highway 17 is designated as industrial, and east of the highway is designated for residential, institutional, and park use. The nearest residences are located approximately 75 metres (m) from the Project site.
# Studies, Reports, and Plans

The Application includes the following studies, assessments, and plans:

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- Attachment 5-B: Input Consideration Report

### 5.2 Planned Consultation During Application Review

### 5.3 Planned Communications During Construction

## 6.0 Aboriginal Engagement

- Attachment 6-A: Indigenous Engagement Summary
Project Engineering Studies

- **Hazardous Materials Report for Demolition** – Buildings to be demolished have the following hazardous materials: asbestos-containing materials, lead paints, polychlorinated biphenyls-containing ballasts or capacitors, lead, mercury, and stored chemicals. The Hazardous Materials Report for Demolition recommends measures for storing, handling, and recycling or disposing of hazardous building materials prior to and during demolition of buildings.

- **Geotechnical Study** – Project-related geotechnical concerns pertain to the seismic risk and potential for liquefaction of low-resistance clean sand underlaying the site. Stone columns and soil densification are proposed ground improvement options to meet the seismic performance requirements for the berth. In addition, the use of soil densification and piling is proposed for the storage building to meet the ground settlement criteria and provide acceptable seismic performance.

- **Energy Efficiency Study** – Both Project design technology and measures recommended for operation are proposed for Project energy conservation. Combined, these result in a total energy savings of 1,535 megawatt hours per year and an overall savings of 14% in relation to the theoretical baseline energy consumption.

- **Marine Traffic Information Requirements** – Marine vessel types include Handysize, Handymax, Supramax, Ultramax, Panamax, and Kamsarmax. The operational plan includes guidance for vessel berthing and unberthing (along with information on pilotage tug assistance), as well as mooring and unmooring operations.
Project Effects Assessments

- **Traditional Use** – the Traditional Use (TU) information will be assessed separately in an addendum to this Application, as the information is provided. This Application has been written using secondary data and does not incorporate TU information provided by Indigenous groups’ own TU studies. Each Addendum will assess potential impacts to a specific Indigenous group, using the same assessment scope that was used for this Application. Each Addendum will also discuss relevant additional mitigation measures if applicable.

- **Phase I and II Environmental Site Assessment** – The Phase I and II Environmental Site Assessment identified 10 onsite areas of potential environmental concern and 2 offsite areas of potential environmental concern. Based on the information reviewed and sampling conducted, there is a low likelihood of contaminated soil or groundwater being encountered during construction, and adverse Project effects are unlikely with the application of proposed management measures.

- **Lighting** – The lighting design and proposed operation for the Project is consistent with VFPA guidance and industry practice, and uses energy-efficient light-emitting diode sources. The Lighting Impact Statement concludes that Project lighting design will minimise the potential for adverse lighting effects to the greatest extent practical while meeting worker safety requirements.

- **Noise** – Baseline (2015) noise levels and expected (2030) noise levels were modeled using Cadna/A. With the implementation of the Project’s low noise initiatives and without additional mitigation, the average increase in the noise rating level at residential receivers during the operation phase is predicted to be no more than 1 A-weighted decibels (dBA) and the change in the percentage of people highly annoyed by the overall noise environment is predicted to be less than 6.5%. The predicted noise levels generally comply with VFPA’s noise criteria and the change in the percentage of people highly annoyed is predicted to comply with Health Canada’s suggested criteria of 6.5% (Health Canada 2017).
• **Air Quality** – Baseline and Project-related air quality emissions were modeled using CALPUFF. No off-site exceedances of ambient air quality objectives are predicted due to the Project. Predicted air quality effects, including ambient background levels, at sensitive receptors and residential neighbourhoods will be generally low and will remain below all ambient air quality objectives.

• **View and Shade** – The Project is consistent with existing land uses, and is visually similar to the existing infrastructure that predominates in the area. Based on viewscape and shading modeling, the Project will likely have minimal effects on views and shade in the surrounding communities.

• **Traffic** – The Project will generate a minimal amount of additional road traffic. Increased Project rail traffic will lengthen delays to road traffic due to blockages at rail crossings. For the road crossing across Robson Road at Elevator Road, an increase of road blockages from approximately one and a quarter hours per day without the Project, up to five and a half hours per day is likely to occur without mitigation. Vehicle access into the rail loop will be restricted while a potash train is unloading which will only affect BHP operations. The proposed mitigation options (Elevator Road Interchange or notional internal overpass) will mitigate all road blockages, allowing unimpeded access to Gunderson Slough and FSD.

• **Archaeological Potential Preliminary Assessment and Archaeological Overview Assessment** – Potential effects from the Project on archaeological resources include the potential disturbance to archaeological resources by densifying soils when pre-loading materials on the surface, and eventually loading product materials on site; and potential disturbance to archeological resources by excavating soils below 2-m depth where a lens of organic material, including archaeological artifacts or features, may be present. An Archaeological Chance Find Procedure is included in the Application, and will be in place during construction. A preliminary assessment of archaeological potential was also conducted in accordance with VFPA guidance. The assessment compared depth of Project excavations to depth of native soils based on geotechnical data. This assessment recommended that ground for disturbance deeper than 2 m to 50 cm past the organic lens, at distances of more than 100 m from the shoreline, should be monitored by a qualified archaeologist and First Nations representatives.

• **Flood Protection Assessment** – The Project site is not protected by a diking system, and is therefore vulnerable to Fraser River flooding. Flood inundation maps based on flood levels simulated using a hydraulic model of the Fraser River were generated for five scenarios: 1:200-year flood using present conditions and with a 1 m sea level rise; 1:500-year flood using present conditions and with a 1 m sea level rise; and the 1894 flood of record. The flood inundation maps all show substantial inundation at the Project site. The product storage building includes a perimeter concrete wall, supporting the roof structure that protects the product against flood events. Electrical rooms will also be elevated. As the concrete wall surrounding the potash storage facility is only penetrated by service doors, potential mitigation options for the service doors could consist of providing water-tight flood doors, sand bags, water-filled flood barriers, or other temporary flexible membrane barriers.

• **Aquatic Resources (including Species at Risk)** – The aquatic effects assessment determined that potential Project-related effects can be mitigated, and residual effects are not anticipated. With appropriate mitigation and good work practices in place, most construction-related effects on aquatic resources associated with the Project will likely be of short duration. In the portion of the Strait of Georgia that overlaps with Project activities, potential effects on marine mammals during the Project’s operation phase are an increased risk of vessel strikes, along with potential acoustic masking for the southern resident killer whale and harbour porpoise.
With the application of appropriate mitigation measures, including adherence to the CEMP, Operation Management Plans, and BMPs, residual effects are not anticipated for any of the aquatic resource components, including commercial, recreational or Aboriginal fisheries.

- **Terrestrial Effects (including Species at Risk)** – Vegetation at the Project site is limited as 98% of the site has been developed and is currently used for industrial activities. Vegetation is primarily patches of common weeds and non-native plants. The Project site provides limited wildlife value, except for relatively mobile species and species with high tolerance for human-related activities. Habitat loss due to Project construction is generally limited to low-quality weedy areas. The Project’s rail loop overlaps with area designated under the *Species at Risk Act* as critical habitat for streambank lupine (*Lupinus rivularis*), a plant species at risk. During repeated surveys, no streambank lupine plants have been observed in the affected area since 2013. The assessment provides details on proposed mitigation and monitoring to meet requirements of the *Species at Risk Act* (SC 2002, c. 29) recovery plan for streambank lupine.
Project Plans

• **Stormwater Pollution Prevention Plan** – This plan has been prepared to prevent or minimise the discharge of pollutants by stormwater runoff during operation. Measures are proposed to efficiently and proactively manage stormwater pollution risks, and that are consistent with stormwater management for the overall FSD site.

• **Construction Environmental Management Plan** – This plan provides measures to avoid or mitigate potential construction-related effects to environmental resources and the surrounding community. Proposed mitigation measures are based on Project scope, current environmental conditions of the site, assessments completed on the Project site to date, and industry-standard environmental construction techniques. Mitigation measures include water quality protection, invasive species management, guidance on soil and groundwater management, and archaeological monitoring.

• **Rail Operations Plan** – The Project will require reconfiguration of the rail within the FSD property. Rail component specifications comply with industrial standards from the connecting carriers, and are fit for purpose to the proposed traffic levels.

• **Fire Safety Plan** – This plan provides the organisational and procedural framework for responding to fire emergencies during Project operation. It has been developed to comply with all relevant federal and provincial legislation, regulations, guidelines, and objectives, and is largely based on FSD’s existing Emergency Response Plan.

• **Spill Prevention and Emergency Response Plan** – This plan provides guidance for onsite and offsite personnel on the required actions for preventing and responding to emergencies. This plan also provides guidance to mitigate the risk of environmental contamination from the accidental release of deleterious materials by providing clear procedures for their storage and handling as well as clear plans of action should such a release occur.
Community and Stakeholder Engagement

BHP is working with VFPA to consider community interests as part of the PER Process. Public and stakeholder consultation occurred during the Preliminary Review Phase (prior to the submission of this Application), and is summarised in the following reports:

- **Preliminary Public Comment Period – Consultation Summary Report:** The public and stakeholders were actively engaged during a Comment Period from October 12 to November 8, 2017. Consultation materials and activities included a project website, information brochure, online feedback form, notification letters, newspaper advertisements, and community information sessions (October 26 and 28, 2017). Materials and outreach were designed to introduce the Project to interested parties and answer any preliminary comments or questions. Participation was as follows:
  - 21 people attended the public information meeting in New Westminster
  - 36 people attended the public information meeting in Surrey
  - 26 people completed the feedback form online or in person
  - 9 written submissions were received by email
  - 78 people requested to be added to the Project database
  - 780 unique page views on the project website

- **Preliminary Public Comment Period – Input Consideration Report:** The report identifies how public and stakeholder input will be considered in the scope of technical and environmental studies, and in Project design.

Public and stakeholder consultation and engagement will continue during the Application review and during construction, and is anticipated to include open houses, notifications, and sharing of Project documents.
**Indigenous Engagement**

BHP has commenced early engagement activities with Indigenous groups that may have overlapping interests with the Project. BHP’s approach to engagement focuses on early engagement and frequent communications to develop relationships. Engagement efforts strive to identify areas of concern and are intended to enhance the potential economic benefit for local or potentially impacted Indigenous groups.

BHP recognises the traditional and legal rights of Indigenous groups, and acknowledges their right to practise and protect their cultures, identities, traditions, and customs. In addition, BHP encourages cultural awareness and diversity, and recognises and respects sites, places, structures, and objects that are culturally or traditionally significant to Indigenous groups. Acknowledging and respecting Indigenous groups as traditional owners or users of the land is a practice that is aligned with the BHP Code of Business Conduct. Knowing who is connected to the land and the nature of that connection is critical to engaging Indigenous groups appropriately.

**Preliminary Indigenous Engagement:**

During this phase of engagement, BHP initiated discussions regarding the proposed Project with Indigenous groups potentially impacted by the Project. BHP shared detailed Project information and supported Indigenous review of Project documents including Baseline Studies, the Archaeological Overview Assessment (AOA), and the Draft Assessment. BHP also pursued Engagement Agreements with Indigenous groups, and supported Traditional Use Studies from First Nations.

Issues and concerns have been tracked, and included comments on effects to fishing as well as fish and fish habitat, cumulative effects, potash spills, archaeological potential, and others.

To-date, BHP has engaged Cowichan Tribes, Halalt First Nation, Hwlitsum First Nation, Katzie First Nation, Kwantlen First Nation, Kwikwetlem First Nation, Lake Cowichan First Nation, Lyackson First Nation, Métis Nation British Columbia, Musqueam Indian Band, Penelakut Tribes, Qayqayt First Nation, Semiahmoo First Nation, Sto:lō Nation, Stz’uminus First Nation, Tsawwassen First Nation and Tsleil-Waututh Nation.

**Application Review Phase Indigenous Engagement and Consultation:**

BHP will continue to work with Indigenous groups who indicate and identify an interest in the Project to develop customised engagement and consultation strategies that align with each community or organisation’s unique potential and actual concerns, rights, and traditional uses.

Future engagement activities planned during Application review are currently being discussed with VFPA, and are anticipated to include meetings, emails, information sessions, potential workshops, sharing of updated Project documents and others. Once the Application has been accepted for review, VFPA will confirm which consultative activities will be delegated to BHP, and which will remain with VFPA.
Disclaimer

This work was performed in accordance with contract number 8500085638 between Hemmera Envirochem Inc. (Hemmera) and BHP, dated September 11, 2015. This report has been prepared by Hemmera, based on research conducted by Hemmera, for the sole benefit of and use by BHP. In performing this work, Hemmera has in good faith relied on information provided by others, and has assumed that the information provided by those individuals is both complete and accurate. This work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The results presented herein should be considered within the context of the scope of work and Project terms of reference; further, the results are time-sensitive, and are considered valid only at the time the report was produced. The results contained in this report are based on the applicable guidelines, regulations, and legislation existing at the time the report was produced; any subsequent changes in the regulatory regime may alter the results.
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<td>BC Hydro Letter of Acknowledgement</td>
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<tr>
<td>Attachment 2-B</td>
<td>Metro Vancouver Letter of Acknowledgement</td>
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<td>Attachment 2-C</td>
<td>CN Rail Letter of Acknowledgement</td>
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<td>Attachment 3-A</td>
<td>Drawings</td>
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<tr>
<td>Attachment 4.1-B</td>
<td>Geotechnical Report</td>
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<tr>
<td>Attachment 4.1-C</td>
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<td>Marine Traffic Information Requirements Report</td>
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<td>Attachment 4.2-A</td>
<td>Aquatics Technical Data Report</td>
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Attachment 4.2-B  Archaeological Resources Technical Data Report
Attachment 4.2-C  Commercial, Recreational, and Aboriginal Fisheries Overview Technical Data Report
Attachment 4.2-D  Human Health Technical Data Report
Attachment 4.2-E  Hydrogeology Technical Data Report
Attachment 4.2-F  Land and Water Use Technical Data Report
Attachment 4.2-G  Lighting Technical Data Report
Attachment 4.2-H  Socio-Economics Technical Data Report
Attachment 4.2-I  River Hydraulics and Morphology Technical Data Report
Attachment 4.2-J  Water and Sediment Quality Technical Data Report
Attachment 4.2-K  Traditional Land Use Technical Data Report
Attachment 4.2-L  Plant Communities and At-Risk Plants Technical Data Report
Attachment 4.2-M  Wildlife Technical Data Report
Attachment 4.2-N  Phase I and II Environmental Site Assessment
Attachment 4.2-O  Lighting Impact Statement
Attachment 4.2-P  Noise Assessment
Attachment 4.2-Q  Air Quality Assessment
Attachment 4.2-R  View and Shade Impact Analysis
Attachment 4.2-S  Traffic Impact Assessment
Attachment 4.2-T  Archaeological Potential – Preliminary Assessment Report
Attachment 4.2-U  Archaeological Overview Assessment
Attachment 4.2-V  Flood Protection Assessment
Attachment 4.2-W  Aquatic Resources Assessment Report
Attachment 4.2-X  Terrestrial Resources Assessment Report
Attachment 4.2-Y  Summary of Potential Effects and Mitigation
Attachment 4.3-A  Stormwater Pollution Prevention Plan
Attachment 4.3-B  Construction Environmental Management Plan
Attachment 4.3-C  Rail Operations Plan
Attachment 4.3-D  Fire Safety Plan
Attachment 4.3-E  Spill Prevention and Emergency Response Plan
Attachment 5-A  Consultation Summary Report
Attachment 5-B  Input Consideration Report
Attachment 6-A  Indigenous Engagement Summary
ACRONYMS, ABBREVIATIONS, SYMBOLS, AND UNITS OF MEASURE

<table>
<thead>
<tr>
<th>Acronym / Abbreviation</th>
<th>Definition</th>
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<tr>
<td>AAQO</td>
<td>Ambient Air Quality Objectives</td>
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<tr>
<td>AOA</td>
<td>Archaeological Overview Assessment</td>
</tr>
<tr>
<td>APEC</td>
<td>area of potential environmental concern</td>
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<tr>
<td>BATNEEC</td>
<td>Best Available Technology Not Entailing Excessive Cost</td>
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<tr>
<td>BC</td>
<td>British Columbia</td>
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<td>BHP</td>
<td>BHP Billiton Canada Inc.</td>
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<tr>
<td>BMP</td>
<td>best management practice</td>
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<td>CCME</td>
<td>Canadian Council of Ministers of the Environment</td>
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<tr>
<td>CEMP</td>
<td>Construction Environmental Management Plan</td>
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<tr>
<td>CRA</td>
<td>Commercial, recreational and Aboriginal</td>
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<tr>
<td>CSR</td>
<td>Contaminated Sites Regulation</td>
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<tr>
<td>Delta</td>
<td>Corporation of Delta</td>
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<td>ESA</td>
<td>Environmental Site Assessment</td>
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<td>FSD</td>
<td>Fraser Surrey Docks</td>
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<td>length overall</td>
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<td>OGV</td>
<td>ocean-going vessel</td>
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<td>Port Authority Rail Yard</td>
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<td>Project and Environmental Review</td>
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<td>PM_{10}</td>
<td>airborne particles or particulate matter 10 microns or less in diameter</td>
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<table>
<thead>
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<td>percent</td>
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<td>carbon monoxide</td>
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<td>DWT</td>
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<tr>
<td>ha</td>
<td>hectare</td>
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<tr>
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</tr>
<tr>
<td>m^2</td>
<td>square metre</td>
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<tr>
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</tr>
<tr>
<td>mm</td>
<td>millimetre</td>
</tr>
<tr>
<td>Mtpa</td>
<td>million tonnes per annum</td>
</tr>
<tr>
<td>NO_2</td>
<td>nitrogen dioxide</td>
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1.0 GENERAL SUBMISSION REQUIREMENTS

BHP Billiton Canada Inc. (BHP) is considering a portion of the Fraser Surrey Docks (FSD) at 11060 Elevator Road in Surrey, British Columbia (BC) as a potential site for the construction of a bulk potash export facility (Project). This permit Application covers site preparation, construction and operation of the Project, which will take place on federal lands within the jurisdiction of the Vancouver Fraser Port Authority (VFPA). The Project will enable the export of potash produced by the proposed Jansen Project in Saskatchewan via bulk ocean-going vessels. A detailed description of the Project is provided in Section 2.0 of this document. As the Project proponent, BHP operates from its headquarters at 130-3rd Ave South, Saskatoon, Saskatchewan, S7K 1L3. Additional information about BHP is available on the corporate website at www.bhp.com.

Located on the banks of the Fraser River, FSD is a modern, multi-purpose marine terminal. FSD has been serving worldwide container, breakbulk, project cargo, forest products and bulk customers in the Fraser River area since 1962.

Technically known as potassium chloride, potash is a naturally occurring mineral salt and a key ingredient in agricultural fertilizer, including common household garden fertilizers. Potash is non-flammable and non-combustible, and is considered non-toxic to aquatic species. Similar to table salt, potash is water soluble and mildly corrosive to metals, and thus requires dry storage.

The world’s largest known reserves of potash are located in Saskatchewan, Canada. Potash is processed into solid particles that are up to approximately 4 millimeters (mm) in size, and is found in a range of colours including pink and red. Approximately 95 per cent (%) of potash consumption is for use in fertilizers; the remaining 5% is used in a variety of chemical and manufactured products. Fertilizers are a major contributor to improving crop yields and resilience and helping to feed the growing global population.

This Application has been prepared to meet the Category D Application Submission Requirements for the Port of Vancouver’s Project and Environmental Review (PER) No. 17-108. The Application includes supporting studies that are provided as attachments, which may include appended documents, which are identified as appendices.

To assist the reader in navigating the document and to demonstrate compliance with the submission requirements, a Table of Concordance has been prepared, and is included as Attachment 1-A. The Table of Concordance presents details of all completed studies in support of the Application.
1.1 Application Fee and Documentation Deposit

The Application fee of $23,625 (including GST) and documentation deposit were provided at the time of submission. The documentation deposit is based on 1% of the construction value of the portion of works within VFPA’s jurisdiction, which is estimated to be over $100 million, to a maximum of $10,000. As such, a documentation deposit of $10,000 is provided with this submission.

1.2 Building Permit

BHP recognizes that a building permit(s) will be required. Following receipt of PER approval to proceed with construction, BHP will follow VFPA guidance to meet the building permit requirements to submit a permit application.

1.3 Project Team Members Contact List

Attachment 1-B provides a central contact list for all Project team members including name, title, address, phone number, and email address. BHP’s office and contact information are provided below.

BHP Potash
130 3 Ave S
Saskatoon, Saskatchewan
S7K 1L3

Project Queries Phone Number: 1-844-385-8581
BHP Office Phone Number: 1-306-385-8400
Project email: PotashPortPermit@bhpbilliton.com
2.0 PROJECT DESCRIPTION REQUIREMENTS

This Project Description provides general information about the Project at the FSD, introduces BHP as the Project proponent, and presents an overview of the activities anticipated to occur during the Project’s lifecycle.

Located on the south side of the Fraser River in Surrey, BC in an industrial area adjacent to Highway 17, FSD has operated as an industrial port facility since the early 1930s. The FSD site has been selected as a potential location for the Project, and will serve as an integral component of BHP’s international supply chain for the proposed Jansen Project. Construction and operation of the proposed Jansen Project marks the first project in BHP’s 100-year plan to expand its potash business and holdings in the Saskatchewan basin. The proposed Jansen Project is planned to initially produce 4 million metric tonnes per annum (Mtpa), increasing over time to approximately 8 Mtpa. The proposed Jansen Project is predicted to have an operational life of 50+ years. The FSD site will include rail receiving, on-site storage, and bulk ocean-going vessel (OGV) loading facilities for supply of potash to world markets.

Backed by an environmental management approach to identify, assess, and control material risks, BHP strives to deliver lasting benefits to the environment and the communities in which it operates by improving natural resource management. BHP is committed to delivering responsible environmental management solutions for this Project while continuously pursuing conservation and other opportunities to achieve predicted social and environmental benefits.

BHP’s ultimate selection of the FSD site as a potential location for the Project supports BHP’s global corporate commitment to responsible and sustainable development. The proposed FSD site is an established, active marine terminal with much of the required berthing and associated infrastructure already in place and is well serviced by existing rail and road infrastructure. In addition, the FSD site has operated as an industrial port terminal for close to 90 years, has been the subject of numerous environmental studies for many decades, and is supported by a large body of contemporary information informing the Project’s assessment.

BHP remains committed, throughout the Project design and environmental assessment process and beyond, to implementing best available technology that balances environmental controls with capital and operating cost of the technology, while minimising adverse socio-community and environmental effects and maximising Project-related benefits.

2.1 GENERAL INFORMATION

The following sub-sections provide a summary of the Project, an overview of the background of BHP as the proponent, and the rationale guiding Project development. In addition, these sub-sections present the proposed Project setting and schedule; outline the intended land use including ownership and tenure; and summarise the approach for consistent land use at the Project site.
2.1.1 Project Summary

FSD is being considered as a suitable location for the Project primarily because it is an active marine terminal with much of the required berthing and associated infrastructure already in place. Added benefits include the site being well serviced by existing rail and road infrastructure. The Project will facilitate BHP’s potash exports as follows:

- Receive potash shipments by rail from the proposed Jansen Project.
- Offload potash from railcars to the potash storage building or directly to a waiting vessel.
- Store potash in the potash storage building.
- Transfer potash via a conveyor system to the shiploader onto waiting vessels for export.

The Project will occupy an approximately 29-hectare (ha) of the FSD site, and will include Berth #9, and part of the existing FSD container yard of the FSD site (Figure 2-1). Key Project components are shown on Figure 2-2 and Figure 2-3, and include:

- Railcar unloading station
- Material handling and transfer systems
- Potash storage building
- Berth improvements and new shiploader
- Railcar unit train loop
- Utility and access improvements (e.g., pedestrian overpass, line painting, etc.).
Figure 2-1

Fraser River
Berth 3
Berth 4
Berth 5
Berth 7
Berth 8
Berth 9
Berth 10
Substation
Potash Storage Building
Shiploader
Conveyor
Rail Car Unloading
Station
Shed 6
Catalyst
Shed 1
Shed 2
Bekaert
Shed 5
Shed 4
Tie Into Robson Road Here

Notes
1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
2. This extent should be considered approximate only.

Sources
- Base map: Ortho Imagery from City of Surrey.

NAD 1983 UTM Zone 10N
Figure 2-1
1. THE NEW PARKING IS AT EXISTING FRASER SURREY DOCK ADMINISTRATION BUILDING. OPERATOR PARKING WITHIN SITE AS PER TERMINAL GUIDELINES AND NOT IN CONFLICT WITH OPERATIONS.

2. 2 OPERATOR PARKING STALLS AT EACH ELECTRICAL ROOM.

3. TERMINAL SURFACE IS FLAT AND PAVED. ROADWAYS AND PEDESTRIAN PATHWAYS ARE PAINTED ON PAVED SURFACE WITH NO CURVES. MIN. WIDTH OF ROADWAY 8m.

- **NOT FOR CONSTRUCTION**
- **PER DRAWING**

**NOTES:**

1. **NEW BHP INFRASTRUCTURE**

2. **PROPOSED ROADS**

3. **NOTIONAL INTERNAL OVERPASS**

4. **LAYDOWN AREA**

**LEGEND:**

- **NEW BHP INFRASTRUCTURE**
- **PROPOSED ROADS**
- **NOTIONAL INTERNAL OVERPASS**
- **LAYDOWN AREA**
Figure 2-3  Project Rendering
2.1.2 Proponent Background

BHP Billiton Canada Inc. is a member of the global BHP Group of resource companies, which is one of the world’s leading producers of major commodities. Sustainability is a key corporate objective of BHP, and drives its commitment to avoid or minimise effects of its operations while contributing long-term social and environmental benefits. BHP holds mineral rights in the province of Saskatchewan, and has invested in the construction and development of the proposed Jansen Project, situated approximately 140 kilometres east of Saskatoon. The proposed Jansen Project is the location of one of the world’s largest undeveloped potash deposits, and is the first project in BHP’s 100-year plan to expand its potash business and holdings in Saskatchewan. Designing and implementing best management practices to maintain biodiversity and ecosystems for future generations is paramount in BHP’s commitment to the environment and sustainability. As part of this Project and other projects under BHP’s care, BHP implements controls to prevent, minimise and rehabilitate effects to biodiversity. Supporting conservation efforts and responsible development is integral to sustainability, identified as a core value in BHP’s Charter.

In support of its sustainability commitment, BHP seeks meaningful long-term relationships that respect local cultures and create lasting benefits. Where feasible, BHP seeks to avoid environmental effects while contributing to lasting environmental benefits across the regions where it operates. BHP’s approach to sustainability is consistent with the principles and requirements of a range of regulatory and voluntary commitments; BHP’s Project development will proceed according to these principles.

In support of its supply chain objectives for the proposed Jansen Project, BHP has assessed port options in North America, and has engaged in discussions with various commercial entities at multiple port sites on the west coast. Currently, BHP is seeking environmental approvals as part of due diligence, including approvals for this Project, to support its selection of an alternative, and to advance commercial discussions to secure a potash export facility. This Project would be BHP’s only current company and business operation in the Vancouver Gateway.

2.1.3 Project Rationale

BHP anticipates that the world will require new supplies of potash in the next decade, as the market rebalances with demand growth absorbing current overcapacity and latent capacity. BHP anticipates that the world will require new supplies of potash to meet global demand after 2020, and has identified the FSD site as a potential location for the Project. FSD is considered a suitable location for the Project because of the existing rail and deep-water infrastructure.

Canada has the world’s largest known reserves of potash. BHP is investing in the long-term future of the potash market by developing a 100-year plan to develop its potash business and holdings in the Saskatchewan basin to meet the increasing global demand for potash. BHP’s proposed facility would receive potash via rail from the proposed Jansen Project in Saskatchewan, store the product, then load onto bulk ocean-going vessels for export. A permitted port site is required to seek approval of the proposed Jansen mine project.
Potash, technically known as potassium chloride, is a naturally occurring mineral salt and a key ingredient in agricultural fertilizer, including common household garden fertilizers. Potash is processed into solid particles that are up to approximately 4 mm in size (see Figure 2-4). Potash is non-flammable and non-combustible and requires dry storage. Similar to table salt, potash is water soluble, and mildly corrosive to metals.

Figure 2-4  Photo of Potash

2.1.4  Project Schedule

Construction will take approximately three to four years to complete and timing is subject to approval of the Board of BHP, and receipt of construction permits. This would not occur before Q1 2019.

Construction activities will be scheduled as follows:

- for Fraser River instream works, work will be scheduled Monday to Saturday from 7:00 am to 8:00 pm (excluding severe weather events, and freshet conditions), and will consider least risk timing windows for fish, and
- All other on-site construction will be performed Monday to Saturday from 7:00 am to 8:00 pm in order to maximize construction efficiencies and minimize construction duration. The majority of on-site construction activities will occur during the day to minimize nighttime noise nuisance. Offsite modularization construction will minimize onsite construction hours and impacts to community. Construction activities may be performed in the evening and/or night to meet construction requirements and to optimise construction efficiencies at times during peak construction. Activities will be scheduled as such to have minimum impact on the surrounding community.
• If Project construction hours are required outside of VFPA’s standard work hours (Monday to Saturday from 7:00 am to 8:00 pm), written approval for authorized work from VFPA will be applied for in accordance with the VFPA PER Extended Work Hours Guidelines.

2.1.5 Land Use

2.1.5.1 Ownership and Tenure

The Project is located on federal land under VFPA jurisdiction, mostly within the FSD lease area, with FSD operating the terminal. The southeast portion of the site is bounded by a rail right-of-way on VFPA land. The rail upgrades for the Project will require alterations within the Port Authority Rail Yard (PARY). The PARY is a VFPA-owned railway yard operated by FSD, supported by rail agreements with Canadian National Railway, Southern Railway of British Columbia (SRY), Burlington Northern and Santa Fe Railway (BNSF), and Canadian Pacific Railway. Alterations to existing rail infrastructure is likely to be required to accommodate additional rail tracks. Prior to construction, BHP will have written agreements in place with the relevant rail operators, enabling the Project to construct and operate in this area (see Attachment 2-A, 2-B, and 2-C).

2.1.5.2 Consistency of Land Use

The Land Use Plan for VFPA designates the proposed Project area as a Port Terminal, which is defined as an area “…primarily designated for deep-sea and marine terminals that handle a variety of commodities, including… primary uses that support shipping, transportation of goods and passengers, handling of goods, and other uses” (VFPA 2014). The Project is consistent with VFPA’s land use designation of Port Terminal.

The Project site and adjacent port lands are designated as Industrial in Surrey’s Official Community Plan (City of Surrey 2014). Lands surrounding the Project west of Highway 17 are designated as commercial, industrial, and mixed use. East of Highway 17, land use is predominantly residential and institutional (school).

2.1.6 Project Setting

The Project site is located in Metro Vancouver in Surrey, BC (Figure 2-5) in an industrial area adjacent to Highway 17 (South Fraser Perimeter Road). The Project is located on the south shore of the main arm of the Fraser River, a regionally important, fish-bearing watercourse. The Project site has been an industrial port facility since the early 1930s.

The site is approximately 6 km from the Whalley town centre in Surrey, and borders the boundary of the Corporation of Delta (Delta). The Annacis Island portion of the City of New Westminster is located on the north side of the Fraser River directly across from the Project.
Land use west of Highway 17 is industrial, and east of the highway, land use is generally in use as residential, institutional and park. The nearest residences are located on Regal Drive, Royal Crescent, and River Road in Surrey, approximately 75 m from the Project site boundary (Figure 2-5).

The nearest schools are Royal Heights Elementary School (11665-97 Avenue in Surrey) and Annieville Elementary School (112 Street in Delta), which are situated approximately 600 m to 700 m from the Project site (Figure 2-5). The nearest park is Royal Heights Park, in Surrey, located approximately 300 m from the Project (Figure 2-5). The nearest park is Royal Heights Park, in Surrey, located approximately 300 m from the Project.

In addition to the Project’s proximity to the Fraser River, all watercourses near the Project site are tributaries of the Fraser River. Watercourses in the Project area are hydraulically connected to Gunderson Slough (Figure 2-5) to the south or to Manson Canal on the north. Ditches from the south portion of the site drain into Shadow Brook, which, in turn, flows into Gunderson Slough. Armstrong Creek and Colliers Canal are fish-bearing watercourses that flow into Manson Canal. Several non-fish-bearing ditches intersect or flow adjacent to the perimeter of the site.
1. The classifications of the watercourses within and immediately adjacent to the Project site were identified using the City of Surrey Mapping Online System. Fish-bearing watercourses consist of watercourses inhabited by fish throughout the year. Non-fish-bearing watercourses do not contribute significant food/nutrient inputs to downstream fish populations (based on connectivity). Non-fish-bearing watercourses are non-fish bearing and do not contribute significant food/nutrient value to downstream fish populations.

2. This map is not intended to be a standalone document but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and instructions described.

Sources
- Open Data BC, City of Surrey
- Aerial Image, City of Surrey, 2014
2.2 **PROJECT CONSTRUCTION**

Construction activities proposed for the Project include site preparation, shore-side infrastructure construction and development of in-water works, upland infrastructure construction, rail loop construction and access improvements, and utilities construction and development of connections. Activities are described in more detail below.

Construction will be performed in accordance with all applicable codes, jurisdictional regulations, and approved Project engineering drawings and specifications. BHP will adhere to applicable environmental regulations and permits during the Project’s construction phase, and will engage appropriately qualified contractors, construction managers, and licensed professionals (e.g., engineers, biologists) to oversee all activities.

An overview of key Project activities and approximate timing is provided in **Table 2-1** and is subject to Project approval by VFPA and receipt of any associated permits. This overview is preliminary and based on typical sequencing for the size and scale of the Project. Detailed sequencing and timing of Project activities would be confirmed prior to construction.

**Table 2-1  Estimated Project Schedule Overview**

<table>
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<tr>
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<tr>
<td>Site Preparation and Construction</td>
<td></td>
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<td>Demolition and utility relocation</td>
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<tr>
<td>Soil densification for potash storage building</td>
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<tr>
<td>Railcar unloading station</td>
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<td></td>
</tr>
<tr>
<td>Potash storage building</td>
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<tr>
<td>Utilities and on-site infrastructure</td>
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<tr>
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<td>Shiploader</td>
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<td>Reclaimer</td>
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<td>Wharf and marine structures</td>
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</table>
2.2.1 Site Preparation

Site preparation activities for this Project include demolition, utility relocation, and soil densification (e.g., pre-loading) for the potash storage building.

2.2.1.1 Demolition

The Project team will locate existing utility services prior to commencing ground disturbance and site preparation activities, including demolition of existing buildings on the FSD site. Deep excavations extending into the groundwater table will likely require dewatering and associated testing and treatment prior to discharge. Dewatering will be in conformance with regulatory and permit requirements.

As shown on Figure 2-6, existing structures at the FSD site that overlap with planned Project facilities to be demolished as part of the Project include:

- Former Bekaert office building
- Diesel shop and associated equipment (construction of a new diesel shop will be permitted by FSD)
- South end of Shed 5
- Container truck gate (construction of a new container truck gate will be permitted by FSD)
- Three underground fuel tanks
- Four substations
- Railway area at southeast portion of site
- Other ancillary structures (high mast lights, junction boxes, rail scanners, etc.).

Materials from building demolition will be removed from site and recycled, where possible.

Note: demolition of Shed 4 is included in the scope of the Direct Coal Transfer Facility application. The demolition of the Bekaert building and the adjacent storage building is included in the scope of the Fraser Grain Terminal application.

Existing asphalt and asphalt-reinforced concrete will need to be removed from site in the following areas:

- Railcar unloading station, conveyor tunnel, and transfer towers
- Potash storage building
- Rail loop.
Figure 2-6 Existing Structures to be Demolished
2.2.1.2 Utility Re-alignment

As described below, portions of an existing sewer main, watermain, and storm sewer will be re-aligned to accommodate Project infrastructure (see Figure 2-7). The Greater Vancouver Sewerage and Drainage District’s North Surrey Interceptor will likely require substantial re-alignment (approximately 550 m). This re-alignment is necessary due to the location and anticipated loads of the foundations for the new storage building. BHP will engage with Metro Vancouver to coordinate the re-alignment of the sewer main.

The existing trunk sanitary sewer, referred to as the Manson Road Section Extension, Annieville Channel to Robson Road, is a reinforced concrete box-shaped conduit 1.42 m wide by 1.75 m high, with approximately 1.1 m to 1.2 m cover, and runs diagonally under the proposed building. Figure 2-7 shows a proposed dog-leg re-alignment for the sanitary trunk sewer (potentially 1,676 mm diameter as shown, or a commonly available 1,500 mm wide by 1,800 mm high box culvert). This re-alignment runs south from manhole #2 along the east side of the proposed storage building, then deflects north to tie-in to newer manhole #1A, River Road Outfall Diversion Manhole. The re-aligned sewer could be shorter if a new manhole is constructed on the existing trunk sanitary sewer. The re-aligned sewer will be constructed in advance of pre-load work prior to potash storage building construction.

To connect the new portion of sanitary line, a temporary pumped overland bypass will be constructed (including possible use of temporary utility bridges for railway crossings) while the permanent replacement sanitary line is being constructed. Following completion of the tie-ins at each end of the new line, sanitary flows will be diverted to the new permanent sewer line and the temporary bypass will be removed. Reinforced concrete slabs will likely be required to protect new sanitary line crossings under existing or new railway tracks.

The Project will use FSD’s administration and maintenance facilities, and therefore, no new domestic sanitary sewage connections from new washroom or lunchroom facilities will be required.

Water Services

Due to requirements for substantial ground improvement at the FSD site, the existing 200-mm-diameter watermain will be re-aligned in the vicinity of Berth 9, where the new shiploader will be located, and support structures will be buried in this area. The new 200-mm watermain and three new hydrants will be located east of the existing watermain and hydrants.

As with the sanitary line, a substantial re-alignment of the 450-mm-diameter watermain will likely be required due to the location and anticipated loads of the foundations for the new storage building. The watermain will be re-aligned in a dog-leg around the proposed storage building. The new 450-mm main will supply the new 200-mm diameter loop fire water line around the proposed storage building. New hydrants will be connected to this new loop water line, as well as to existing watermains.
Metro Vancouver is also proposing to construct a major water infrastructure project, called the Annacis Water Supply Tunnel, deep below the Fraser River between the City of New Westminster and the City of Surrey. BHP is in discussions with Metro Vancouver about this to ensure the Project and the Annacis Water Supply Tunnel do not interfere with one another.

Potable and fire water will be sourced from municipal water connections on the FSD property, as shown on Figure 2-7. New hydrants will be installed near the new facilities including materials handling conveyors, towers, and major equipment.

**Stormwater Management**

Stormwater runoff control for the Project will require some minor re-alignments of storm sewers and catch basins, and slight re-positioning of one outfall. The storm sewer and catch basin re-alignments and re-positioned outfall is not anticipated to change the quantity and quality characteristics of the stormwater runoff, given that all potash storage and conveyance will be enclosed. Changes to the stormwater system, as shown on Figure 2-7, are as follows:

- Due to ground improvement and piling in the Berth 9 area (northwest corner of site), construction of an existing storm sewer outfall (1,067-mm inside diameter) will be sequenced to provide uninterrupted service.
- A new (1,219-mm inside diameter) bypass storm sewer will be constructed around the north end of the proposed storage building, and the storm system runoff will be directed to this bypass, and the existing storm sewer (1,067-mm inside diameter) will be removed.

Three existing catch basins and the associated storm sewer within the Berth 9 area, and three existing three catch basins and the associated storm sewer near the potash storage building, will be replaced with upgraded stormwater interceptor catch basins. The interceptor catch basins will be re-aligned slightly to accommodate the Project infrastructure. A small increase is likely in impervious surface area where railway track area will either be paved, or covered by roofed-over structures. This increase may be offset by new gravel surfaced areas for the new railway track. Initial calculations indicate that the change in impervious surface area in the Project development area could range from a reduction of 0.5% to an increase of approximately 2%.

The more rapid runoff from the roof of the storage building than that from the near-flat paved container-yard surface, could result in a slight, short-duration, localised increase in runoff flows during rainstorm events. It may be possible to mitigate this potential increase by routing the flows from roof rainfall runoff overland. Channel storage in pipes or ditches, and other mitigation measures will be considered, developed, implemented where beneficial during the Project’s design phase. The design intent is to follow the existing drainage patterns as closely as possible, and, ideally, to not increase the runoff flows in any of the storm sewers leading to outfalls into the Fraser River.
DESCRIPTION OF IMPACT ON FISH-CLASSIFIED WATERCOURSE:

1. RAILWAY CROSS BERTH 9 DITCH (CULVERTED) NEAR WEST END OF BERTH 9 DITCH (CULVERTED). THIS DITCH ACTUALLY PROVIDES STORMWATER RUNOFF DRAINAGE TOWARD THE SOUTH, AS OPPOSED TO JUST BLOWING A LOW WET AREA.

2. RAILWAY CROSS BERTH 9 DITCH (CULVERTED) AT WEST (OUTLET) END OF BERTH 9 DITCH (CULVERTED). THIS WEST END OF BERTH 9 DITCH (CULVERTED) WILL HAVE TO BE REALIGNED LATERALLY SLIGHTLY TO THE SOUTH.

3. RAILWAY CROSS BERTH 10 DRAINAGE (CULVERTED) NEAR MIDDLE OF BERTH 10 DRAINAGE (CULVERTED). THE NEAR-WEST END OF BERTH 10 DRAINAGE (CULVERTED) WILL HAVE TO BE REALIGNED LATERALLY NORTHWARD.

4. RAILWAY CROSS BERTH 9 DITCH (CULVERTED) AT EAST END OF BERTH 9 NORTH DITCH (THAT DISCHARGES EASTWARD INTO BERTH 9 DITCH (CULVERTED) LATERAL HANGLE BUMP). THIS CULVERTED DITCH IS ACTUALLY A CONVENTIONAL STORM SEWER, BASED UPON THE RECORD DRAWING INFORMATION TO DATE.

5. BUILDING COVER BERTH 9 DITCH (CULVERTED) AT EAST END OF BERTH 9 DITCH (CULVERTED) WILL HAVE TO BE REALIGNED LATERALLY TO THE NORTH, AROUND THE NORTH END OF THE PROPOSED STORAGE BUILDING.

6. SHALLOTIER FACILITY COVER BERTH 9 DITCH (CULVERTED) AT EAST, (OUTLET) END OF BERTH 9 DITCH (CULVERTED). THIS FLAT LAD IN BERTH 9 DITCH (CULVERTED) WILL HAVE TO BE REALIGNED LATERALLY SOUTHWARDS, BETWEEN THE PROPOSED ROWS OF PILES.

7. CONVEYOR SYSTEM MATERIAL STORAGE AREA COVER BERTH 9 DRAINAGE (CULVERTED) NEAR THE WEST END OF THE BERTH 10 DRAINAGE (CULVERTED). THIS "CULVERTED" DRAINAGE IS ACTUALLY A CONVENTIONAL STORM SEWER, BASED UPON THE RECORD DRAWING INFORMATION TO DATE.

8. RAILWAY CROSS BERTH 10 DRAINAGE (CULVERTED) NEAR WEST END OF BERTH 10 DRAINAGE (CULVERTED). THE NEAR-WEST END OF BERTH 10 DRAINAGE (CULVERTED) WILL HAVE TO BE REALIGNED LATERALLY NORTHWARD, AROUND THE PROPOSED CONVEYOR STORAGE AREA.
2.2.1.3 Soil Densification for Potash Storage Building

Soil densification is required to prepare the new potash storage building site for foundations, minimise settlement and improve seismic performance. The existing ground surface will be pre-loaded with up to 500,000 cubic metres (m³) of clean material (e.g., Fraser River sand). The weight of the pre-load material will compress and densify the existing soils. Once the required amount of ground settlement has been achieved, the pre-load material will be removed, and structural work can commence. The pre-load material will be moved to other areas at the terminal requiring preload, or will be sold and trucked from site.

Additional soil densification for the vessel berth is described in Section 2.2.2.1.

2.2.1.4 Supply and Storage of Construction Materials

Large-dimension materials (e.g., piles) will be delivered to the site via barge while most other construction materials (e.g., aggregate, lumber, steel) will be trucked to the site. Pre-fabricated elements (e.g., portal reclaimer and shiploader) will be shipped to the site via heavy-lift vessels. A laydown area has been located to minimise traffic between the works and laydown areas. The laydown area for the Project is anticipated to be approximately 140 m by 180 m and located west of the potash storage building, as shown in Figure 2-8.
Figure 2-8 Excavation and Laydown Area
2.2.2 Shore-side Infrastructure and In-water Works

Project activities for shore-side infrastructure and in-water work consist of:

- Berth improvements
- Installation of a new shiploader
- In-water installation of a pile-supported transfer tower

2.2.2.1 Berth Improvements

Improvements are required to upgrade the berth to withstand a seismic event that has a 475-year return period. Onshore soil densification, pile driving, and structural upgrades are planned along the full length of Berth 9. Soil behind the bulkhead wall will be densified by vibro-compaction with stone columns. Soil densification for the marine berth foundation will include installation of approximately 15,000 m³ of stone aggregate material for the sub-base and base. The stone aggregate material will be clean, durable, crushed stone with a maximum particle size of 50 mm.

Approximately 186 piles will be driven on the shore-side of the bulkhead wall using a shore-side crane. Piling will be either by vibration, impact hammering, or a combination of the two methods, depending on geotechnical requirements. The pile dimensions are 914 mm in diameter and 20 m in length.

Concrete transition slabs are currently positioned at the berth to create a more gradual change from the relatively rigid berth to the softer onshore soils. The existing slabs that will be affected by berth upgrades will be replaced using formwork, steel reinforcing, and other methods to connect to piles and the existing tie beam. The bedding for the concrete slab will be excavated and backfilled as part of the ground improvement tie-backs, and concrete will be poured directly from a truck, or via a crane with a concrete hopper. Steelworks will be completed to install tie-backs to the existing wharf. The area behind the existing and replacement transition slabs will be paved.

The existing cranes at Berth 9 travel on two rails. The new shiploader will require three rails consisting of:

- The existing two shore-side crane rails, which will be extended approximately 50 m to the north at Berth 9; and
- A third new lightweight tipper rail, running alongside the existing land-side rail which will be approximately 200 m in length.

No development dredging is required to deepen the berth.

2.2.2.2 Shiploader Installation

A new traveling shiploader, large enough to accommodate Handysize up to Kamsarmax-size vessels, will be installed at Berth 9. The shiploader will be prefabricated offsite and modularised to minimise installation time. The shiploader will then be transported to the FSD site on a heavy lift ship and craned into place on
the existing shore-side crane rail. The existing cranes are 55 m in height and the proposed shiploader is approximately 26 m in height, therefore the shiploader will be approximately half the height of the existing cranes. The shiploader is shown on the rendering in Figure 2-3.

2.2.2.3 Transfer Tower

The transfer tower closest to the shiploader (Transfer Tower 4 on Figure 2-2) will be located in the river, and will be pile-supported. A small bridge will connect the transfer tower to berth 9. Thirteen steel piles will be driven adjacent to the berth to support the transfer tower and the pile cap. The piles are anticipated to be approximately 1219 mm in diameter and 50 m in length. Installation will include removing the existing riprap on the shoreline slope from the location of the new piles, storing the riprap onsite for later re-use, and preparing an area slightly larger than the pile diameter. The piles will be driven to the depth required (i.e., refusal), and new riprap will be placed around the new piles. Any remaining riprap may be used for repairs or improvements at the site as required. Estimates indicate approximately 25 m³ of new riprap will be required.

2.2.3 Upland Infrastructure

Upland infrastructure construction, as shown on Figure 2-2, includes:

- A railcar unloading station (below-grade railcar unloading facility, potash-receiving hopper, and track and structural enclosure)
- A dust collection system consisting of three dust collectors
- A concrete tunnel, approximately 5.5 m wide by 5.5 m high, and 90 m long, constructed through cut-and-cover methods, to house the conveyor transporting the potash to the surface materials handling system (Pit Conveyor 411420A-CV-00001 on Figure 2-2)
- A covered conveyor system connecting the railcar unloading system with the potash storage building and to the shiploader
- A potash storage building (471-m-long by 63-m-wide by 40-m-high). Note these dimensions are indicative and are subject to change due to refinement in design development and procurement.
- An off-spec storage building. At this stage of engineering design the off-spec building dimensions are 14 m wide x 14 m long x 7.5 m tall.
- A portal reclaimer in the potash storage building, stacker conveyor, reclaim conveyor, and overhead tripper.

Foundations for the storage building, conveyor, and transfer tower structures will require the following:

- Excavation
- Rough grading
- Placement and compaction of structure sub-base and base material
- Installation of reinforcing steel and formwork, including all inserts for concrete foundations
- Concrete pours
- Erection of prefabricated steel for buildings, transfer towers, and conveyor supports
- Installation of rails and mechanical and steel supports for stacker and reclaim conveyors, followed by installation and commissioning of electrical services and controls.

The excavation depths required for the various Project infrastructure are shown on Figure 2-8.

The portal reclaimer is machinery that will be used for bulk handing of potash stockpiles in the potash storage building. Given its large size, it will be brought to the site pre-assembled and modularised using a heavy-lift vessel. The reclaimer will be craned from the vessel and into position using self-propelled modular transporters, and erected in the potash storage building.

2.2.4 Rail and Access Improvements

The new rail loop (identified as New Rail on Figure 2-2) will have a 11-degree curve and will include three tracks for both inbound and outbound trains.

The rail right-of-way and railcar unloading station will be excavated to rough grade, back-filled with sub-base and base, then compacted with crushed stone to form the track ballast. Wooden or pre-cast concrete railway ties will then be installed on the prepared surface, followed by laying of steel rails. Crushed stone will be laid between the railway ties, and the ballast will be compacted by a tamping machine.

The proposed vehicular access to the site is from Timberland Road to Robson Road and entering the Elevator Road security gate. General traffic and emergency vehicle access ways will be delineated by painted access ways.

A pedestrian overpass over the rail lines will be constructed at the railcar unloading station (Figure 2-2). Level-grade vehicle crossings will also be constructed where the outloading conveyor and the pit conveyor cross the rail lines. Railway level crossing components to be installed include signage and miscellaneous steel.

At present, a mobile container gantry crane is located adjacent to Berth 9. This crane is mobile and will be moved down the rails to a nearby berth prior to construction.

To accommodate 2 inbound tracks and 1 outbound track and 2,500 m trains, the new potash facility will use existing PARY lines 92 (currently approximately 1,600 m) as the outbound track and tracks 93 (currently approximately 1,600 m) and 94 (currently approximately 550 m) for inbound tracks #1 and #2. PARY track 94 will require extension to the north by approximately 1,050 m.
Tracks 92, 93 and 94 will be extended south from the existing PARY into the site loop tracks with an additional 2,100 m for each inbound track and 2,800 m for the outbound track. Table 2-2 below shows existing PARY track lengths, extensions and track totals. Existing PARY tracks proposed to be reused may be required to be demolished and rebuilt pending a detailed integrity inspection by BHP. A total of 230 m of breakout siding is included in the facility just south of the proposed railcar unloading station to break out and store bad order cars before commencing rail unloading.

Table 2-2  Existing PARY track lengths, extensions and track totals.

<table>
<thead>
<tr>
<th>Potash Tracks</th>
<th>PARY Track Number</th>
<th>Existing PARY Track Length</th>
<th>Track Extension to the North</th>
<th>Extension for Loop Track (m)</th>
<th>Total new track</th>
<th>Total Track Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound Track #1</td>
<td>94</td>
<td>Approx. 550 m</td>
<td>1,050 m</td>
<td>2,100 m</td>
<td>3,150 m</td>
<td>3,700 m</td>
</tr>
<tr>
<td>Inbound Track #2</td>
<td>93</td>
<td>Approx. 1600 m</td>
<td>Minor changes to connect to CN line</td>
<td>2,100 m</td>
<td>2,100 m</td>
<td>3,700 m</td>
</tr>
<tr>
<td>Outbound Track</td>
<td>92</td>
<td>Approx. 1600 m</td>
<td>Minor changes to connect to CN line</td>
<td>2,800 m</td>
<td>2,800 m</td>
<td>4,400 m</td>
</tr>
<tr>
<td>Onsite break out siding</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>0 m</td>
<td>230 m</td>
<td>230 m</td>
<td>230 m</td>
</tr>
</tbody>
</table>

Rail re-alignment will be required to accommodate new potash tracks, the railcar unloading facility and the storage building and conveyors. Rail track demolition is included as part of the Project. SRY track realignment will be permitted separately by FSD, prior to track demolition. Additional information is provided in the Rail Operations Plan (Attachment 4.3-C).

Relocation/ realignment of Timberland Road and Robson Road is considered part of the Project. To accommodate the new storage building, railcar unloading facility, rail and conveyors, it is proposed to realign Robson Road around these new facilities. The realignment will pass through the intermodal yard, which is to be demolished, east of the proposed new potash railcar unloading station and run adjacent to the proposed potash storage building and inbound rail track where it will connect to the notional internal overpass mitigation option overpass road at the existing Plywood road location.

For the road crossing across Robson Road at Elevator Road, an increase of road blockages will occur without mitigation. As such, one of the two overpass mitigation options identified in the Traffic Impact Study (Attachment 4.2-S) will be implemented which will mitigate all road blockages to Gunderson Slough, allowing improved access to Gunderson Slough and FSD. If the Elevator Road Interchange overpass is not planned to be constructed when operations commence for the BHP Project, BHP would construct the notional internal overpass. Permitting for an overpass will be completed separate to this PER Application, once there is certainty on which overpass option will be constructed.
2.2.5 Utilities

Most of the utility information for the Project (i.e., sanity, water, and stormwater) is described in Section 2.2.1.2 because of the requirement for re-alignment. Power connections and details are discussed here as they occur later in construction sequencing.

The Project connections to the local electrical distribution grid will require approximately four-megawatt additional demand from BC Hydro. It is assumed that power will be provided at 25 kilovolts. Initial discussions with BC Hydro have been initiated and once a permit is issued for the Project these discussions will be advanced and an application to BC Hydro will be formally submitted.

Three electrical rooms housing transformers will be constructed. The location of the electrical room near the shiploader (electrical room 3), southeast of transfer tower 4, will provide sufficient clearance for the rail loop master plan, including a 12-m road allowance. A new main substation, located near the railcar unloading station, will also be constructed and will be the connection point with BC Hydro.

Construction Equipment

A description of upland and shore-side and marine equipment to be used during construction is provided below. A refueling area will be designated during construction. The refueling area is anticipated to be located within the laydown area (see Figure 2-8.) and will not occur within 30 m of the Fraser River.

2.2.5.1 Upland and Shore-side

Upland and shore-side Project-related construction activities will include the following equipment:

- Excavators
- Cranes
- Circular saw
- Dump trucks
- Loader
- Forklift
- Concrete truck, pump truck, and paver
- Plate compactor
- Haul truck
- Bulldozer
- Roller
- Tamper
- Self-propelled modular transporter
- Light-duty trucks.

2.2.5.2 Marine

Marine Project-related construction activities will include the following equipment:

- Flat-top barge
- Heavy-lift vessel
- Tugs
- Vibro- and impact hammer pile drivers
- Crane suspended down-hoe vibrator for pile driving
- Excavator for riprap removal and placement
2.2.6 Out of Scope Activities

A number of Project activities are required for the Project but do not form part of the permit application scope of works since these activities will be completed by other parties. These activities are summarised in Table 2-3 below.

Table 2-3 Out of scope Project Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Party Responsible</th>
<th>Phasing Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demo of the Bekaert warehouse &amp; shed</td>
<td>FGT (under Permit 17-035)</td>
<td>To be completed by FGT prior to the FGT Project and BHP Project construction (likely in 2018).</td>
</tr>
<tr>
<td>Demo of Shed 4</td>
<td>FSD (under Permit 12-072)</td>
<td>To be completed by FSD prior to BHP Project construction (exact timelines to be determined upon approval of BHP Project).</td>
</tr>
<tr>
<td>Relocation of container truck gatea</td>
<td>FSD</td>
<td>FSD will permit re-construction of this separately. The Permit for this will be submitted in 2018. The construction for this will be completed prior to, or concurrently with the BHP Project construction (exact timelines to be determined upon approval of BHP Project).</td>
</tr>
<tr>
<td>Demolition and relocation of the CBSA radiation detection portal</td>
<td>FSD</td>
<td>This scope of works will be included in the container gate permitting scope (refer to the line above).</td>
</tr>
<tr>
<td>Relocation of the diesel shop and maintenance facilitya</td>
<td>FSD</td>
<td></td>
</tr>
<tr>
<td>FSD administration building</td>
<td>FSD (under Permit 17-162)</td>
<td>To be completed by FSD. Project construction will likely begin in 2018.</td>
</tr>
<tr>
<td>Re-alignment of SRY rail tracksa</td>
<td>FSD</td>
<td>To be completed by FSD. Rail re-alignment will be completed prior to demolition of the SRY tracks by BHP.</td>
</tr>
<tr>
<td>FGT Phase 3 rail alignment (loop track)</td>
<td>FGT</td>
<td>To be completed by FGT around the same time as the BHP rail loop is constructed (likely in 2023).</td>
</tr>
<tr>
<td>Notional internal overpass</td>
<td>BHP</td>
<td>To be completed separately by BHP if required prior to Project construction (exact timelines to be determined upon approval of this Project).</td>
</tr>
</tbody>
</table>

a Note demolition for this scope is included in the BHP Project scope.
2.3  PROJECT OPERATION

2.3.1  Operation Process

The Project has been designed to operate using the best available technology to minimise effects to the environment, including that for minimising noise, air quality, and light emissions. An operation process flow diagram is included in Figure 2-9 and summarised here. The potash unloading and loading facility and material handling and transfer systems have been designed to maximise worker safety, minimise material loss via spills and dust generation, and maintain a high peak rate by implementing automation and material-handling equipment technologies.

Potash will arrive to the Project site via rail. Potash will be unloaded from unit trains moving at a continuous slow speed, minimising noise and air quality emissions as compared to the alternative method of batch-processing of railcars through shunting. Potash will be automatically dumped from the railcars into the railcar unloading facility. From the railcar unloading facility, potash will be conveyed to a belt scale and diverted to either the potash storage building via the storage feed conveyor or the shiploader via the outloading conveyor (Figure 2-2). Based on current estimates, it is anticipated that approximately 25% or less of the potash will be diverted directly to the shiploader for export while the remaining amount will be diverted to the storage building. Within the potash storage building, a stacking conveyor will be used to stockpile the potash, and a portal reclaimer and reclaimer conveyor will be used to recover the potash from the stockpiles when it is ready for export. Potash will leave the storage building on an outfeed transfer conveyor (BC-05), which will feed into the outloading conveyor (BC-06). From the outloading conveyor, potash will be weighed and sampled, and then conveyed to the traveling shiploader for loading onto vessels.
Figure 2-9  Process Flow Diagram
2.3.1.1 Rail Operations and Potash Unloading

The rail loop will intersect with the new railcar unloading system, and will align with the existing rail infrastructure in the PARY. The railcar system will have track-length capacity to hold three-unit trains onsite. Each train will have 177 enclosed potash railcars, and will be about 2,500m long. The track layout and total track length will accommodate a total of three trains, to allow for one train to be unloaded while a second train is waiting to be unloaded, and a third train is leaving the site empty. The rail loop will conform to railway industrial track standards for rail materials, track ties, and power switch stands.

The railcar unloading station will comprise an enclosed railcar unloading facility containing the receiving hopper and rail track-grated floor, over which the train cars will pass above the pit. To promote safe operation, a safety feature of the railcar unloading facility will include installation of equipment to automate opening and closing of railcar bottom discharge gates. The railcar unloading facility will accommodate up to three railcars at a time, and will allow full unit trains of enclosed potash railcars to discharge while in motion. These lengths and associated anticipated rates will be designed to match the capacity of the conveyor. The railcar unloading operation will be fully automated: potash will be discharged automatically over the railcar unloading facility from the railcars, and mechanical shakers will be used to dislodge remaining potash in the railcar, if necessary. Safe access to equipment for maintenance personnel will be an important design feature.

2.3.1.2 Materials Handling and Potash Storage

The concrete railcar unloading facility pit will be below grade, and will be connected by concrete tunnel to the storage building. The tunnel will house the take-away conveyor to transfer potash from the railcar unloading facility into storage. The hopper system will transfer potash onto a feeder conveyor and into the transfer chute to the take-away conveyor. The take-away conveyor will carry material through the tunnel to either the storage building or directly to the shiploader. Safe access will be provided for maintenance of the transfer chute and feeder transfer conveyors.

The potash storage building will be fully enclosed, and will include a portal reclaimer, stacker conveyor, reclaim conveyor, and overhead tripper. The potential for fugitive dust will be minimal at the building’s exit points (e.g., conveyors) because air velocities will be very low given the building volume.

Conveyors running from the potash storage building to the shiploader will be situated above ground, and will pass over three transfer towers with concrete footings or installed on pipe pile supports which are 762 mm in diameter (Figure 2-9). Conveyors not located inside a building or tunnel will be covered to minimise dust and maintain potash quality. The full length of each conveyor will have walkways with appropriate downward-facing safety lighting and emergency pull cords on either side of the belt. A single shiploader wharf conveyor will run along the land side of the berth to feed the shiploader.
An off-spec storage building will be located along the outloading conveyor to store potash that cannot be shipped for various reasons (e.g., wrong grade or contaminated with foreign material). If the stored potash is deemed saleable, it will be returned to the potash storage building. If it is not deemed saleable, it will be disposed of offsite to a facility that is permitted to take the product. The off-spec building will also store bags of dust from the various dust collectors located across the Project site until a sufficient quantity is accumulated to properly dispose of offsite. The building will be generally empty, with a maximum storage capacity of 300 tonnes.

2.3.1.3 Dust Control

Dust generated by potash handling at the facility will be managed with several types of dust control:

- Dust collectors will be strategically placed at locations within the facility which have the potential to generate airborne dust.
- For railcar unloading and conveyor structures, dust will be controlled by enclosing the unloading facility (openings for train entry and exit) and covering the conveyors.
- For the hopper, an independent dust collection unit will be installed along the full length of the hopper to manage fugitive dust. The overhead structure will also act as a rain enclosure.
- Transfer towers will have localised dust collection units.
- A covered holding area located at the last transfer point before the shiploader conveyor will temporarily store waste product from the dust collection systems and dry clean-up operations.

2.3.1.4 Shiploader and Vessel Operations

Project berthing and shiploader facilities will accommodate vessels ranging in size from Handysize (19,000 dead weight tonnes (DWT)) to Kamsarmax (82,000 DWT). Larger vessels (i.e., Supramax, Ultramax, Panamax, and Kamsarmax) will be light-loaded to operate within the available channel draft (11.5 m). The new traveling shiploader will be designed to match the 24-m rail gauge of the existing rail-mounted gantry cranes, and will be large enough to load Kamsarmax-size vessels. The average loading time for a vessel will be 26 hours. The shore-mooring team will handle the ship’s fore and aft mooring lines in accordance with the pilot’s instructions and the agreed FSD Terminal Mooring Plan. While vessels are at berth, they will be loaded 24 hours a day, seven days a week. Bunkering may be required from time to time at the Project site. Additional information on bunkering procedures is provided in Attachment 4.1-D: Marine Traffic Information Requirements Report.

2.3.1.5 Maintenance Activities

Equipment and vehicle refueling during operation will occur at the FSD maintenance facility. If locomotive refueling is required, it would occur in the PARY at the existing designated locations.
Maintenance of the facility, roads, and rail will be ongoing, facilitated by a potential two- to three-week annual shutdown. Routine maintenance activities, such as painting and maintaining equipment components, will be completed with light trucks and mobile cranes. Annual maintenance of roads and rail will consist of spot repairs, as required, using a light truck and crane truck. Major rail repairs (likely at five-year intervals), will require specialised rail equipment.

As part of the Fraser River dredging program administered by VFPA, maintenance dredging is anticipated to maintain the design depth of Berth 9 and approach, as per standard procedure.

### 2.3.2 Existing and Proposed Capacities

All capacities described below and summarised in Table 2-4 will be new since BHP currently has no operations at the FSD site. Proposed Project operations assessed in this Application are based on an initial nominal rate of approximately 8 Mtpa (to match the proposed Jansen Project output). All potash will be received by rail and exported via vessel. There will be an initial ramp-up phase, driven by market conditions, to achieve the 8 Mtpa nominal rate. An average of eight to ten 2,500-m unit trains per week are anticipated to arrive at the site throughout the year. Each train will have 177 cars, and will carry 18 kilotonnes (kt) of potash. A maximum of five trains will be unloaded per day (with four trains completely unloaded and one train partially unloaded).

An average of three to four vessels will berth at the site per week throughout the year. Vessels loaded at the facility will range from 19,000 DWT to 82,000 DWT capacity, and will include:

- Handysize (19,000 DWT)
- Handymax (33,250 DWT)
- Supramax (53,000 DWT max capacity, 51,850 DWT max Fraser River capacity)
- Ultramax (61,000 DWT max capacity, 50,180 DWT max Fraser River capacity)
- Panamax (70,000 DWT max capacity, 51,620 DWT max Fraser River capacity)
- Kamsarmax (82,000 DWT max capacity, 54,430 DWT max Fraser River capacity)

Supramax, Ultramax, Panamax and Kamsarmax vessels will be light-loaded based on the available channel draft.

Potash shipments will be dynamic during Project operation, and will change based on customer markets, rather than following a seasonal pattern. Peak periods of daily activity at the site will be associated with vessel and train arrivals, which could occur at any time of the day.
Table 2-4 Summary of Proposed Capacities

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity(^a)</th>
<th>Accessible days per Year</th>
<th>Accessible Hours per Day</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incoming</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trains</td>
<td>455 trains/year (\approx 18 \text{ kt (177 cars per train)})(^b)</td>
<td>(\approx 365)</td>
<td>24</td>
<td>(\approx 8 \text{ Mtpa})</td>
</tr>
<tr>
<td><strong>Total Incoming</strong></td>
<td></td>
<td></td>
<td></td>
<td>(\approx 8 \text{ Mtpa})</td>
</tr>
<tr>
<td><strong>Outgoing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vessel Loading</td>
<td>(\approx 19,000 \text{ DWT (Handysize)})</td>
<td>(\approx 365)</td>
<td>24</td>
<td>Up to 20%, up to (\approx 1.6 \text{ Mtpa})</td>
</tr>
<tr>
<td></td>
<td>(\approx 33,250 \text{ DWT (Handymax)})</td>
<td>(\approx 365)</td>
<td>24</td>
<td>(\approx 6 \text{ Mtpa})</td>
</tr>
<tr>
<td></td>
<td>(\approx 51,850 \text{ DWT (Supramax)})</td>
<td>(\approx 365)</td>
<td>24</td>
<td>Up to 75%, up to (\approx 6 \text{ Mtpa})</td>
</tr>
<tr>
<td></td>
<td>(\approx 50,180 \text{ DWT (Ultramax)})</td>
<td>(\approx 365)</td>
<td>24</td>
<td>(\approx 2 \text{ Mtpa})</td>
</tr>
<tr>
<td></td>
<td>(\approx 51,620 \text{ DWT (Panamax)})</td>
<td>(\approx 365)</td>
<td>24</td>
<td>(\approx 5 \text{ Mtpa})</td>
</tr>
<tr>
<td></td>
<td>(\approx 54,430 \text{ DWT (Kamsarmax)})</td>
<td>(\approx 365)</td>
<td>24</td>
<td>Up to 35%, up to (\approx 2.8 \text{ Mtpa})</td>
</tr>
<tr>
<td><strong>Total Outgoing</strong></td>
<td></td>
<td></td>
<td></td>
<td>(\approx 8 \text{ Mtpa})</td>
</tr>
</tbody>
</table>

\(^a\) The DWT (deadweight tonnage) provided for each ship size reflects the light loaded maximum capacity required to navigate the Fraser River, limited by an 11.5 m draft. The estimated number of vessel calls for each vessel class will be confirmed in the future.

\(^b\) The 455 trains per year was determined by engineering during an earlier stage of the project planning. The rail operations plan shows 438 trains per year which is a more accurate number. The rail operations plan was updated at a later stage, once the number of trains had been further refined, and as a result the annual number of trains was updated to 438. The proposed capacity numbers presented in the table above are therefore conservative.

During Project operation, parking for Project employees, visitors, and trades people will be provided around FSD’s administration building and maintenance shop (the parking, admin and maintenance buildings are being permitted separately). FSD’s administration building will have approximately 100 parking spots.

During an emergency, procedures will be in place to clear the train tracks to allow emergency vehicles access inside the rail loop.

### 2.3.3 Proposed Increase in Terminal Capacity

Given that the Project will be a new facility and that no potash is currently being shipped from the site, the increase in capacity is the same as the proposed capacity: 8 Mtpa.

### 2.4 HOURS OF OPERATION AND EMPLOYMENT

The FSD terminal operates 24 hours per day, seven days per week, and Project operations for unloading and loading will be consistent with this regime. The majority of on-site maintenance activities will occur during the day to minimize nighttime noise nuisance. Maintenance activities may be performed in the evening and/or night to meet operational requirements and to optimise efficiencies. Activities will be
scheduled as such to have minimum impact on the surrounding community. Administration and maintenance operations will generally occur between 7:00 a.m. to 5:00 p.m.

As per VFPA's new extended work hours guidelines, BHP will submit a request for extended work hours if required, after issuance of a project permit for the BHP Project by VFPA, prior to construction. BHP commits to complying with the extended work hours guidelines.

BHP has no employees presently working on the site. It is estimated that the Project workforce including management, system and equipment operators, and maintenance trades, will be approximately 40 to 50 persons comprising of fulltime and casual positions. In addition, the Project will need to engage service providers from the local community.

2.4.1 Waste and Wastewater Management

Small quantities of waste material or off-spec material will be trucked offsite. Volumes will likely be no more than five single trailer dump trucks per month.

The only wastewater that will be generated onsite will be from the wash-down of equipment prior to scheduled maintenance activities, anticipated to occur one to four times per month. Runoff from equipment washing will be collected in the retention areas of the transfer tower foundations, created by installing raised curbs. The wastewater will likely be removed by a vacuum truck, and disposed offsite at an accredited facility permitted to take such waste.
### 3.0 PROJECT DRAWING REQUIREMENTS

Drawings and associated information needs as identified in the Submission Requirements are listed in the drawing concordance table (Table 3-1). Engineering drawings listed below have been prepared by qualified professionals and are provided in PDF format in Attachment 3-A. A separate digital file will be provided in AutoCAD format.

#### Table 3-1 Drawing Concordance

<table>
<thead>
<tr>
<th>Drawing Requirements</th>
<th>Ausenco Drawing Number (101051-03)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td></td>
</tr>
<tr>
<td>Plan showing the relationship of the proposed Project to surrounding area at a 1:5000 scale</td>
<td>40600-LO-DWG-00135</td>
</tr>
<tr>
<td><strong>Site Plan</strong></td>
<td></td>
</tr>
<tr>
<td>Lease and property boundaries, easements and right-of-ways.</td>
<td>40600-LO-DWG-00136</td>
</tr>
<tr>
<td>Legal high-water mark where applicable.</td>
<td>40600-MA-DWG-00141</td>
</tr>
<tr>
<td>Location and dimensions of all existing and proposed buildings, structures, equipment, and marine structures.</td>
<td>40600-LO-DWG-00129, 40600-ME-DWG-00167, 40600-ME-DWG-00168, 40600-CL-DWG-00149</td>
</tr>
<tr>
<td>Access points including roadways, driveways, parking areas, walkways, berths, gangways, docks.</td>
<td>40600-LO-DWG-00129</td>
</tr>
<tr>
<td>Area of construction staging/laydown area.</td>
<td>40600-LO-DWG-00129</td>
</tr>
<tr>
<td><strong>Building Structures and Equipment</strong></td>
<td></td>
</tr>
<tr>
<td>Drawing Requirements</td>
<td>Ausenco Drawing Number (101051-03)</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Roof plans with dimensions and elevations of roof parapet, mechanical and</td>
<td>40600-ST-DWG-00143, 40600-ST-DWG-00119, 40600-ST-DWG-00121, 40600-ST-DWG-00123, 40600-ST-DWG-00133</td>
</tr>
<tr>
<td>elevator/stair housing.</td>
<td></td>
</tr>
<tr>
<td>Finishing details and materials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40600-ST-DWG-00143, 40600-ST-DWG-00110, 40600-ST-DWG-00111, 40600-ST-DWG-00112, 40600-ST-DWG-00113,</td>
</tr>
<tr>
<td></td>
<td>40600-ST-DWG-00114, 40600-ST-DWG-00115, 40600-ST-DWG-00116, 40600-ST-DWG-00117, 40600-ST-DWG-00119,</td>
</tr>
<tr>
<td></td>
<td>40600-ST-DWG-00121, 40600-ST-DWG-00123, 40600-ST-DWG-00134</td>
</tr>
<tr>
<td>Excavation depths anticipated (receiving pits, foundations, trenches for utilities,</td>
<td>40600-CL-DWG-00149</td>
</tr>
<tr>
<td>etc.), including depth of excavation required to construct any below-ground</td>
<td></td>
</tr>
<tr>
<td>infrastructure.</td>
<td></td>
</tr>
<tr>
<td>Include signage information for what is proposed (location, dimensions and</td>
<td></td>
</tr>
<tr>
<td>lighting details).</td>
<td>Signage will be provided during the building permitting phase</td>
</tr>
<tr>
<td>Information on Site loading for foundation design criteria and any other</td>
<td></td>
</tr>
<tr>
<td>anticipated loads.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Details on this are provided in the Geotechnical Report (Attachment 4.1-B).</td>
</tr>
<tr>
<td>Marine Structures</td>
<td></td>
</tr>
<tr>
<td>Site plan specific to proposed marine works only. Identify existing marine</td>
<td>40600-MA-DWG-00139</td>
</tr>
<tr>
<td>structures and those intended to be removed or relocated or will be impacted</td>
<td></td>
</tr>
<tr>
<td>(e.g. storm water outfall impacted by rip rap placement).</td>
<td></td>
</tr>
<tr>
<td>Dimensions and cross sections of front, rear and two sides of proposed marine</td>
<td></td>
</tr>
<tr>
<td>structures including dolphins, piles, docks, piers, gangways, floats, fenders,</td>
<td></td>
</tr>
<tr>
<td>bollards, rip rap, navigational lighting, navigation aids, ranges, dredging</td>
<td></td>
</tr>
<tr>
<td>channels, dams and areas to be filled etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40600-MA-DWG-00139, 40600-MA-DWG-00140, 40600-MA-DWG-00141</td>
</tr>
<tr>
<td>Dimensions and characteristics of proposed materials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40600-MA-DWG-00141</td>
</tr>
<tr>
<td>Structures in relation to the tidal Higher High Water and Lower Low Water lines</td>
<td></td>
</tr>
<tr>
<td>including water depth.</td>
<td>40600-MA-DWG-00141</td>
</tr>
<tr>
<td>Plan of proposed dock facility to include location and SWL of mooring securing</td>
<td></td>
</tr>
<tr>
<td>points.</td>
<td>40600-MA-DWG-00158</td>
</tr>
<tr>
<td>Confirm the design vessel (maximum size that can be accommodated) at the</td>
<td></td>
</tr>
<tr>
<td>berths on the plans.</td>
<td>40600-MA-DWG-00141</td>
</tr>
<tr>
<td>Lot Grading and Utilities</td>
<td></td>
</tr>
<tr>
<td>Separate plans showing existing and proposed utilities.</td>
<td>40600-CL-DWG-00137 (existing), 40600-CL-DWG-00138 (proposed)</td>
</tr>
<tr>
<td>Lot grading plan showing existing/proposed paving and drainage. Separate to two</td>
<td>40600-CL-DWG-00142</td>
</tr>
<tr>
<td>plans if required for clarity.</td>
<td></td>
</tr>
<tr>
<td>Note that oil/grit/water separators are required to be included as part of site</td>
<td>40600-CL-DWG-00138</td>
</tr>
<tr>
<td>storm water collection.</td>
<td></td>
</tr>
<tr>
<td>Discrete Site plan showing existing/proposed fire hydrants and emergency vehicle</td>
<td>40600-CL-DWG-00144</td>
</tr>
<tr>
<td>access routes.</td>
<td></td>
</tr>
<tr>
<td>Drawing Requirements</td>
<td>Ausenco Drawing Number (101051-03)</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Proposed service connections to utilities or systems (water, sewer, storm water,</td>
<td></td>
</tr>
<tr>
<td>power, gas), both above and below ground.</td>
<td>40600-CL-DWG-00137 (existing),</td>
</tr>
<tr>
<td></td>
<td>40600-CL-DWG-00138 (proposed),</td>
</tr>
<tr>
<td></td>
<td>40600-EL-DWG-00151 (electrical)</td>
</tr>
<tr>
<td>Provide written confirmation of which other authorities or jurisdictions need to</td>
<td>Attachment 2-A</td>
</tr>
<tr>
<td>provide consent or conduct works to establish connections to utilities, and</td>
<td>Attachment 2-B</td>
</tr>
<tr>
<td>confirmation that capacity exists within those 3rd party networks.</td>
<td>Attachment 2-C</td>
</tr>
<tr>
<td>The Applicant is responsible for location of all existing utilities. VFPA will</td>
<td></td>
</tr>
<tr>
<td>provide known utility information, but location of buried utilities must be</td>
<td>Acknowledged</td>
</tr>
<tr>
<td>confirmed by the applicant.</td>
<td></td>
</tr>
<tr>
<td><strong>Lighting Plan</strong></td>
<td></td>
</tr>
<tr>
<td>Lighting shown on the Site plan for all proposed exterior lighting including the</td>
<td>40600-EL-DWG-00101, 40600-EL-</td>
</tr>
<tr>
<td>location, type of bulbs, orientation, and level of illumination on the ground. For</td>
<td>DWG-00103, 40600-EL-DWG-00104,</td>
</tr>
<tr>
<td>further information, please review Port of Vancouver’s Lighting Guideline,</td>
<td>40600-EL-DWG-00151, 40600-EL-DWG-</td>
</tr>
<tr>
<td>available at: <a href="http://www.portvancouver.com/development-and-permits/project-">http://www.portvancouver.com/development-and-permits/project-</a></td>
<td>00152, 40600-EL-DWG-00153, 40600-</td>
</tr>
<tr>
<td>and-environmental-reviews/technical-guidelines/</td>
<td>EL-DWG-00155</td>
</tr>
<tr>
<td>Parking and Access</td>
<td></td>
</tr>
<tr>
<td>Widths of proposed roadways and driveways.</td>
<td>40600-CL-DWG-00144</td>
</tr>
<tr>
<td>Dimensions of maneuvering areas including turning radii.</td>
<td>40600-CL-DWG-00144</td>
</tr>
<tr>
<td>Proposed employee and/truck parking area with dimensioned and numbered parking</td>
<td>40600-LO-DWG-00129</td>
</tr>
<tr>
<td>stalls.</td>
<td></td>
</tr>
<tr>
<td>Typical cross sections and proposed grades of all streets, and details of curbs,</td>
<td>40600-LO-DWG-00129</td>
</tr>
<tr>
<td>gutters, sidewalks, and other improvements.</td>
<td></td>
</tr>
<tr>
<td>Fire access routes or lanes to be shown on a Site plan.</td>
<td>40600-CL-DWG-00144</td>
</tr>
<tr>
<td><strong>Rail</strong></td>
<td></td>
</tr>
<tr>
<td>Existing and proposed rail tracks, switches, and other associated rail works.</td>
<td>40600-LO-DWG-00145 (existing),</td>
</tr>
<tr>
<td>(both on and off site to support the proposed development).</td>
<td>40600-LO-DWG-00146 (proposed),</td>
</tr>
<tr>
<td></td>
<td>40600-LO-DWG-00147 (proposed + other</td>
</tr>
<tr>
<td>Rail</td>
<td>rail)</td>
</tr>
<tr>
<td>Provide name/number for each track shown on plans; ideally show rail plans</td>
<td>40600-LO-DWG-00145 (existing),</td>
</tr>
<tr>
<td>with orthophoto overlay and lease boundaries depicted</td>
<td>40600-LO-DWG-00146 (proposed),</td>
</tr>
<tr>
<td></td>
<td>40600-LO-DWG-00147 (proposed + other</td>
</tr>
<tr>
<td></td>
<td>rail)</td>
</tr>
</tbody>
</table>
4.0 REQUIRED STUDIES, REPORTS, AND PLANS

The following sections summarise the required studies, reports, and plans submitted as part of the Application. Studies inform the basis for design. Reports include stand-alone technical data reports, which document existing conditions within the Project development area (PDA) and technical study area as well as effects assessments. Plans for the Project identify management and mitigation measures during construction and operation to address potential adverse effects of the Project. Table 4-1 provides a list of all required studies, reports, and plans that were completed for the Project.

Table 4-1 Required Studies, Reports, and Plans

<table>
<thead>
<tr>
<th>Required Studies, Reports, and Plans</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Engineering Studies</strong></td>
<td></td>
</tr>
<tr>
<td>Hazardous Materials Report for Demolition</td>
<td>Attachment 4.1-A</td>
</tr>
<tr>
<td>Geotechnical Report</td>
<td>Attachment 4.1-B</td>
</tr>
<tr>
<td>Energy Efficiency Study</td>
<td>Attachment 4.1-C</td>
</tr>
<tr>
<td>Marine Traffic Information Requirements Report</td>
<td>Attachment 4.1-D</td>
</tr>
<tr>
<td><strong>Project Effects Assessment</strong></td>
<td></td>
</tr>
<tr>
<td>Phase I and II Environmental Site Assessment</td>
<td>Attachment 4.2-N</td>
</tr>
<tr>
<td>Lighting Impact Statement</td>
<td>Attachment 4.2-O</td>
</tr>
<tr>
<td>Noise Assessment</td>
<td>Attachment 4.2-P</td>
</tr>
<tr>
<td>Air Quality Assessment</td>
<td>Attachment 4.2-Q</td>
</tr>
<tr>
<td>View and Shade Impact Analysis</td>
<td>Attachment 4.2-R</td>
</tr>
<tr>
<td>Traffic Impact Assessment</td>
<td>Attachment 4.2-S</td>
</tr>
<tr>
<td>Archaeological Potential – Preliminary Assessment Report</td>
<td>Attachment 4.2-T</td>
</tr>
<tr>
<td>Archaeological Overview Assessment</td>
<td>Attachment 4.2-U</td>
</tr>
<tr>
<td>Flood Protection Assessment</td>
<td>Attachment 4.2-V</td>
</tr>
<tr>
<td>Aquatic Resources Assessment Report</td>
<td>Attachment 4.2-W</td>
</tr>
<tr>
<td>Terrestrial Resources Assessment Report</td>
<td>Attachment 4.2-X</td>
</tr>
<tr>
<td>Summary of Potential Effects and Mitigation</td>
<td>Attachment 4.2-Y</td>
</tr>
<tr>
<td><strong>Project Plans</strong></td>
<td></td>
</tr>
<tr>
<td>Stormwater Pollution Prevention Plan</td>
<td>Attachment 4.3-A</td>
</tr>
<tr>
<td>Construction Environmental Management Plan</td>
<td>Attachment 4.3-B</td>
</tr>
<tr>
<td>Rail Operations Plan</td>
<td>Attachment 4.3-C</td>
</tr>
<tr>
<td>Fire Safety Plan</td>
<td>Attachment 4.3-D</td>
</tr>
<tr>
<td>Spill Prevention and Emergency Response Plan</td>
<td>Attachment 4.3-E</td>
</tr>
</tbody>
</table>
4.1 **PROJECT ENGINEERING STUDIES**

The Project engineering studies described below were completed by qualified engineering professionals in their respective fields.

### 4.1.1 Hazardous Materials Report for Demolition

Hemmera prepared a Hazardous Materials Report for Demolition based on the Pre-Demolition Hazardous Materials Survey conducted by Astech Consultants Ltd. ([Attachment 4.1-A](#)). The Hazardous Materials Survey identifies asbestos-containing materials, lead paints, polychlorinated biphenyl-containing ballasts or capacitors, lead, mercury, and stored chemicals associated with numerous buildings and structures at the Project site.

The Hazardous Materials Report recommends measures for the storage, handling, and recycling or disposal of hazardous building materials prior to and during demolition to best address the identified hazardous materials, including retaining an abatement specialist contractor to manage handling and removal processes. Handling of hazardous building materials, adherence to contract specifications, quality control, and final acceptance of the work remain the responsibility of BHP. For each hazardous material, the abatement contractor must determine and be responsible for assessing the risk and establishing an exposure control plan for the work, and for providing submittals to applicable regulators, including submission of the Notice of Project to WorkSafeBC, for work involving asbestos, lead, mould, and site-specific work procedures.

### 4.1.2 Geotechnical Report

Geotechnical investigations were completed by MEG Consulting Ltd. and summarised in their Geotechnical Report ([Attachment 4.1-B](#)). The purpose of the geotechnical investigations was to confirm the geotechnical assumptions that were used in the Desktop Geotechnical Study for FSD Berth 9 ([Attachment 4.1-B](#)) and perform foundation and seismic analyses. The main objectives of the geotechnical assessment were to provide information sufficient to perform a trade-off study between the Berth 9 and Berth 10 options, and to provide a preliminary foundation assessment for the potash storage building. Concerns at the Project site are related to the seismic hazard and the potential for liquefaction of the low-resistance clean sand layers.

Based on the results of the preliminary analyses, ground improvements are proposed to meet the performance requirements established for the berth and the potash storage building. Ground densification options for the berth include stone column densification and piling. For the potash storage building, the use of preload and stone column densification are proposed to meet the settlement and seismic criteria.
4.1.3 Energy Efficiency Study

Ausenco prepared an Energy Efficiency Study to identify the energy savings that will be achieved as a result of energy conservation measures incorporated into the Project design and operation (Attachment 4.1-C). The study is based on Ausenco’s report on Best Available Technology Not Entailing Excessive Cost (BATNEEC) Analysis for Project Development (Appendix A of Attachment 4.1-C). The BATNEEC analysis evaluates techniques for conveying, dust control and collection, receiving, storage, shiploading, lighting, site operation, and stormwater management. The Energy Efficiency Study considers motor loads, lighting, instrumentation and controls, and HVAC.

The Project design includes energy conservation measures achieved through selecting efficient equipment types. For operational processes, inefficient modes have been eliminated and equipment will operate only when needed. The combination of selected technology and operational methodology results in a total energy savings of 1,535 megawatt hours per annum, which is based on:

- 4.5% savings due to equipment and lighting selection,
- 9.4% savings due to optimized operational and methodologies, and
- overall combined savings of 13.9% for optimized plant design.

4.1.4 Marine Traffic Information Requirements

Ausenco prepared the Marine Traffic Information Requirements Report (Attachment 4.1-D), which describes the range of design vessels and descriptions of vessel sizes that will be used to transport potash, and anticipated traffic levels, anchorage requirements, and utilisation periods. An operational plan for berthing and unberthing is also included in this plan, as well as pilotage details and guidance on tug assistance during vessel berthing and unberthing and mooring and unmooring operations. No warping of vessels for potash loading at FSD Berth 9 will be required. Vessel bunkering will take place primarily in Vancouver Harbour, either at designated anchorages or at berth. If vessel bunkering is required at the Project site in the Fraser River, bunkering will only occur alongside the vessel while at berth. Additional bunkering measures are described in Attachment 4.1-D.

Vessel types include: Handysize, Handymax, Supramax, Ultramax, Panamax, and Kamsarmax. Vessels range in size from Handysize (170 m length overall (LOA), 25-m beam, and 10-m fully laden draft), to Kamsarmax (229 m LOA 32-m beam, and 15-m fully laden draft). Note Kamsarmax, Panamax, Ultramax and Supramax sized vessels will be light loaded to accommodate the 11.5 m Fraser River draft. Anticipated vessel traffic levels, while operating at full capacity (8 Mtpa), are estimated at 185 berth calls per year. To meet this throughput, a vessel mix will be used, and this mix will vary depending on vessel availability, market conditions, and other factors.
4.2 **EXISTING CONDITIONS AND PROJECT EFFECT REPORTS**

Existing conditions for the Project for biophysical and socio-community components were documented in technical data reports, and potential Project-related effects were considered in assessment reports. This section summarises the technical data reports and Project effects assessments conducted in the vicinity of the Project.

4.2.1 **Environmental Components**

The environmental components selected for inclusion in the Application are listed in Section 4 of the Project and Environmental Review (PER) Application Submission Requirements. **Table 4-2** identifies the technical data reports completed and their location within this Application.

**Table 4-2 Existing Conditions Reports Completed for the Project**

<table>
<thead>
<tr>
<th>Existing Conditions Reports</th>
<th>Attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatics Technical Data Report</td>
<td>Attachment 4.2-A</td>
</tr>
<tr>
<td>Archaeological Resources Technical Data Report</td>
<td>Attachment 4.2-B</td>
</tr>
<tr>
<td>Commercial, Recreational, and Aboriginal Fisheries Overview Technical Data Report</td>
<td>Attachment 4.2-C</td>
</tr>
<tr>
<td>Human Health Technical Data Report</td>
<td>Attachment 4.2-D</td>
</tr>
<tr>
<td>Hydrogeology Technical Data Report</td>
<td>Attachment 4.2-E</td>
</tr>
<tr>
<td>Land and Water Use Technical Data Report</td>
<td>Attachment 4.2-F</td>
</tr>
<tr>
<td>Lighting Technical Data Report</td>
<td>Attachment 4.2-G</td>
</tr>
<tr>
<td>Socio-economics Technical Data Report</td>
<td>Attachment 4.2-H</td>
</tr>
<tr>
<td>River Hydraulics and Morphology Technical Data Report</td>
<td>Attachment 4.2-I</td>
</tr>
<tr>
<td>Water and Sediment Quality Technical Data Report</td>
<td>Attachment 4.2-J</td>
</tr>
<tr>
<td>Traditional Use Technical Data Report</td>
<td>Attachment 4.2-K</td>
</tr>
<tr>
<td>Plant Communities and At-risk Plants Technical Data Report</td>
<td>Attachment 4.2-L</td>
</tr>
<tr>
<td>Wildlife Technical Data Report</td>
<td>Attachment 4.2-M</td>
</tr>
</tbody>
</table>

4.2.2 **Traditional Use**

The Traditional Use Technical Data Report (**Attachment 4.2-K**) describes the historical and current use of land, water, and resources for traditional purposes at the Project site, and provides information on seven First Nations with traditional territories that overlap the Project study area: Katzie First Nation, Kwantlen First Nation, Kwikwetlem First Nation, Musqueam Indian Band, Qayqayt First Nation, Tsawwassen First Nation, and Tsleil-Waututh Nation.

The existing conditions for the current use of land and resources for traditional purposes were described based on publicly available data and information sources, including a review of existing secondary data focusing on the seven First Nations noted above. Where available, additional sources identified by First Nations were reviewed and incorporated.
The literature and secondary data review indicates historical evidence of long-term use of the lower Fraser River and surrounding areas by Indigenous populations for resources, subsistence, and cultural activities. Given the scale and type of publicly available information on Traditional Use (TU), a description of TU has been compiled that would apply generally in the vicinity of the Project, but information is too sparse to apply specifically to the PDA. Current traditional uses occurring at the PDA are limited due to restricted access and industrialisation of the site but include plant gathering, harvesting of mammals and shellfish, and Fraser River fisheries for commercial and recreational purposes as well as Aboriginal Food, Social, and Ceremonial. The Fraser River also remains an important transportation link for local Indigenous communities, allowing continued interaction for intergroup exchange and cultural activities. Discussions on the potential of the Project to impact Indigenous groups have been started with multiple Indigenous groups, and will continue to be managed by BHP throughout the life of the Project.

BHP recognizes the unique nature of current and historical uses of the area by Indigenous people. As such, First Nations specific Traditional Use information will be assessed separately in an addendum to this Application as the information is provided. This Application has been written using secondary data and does not incorporate TU information provided by Indigenous groups’ own TU studies. Each Addendum will assess potential impacts to a specific Indigenous group, using the same assessment scope that was used for this Application. Each Addendum will also discuss relevant mitigation measures. A separate Addendum will be prepared for each TU study received.

4.2.3 Phase I and II Environmental Site Assessment

Hemmera conducted Phase I and II Environmental Site Assessments (ESAs) for the Project to review the potential for contamination at the Project site (Attachment 4.2-N). The purpose of the Phase I and Phase II ESAs was to identify and describe areas of potential environmental concern (APECs) and potential contaminants of concern associated with present and historical on- and offsite activities that may have adversely affected soil and groundwater quality at the Project site. The Phase I and II ESA was completed in accordance with the approach outlined in the Canadian Standards Association standards for Phase I (CSA 2012) and Phase II (CSA 2000) ESAs and VFPA’s Environmental Baseline and Exit Assessment requirements (VFPA 2016).

The desktop review of former land use and activities conducted during the Phase I ESA identified 9 onsite APECs and 3 offsite APECs. Field work and analysis for the Phase II ESA focused on the APECs that were deemed to have higher potential to interact with the Project construction.

The Project site’s soil analytical results met both the applicable Canadian Council of Ministers of the Environment (CCME) industrial land use (IL) guidelines (CCME 2014) and the Contaminated Sites Regulation (BC Reg. 375/96) (CSR) commercial land use standards except for three samples, which contained concentrations of phenanthrene greater than the CCME IL guideline. Although these soil samples exceeded the CCME IL guideline, they were less than the British Columbia (BC) CSR non-agricultural land standards for soil relocation. These samples were collected at depths greater than 2.4 metres (m) below ground surface (bgs) (i.e., they are not surficial in nature), and are not likely to be encountered in future earth works.
The groundwater analytical results met the applicable CCME guidelines and BC CSR standards, except for dissolved iron, which exceeded the CCME Freshwater Aquatic Life Guideline x 10 (CCME 1999) across the Project site. Dissolved iron naturally exceeds the guideline in groundwater in various parts of BC, including the Lower Mainland. Considering the provincial regulatory regime, the BC Ministry of Environment has exempted iron from most commercial and industrial uses under the CSR. The results of the Phase II ESA indicate that future use of the Project site by BHP is not likely to be constrained by the soil or groundwater quality at the Project site. No further investigation is warranted at this time.

4.2.4 Lighting

As described in the Lighting Assessment (Attachment 4.2-O), several different lighting sources currently exist at the Project site. There is some light spill onto Robson Road, which aids in driver visibility. Though the existing high-mast luminaires were in view and bright in the background, very little spill light (under 2 lux) was cast onto the adjacent residences. Local residences adjacent to the Project site were determined as Lighting Zone 3, which limits spill light to 3 lux or less in the vertical plane at the local residences.

When viewed against a background of mountains, existing lighting at the Project site was assessed as significant, as very bright luminaires are set against a dark sky, which creates a high level of contrast.

According to the VFPA Guidelines, “Lighting Plans should be designed to minimise glare, light trespass, energy conservation, and to maintain dark skies while ensuring safety and security (VFPA 2015a).” Additionally, the Project site lighting must meet the Canadian Occupational Health and Safety Regulations (SOR/86-304) for worker safety, which define target levels of 100 lux for stairways and 10 lux for outside areas where activity is low.

Impacts on fish and wildlife have been reviewed and assessed. However, research is limited with respect to two key factors: dosage (amount of light) and duration (how long lighting is on for) as it relates to impacts on a given species. Effects of lighting on wildlife and fish are much more difficult to assess than effects on humans, therefore the impact on the majority of species are not well known with respect to dosage and duration. That said, based on the additional lighting proposed for the site, the dosage on the shoreline and Fraser River would be very low and therefore is considered insignificant.

To assess potential light trespass effects from Project lighting on local residents, the level of spill light (lux) offsite at local residences and any defined areas of environmental sensitivity was reviewed. For this assessment, no additional lighting around the rail loop is anticipated to be required. Light trespass from the proposed lighting will be very limited, given that it will be:

- Located 230 m or more from local residences
- Equipped with light shields
- Directed away from local residences.
The majority of Project lighting fixtures will be aimed downwards to limit up-light\(^1\). Where floodlights are proposed, visors will be added as per the recommendations in Illuminating Engineering Society of North America (IESNA) Lighting Handbook (DiLaura et al. 2011).

Luminaires with optical systems which limit up-light have been proposed for the Project. These limiting systems are referred to as full cut-off optics. Light will be reflected off surfaces, such as pavement and steel structures, and redirected into the sky, however this is common for lighting installations. The use of full cut-off optics is effective in minimizing sky-glow to the greatest extent practical.

In summary, the lighting design and proposed operation for the Project are consistent with VFPA guidance and industry practice, utilises energy-efficient light-emitting diode sources, and minimises the potential for adverse lighting effects to the greatest extent practical while also taking into account worker safety requirements.

**4.2.5 Noise Assessment**

BKL Consultants Ltd. conducted an environmental noise assessment for the Project in compliance with relevant VFPA guidelines (Attachment 4.2-P) by assessing baseline noise levels and modeling the anticipated change due to the Project. Existing community noise levels were measured using five noise level meters installed in the community at locations that were representative of the closest noise-sensitive receivers (e.g., residences, care facilities, schools) in Surrey and New Westminster. The duration of noise measurements captured a range of noise generated by activities adjacent to the Project site at FSD including the unloading of steel, agricultural products, and containers from ships. These measurements were used to characterise the existing annual average community noise environment, and peak intermittent events, to assist in establishing a baseline of existing noise levels at potentially affected receivers.

A Cadna/A computer noise model was developed to assess existing (2015) noise levels, and expected construction and operation (2030) noise levels at nearby residences. The noise prediction and analysis indicate that the dominant noise source for most receivers in the baseline scenario is traffic on the South Fraser Perimeter Road. With the application of low noise initiatives, the prediction is that the average increase in total noise for the operational scenario, with and without the Project in 2030, will be no more than 1 A-weighted decibels (dBA). An increase in noise level will be likely, given that no activities are being decommissioned and new activities will be added at the Project site. The receivers in Surrey closest to the site will experience the most significant noise level increases; with a maximum increase in noise level of 3 dBA and a maximum change in percentage of people highly annoyed by the overall noise environment of 2.4%. The predicted noise levels generally comply with VFPA’s noise criteria and the change in the percentage of people highly annoyed is predicted to comply with Health Canada’s suggested criteria of 6.5% (Health Canada 2017). Noise from construction activities is predicted to exceed Health Canada’s

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\(^1\) Uplight – The percentage of lumens distributed above the luminaire between 90 and 180 degrees vertical (IESNA RP-33-14)
suggested noise criteria for at least one receiver in each receiver group. Pile-driving activities will likely generate the highest noise levels for receivers. Noise management procedures such as a Communication Plan for residents, are recommended.

4.2.6 Air Quality Assessment

WSP Canada Inc. prepared an Air Quality Assessment to evaluate the change in emissions and potential effects on air quality due to the Project (Attachment 4.2-Q). The assessment included developing an air emissions inventory for existing (2015) conditions and the future (2023) Project conditions. The baseline and Project emissions were modeled using the CALPUFF modeling suite, as per the guidelines from the VFPA and the 2015 British Columbia Air Quality Dispersion Modelling Guideline (MOE 2015) to predict Project effects on air pollutant concentrations. Predicted air pollutant concentrations were compared to applicable ambient air quality objectives.

As part of the Air Quality Assessment, a discussion of the local air quality was presented. Data was gathered from the Lower Fraser Valley Air Quality Monitoring Network, operated by Metro Vancouver, consists of 28 air quality monitoring stations, 22 of which are located within Metro Vancouver. The monitoring stations measure criteria air contaminants such as: carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), PM₁₀, and PM₂.₅. The closest station to the Project that monitors CO is Burnaby South, which recorded a maximum 1-hour average and maximum 8-hour rolling average during the monitoring period of approximately 5% and 12% of the respective ambient air quality objectives (AAQOs). The closest stations to the Project that monitor NO₂ are North Delta and Burnaby South, which recorded maximum 1-hour averages of 65% of the AAQO, and annual averages of 75% and 50% respectively of the AAQO. The closest station to the Project that monitors PM₁₀ is Burnaby South, which recorded a maximum 24-hour rolling average and annual average of approximately 68% and 50% of the respective AAQOs.

Potential Project air emissions are primarily fugitive dust from the handling of potash and combustion emissions associated with locomotives, ocean-going vessels and other non-road equipment. The engineering design of the Project was developed to mitigate and minimise air emissions to the environment from the facility by selecting BATNEEC for potash handling terminal operations. The Project design incorporates automation and material handling equipment techniques to minimise spills and the generation of dust. At material handling points where dust has the potential to be created, best available control technologies in the form of covered storage, baghouse dust collectors, and a telescopic cascading chute on the traveling shiploader are proposed to minimise effects to air quality.

Using conservative assumptions to predict potential air quality effects from Project emissions, the following conclusions can be drawn for the future conditions with the Project in place:

- Predicted air quality effects, including ambient background levels, at sensitive receptors and residential neighbourhoods will be generally low and remain below all AAQOs.
The predicted air contaminant concentrations quickly diminish as emissions disperse further away from the Project.

For all air contaminants, no AAQO exceedances were predicted outside the immediate area of the Project fenceline.

At three receptors (one located on adjacent port tenant land and two on adjacent rail yard), less than 100 meters from the Project fenceline, modeling predicts the potential for exceedance as follows:

- fine particulate matter less than 2.5 microns in diameter (PM$_{2.5}$) (24-hour averaging period),
- inhalable particulate matter – less than 10 microns in diameter (PM$_{10}$) (24-hour averaging period), and
- total particulate matter (24-hour averaging period).

Given the low predicted frequency of concentrations above the AAQO at these receptors, the spatial extent of the predicted concentrations, and the assumptions used in estimating emissions from these sources, offsite exceedances of the AAQO are not anticipated from the Project.

Construction mitigation for air quality is described in the Construction Environmental Management Plan (CEMP) (Attachment 4.3-B).

4.2.7 View & Shade Impact Analysis

Enns Gauthier Landscape Architects Inc. completed a view and shade impact analysis for the Project (Attachment 4.2-R). The report included a desktop study of baseline information and guidelines, site visits and viewpoint selection, preparation of photo simulations, and assessment of potential view impact. To study potential shade effects of the Project on surrounding areas, shade effects were modeled for 9:00 a.m., 12:00 p.m., and 3:00 p.m. during spring equinox, summer solstice, fall equinox, and winter solstice.

Much of the Project site is surrounded by tall, dense vegetation to the east and southeast. Tall, mature deciduous and coniferous trees are abundant throughout the residential areas, parks, and neighbourhood roadways on the slopes south of the Project site. Existing views of the Project site from across the Fraser River from residential areas and public parks in Queensborough are of the existing industrial land uses.

The study concluded that the Project adheres to the View and Shade Guidelines (PMV 2015). The Project is consistent with existing land uses, and in general is predicted to have a minimal effect on views in surrounding communities. South of the Project site, existing mature tree stands form a natural vegetative screen from the proposed facilities. Views from east of the Project are more open; however, existing industrial use and infrastructure predominate these views, and views of the proposed infrastructure skyline, massing, and building materials will be similar to existing conditions. As such, the views to the Project site from the south and east are unlikely to be adversely affected.
The views most affected by the Project are predicted to be from the north (i.e., the New Westminster and Queensborough waterfront areas facing south and southeast). The study recommends techniques to mitigate adverse visual effects for key public, tourist, and residential locations in this area. Recommended mitigation techniques include installing fast-growing and robust trees, vertical vegetative elements, and vertical architectural screens or elements against the infrastructure. In certain areas where these mitigation techniques are not applicable or desired, an alternative approach would be to explore opportunities to effectively communicate the Fraser River’s industrial heritage.

In general, the Project will likely have a minimal impact on views in surrounding communities, and the materials proposed for use on the Project and the sizes of the proposed conveyors, storage structures, and rail ramps are consistent with prior use at the site and surrounding industrial and port activity.

Shading effects due to the Project on the site and surrounding areas is predicted to be minimal, given the existing industrial zoning and land use at and near the site, and distances to any public place, roadway, pathway, gathering space, or residence.

4.2.8 Traffic Impact Study

Mott MacDonald Canada Ltd. conducted a Traffic Impact Study (Attachment 4.2-S) that assessed:

- Existing and projected traffic volumes
- Project-related traffic volumes and changes to road and rail infrastructure that may affect transportation conditions
- Existing conditions (2017) with those on opening day (2023) and future (2030).

The Project site layout will necessitate realigning of the existing Timberland and Robson Roads.

On opening day in 2023, increased rail traffic will result in delays due to trains blocking at-grade crossings, prior to mitigation being applied. These delays are due to the following:

- No road/rail grade separation is currently present
- Potash will be unloaded as a unit train operation, without any splitting of trains.

Due to the lengths of unit trains and location of road crossings, trains will be unloading while they are blocking road crossings. For the Robson Road crossing at Elevator Road, with no mitigation in place, duration of road blockages will increase from approximately one hour per day without the Project to up to four hours per day. Vehicle access into the rail loop will not be possible while a potash train is unloading which will only affect BHP operations. One of the following mitigation options will be applied which will successfully mitigate the delays:

- Building the Elevator Road Interchange, or;
- Building the notional internal overpass in the event the Elevator Road Interchange is not constructed in time for commencement of operations. The phased approach includes re-routing Robson Road in combination with constructing an overpass over Elevator Road which would mitigate the blockage at Robson Road and Elevator Road.
Additional detail on the mitigation is provided in the Traffic Impact Study (Attachment 4.2-S).

### 4.2.9 Archaeological Potential – Preliminary Assessment

Hemmera conducted a preliminary assessment of archaeological potential for the PDA (Attachment 4.2-T), based on Project footprint and depth of ground alteration works, and in accordance with VFPA guidance. The assessment was also based on the Archeological Overview Assessment (AOA) prepared by Kleanza Consulting Ltd. (Kleanza) (see Section 4.2.10 and Attachment 4.2-U). The assessment includes evaluation of whether the Project is situated: on fill or native soil, with anticipated effects to native soil; within 100 m of potable water (historically or existing); in proximity to the original shoreline or river/stream bank; and on relatively level ground.

Potential effects from the Project include potential disturbance to archaeological resources. The first potential effect includes densifying soils during pre-load of the potash storage building area may compress soils where archaeological materials may be present. The second includes direct disturbance due to excavating soils below 2-m depth where a lens of organic material including archaeological artifacts or features may be present. For example, Table 4-3 identifies excavation activities indicated to be below 2 m (Drawing 40600-CL-DWG-00149 in Attachment 3-A).

<table>
<thead>
<tr>
<th>Structure to be Excavated</th>
<th>Depth of Excavation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm and sanitary sewer (east side of storage building)</td>
<td>2.25 m</td>
</tr>
<tr>
<td>Storm sewer (west side of storage building)</td>
<td>2.7 m</td>
</tr>
<tr>
<td>Railcar unloading station</td>
<td>12.20 m</td>
</tr>
</tbody>
</table>

Source: Drawing 40600-CL-DWG-00149 (Attachment 3-A)

An Archaeological Chance Find Procedure has been developed for the PDA, and is included in the CEMP. Communications with all involved First Nations should continue for the duration of this Project to provide an effective forum for archaeological or heritage concerns to be raised, discussed, and addressed in a timely manner.

### 4.2.10 Archaeological Overview Assessment

In accordance with archaeological best practice, Kleanza completed an AOA for the Project (Attachment 4.2-U). The AOA reviewed a previous AOA prepared by Archer CRM in 2014, which identified the approximate location of the former shoreline of the Fraser River within the Project site, and designated areas of high archaeological potential along the former shoreline.

The AOA also reviewed data collected during a preliminary field reconnaissance survey and during archaeological monitoring of geotechnical investigations. Monitoring found that a persistent lens of organic material lies below the asphalt and industrial fill throughout the Project site. This lens occurs between 2 m
and 4 m below surface, and was only absent near the existing water’s edge. This organic material has the potential to contain archaeological materials including the potential for preserved waterlogged organic artifacts (e.g., basketry). The AOA concluded that previous disturbance within the Project site has not removed the potential for archaeological materials to be found. These findings are consistent with those of Archer CRM (2014).

Kleanza’s AOA concluded that the PDA overlaps with an area of high archaeological potential and ethnographic sensitivity based on the number and importance of nearby archaeological sites, as well as the general importance of the banks of the Fraser River to First Nations people. Based on the results of the AOA and discussions with First Nations, Kleanza recommends that archaeological monitoring is recommended for all ground disturbances deeper than 2 m below the current surface. Monitoring should continue until maximum excavation depth is reached or a minimum of 50 cm of non-organic, sterile sediments have been observed by the supervising archaeologist on site, whichever occurs first. Once a minimum of 50 cm of non-organic, sterile sediments have been observed by the supervising archaeologist on-site monitoring can be discontinued.

4.2.11 Flood Protection Assessment

Northwest Hydraulic Consultants Ltd. (NHC) assessed various flood scenarios for the Project (Attachment 4.2-V) by overlaying flood inundation mapping with the Project site plan to identify vulnerable infrastructure. The Project area is not behind a dike, and may therefore be affected by high water levels in the Fraser River.

The existing Fraser River conditions and flood protection planning was reviewed as part of the River Hydraulics and Morphology Technical Data Report (see in Attachment 4.2-I). Historic charts, air photos, and bathymetry were reviewed to understand changes in planform (river shape as viewed from above) and bed level in the lower Fraser River near FSD. Peak water levels at the site occur during two times of the year: during the freshet season (May to July) and during the winter months (December and January).

NHC developed inundation maps based on flood levels simulated using a hydraulic model of the Fraser River, for the following five scenarios, including a scenario specified by VFPA:

- 200-year flood (present conditions)
- 200-year flood with 1 m of sea level rise and moderate climate scenario
- 500-year flood (present conditions)
- 500-year flood with 1-m sea level rise and moderate climate scenario
- 1894 flood of record (present conditions).
Inundation mapping does not account for measures or precautions that may be taken for flood preparation such as temporary lock block walls and sandbag berms. Mapping for all the modeled scenarios shows a substantial inundation at the Project site. Without mitigation, all flood scenarios could result in damage to infrastructure. NHC recommends that the flood protection plans for the Project site should be reviewed and updated. Structural measures such as berms or flood walls, as laid out in FSD’s Emergency Response Plan (FSD 2014), should be considered to mitigate potential flood damage to commodities and infrastructure, as well as to prevent environmental contamination.

Ausenco prepared a memo on flood mitigation that identifies feasible flood mitigation measures (Appendix A of Attachment 4.2-V). The potash storage building includes a perimeter concrete wall, supporting the roof structure that protects the product against flood events. Electrical rooms will also be elevated. As the concrete wall surrounding the potash storage facility is only penetrated by service doors, potential mitigation options for the service doors could consist of providing water-tight flood doors, sand bags, water-filled flood barriers, or other temporary flexible membrane barriers.

### 4.2.12 Aquatic Resources Assessment

Hemmera conducted the Aquatic Resource Assessment (Attachment 4.2-W) in accordance with VFPA’s Project PER Guidelines for Habitat Assessment (VFPA 2015b). The report assesses Project-related effects on fish and fish habitat, benthic invertebrates, marine mammals, species of conservation concern, and commercial, recreational, and Aboriginal (CRA) fisheries. The assessment reviewed both potential effects in the Fraser River and in upland watercourses.

The PDA includes a portion of the Fraser River that provides general migration, foraging, and rearing habitat value to CRA fish, including Pacific salmon and trout, char, sturgeon, and eulachon. Benthic invertebrate productivity was comparably low within the PDA, suggesting relatively poor foraging habitat for CRA fish compared to other parts of the Fraser River. Fishing for CRA species, particularly salmon gill net fishing, occurs throughout the lower Fraser River.

Marine mammals most commonly observed within the Strait of Georgia and Juan de Fuca Strait with the potential to occur near the Project are: humpback whale, southern resident killer whale, Steller sea lion, harbour seal, and harbour porpoise.

The Project may result in construction and operation-phase disturbance; however, with appropriate mitigation in place and good work practices, most construction-related effects on aquatic resources associated with the Project will likely be of short duration. Effects to Fraser River fish and fish habitat (including CRA fisheries) could occur during temporary removal of shoreline protection material and pile driving required along the existing Berth 9. In addition, the new in-water transfer tower will also result in alteration and shading of approximately 188 square metres (m²) of Fraser River habitat under the new tower. Although the shading and installation of new piles will not likely result in serious harm to fish, as a precautionary measure, this aspect of the Project will be submitted for a project review by Fisheries and Oceans Canada.
The Project rail loop overlaps with approximately 700 m² of daylighted instream and 3,250 m² of riparian habitat; however, no watercourses in the PDA are classified as fish habitat by the City of Surrey. The Project will involve re-alignment of one culverted drainage (i.e., Berth 9 Ditch) that offers some food and nutrient value to downstream habitat in the Fraser River; however, no loss of fish habitat will result from this work. Any resulting changes in water quality and base flows will likely be mitigated with the application of appropriate measures and adherence to water quality guidelines and BMPs.

Potential effects on marine mammals from the Project’s construction phase includes physical injury or behavioural disturbance from increases in underwater noise, primarily from noisy construction activities such as impact pile driving. Other than seals and sea lions, marine mammal occurrence in the vicinity of Project construction is infrequent. Potential effects on marine mammals during the Project’s operation phase include:

- An increased risk of vessel strikes near the mouth of the Fraser River South Arm
- Potential acoustic masking for southern resident killer whale and harbour porpoise due to Project vessel operations in the technical study area.

Project-related effects are largely anticipated to be minor. With the application of appropriate mitigation measures, including adherence to the CEMP, Operation Management Plans, and BMPs, residual effects are not anticipated for any of the aquatic resource components.

### 4.2.13 Terrestrial Effects

Hemmera conducted the Terrestrial Resources Effects Assessment (Attachment 4.2-X) in accordance with VFPA’s Project PER Guidelines for Habitat Assessment (VFPA 2015b). The vegetation component of the terrestrial resources assessment includes an assessment of plant communities and at-risk plant species in the PDA. The wildlife component of the terrestrial resources assessment includes an overview assessment of habitat availability, birds, mammals, amphibians and reptiles, and species of conservation concern.

Natural vegetation in the PDA is very limited, with most of the site (98%) developed and in use for industrial and port terminal activities. Vegetation primarily comprises common weedy and non-native plant species, which are surrounded by industrial site development. Plant communities in the PDA consist of small, isolated islands of habitat that have been substantially disturbed by previous development. The PDA provides limited wildlife value, except for relatively mobile species and species with a high tolerance for human activities. The lack of natural ecosystems at the site minimises its capacity to support substantial wildlife populations.

Double-crested cormorant, great blue heron, and barn swallow are species of conservation concern that have been observed in the Fraser River habitat adjacent to the PDA.

Approximately 0.5 hectares (ha) of herbaceous habitat and 0.1 ha of treed habitat will be removed to accommodate Project activities. Construction of the terminal rail loop requires culverting 0.07 ha of non-fish-bearing aquatic ditch habitat that provides marginal habitat value for amphibians.
The Project will overlap critical habitat (Population #2b) for streambank lupine designated under the *Species at Risk Act* (SC 2002, c. 29); however, no streambank lupine plants have been observed during repeated surveys at the Population #2b site since 2013. This Population #2b site is assumed to contain seedbank. Proposed mitigation for Project effects to critical habitat for streambank lupine has been developed to transfer seedbank in the Population #2b site to aid in the survival and recovery of Population #2a at Alaska Way. BHP, FSD, and other FSD business stakeholders have submitted a SARA permit application to Environment and Climate Change Canada for alteration of streambank lupine critical habitat (Population #2b). With the implementation of proposed mitigation measures identified in the permit application and consistent with the streambank lupine recovery plan, residual effects to streambank lupine are anticipated to be offset.

In summary, the Project has the potential to disturb vegetation and wildlife as a result of site preparation, vegetation clearing, and construction activities; however, the application of appropriate mitigation measures and adherence to BMPs are anticipated to offset potential residual effects, including those to streambank lupine critical habitat. The loss of habitat is limited to areas that are of marginal value to wildlife, including species of conservation concern. Although the loss of vegetated areas is permanent, the residual effect to birds and mammals are unlikely to be significant due to the generally low quality and lack of habitat present.

### 4.2.14 Summary of Potential Effects and Mitigation

*Attachment 4.2-Y* provides an overview of potential Project-related effects on the environment, public, Indigenous groups, and heritage resources during construction and operation, and summarises the associated proposed mitigation measures (e.g., avoidance and mitigation of construction and operation-phase effects).

### 4.3 Project Plans

#### 4.3.1 Stormwater Pollution Prevention Plan

Hemmera prepared the Stormwater Pollution Prevention Plan (SPPP) (*Attachment 4.3-A*) in accordance with VFPA’s PER Guidelines to proactively and efficiently manage stormwater pollution risks during Project operations, integrate BHP operational procedures and complement existing FSD plan(s). To accomplish this, VFPA’s guiding principles for stormwater management are as follows:

- Minimise the amount of stormwater discharged to the environment;
- Prevent or minimise the pollutant loading of stormwater;
- Treat or otherwise manage stormwater if pollutant loading cannot be prevented; and
- Integrate effectively with FSD’s stormwater system.

A Master Drainage Plan was prepared by Delcan in 2004 for the Project site to consolidate the known information about the existing site drainage; assess the drainage and flood protection at the site; assess the potential effects of onsite and offsite development; and identify improvements for site drainage. This report is included in Appendix A of *Attachment 4.3-A*. The majority of the PDA is paved, with curbs and
catch basins acting as the major collectors of stormwater. There are three main outputs of stormwater to the surrounding environment: Berth 10 drainage (culverted), Berth 9 drainage (culverted), and the Elevator Road culvert to Gunderson Slough; the final destination of stormwater will be the Fraser River to the west, and Gunderson Slough to the south.

### 4.3.2 Construction Environmental Management Plan

The CEMP (Attachment 4.3-B) was prepared by Hemmera and follows the VFPA Guidelines for Construction Environmental Management Plans (VFPA 2015c). Included in the CEMP are measures that will avoid or mitigate potential construction-related effects to environmental resources and the surrounding community. Best practices proposed in the CEMP are based on Project scope and design, existing environmental conditions of the site, recommended mitigation based on assessments completed at the Project site to date, and industry-standard environmental construction techniques. Onsite environmental monitoring of the construction works is a key component for compliance with the CEMP.

Sub-component plans and procedures included as appendices to CEMP are:

- Soil and Groundwater Management Plan
- Chance Find Procedure
- Reportable Quantities

The Project is located on federal land administered by VFPA; therefore, federal and VFPA regulations and policies are applicable to the site. The construction contractor will be responsible for preparing work plans that comply with the CEMP and having all required permits necessary to undertake the construction and ensure compliance with the terms and conditions of these permits.

### 4.3.3 Rail Operations Plan

Ausenco has prepared a Rail Operations Plan (Attachment 4.3-C) to describe how train movements will be managed for potash handling at the FSD site. FSD is serviced by multiple railways, including Burlington Northern Santa Fe, Canadian National Railway, Canadian Pacific Railway, and local shortline Southern Railway of BC. The rail yard within the FSD property operates as a flat switching yard. Loaded railcars are set out in long parallel yard tracks. Cuts of those loaded cars are switched by FSD locomotives for unloading and then switched again into empty car cuts for departure.

The Project will re-configure the FSD rail yard. The reconfigured track design will allow the potential FSD Direct Transfer Coal rail traffic to proceed without interference to potash service. The yard will have capacity to independently service existing rail traffic. Project rail loop reconfiguration is shown on the rail drawings in Section 3.0 (Project Drawing Requirements) of the PER Application. The safety of the design was modeled by TUV Rheinland Mobility Inc. for safe operation at up to 25 kilometres per hour. The terminal rail loop design configuration contains curvature with radius shorter than required railway design minimums.
Lubrication will be maintained on rail curves to lessen the potential for rail climb while reducing rail wear and squeal. All component specifications comply with minimum industrial standards from the connecting carriers, and are fit for purpose to the proposed traffic levels.

4.3.4 Fire Safety Plan

Ausenco prepared the Fire Safety Plan (Attachment 4.3-D) to provide an organizational and procedural framework for responding to fire and other emergencies at the Project. It is largely based on FSD’s existing Emergency Response Plan (Appendix A of Attachment 4.3-D). The response plan provides guidance and direction to FSD Employees, FSD’s Emergency Response Team, and emergency support agencies, and includes a description of roles and responsibilities in implementing the Fire Safety Plan, provisions for training for all site personnel, and descriptions of potential hazards. The Fire Safety Plan has been developed to comply with all relevant federal and provincial acts, regulations, guidelines, and objectives.

4.3.5 Spill Prevention and Emergency Response Plan

Hemmera prepared the Spill Prevention and Emergency Response Plan (Attachment 4.3-E), which provides guidance for onsite and offsite personnel on the required actions for preventing and responding to spills and emergencies. This plan also provides guidance to mitigate the risk of environmental contamination from the accidental release of deleterious materials by providing clear procedures for their storage and handling as well as clear plans of action should such a release occur. Due to integrated shiploading operations between the FSD and BHP, appropriate elements of the FSD emergency plan have been incorporated into the Spill Prevention and Emergency Response Plan.

Emergency response planning includes an emergency response hierarchy, response tiers (i.e., level of response), roles and responsibilities, resources, and internal and external communications that will be implemented during and after an incident at the Project site.
5.0 COMMUNITY AND STAKEHOLDER CONSULTATION

5.1 PRELIMINARY COMMENT PERIOD

BHP’s approach for the Preliminary Public Comment Period was to develop a comprehensive public engagement process to provide valuable information to key stakeholders and members of the public, and generate meaningful dialogue. The engagement and consultation strategy meet all requirements outlined by VFPA for public and stakeholder consultation.

During the Preliminary Public Comment Period, the following activities were completed:

- Developed a Project website to make information available to the community and stakeholders
- Placed advertisements in four local newspapers
- Created an information brochure and display boards for download on the Project website and made available in print at community information sessions
- Developed an online feedback form to collect community and stakeholder input and made paper copies available at the information sessions
- Developed notification letters which were delivered by hand, regular mail and email to neighbouring residents, local businesses and three community associations
- Developed and delivered notification letters to municipal, provincial and federal government stakeholders by email and regular mail
- Hosted two community information sessions at locations in local communities (Surrey and New Westminster)

The Preliminary Public Comment Period provided a variety of methods for participation and input, including public events, an online feedback form, and a Project phone number and email address.

Participation results are as follows:

- 21 people attended the public information meeting in New Westminster
- 36 people attended the public information meeting in Surrey
- 26 people completed the feedback form online or in person
- 9 written submissions were received by email
- 78 people requested to be added to the Project database
- 780 unique page views on the project website

Further details about the Preliminary Public Comment Period are provided in the Preliminary Public Comment Period Consultation Summary Report (Attachment 5-A), also available at https://www.bhp.com/fsdpotashexport and the VFPA website at https://www.portvancouver.com/development-and-permits/status-of-applications/bhp-billiton-potash-export-facility/. The Preliminary Public Comment Period Input Consideration Report identifies how public and stakeholder input will be considered in the scope of technical and environmental studies, and in Project design and is also available for review on the project and VFPA websites (Attachment 5-B).
5.2 **PLANNED CONSULTATION DURING APPLICATION REVIEW**

BHP is committed to developing a Project that aligns with its Charter Values of Sustainability, Integrity, Respect, Performance, Simplicity, and Accountability. The project team has prepared a communication program for engagement and consultation in accordance with VFPA’s permitting guidance materials. To support consultation for the Application Review Public Comment Period, at minimum, VFPA is expected to require the following:

- Updated Consultation and Engagement Plan
- Notifications (local newspaper advertising, letter/postcard to nearby residents, stakeholders and businesses a minimum of 10 days prior to open houses)
- Meetings with stakeholders (as required)
- Online outreach via project webpage, including an opportunity for online feedback
- Two community open houses (Surrey/ Delta and New Westminster)
- Consultation Summary Report
- Input Consideration Report

BHP will coordinate with VFPA regarding notifications to stakeholders about the Application Review phase public comment period. VFPA will lead stakeholder consultation during the application review period with the support and participation of BHP. Any stakeholder meetings will be formally documented, and Project enquiries will be tracked and responded to in a timely manner (as appropriate).

Upon completion of the public comment period an Application Review Phase Consultation Summary Report and an Application Review Phase Input Consideration Report will be developed and following approval by VFPA, posted to the project website.

5.3 **PLANNED COMMUNICATIONS DURING CONSTRUCTION**

The following tools and tactics will be used to ensure that stakeholders receive timely information about work related to construction on the project site:

- Notification letters, which will be submitted to VFPA for approval prior to distribution, to identified stakeholders and affected residents at the start of construction and in advance of any noisy work.
- Update to Project webpage with information about the construction, what to expect and project schedule.
- Inform directly affected residents and stakeholders once work is complete.
- Maintain the dedicated project information email address and telephone number.

BHP is committed to keeping our neighbours informed during construction. Any feedback received during construction will be tracked and responded to in a timely manner and updates provided to VFPA as appropriate. Any suggestions or complaints received during construction will be considered and addressed appropriately.
6.0 INDIGENOUS ENGAGEMENT

6.1 PRELIMINARY INDIGENOUS ENGAGEMENT:

During this phase of engagement, BHP initiated discussions the proposed Project with Indigenous groups potentially impacted by the Project. BHP shared detailed Project information and supported Indigenous review of Project documents including Baseline Studies, the AOA Report, and the Draft Assessment. BHP also pursued Engagement Agreements with Indigenous groups, and supported Traditional Use Studies from First Nations. The Engagement Agreements enable Indigenous groups to more actively participate in the permitting process.

Issues and concerns have been tracked, and included comments on effects to fishing as well as fish and fish habitat, cumulative effects, potash spills, archaeological potential, and others. Detailed issues and concerns can be found in Attachment 6-A.

To-date, BHP has engaged Cowichan Tribes, Halalt First Nation, Hwlitsum First Nation, Katzie First Nation, Kwantlen First Nation, Kwikwetlem First Nation, Lake Cowichan First Nation, Lyackson First Nation, Métis Nation British Columbia, Musqueam Indian Band, Penelakut Tribes, Qayqayt First Nation, Semiahmoo First Nation, Stó:lo Nation, Stz’uminus First Nation, Tsawwassen First Nation and Tsleil-Waututh Nation.

6.2 APPLICATION REVIEW PHASE INDIGENOUS ENGAGEMENT AND CONSULTATION:

Future engagement activities planned during Application review are currently being discussed with VFPA, and are anticipated to include meetings, emails, information sessions, potential workshops, sharing of updated Project documents and others. Once the Application has been accepted for review, VFPA will confirm which consultative activities will be delegated to BHP, and which will remain with VFPA.
7.0 REFERENCES


8.0 CLOSING

This work was performed in accordance with Contract 8500085638 between Hemmera Envirochem Inc. (Hemmera) and BHP Billiton Canada Inc. (BHP), dated September 11, 2015. This report has been prepared by Hemmera, based on fieldwork and desktop work conducted by Hemmera, for the sole benefit and use by BHP. In performing this work, Hemmera has relied in good faith on information provided by others, and has assumed that the information provided by those individuals is both complete and accurate. This work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The findings presented herein should be considered within the context of the scope of work and Project terms of reference; further, the findings are time sensitive and are considered valid only at the time the report was produced. The conclusions and recommendations contained in this report are based upon the applicable guidelines, regulations, and legislation existing at the time the report was produced; any changes in the regulatory regime may alter the conclusions and/or recommendations.