

Vancouver Fraser Port Authority

# Centerm Expansion Project / South Shore Access Project – Draft Construction Environmental Management Plan

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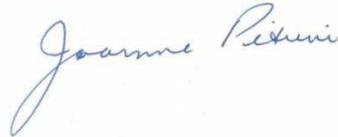
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## Acronyms

ACM	Asbestos-Containing Material
AOA	Archaeological Overview Assessment
BC	British Columbia
BMP	Best Management Practice
CCME	Canadian Council of Ministers of the Environment
CCT	Correlated Colour Temperature
CEMP	Construction Environmental Management Plan
Centerm	Centerm Container Terminal
CEP	Centerm Expansion Project
CEPA	Canadian Environmental Protection Act
CNR	Canadian National Railway
CO <sub>2</sub>	Carbon Dioxide
CRAB	Create a Real Available Beach
CSA	Canadian Standards Association
CSR	Contaminated Sites Regulation
DFO	Department of Fisheries and Oceans (also known as Fisheries and Oceans Canada)
DPWV	DP World Vancouver
ECCC	Environment and Climate Change Canada
EM	Environmental Monitor
EMA	British Columbia Environmental Management Act
EPP	Environmental Protection Plan
HWR	Hazardous Waste Regulation
kPa	Kilopascal Pressure Unit
KWL	Kerr Wood Leidal Consulting Engineers
LEED	Leadership in Energy and Environmental Design

m	metre
mg/l	milligrams per litre
mm	millimetre
NPA	Navigation Protection Act
ODS	Ozone Depleting Substance
PCB	Polychlorinated Biphenyl
PER	Project and Environmental Review
pH	is a measure of how acidic/base a liquid is
PMV	Port Metro Vancouver
RCM	Reclaimed concrete material
SARA	Species at Risk Act
SSAP	South Shore Access Project
TBC	To Be Confirmed
TMP	Traffic Management Plan
TSS	Total Suspended Solids
VACS	Vehicle Access Control Gate
VFPA	Vancouver Fraser Port Authority
WCMRC	Western Canada Marine Response Corporation
WQG	Water Quality Guidelines

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# 1. Introduction

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The Construction Environmental Management Plan (CEMP) describes how activities undertaken during the construction of the Centerm Expansion Project (CEP) and South Shore Access Project (SSAP), referred to collectively as “the proposed Project,” will be managed to avoid or mitigate negative environmental impacts

The objectives of the CEMP are to:

- protect valued ecological features of the terrestrial, marine, and atmospheric environments during the pre-construction demolition and construction phases of the proposed Project;
- protect human health and ensure the safety of the public and site workers;
- ensure compliance with conditions of permits and approvals granted by environmental regulatory agencies; and
- manage potential environmental liabilities.

The Centerm Container Terminal (Centerm or the Terminal) on the south shore of Vancouver’s Inner Harbour is one of three primary container terminals in the Vancouver area. The Vancouver Fraser Port Authority (port authority) is proposing to concurrently deliver the two components of the proposed Project to increase goods movement through the south shore of Vancouver’s Inner Harbour. The CEP is a set of improvements to Centerm aimed at increasing container handling capacity and accommodating larger vessels (On-Terminal improvements). The SSAP entails improvements to the road and rail networks benefiting all port users (Off-Terminal improvements).

The port authority has established a Centerm Expansion Project Team (CEP Team) consisting of port authority staff and subject matter experts. The CEP Team includes engineers, environmental scientists, project managers, and communications and engagement specialists. The CEP Team is working closely with DP World Vancouver (DPWV), the operator of Centerm, to deliver the proposed Project. The port authority intends to deliver the proposed Project under a single Design Build (DB) Contract by which the selected Design Builder develops and constructs the final design of the proposed Project based on the performance requirements and technical specifications established by the CEP Team.

This Draft CEMP has been prepared to define the roles and responsibilities and mitigation measures that will be followed to minimize potential adverse effects on the environment and communities during development of the proposed Project. This Draft CEMP is based on the current conceptual design of the proposed Project and will be expanded and completed by the Design Builder once the detailed design of the proposed Project has been completed and construction plans are developed. It is the Design Builder’s responsibility to take ownership of this draft CEMP and finalize it (including any required sub-plans identified within the CEMP).

The proposed Project is subject to review and approval by the port authority under the Project and Environmental Review (PER) process before it can proceed. The development and submission of a CEMP for the proposed Project is a PER requirement and is subject to review and approval by the PER Team. For consistency with the DB Contract, all submission references in this CEMP refer to Design Builder submissions to the CEP Team. As the permit holder, the CEP Team will then coordinate the review and approval of these plans with the PER Team, and other applicable regulatory agencies (i.e., Environment and Climate Change Canada (ECCC) and department of Fisheries and Oceans (DFO)), as required.

This Draft CEMP builds on the mitigation measures identified in the Environmental Study Report and has been prepared in accordance with the *Project and Environmental Review Guidelines – Construction Environmental Management Plan* (CEMP Guidelines) (PMV 2015a). Table 1-1 shows how the CEMP Guidelines have been addressed within this Draft CEMP.

**Table 1-1: Comparison of PER Guidelines CEMP (July 2015) and Draft CEMP**

PER Guidelines – CEMP sub-plans	Draft CEMP sub-plans	Comment
5.5.1 General Practices	5.1 General Practices	
5.5.2 Site Access, Mobilization and Laydown Areas	5.2 Site Access, Mobilization and Laydown Areas	
5.5.3 Air Quality	5.3 Air Quality	
5.5.4 Noise and Vibration	5.4 Noise, Vibration and Light Management	Includes Mitigation and Management Measures for Noise, Vibrations, and Fugitive Lighting
5.5.5 Machinery and Equipment	5.5 Machinery and Equipment	
5.5.6 Erosion and Sediment Control	5.6 Erosion and Sediment Control	
5.5.7 Contamination Soil and Groundwater Management	5.7 Contamination Soil and Groundwater Management	Draft Soil Management Plan already developed (AECOM 2017a)
5.5.8 Vegetation and Wildlife Management	5.8 Vegetation and Wildlife Management	
5.5.9 Concrete Works and Grouting	5.9 Concrete Works and Grouting	
5.5.10 Marine Works	5.10 Marine Works (Working In or Near Water)	
	5.10.2.1 Marine Operations Safety	
	5.10.2.2 General Practices Working In or Near Water	
	5.10.2.3 Protection of Marine Resources	
	5.10.2.4 Dredging – Load Site	
	5.10.2.5 Dredging – Disposal Site	
	5.10.2.6 Fill Placement	
5.5.11 Archaeological Resources	5.11 Archaeological Resources Management	
5.5.12 Sensitive Habitat Features and Species	5.12 Sensitive Habitat Features and Species	
	5.13 Water Quality Monitoring	Draft TSS/Turbidity Monitoring Plan already developed (AECOM 2017c)
	5.14 Stormwater Management	Draft Stormwater Pollution Protection Plan already developed (AECOM 2017b)
	5.15 Hazardous Materials Management	
5.6.2 Environmental Emergency Plan	6.2 Environmental Emergency Plan	
5.6.3 Spill Response Plan	6.3 Spill Response Plan	
5.7 Fuel Management Plan	7.0 Fuel Management	
5.8 Waste Management Plan	8.0 Waste Management	

This Draft CEMP is the foundation document for more-detailed supporting plans and procedures that have been, or may be, developed to provide additional direction specific to mitigating the effects of construction on the environment from the proposed Project.

## 1.1 Supporting Plans Already Developed

In addition to this Draft CEMP, the following supporting draft plans have already been developed:

- Draft Soil Management Plan (AECOM 2017a)
- Draft Stormwater Pollution Prevention Plan (AECOM 2017b)
- Draft TSS/Turbidity Monitoring Plan (AECOM 2017c).

These plans will require updating by the Design Builder as final details of the proposed Project are developed, and implementation proceeds.

## 1.2 Plan Delivery Schedule

The following summary is provided to highlight which CEMP sub-plans would be tied to which pieces of work, and to which regulatory authority each CEMP deliverable will be submitted. In parallel with submissions to regulatory authorities, the CEP Team will also share these plans with Aboriginal groups for review and comment, and comments received from Aboriginal groups will be considered and responded to in parallel with comments received from regulatory authorities.

### Phase 1: Field Investigations

The Design Builder may need to conduct in-water surveys and geotechnical investigations prior to finalizing the CEMP.

### Phase 2: Start of Construction

This phase would include:

- All land based construction activities other than changes to the existing storm water conveyance system.
- Demolition works over the water with mitigation measures in place to prevent demolition materials from entering the water. This includes Ballantyne Pier, Marginal Wharf, SRY west dock, and the above-water portions of the piles supporting these dock structures.
- Marine vessels bringing materials to/from the site, consistent with the existing site use as a port terminal.
- At least 30 days prior to this phase, the CEP Team would submit to the PER Team, ECCC, and DFO, the Design Builder's Final CEMP and the following stand-alone sub-plans:
  - Soil Management Plan
  - Erosion and Sediment Control Plan
  - Chance Find Protocol

### Phase 3: In-Water Works

This phase would include in-water works such as dredging and land reclamation. Depending on the timing of receiving project permits and authorizations, Phase 3 activities may commence at the same time as Phase 2 activities.

At least 30 days prior to this phase, the CEP Team would submit to the PER Team, ECCC, and DFO, the Design Builder's following stand-alone sub-plans:

- Dredging Plan
- TSS/Turbidity Monitoring Plan

Note that, in parallel, the CEP Team will also be submitting the Design Builder's Dredge Material Disposal Plan to ECCC, as a requirement of the DAS permit. This plan handles the "care and control" of material from the load site to DAS site, and disposal at the DAS site.

### Phase 4: Storm Water Utility Works

In addition to Phase 2 & 3 activities, this phase would also include expansion of the existing storm water conveyance system.

At least 30 days prior to this phase, the CEP Team would submit the Design Builder's stand-alone Storm Water Pollution Prevention Plan to the PER Team. This document cannot be completed as quickly as the other documents because it contains final design details of the storm water conveyance system, including specifications for the oil/water/sediment separators.

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## 2. Project Information

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### 2.1 Project Location and Setting

The proposed Project is located within Vancouver Inner Harbour, the area between the First and Second Narrows, on the south shore of the Burrard Inlet (Figure 2-1). The Terminal site (the Site) is bounded by East Waterfront Road, Centennial Road, and the Canadian National Railway (CNR) Rail yard to the south and extends into the Burrard Inlet to the north to a maximum distance of 500 metres (m) from the shore (Figure 2-2). Centerm currently covers approximately 31 hectares (ha) of Port of Vancouver land from Hawks Avenue in the east to Main Street in the west. The coordinates of the approximate centre of the Site are 49°17'14"N, 123°05'34"W.

The Off-Terminal improvements to road and rail access would occur along the south shore roadway corridor between Clark Drive and Main Street (Figure 2-3). These improvements include an extension to Waterfront Road linking Waterfront Road East with Centennial Road and a new Centennial Road Overpass extending west from Clark Drive to the Terminal entrance along Centennial Road. The Centennial Road Overpass would be positioned adjacent to Lantic (Rogers Sugar); the geographic coordinates are 49°16'59.5"N, 123°04'50"W.

#### 2.1.1 Land Tenure, Administration, and Classification

The Terminal is situated on federal land under the administration of the port authority and leased to DPWV as the Terminal operator. The proposed Off-Terminal improvements are also on port authority lands, bounded by a rail right-of-way to the south. Alterations to the adjacent rail support yard will amend the existing agreements with CNR to accommodate the construction activities. Where the Centennial Road Overpass follows the roadway adjacent to the rail right-of-way, there may be some airspace encroachment by the overpass structure on rail owned by Lantic, and by CNR on Canadian Pacific Railway lands.

The Site and the majority of the Burrard Inlet south shore is classified as Port Terminal under the port authority's Land Use Plan (PMV 2014). The area immediately to the west of Centerm designated as a Special Study Area. Southwest of the Terminal, the area around CRAB Park is designated as recreational.

#### 2.1.2 Terrestrial Environment Condition

Centerm is located in the Inner Harbour, which is the most industrialized section of Burrard Inlet and has undergone high levels of commercial and industrial port activity since the late 1800s. The harbour has developed significantly over time, and now includes a variety of port, residential, and recreational uses along the shoreline; however, almost all of the shoreline has been modified as a result of this proposed development.

The Centerm site consists primarily of paved surfaces used to store and manoeuvre shipping containers, roads and rail infrastructure, and administrative and maintenance buildings. The proposed Project would take place on industrial land where vegetation and wildlife habitat are typical of an urban-industrial area. Lands adjoining the proposed Project site includes a mix of urban and industrial areas, with CRAB Park located immediately southwest.

#### 2.1.3 Marine Aquatic Environment

The marine area around the western end of the Terminal has a varied substrate that supports diverse biota, including plants, such as brown and red algae and bull kelp; a variety of invertebrates, such as California sea cucumber (*Parastichopus californicus*), shrimp (*Pandalus* spp.), and various crab species, including Dungeness

(*Metacarcinus magister*); and fish, including kelp perch (*Brachyistius frenatus*), pile perch (*Rhacochilus vaccus*), and lingcod (*Ophiodon elongatus*). The marine area at the eastern end of the Terminal has less diversity of substrate, with the majority consisting of fine mud overlying occasional cobbles, shell hash, and woody debris. Sea life observed in that area included occasional crabs and anemones (*Actiniaria* spp.).

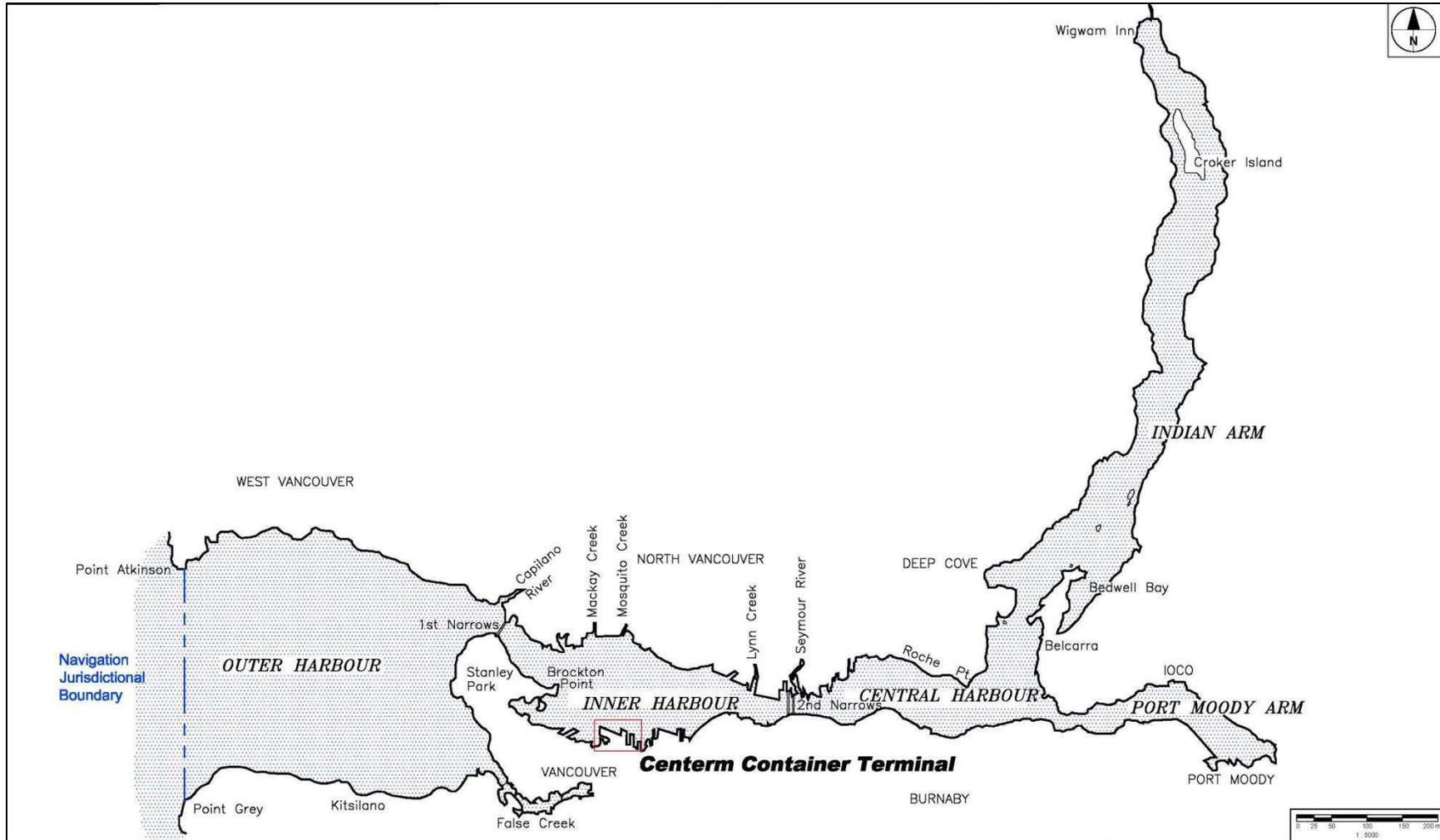


Figure 2-1: Project Location within Burrard Inlet

## 2.1.4 Potential Contaminants of Concern

Industrial harbours, especially those with long operating history such as Vancouver, contain varying levels of sediment contamination. Polycyclic aromatic hydrocarbons and metals are common contaminants in these areas due to potential releases from docking vessels and accidental releases such as bilge water, antifouling paint used on hulls, and urban surface water runoff from roadways (e.g., metals, oil/grease/fuel residue, tire residues, asphalt residues).

## 2.1.5 Site Archaeology

Despite ethnographic evidence of past use of this area, no subsurface archaeological sites have been recorded within 2.5 kilometres (km) of the proposed Project. This absence of identified sites may be due to historical disturbances and does not indicate a lack of pre-contact cultural deposits. The 2016 Archaeological Overview Assessment (AOA) indicates that it is possible that archaeological remains in the area at and around the proposed Project may have been affected by historical development. The shoreline, has been extensively modified and disturbed, including considerable filling and capping of the foreshore.

## 2.2 Project Description

Terminal improvements include expanding the land area at both the west and east ends of the existing Terminal. Approximately 4.2 ha of marine area will be infilled on the west and 4 ha on the east. In-water marine works will include dredging to remove unstable substrates, constructing new rock dykes and extending the berth face, and infilling open water areas within the dykes. In addition, a navigational turning basin for the cruise ship berth will be added in the area between the westward extension of Centerm and the SeaBus Terminal.

Works on land include removing the warehouse structures and rehabilitating the Ballantyne Pier (retaining the Ballantyne Pier heritage building), reconfiguring the intermodal yard to expand the yard (extending the existing tracks and adding an additional track), removing the Heatley Avenue Overpass, reconfiguring the container yard, consolidating existing buildings into one Container Operations Facility, establishing new storage facilities, increasing Terminal Operations parking near the Container Operations Facility, reconfiguring the Terminal entrance area, upgrading terminal control systems and yard equipment, installing one new quay crane and replacing one quay crane, installing up to 5 new electrified rail-mounted gantry cranes, and adding up to 20 new diesel-powered internal transfer vehicles.

Off-Terminal improvements include constructing an overpass to the entrance of the Terminal, Waterfront Road extension and VACs gates and constructing Centennial Road Overpass east of the Terminal.

Table 2-1 provides a summary of the proposed improvements (Figure 2-2 and Figure 2-3)

Table 2-1: On-Terminal and Off-Terminal Improvements

<b>Centerm Expansion Project (On-Terminal Improvements)</b>	
<b>1. Westward Expansion of Centerm</b>	Expansion of the container yard and intermodal yard westward. Includes a larger wharf structure, dredging, rock dykes, and earth fill.
<b>2. Eastward Expansion of Centerm</b>	Additional container storage, new truck gate, parking, and new operations building. Includes rehabilitation of existing Ballantyne Pier with rock dykes and earth fill.
<b>3. Expansion of the Terminal Intermodal Yard</b>	Expansion of intermodal yard through addition of fifth rail track and rail track extensions to the west and east.
<b>4. Reconfiguration of the Container Yard</b>	Increased capacity and efficiency for container yard operations, including space for loaded containers, empties, and refrigerated container stacks.
<b>5. Modernize Truck Gate System</b>	Reconstruction of the terminal entrance and exit gates using updated gate technologies to increase container truck throughput.
<b>6. New Container Operations Facility Building and Parking</b>	Repurposing the vacant Ballantyne cruise ship terminal building into a new operations and administration building with associated employee parking.
<b>7. Removal of the Heatley Avenue Overpass</b>	Removal of this overpass to accommodate the eastern extension of the intermodal yard.
<b>8. Navigational Turning Basin for Cruise Ship Berth</b>	Dredging to enhance a navigational turning basin in the area between the westward extension of Centerm and the SeaBus terminal.
<b>South Shore Access Project (Off-Terminal Improvements)</b>	
<b>9. Waterfront Road Extension and VACS Gates</b>	Extension of Waterfront Road to Centennial Road, providing a connection to the Main Street overpass and creating a continuous roadway through port lands between downtown Vancouver and Highway 1. Installation of new vehicle access control gates on Waterfront Road under Main Street Overpass.
<b>10. Centennial Road Overpass</b>	A grade-separated access to the Centerm terminal entrance area, from Clark Drive via Centennial Road. The overpass would cross multiple at-grade rail crossings. Container trucks would continue to access the terminal via Centennial Road from port access points at Clark Drive and Commissioner Street.

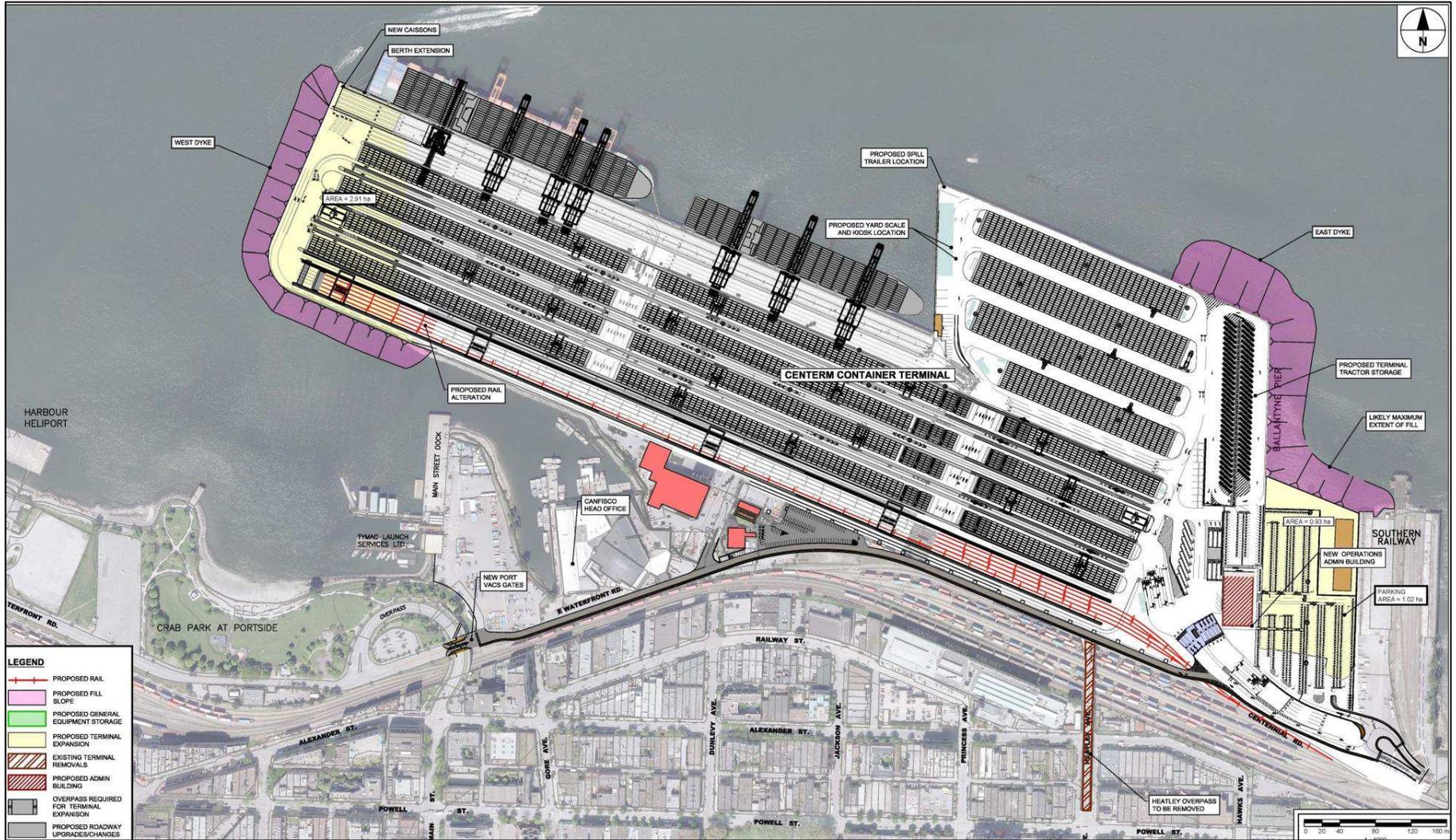


Figure 2-2: Proposed Design

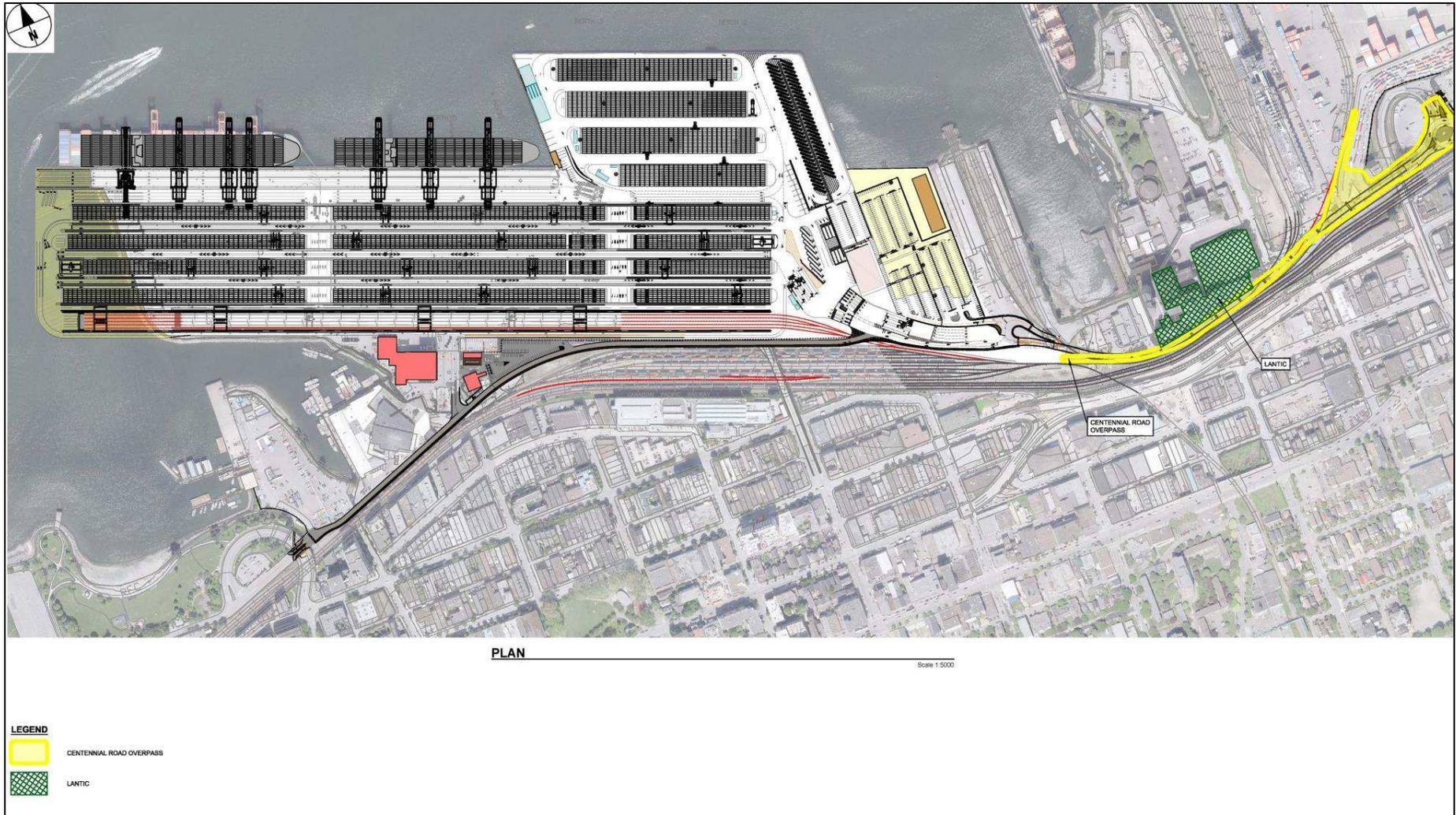


Figure 2-3: Centennial Road Overpass

## 2.3 Project Schedule

The permitting and procurement stage is anticipated to begin in the latter part of 2016, and extend through 2017. Should the proposed Project be approved, construction is anticipated to commence in early 2018 and be completed at the end of 2020. The anticipated schedule for key components of the proposed Project is:

Marine Dredging and In-filling	6 months during fall and winter 2018
Land Reclamation	12 months during 2018-2019
Intermodal Yard works	approximately 18 months from mid-2019
Container Yard alterations	mid-2018 to late 2020
Container Operations Facility Building	approximately 2 years from early 2018
Truck Gates	6 to 9 months ending in early 2020
SSAP	approximately 2 years from early 2018

## 2.4 Construction Hours

Construction activities will conform to established port authority construction hours of 7:00 a.m. to 8:00 p.m., Monday to Saturday and excluding Sundays and holidays. There are two elements of the proposed Project, however, for which construction is anticipated to occur on a 24-hour basis: in-water marine works (excluding any pile driving or similar noisy activities) and the Centennial Road Overpass. Pile driving is currently not part of the plan for the proposed Project, but should the Design Builder decide to use driven piles in the project design, additional work hour restrictions will be developed in consultation with the port authority's Project and Environmental Review (PER) team.

The main marine construction will include dredging, construction of rock dykes and infilling of the eastern and western expansion areas. These works are expected to take up to twelve months, with the actual time depending on the final volume of material that would need to be dredged. The published least-risk in-water work window set by Fisheries and Oceans Canada (DFO) for Burrard Inlet to protect marine species is from August 16 to February 28 of any year. The construction schedule for in-water works will comply with timing restrictions established by DFO in the *Fisheries Act* Authorization for the proposed Project. To accommodate the dredging marine works within the least-risk in-water work window and achieve the overall target completion in 2020, however, work would need to take place on a 24-hour basis including weekends. A shorter work day would result in dredging (and associated backfilling) stretching over multiple years to respect the work window. The infilling required for the eastern and western expansions includes placing large volumes of material, that cannot be completely placed within the least-risk in-water timing window, and therefore requires work extending outside of the least-risk window.

Situated on a narrow road corridor, the construction of the Centennial Road Overpass would affect traffic movement along the south shore port area, particularly truck traffic serving Centerm. To minimize traffic disruption during Terminal operating hours (7:00 a.m. to 1:00 a.m., Monday to Friday) when traffic flows are heavy, construction hours for activities that will cause traffic disruption, such as lifting steel girders, foundation works, repositioning equipment, and utility diversions, will be extended to 24 hours per day and weekends. Works in proximity to the rail tracks adjacent to the south shore roadway will be scheduled at times when the tracks are available, and train movements are at their minimum, which is expected to include evenings, overnights, and weekends.

## 3. Contacts and Responsibilities

### 3.1 Key Personnel and their Roles

Centerm will continue operating during construction, and managing environmental performance during construction will require excellent communication and collaboration among the Project Team, DPWV, and the Design Builder. The Design Builder will be required to successfully implement mitigation measures and best practices during construction. Input and review will be required from project managers, environmental specialists, port authority representatives, field monitors, and construction trades personnel.

Roles and responsibilities for environmental management during construction of the proposed Project are listed in Table 3-1 and will apply to all construction environmental management plans and procedures during construction. The delegation of responsibilities between the CEP Team and Design Builder will be defined based on the contractual terms. The delegation of responsibilities will include those specified in PER's CEMP Guidelines:

The Design Builder will update contact names and contact information when the Draft CEMP is updated. The responsibilities of the key personnel, including Environmental Manager, and Environmental Monitor, are described in greater detail in the following sections.

**Table 3-1: Personnel Roles and Responsibilities**

Role	Organization	Responsibilities	Contact Name	Contact #
Project Sponsor	Vancouver Fraser Port Authority – CEP Team	Port Authority Representative – CEP Team	TBC	TBC
Project Partner	DP World Vancouver	Terminal Operator Representative	TBC	TBC
Project Team – Project Manager	WSP Canada	Project Management	TBC	TBC
Project Team – Owner's Engineer	AECOM Canada	Technical and Quality Assurance Support to Project Team	TBC	TBC
Design Builder – Construction Manager	TBC	Construction Phase Lead for Design Builder	TBC	TBC
Design Builder Environmental Manager	TBC	Lead Design Builder Environmental Management Activities	TBC	TBC
Environmental Monitor	TBC	Environmental Monitoring	TBC	TBC

### 3.2 Environmental Manager Responsibilities

An Environmental Manager is responsible for oversight of the environmental aspects of the Project and the day-to-day implementation of the CEMP. The Environmental Manager will be a Professional Biologist or a Professional Engineer or Geoscientist. The Environmental Manager will have a minimum of 10 years' experience with environmental management, including construction environmental management.

Roles and responsibilities of the Environmental Manager include:

- Managing all environmental issues associated with the Project on a day-to-day basis.
- Establishing and maintaining working relationships with relevant Governmental Authorities and stakeholders.
- Managing the implementation of site wide environmental monitoring.

- Preparing and submitting reports on the required procedures and mitigation measures set out under the CEMP and all environmental commitments.

### 3.3 Environmental Monitor Responsibilities

Environmental monitoring will take place throughout construction to observe, record, and report on the effectiveness of work practices and mitigation measures. Roles and responsibilities of the Environmental Monitor (EM) include:

- Being familiar with relevant aspects of the proposed Project as they relate to regulatory permits, approvals, and project environmental management documentation, including the CEMP.
- Maintain and update the CEMP as required to reflect work activities, environmental sensitivities and lessons learned from environmental monitoring activities.
- Verifying that copies of spill response plans, emergency procedures, and other applicable environmental and heritage protection documents are maintained at work sites at all times.
- Participating in construction meetings as necessary, including pre-work orientation meetings.
- Ensuring appropriate levels of protection are in place to minimize or prevent effects on environmental resources.
- Participating in project meetings, if required, to ensure that important environmental issues are brought to the forefront of discussions with other stakeholders.
- Being on-site as per the schedule established between parties prior to project start and remaining on-call during non-critical work periods to respond to emerging environmental issues.
- Providing recommendations to construction personnel to achieve compliance with the CEMP, component plans, and regulatory approvals in consultation with the Project Manager and DPWV representatives.
- Carrying out on-site monitoring on a frequency appropriate to the sensitivity of the area where work is being conducted, the activity taking place, and the associated level of risk. At a minimum, daily monitoring and reporting for each work activity and work shift will be undertaken.
- Immediately notifying the Construction Supervisors when there is a serious threat to environmental resources based on the potential actions or direct effects of construction activities. The compliance team and Construction Supervisors will suspend work if environmental commitments, best management practices (BMPs), regulatory approvals, permits, or applicable legislation are not being met; or if a serious threat to environmental resources is occurring or imminent.
- Observing, recording, and reporting on ongoing construction activities and their environmental effects in a factual and objective manner.
- Assisting in environmental emergency situations to minimize adverse environmental effects, including notification and documentation.
- Issuing Stop Work Orders should the EM observe any activity conducted in breach of the CEMP or the applicable Environmental Work Plan; or if they identify a serious threat to the environment (actual or imminent) from the effects of any construction activity.

Reporting and communication responsibilities of the proposed Project's EM(s) include:

- Liaising with the Construction Manager and reporting to the Project Manager with respect to issues that may require communication with regulatory agencies, Aboriginal groups, and key stakeholders.
- Assisting with any applicable environmental orientation sessions for staff that are new to the Site.

- Providing advice and technical assistance on environmental matters to the site personnel in a timely and proactive manner.
- Providing recommendations for modifying and/or improving environmental mitigation measures as necessary.
- Working cooperatively with other parties to resolve immediate environmental issues.
- Providing useful and timely advice on recommended construction practices in and around sensitive areas.
- Maintaining daily environmental monitoring inspection checklists and a log of construction and mitigation activities (including photographs, as appropriate). Information from daily environmental monitoring logs will be consolidated into a monthly summary report. The monthly summary report will include at minimum the results of water-quality sampling, marine fauna salvaging and relocating activities, observations about the effectiveness of the mitigation measures, any environmental incidents and corrective actions taken.
- Along with the relevant staff, preparing an environmental completion report at the conclusion of construction activities. The report will describe the work methodology and provide a brief summary of the works, including problems that occurred and how they were resolved.
- Reporting to the Project Manager on the effectiveness of mitigation measures being implemented, difficulties encountered, and how they are managed.
- Documenting construction activities, mitigation measures, and environmental incidents by field notes and photographs.
- Reporting spills of hazardous materials and other environmental incidents in accordance with DPWV *Spill Prevention and Emergency Response Plan* (DPWV 2016) and Section 6.3.
- Documenting Stop Work Orders, including the location, time and activity resulting in the breach, the element of the CEMP, and applicable Environmental Work Plan breached.
- Assisting in environmental emergency situations to minimize adverse environmental effects, including notification and documentation.

The EMs' role will be focussed on providing assurance that construction activities conform to environmental management commitments and requirements. To reduce the time taken to manually transcribe field notes and improve quality control on monitoring data collected in the field, a standardized mobile data collection system will be used.

### 3.4 Design Builder Responsibilities

The responsibilities of the Design Builder include:

- Design Builder will take ownership of the Draft CEMP, expand and modify it as necessary without reducing commitments, finalize it, and review it with construction personnel prior to commencing works. The Design Builder will ensure, at a minimum, that the CEMP:
  - Identifies the applicable roles and provides detailed descriptions of the responsibilities of the members of the Design Builder's environmental team.
  - Identifies and provides detailed descriptions of monitoring and reporting requirements.
  - Sets out the initial list of environmentally sensitive sites, in connection with which the Design Builder will prepare Environmental Work Plans.
  - Sets out the protocols for issuing and responding to Stop Work Orders in relation to breaches in environmental protection.
  - Includes the required sub-plans.

- Describe the measures to be employed to manage risks to the environment as a result of the construction activities.
- Complies with all of the Design Builder's environmental obligations including those set out in any permits or approvals.
- Design Builder will finalize the CEMP, establish all sub-plans required by the finalized CEMP and submit them to the CEP Team for review and approval before commencing works to which a plan would apply.
- Design Builder will not commence work construction activities until the CEMP has been accepted.
- Design Builder will ensure that the CEMP is current at all times and shall take all steps necessary to ensure that the CEMP remains current, including by updating and supplementing the CEMP to reflect all changes to the construction activities, including in respect of scheduling, Site conditions, and contingency measures, including weather dependent contingency measures, and to the Design Builder's methodologies of performing the construction activities that may have the effect of modifying, replacing, adding to or otherwise altering any portion of the CEMP.
- Design Builder will comply with the PER permit, and any issued conditions, and with any other agency permits or licence issued for the proposed Project under other applicable federal, provincial, and municipal laws, statutes, by-laws, regulations, orders, and policies.
- Construction personnel must cooperate with the EM appointed for the work. They must comply with written or verbal instructions with respect to conducting activities in compliance with the mitigation measures identified in the CEMP.
- Design Builder will correct deficiencies and any non-compliance issues communicated by the EM whether written or verbal. Corrective actions will be made as soon as reasonably possible, ideally within 24 hours of identification.
- The Design Builder will ensure that anyone undertaking construction activities (including subcontractors) are trained on the CEMP and all supporting plans and environmental work plans applicable to their work activity. The Design Builder will maintain training records and make them available to the CEP Team upon request.

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## 4. Relevant Environmental Legislation

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A description of the environmental legislation and associated requirements that are applicable to the proposed Project is provided in Table 4-1. It will remain the responsibility of the Design Builder to ensure that the CEMP complies with any and all permit conditions issued by relevant permitting authorities, including submission of plans that are subject to review.

Table 4-1: Federal and Provincial Environmental Legislation Relevant to the Proposed Project

Act, Regulation or Bylaw	Description	Applicability
<b>Federal</b>		
<p><b><i>Fisheries Act</i> (R.S.C. 1985, c. F-14, chapter 35)</b></p> <p><b>Fisheries and Oceans Canada (DFO)</b></p>	<p>Under section 35(2) of the <i>Fisheries Act</i>, an Authorization from DFO is required to carry out any work, undertaking, or activity that could result in serious harm to fish that are part of a CRA fishery, or to fish that support such a fishery.</p>	<p>Proposed Project components and activities that may require authorization include:</p> <ul style="list-style-type: none"> <li>▪ Dredging and filling:</li> </ul> <p>Placement of material or structures in the water</p>
<p><b><i>Fisheries Act</i> (R.S.C. 1985, c. F-14, section 36)</b></p> <p><b>Environment and Climate Change Canada (ECCC)</b></p>	<p>Environment and Climate Change Canada administers section 36, the key pollution prevention provision, prohibiting the deposit of deleterious substances into waters frequented by fish, unless authorized by regulations under the <i>Fisheries Act</i> or other federal legislation. A deleterious substance can be any substance that, if added to any water, would degrade or alter its quality such that it could be harmful to fish, fish habitat or the use of fish by people.</p>	<p>Discharges that meet CCME Water Quality Guidelines for Protection of Aquatic Life will not normally be considered by ECCC to be deleterious (CCME 2003). In-water construction activities and accidental releases from the on land construction activities have the potential to release deleterious substances into the marine environment. Construction activities will be planned and mitigation measures will be implemented and maintained to ensure compliance with all applicable CCME Water Quality Guidelines for Protection of Aquatic Life.</p>
<p><b>Marine Mammal Regulations (SOR/93-56)</b></p>	<p>The Marine Mammal Regulations under the <i>Fisheries Act</i>. prohibit the disturbance of marine mammals (whales, seals and sea otters).</p>	<p>In-water construction activities have the potential to injure and cause disturbance and stress on marine mammals. Construction activities will be planned and mitigation measures will be implemented to: minimize underwater noise, reduce the risks of collision and injury and provide special protection for endangered species.</p>
<p><b><i>Canadian Environmental Protection Act</i> (1999) (CEPA) Disposal at Sea Regulations (SOR/2001-275)</b></p> <p><b>ECCC</b></p>	<p>Section 125(1) of CEPA prohibits the discharge of any waste or other matter into Canadian waters except in accordance with a permit. The <i>Disposal at Sea Regulations</i> (SOR/2001-275) under the Act set out requirements for a permit to dispose of materials at sea. Only substances listed in CEPA may be considered for disposal at sea, including dredged material, fisheries waste, ships, inert matter, uncontaminated organic matter, and bulky substances.</p>	<p>The proposed Project will require a permit to dispose of, at sea, dredgeate material from any dredging for the terminal expansion.</p>
<p><b><i>Migratory Birds Convention Act</i> (S.C. 1994, c. 22)</b></p> <p><b>ECCC</b></p>	<p>The <i>Migratory Birds Convention Act</i> has the purposes of protecting and conserving migratory birds, as individuals and populations, and their nests. The Act prohibits killing, injuring, taking, or disturbing migratory birds or damaging, destroying, removing, or disturbing nests of migratory birds without a permit. The Act also prohibits deposit of materials on land or into water that may be harmful to migratory birds.</p>	<p>Currently no anticipated activities associated with the proposed Project would trigger a permit under the Act. Construction activities will be planned to avoid any impact on migratory birds during the nesting season.</p>

Act, Regulation or Bylaw	Description	Applicability
<p><b>Species at Risk Act (S.C. 2002, c. 29) (SARA)</b></p> <p>ECCC</p>	<p>SARA has the purposes of protecting plant and animal species in Canada that are under threat of being extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity, and managing species of special concern to prevent them from becoming endangered or threatened. Once a species is listed under SARA, it becomes illegal to kill, harass, capture, or harm it in any way. Critical habitats are also protected from destruction.</p>	<p>SARA is directly applicable to any portion of the proposed Project on federal lands where listed species are identified. If members of listed species are identified, mitigation measures will need to be negotiated with ECCC to minimize effects of the proposed Project. DFO is responsible for aquatic species listed under SARA.</p>
<p><b>Navigation Protection Act (R.S.C. 1985, c. N-22) (NPA)</b></p> <p>Transport Canada</p>	<p>The NPA authorizes and regulates interferences with the public right of navigation. A primary purpose of the NPA is to regulate works and obstructions that risk interfering with navigation in the navigable waters listed in the schedule to the Act. Notice of proposed works affecting these waters must be provided to Transport Canada, whose staff members determine whether the works substantially interfere with navigation. The NPA also prohibits the depositing or throwing of materials that risk affecting navigation in navigable waters and the dewatering of navigable waters.</p>	<p>As it is an arm of the Pacific Ocean, Burrard Inlet is subject to the NPA. The activities associated with the construction of marine works for the proposed Project, including dredging, infilling, and berth construction, will trigger a Notice of Works requirement.</p> <p>While Burrard Inlet lies within the jurisdiction of the port authority, as a Federal Port Authority operating under Part 2 of the <i>Port Authorities Operation Regulations</i> under the <i>Canada Marine Act</i>, the port authority is excluded from Ministerial review under the NPA. However, it is still required that a Notice of Works be submitted to the Minister via Transport Canada.</p>
<p><b>Railway Safety Act (R.S.C. 1985, c. 32 (4th Supp.))</b></p> <p>Transport Canada</p>	<p>Under section 8 of the <i>Railway Safety Act</i> anyone who proposes modifications to railway works must give notice of the works in accordance with the <i>Notice of Railway Works Regulations</i>. This notice is to be given at least 60 days prior to construction and must include a period of not less than 60 days during which objections, pursuant to the <i>Railway Safety Act</i> (subsection 8(2)) may be filed. The required work may proceed if no safety objections from concerned parties are received. If objections are received Transport Canada may intervene if parties cannot resolve the matters of concern.</p>	<p>Site preparation will include railway track removal or alteration.</p>
<p><b>Provincial</b></p>		
<p><b>BC Environmental Management Act (SBC 2003, c. 53)</b></p> <p>BC Ministry of Environment</p>	<p>The provincial law that governs contaminated soils and soil disposal is the <i>BC Environmental Management Act</i> (SBC 2003, c. 53) (EMA), which came into force in 2004. The two associated regulations that govern contaminated soil disposal under the EMA are the BC Contaminated Site Regulation (BC Reg. 375/96) (CSR) and the BC Hazardous Waste Regulation (BC Reg. 63/88) (HWR).</p>	<p>Early soils investigations conducted on the Terminal Site identified areas of contamination. It is anticipated that most of these soils will be managed on-site. However, if these soils cannot be managed on-site and must be removed for disposal on provincial lands, then provincial law will apply.</p>

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## 5. Draft CEMP Components

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As per the CEMP Guidelines, this section describes proposed mitigation measures, guidelines, and management practices that will be applied for the proposed Project. The level of detail given for each component has been scaled to the size and complexity of the proposed Project and the potential for proposed Project-related activities to generate impacts of concern. As per the CEMP Guidelines, the Draft CEMP will be updated as details of the proposed Project change. The level of detail under each of these components will be expanded as the final design is developed.

For each component, the Draft CEMP provides a brief introduction to the scope of the plan, the mitigation and management measures that will be applied, and the ways in which the plan will be further developed or revised, including any further measures that will be identified.

### 5.1 General Practices

The Design Builder will employ the following general practices:

- Ensure all contractors and site managers review the CEMP and the applicable guidelines prior to each project phase or new activity associated with the proposed Project.
- Ensure contractors know how to properly install any protection measures and understand BMPs used on the proposed Project. Improperly installed measures do not perform their intended functions and subsequently do not provide environmental protection.
- Plan and schedule activities associated with the proposed Project for dry weather whenever possible. Minimize works and equipment travel during periods of heavy precipitation.
- Ensure site managers and contractors are prepared to change existing measures and BMPs should they fail or additional measures are required. The EM should be notified of any changes to ensure they are adequate and installed properly.

The Design Builder will finalize the CEMP, establish all sub-plans required by the finalized CEMP and submit them to the CEP Team for review and approval before commencing works to which a plan would apply

### 5.2 Site Access, Mobilization and Laydown Areas

#### 5.2.1 Introduction

Traffic movement related to construction and operations will interface with public roads and local traffic, and may create a hazard if not properly managed. Figure 5-1 depicts site access and emergency routes, and the site compound for the laydown area.

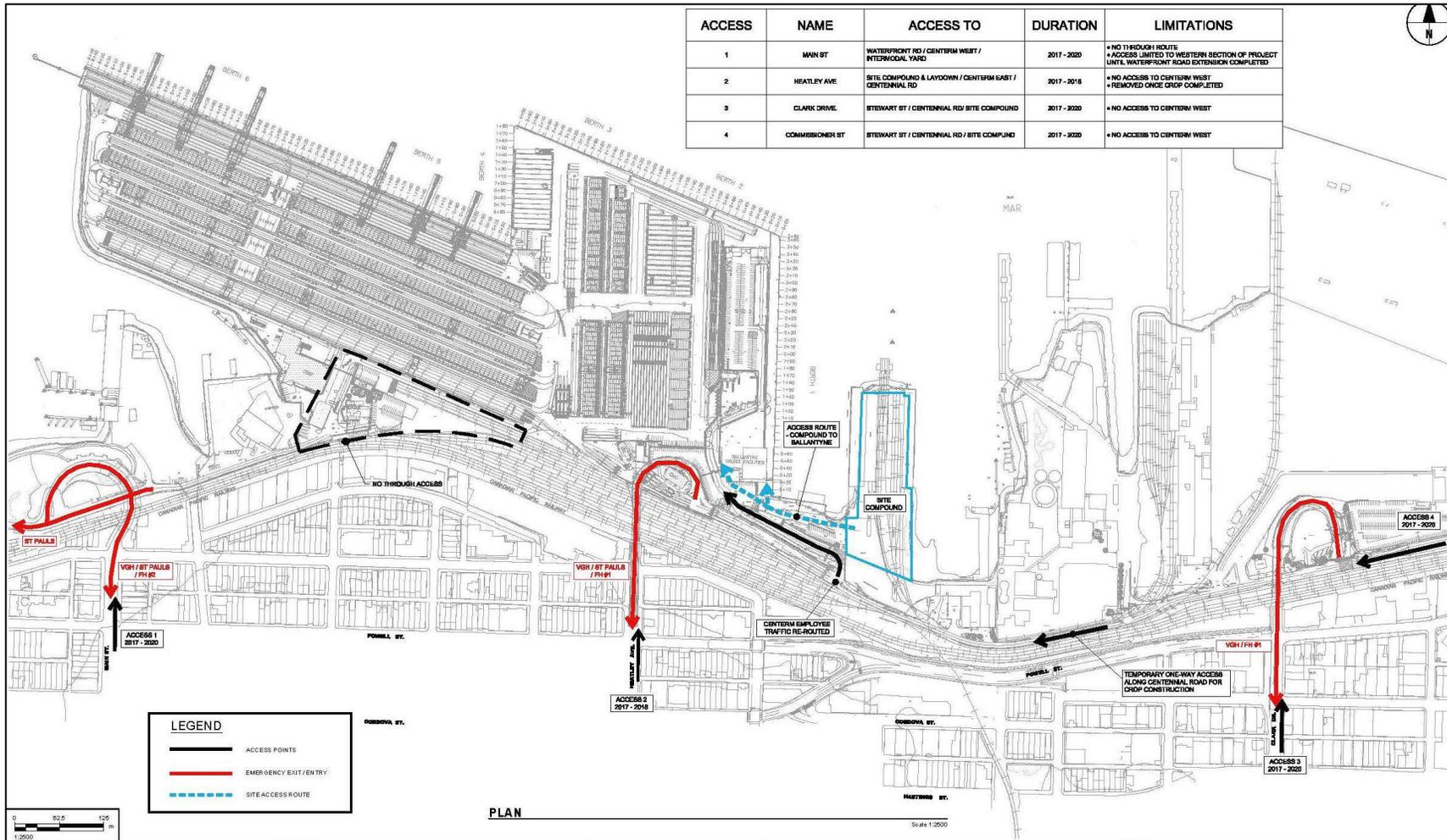


Figure 5-1: Site Access and Emergency Routes

## 5.2.2 Access

Access to the proposed Project is limited due to security restrictions related to the port lands and the Terminal. Port lands are a marine security zone, requiring access via a vehicle access control system (VACS) gate. The Design Builder will be required to establish access with the port authority's processes. VACS gates are currently located at the Heatley Avenue, Clark Drive, and Commissioner Street access points to the port lands.

There are currently no VACS present on the Waterfront Road access route, but one will be added as part of the proposed Project; this route ends at Dunlevy Avenue where the Centerm Maintenance facility gate is located. Entry to the Terminal through the Dunlevy Avenue gate provides limited access to work zones. These would be the intermodal yard and the western expansion area only, as passage through the Terminal to the eastern side of the terminal is prohibited.

Additionally, the Terminal is a customs sufferance area with restricted access. Access to and from work sites on the Terminal will be controlled. Vehicles will be required to proceed directly from the Terminal entrance to the work zone contained behind a security perimeter fence.

## 5.2.3 Site Compound / Laydown

The Design Builder's site compound is expected to be situated on the Burrard Slip east of Centerm. This site, accessible directly from Centennial Road, has up to 1.5 ha, with additional space potentially available on the pile and deck structures on-site. However, these structures are not considered structurally sound, and the Design Builder would be required to obtain an engineering assessment of these structures before they can be used.

The compound will house Design Builder offices, lunchrooms, and parking lot, and will provide the primary laydown area for construction materials and local fabrication activities.

There is limited opportunity to establish laydown areas on the Site. Any available space will be needed to reposition container storage to establish work zones. Therefore, only small laydown areas are anticipated as part of work zones established on the Site. These will be for storage of materials for immediate use at that work zone only.

For marine works, materials will be barged in to the work zone from other facilities on the Burrard Inlet as there is no available loading area adjacent to the Terminal. Material loading cannot be accommodated at Centerm berths.

Access between the site compound and the work zone(s) will be limited. Works at the east end of the Terminal will be accessible from the compound without restriction as a perimeter security fence can be established between the work zone and the Terminal, and an access route established to the site compound.

## 5.2.4 Mitigation and Management Measures

The following BMPs will be applied:

- A detailed Construction Traffic Management Plan (TMP), including traffic control measures, incident management, and communications plans, will be developed by the Design Builder.
- Site compound and laydown area(s) will be established close to the work zones to minimize traffic between work zones and laydown areas.
- Stakeholders affected by proposed Project access to the Terminal will be notified about proposed Project access requirements and expected road traffic impacts, including from traffic on adjacent public roads. Notification will be through the processes established by the TMP.
- Speed limits will be reviewed and updated, if necessary, on roads within the proposed Project footprint, with consideration to proposed Project-related road uses and associated hazards.

- Signage will be updated to indicate revised speed limits and any other necessary information.
- Access to Main Street Dock will be maintained to allow continued access by police and fire crews.

## 5.3 Air Quality

### 5.3.1 Introduction

Air emissions generated during construction of the proposed Project will consist of emissions from vehicles, mobile equipment and generators, and airborne dust.

### 5.3.2 Mitigation and Management Measures

The following BMPs will be applied:

- Dust will be controlled for the duration of the work.
- Environmentally acceptable dust suppressants or water will be used to control dust on access roads, laydown areas, work areas, and disposal areas.
- Oil will not be used as a dust suppressant.
- Speed limits will be applied for mobile diesel equipment, and will be adjusted if required to reduce fugitive dust emissions.
- The time that unpaved surfaces are exposed will be minimized.
- Handling of soils and aggregates will be minimized, and double handling of spoil avoided.
- Disturbed soils will be compacted where possible, and potential dust sources will be watered or covered.
- Storage piles, including sediment temporarily stockpiled on barges, will be managed by appropriately shaping, installing enclosures around them, or covering them.
- Drop height from loaders to haul trucks will be minimized at material transfer locations.
- Truckloads of fine-grained materials will be covered during hauling.
- Activities that create fugitive dust will be reduced during dry and windy conditions.
- Mud and dirt track-out from construction sites will be controlled.
- Run-off from dust mitigation measures (dust suppressant or water) will be managed in accordance with the Storm Water Pollution Prevention Plan, and under no circumstances will run-off containing deleterious substances be allowed to leave the site.

Emissions from vehicles, mobile equipment, and generators will be controlled; control measures will include:

- Optimize truck loads to reduce the number of trips between the source and destination.
- Maintain fleet vehicles and equipment according to manufacturers' guidelines.
- Operate equipment within load tolerances and ratings and minimize cold starts.
- Use modern machinery and commercially available low-sulphur fuels.
- Do not burn oils, rubber, tires, or any other material at the site.
- Use stationary emission sources, such as portable diesel generators or compressors, only as necessary and turn them off when not in use.

- Turn off engines when not in use, or reduce to idle or a setting appropriate for reducing air emissions.
- Inspect equipment for emission control measures.
- Inspect vehicles and equipment on a regular basis and maintain them in good working order.
- Perform routine, daily checks of the exhaust system of all equipment to identify actual or potential deficiencies.
- Implement an anti-idling policy for construction equipment and vehicles that conforms with the established port authority policy and Non-Road Diesel Emissions Program.

## 5.4 Noise, Vibration, and Light Management

### 5.4.1 Introduction

During the construction of the proposed Project, noise, vibration, and additional light will result from various activities, including heavy equipment use. Potential effects may include disturbance of nearby residents and local marine life in the vicinity of the Terminal.

### 5.4.2 Mitigation and Management Measures for Noise and Vibrations

The following BMPs will be applied:

- With the exception of marine dredging and land reclamation activities that would be required to run 24 hours per day, construction activities will be limited to the hours of 7:00 a.m. to 8:00 p.m., Monday to Saturday, excluding holidays. Should construction activities be required outside these hours, the Design Builder must contact the CEP Team to determine whether exceptions are permitted. The Design Builder will not operate outside the stipulated work hours without written approval from the CEP Team.
- A certified professional will calibrate equipment that emits noise and vibrations using manufacturer specifications for optimal performance, limiting the emission of unnecessary noise and vibration disturbance to the surrounding area.
- All equipment will be properly maintained to limit noise emissions, and equipment will be fitted with functioning exhaust and muffler systems as applicable.
- Machinery covers and equipment panels will be well fitted and remain in place to muffle noise, and bolts and fasteners will be tight to avoid rattling.
- Use of engine brakes is prohibited in and around residential areas.
- Local residents will be notified of any activities that could be noticeably audible from their residences, and the duration of any noise, and they will be provided with contact information for making complaints.
- Noise complaints will be reviewed to identify any compliance issues and establish corrective and preventive measures.
- Any noise complaint will be provided to the the PER Team (through CEP Team reporting protocols) within 48 hours of receiving the complaint.
- Short-term sessions will be used to reduce noise impacts when high-noise activities are necessary.
- Pre-emptive measures, such as temporary noise barriers, will be used during noisier demolition and construction activities.

- A “soft start” of equipment will be used during construction of any marine works to alert marine fauna to slowly disperse from the area.
- Travel routes will be selected that avoid noise-sensitive receptors.
- Transportation of materials related to marine dredging and land reclamation activities will be carried out by marine vessels to limit construction vehicles on local city streets.
- Stationary equipment will be positioned to minimize noise whenever possible.
- Heavy equipment will be shut down when not in active use whenever practical.
- All personnel will be trained on strategies planned for mitigating noise and vibrations.

### 5.4.3 Mitigation and Management Measures for Fugitive Lighting

A detailed Lighting Management Plan will be developed by the Design Builder and will include the following BMPs:

- Directional lighting will be used whenever appropriate and necessary to minimize effects on people and wildlife.
- Motion-activated lighting will be used, where feasible, to reduce light pollution.
- It will be determined when daytime ambient light levels are sufficient for operations, and opportunities will be identified for reducing or eliminating artificial lighting.
- Established lighting guidelines from the Canada Green Building Council program of Leadership in Energy and Environmental Design (LEED) will be referenced for facility-specific designs.

BMPs developed by organizations like the International Dark Sky Association ([www.darksky.org](http://www.darksky.org)) to eliminate light pollution will be taken into account during construction to minimize or eliminate lighting effects on neighbours and wildlife. Those practices include:

- Lighting will be provided only where it is required for work, safety, or security.
- Lights will be turned off when not in use.
- Lighting will be focused on the purpose and avoid excessive illumination.
- Timers, dimmers, and motion sensors will be used whenever possible.
- Only “full cut-off” or “fully shielded” lighting fixtures will be used that prevent fugitive light above the 90-degree angle.
- Energy efficient LED lighting sources and fixtures will be used throughout the work.
- Only lighting sources with correlated colour temperature (CCT) no higher than 3000K will be used. Fixtures that are 3000K or less emit less blue light. Exposure to blue light at night has been shown to have harmful effects on people and wildlife (International Dark Sky Association 2015).

## 5.5 Machinery and Equipment

### 5.5.1 Introduction

A wide range of machinery and equipment will be used during construction of the proposed Project. This component of the Draft CEMP will be used to help ensure that machinery and equipment are selected to minimize diesel emissions so that they are properly maintained and inspected, and those risks from spillages of fuel and

other hydrocarbons are minimized. A list of all major pieces of equipment and machinery that are expected to be used during construction will be provided to the CEP Team prior to construction.

## 5.5.2 Mitigation and Management Measures

The following BMPs will be applied:

- Each piece of equipment will be inspected before mobilization to the site to ensure it is in good operating order and free of leaks, excess oil and grease, invasive species, and propagules of noxious weeds.
- Heavy machinery working over, next to, or in water will be clean, well maintained, and leak-free.
- Preventive maintenance and inspection requirements will be adhered to for each piece of machinery and equipment.
- Spill containment kits will be held onboard construction equipment, where required.
- Machinery and equipment will be refueled in accordance with requirements of the fuel management component of the Draft CEMP (Section 7).

## 5.6 Erosion and Sediment Control

### 5.6.1 Introduction

During the construction phase of the proposed Project, soils excavated and exposed can create the potential for erosion of sediment into the marine environment. The proposed Project will proactively apply control measures to prevent increased runoff, protect fish and fish habitat, and avoid increased sedimentation to the marine environment. The construction Erosion and Sediment Control Plan and Stormwater Pollution Prevention Plan will be prepared by the Design Builder prior to the start of construction.

### 5.6.2 Mitigation and Management Measures

The following BMPs will be applied:

- Any areas prone to sedimentation will be identified and, if necessary, site-specific plans or work methods will be developed, as applicable.
- Erosion and sediment control measures will be developed as part of work planning and will be consistent with the scale of the work, sensitivity of the receiving environment in proximity to the work area, anticipated weather conditions, and tidal flows for marine works. Erosion and sediment control measures will include:
- Installation and maintenance of effective erosion and sediment control measures on land including straw bales, gravel for check dams, settling ponds, water diversions, and turbid-water collection sumps.
- Isolation measures such as silt curtains or silt boom for containing and managing suspended sediment where in-water work such as dredging is required.
- Clean water will be diverted around construction areas to minimize the chance of erosion.
- Environmental monitoring will include the regular assessment of the effectiveness of erosion and sediment control measures to determine whether erosion and sediment control measures are functioning as intended. Monitoring will be undertaken weekly at a minimum, immediately after storm events, and daily for higher risk activities.

- Erosion and sediment control measures will be left in place until local construction works are complete and the EM determines they are no longer required.
- Appropriate, site-specific methods will be identified for stabilizing exposed soils and mitigating erosion and sedimentation, such as seeding with an appropriate mix and method.

## 5.7 Contaminated Soil and Groundwater Management

Details on the proposed soil and groundwater measures are contained within the already developed Draft Soil Management Plan (AECOM 2017a). The Design Builder will refine and further develop the Soil Management Plan based on the final design and their selected methods for carrying out the construction.

## 5.8 Vegetation and Wildlife Management

### 5.8.1 Introduction

There are no rare or endangered plants recorded on the site that would require protection during construction of the proposed Project. The limited and weedy nature of vegetation reflects that the existing site is paved for industrial use. The most likely potential effect of clearing the existing vegetation would be to cause the spread of invasive and noxious weeds.

Wildlife habitat within the footprint of the proposed Project is therefore limited to small pockets of herbaceous plant species (mostly invasive weeds) and a few trees. Mitigation measures listed below are focussed on the need to prevent and control introduction and spread of invasive plants and protect nesting birds.

### 5.8.2 Mitigation and Management Measures

The following BMPs will be applied as part of terrestrial wildlife and vegetation management component of the Draft CEMP.

#### 5.8.2.1 Vegetation

- Where possible, without limiting operational uses of adjacent spaces, opportunities will be explored to relocate existing trees.

#### 5.8.2.2 Nesting Birds and Wildlife

- Clearing of vegetation or demolition of structures that could support nesting will be scheduled to take place outside the bird breeding and fledging period (March 15 to August 15).
- If site preparation or demolition is to take place during the bird breeding and fledging period (March 15 to August 15), a nest survey will be conducted to determine whether there are any active nests in any trees, shrubs, buildings, or other structures. If an active nest is found, it will be left undisturbed until young have fledged and left the nest.
- Any tree removal will be planned in advance with the CEP Team in accordance with port authority guidance.
- All construction sites will be maintained free of wildlife attractants such as food, garbage, petroleum products, or other materials with strong odours. Where garbage containers are required, it will be ensured that containers are inaccessible to wildlife.

### 5.8.2.3 Invasive Species

- Earth-moving equipment will be cleaned to remove any foreign soil and vegetation prior to entering the construction site.
- Any surficial material taken from any areas infested with weeds will be covered and the material stockpiled on-site to avoid the spread of seeds.
- Noxious weeds and other invasive plants will be fully removed and properly disposed of, as appropriate. All noxious weeds and invasive plant species will be disposed of in accordance with the local municipal Green Waste Program and at a facility equipped to handle invasive plant waste.
- No invasive species will be used to establish new/replacement landscaping and riparian zones.
- Only species native to British Columbia, or other appropriate species approved by the Owner, will be used to establish new/replacement landscaping and riparian zones.
- After surficial material is taken from an infested area, its movement will be restricted and it will be covered.
- If any areas within the proposed Project footprint result in exposed soils, native vegetation will be used for site restoration and erosion control or alternative methods until a permanent method of erosion protection can be applied.

## 5.9 Concrete Works and Grouting

### 5.9.1 Introduction

Construction activities associated with the proposed Project will require concrete and grouting. It is expected that concrete will be batched at off-site facilities and transported to the Site in mixer trucks. Should large concrete works be required over a sustained duration, a small batching plant may be established at the Site. In this event, the Design Builder will develop a separate Batching Management Plan that includes proposed environmental mitigation measures.

### 5.9.2 Mitigation and Management Measures

The following BMPs will be applied:

- Where feasible, concrete will be poured and grout work conducted in isolation from standing or flowing water.
- After placement, fresh concrete or other products containing Portland cement will be isolated from any waterbodies, and from overland flows hydraulically connected to waterbodies, for at least 72 hours or until cured, and for any additional period specified in environmental permits.
- An impermeable cover will be used to protect fresh concrete pours from rainfall until the concrete cures to prevent runoff of concrete-laden water, and use accelerants if appropriate.
- Any open bags of cement mix will be covered to protect them from rain and wind.
- Smaller concrete mixers will be placed on tarps, polyethylene sheeting, or some other suitable ground-protection cover.
- Water potentially high in pH and turbidity and flowing from areas where pours and other concrete or grouting works are recent or ongoing will be contained, the water pH will be tested, and water high in pH or turbidity will be treated prior to release to receiving waters, or removed to an approved off-site disposal facility.

- Where uncured concrete is placed in marine waters, measures will be implemented to keep fish away from the area until it is properly cured (up to 72 hours). If necessary, carbon dioxide will be used to reduce pH levels if they exceed 8.7 pH units<sup>1</sup>.
- Carbon dioxide (CO<sub>2</sub>) tanks with regulators and diffusers will be available on-site and construction personnel will be trained in the use of CO<sub>2</sub> to manage pH.
- An EM will be on hand to monitor pH levels in adjacent waters for all concrete and grouting activities where there is a risk of ingress to the water.
- Where feasible, secondary containment will be used when concrete is poured over or immediately next to water. Where secondary containment is not feasible for concrete pours directly over, in, and next to water, tanks of CO<sub>2</sub> with regulators and diffusers will be maintained on-site and at a location available for immediate deployment.
- Environmental Work Plans will identify measures to prevent potentially deleterious materials, including concrete and grouting, from entering sensitive environments.
- Appropriate cleanup material for spills of concrete products will be maintained readily available on-site.
- Wash water will not be discharged from concrete trucks directly to the ground. Wash water in volumes that cannot be treated on-site will be captured and removed for treatment and disposal at an approved off-site facility.

### 5.9.3 Re-use of Concrete

Reclaimed concrete material (RCM) sourced from demolition of Ballantyne Pier and the Marginal Wharf may be incorporated into new, non-structural concrete, asphalt, or road base provided the following requirements are adhered to:

- It meets structural and gradational requirements for the intended purpose.
- The deepest extent of burial is limited to 1 m above the high groundwater level.
- The burial area is capped with an impervious surface such as asphalt or concrete.
- Storm water is diverted away from the buried RCM.
- Groundwater monitoring wells are installed to a manner and depth appropriate for monitoring potential groundwater contamination from the RCM. There shall be at least one well for any area with RCM and an additional one well per hectare for any and all areas with recycled asphalt product and/or RCM that are more than 1 ha in size. A groundwater monitoring plan will be developed and implemented to demonstrate that the RCM is not causing adverse environmental impacts. The groundwater monitoring plan will be submitted to the CEP Team for review and approval.
- RCM is not to be used as fill within utility corridors.
- The fine fraction (<2 mm) is removed from the RCM and disposed of appropriately.
- The RCM is free and clear of metal, wood, plastics, and other debris.
- No concrete with coatings (asphalt, tar, etc.) is used in RCM.
- On-site crushing meets all requirements and constraints for dust and air emissions.

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<sup>1</sup> The BC Water Quality Criteria for the protection of aquatic life in marine waters has been used here as it is more restrictive than the CCME value and was set to be protective of marine molluscs.

## 5.10 Marine Works (Working In or Near Water)

### 5.10.1 Introduction

The Project encompasses work activities in and near water. Protection of the marine environment (water quality, fish and fish habitat, marine birds, and marine mammals) will be a priority during any in-water marine works. Safety is also critical given that Burrard Inlet is a working harbour and there is substantial vessel traffic operating around Centerm. This section of the Draft CEMP outlines the mitigation measures to cover working in an around water and includes:

- Marine Operations Safety
- General Practices Applicable to All in-Water Work Activities
- Protection of Marine Resources
- Dredging – Load Site
- Dredging – Disposal Site
- Fill Placement

### 5.10.2 Mitigation and Management Measures

#### 5.10.2.1 Marine Operations Safety

The following BMPs will be applied as part of the marine operations safety component of the Draft CEMP.

- All proposed Project-related marine operations will be based on requirements outlined in the Port Information Guide, which contains the required practices and procedures designed to promote safe and efficient operations within the areas under port authority jurisdiction (PMV 2016).
- Marine event permits will be obtained from the port authority when required, prior to working in waters surrounding the Terminal area.
- All marine activities will be coordinated with Canada Place cruise terminal and SeaBus operations.
- The height of all marine construction equipment will be limited to avoid aerial encroachment onto the final approach and take-off path for helicopters and sea planes.

#### 5.10.2.2 General Practices Working In or Near Water

- The Design Builder will develop and implement work plans for work activities in or near water that defines the mitigation measures and procedures to be followed and that are sufficiently robust to protect marine resources and maintain compliance with the applicable CCME Water Quality Guidelines (WQGs) for Protection of Aquatic Life.
- Work activities in or near water will comply with all applicable permits and legislation including the *Species at Risk Act*, the *Fisheries Act*, Marine Mammal Regulations, and the CEPA 1999 and Disposal at Sea Regulations.
- Work activities in or near water will comply with all applicable mitigation measures and BMPs specified in this section of the CEMP and in other supporting sections, including specific attention to:
- Machinery and equipment (Section 5.5)

- Erosion and sediment control (Section 5.6)
- Fuel management (Section 7)
- The Design Builder will establish procedures for monitoring water quality to support effective management of water quality and demonstrate compliance with the CCME WQGs for Protection of Aquatic Life. Water quality monitoring will be conducted in accordance with Section 5.13.
- The Design Builder must demonstrate that, during the course of their work, they anticipate being in compliance with the CCME WQGs for Protection of Aquatic Life for TSS within a mixing zone of 100 m from the outer boundary of the dredge area where the work activity occurs.
- The Design Builder will establish a procedure for implementation of stop work orders, if required (Section 3.3).

### 5.10.2.3 Protection of Marine Resources

The following BMPs will be applied:

- The construction schedule for in-water works will comply with any timing restrictions established by Fisheries and Oceans Canada (DFO) in the *Fisheries Act* Authorization for the proposed Project.
- Dredging is proposed to occur during the published least-risk in-water work window set by DFO for Burrard Inlet to protect marine species from August 16 to February 28 of any year.
- It is anticipated that, because of the type of marine construction activities involved and the mitigation measures proposed, that, with the exception of dredging, marine construction could occur throughout the year. It is anticipated that the following in-water construction activities can occur in timeframes that extend beyond the least risk window:
  - demolishing the old pile-supported dock at the east end and infilling with structural fill (if this work is done between March 1 to August 15, barriers will be put in place to prevent demolition debris from entering the water);
  - creating rock dykes to contain the structural fill;
  - installing caissons or piles and deck at the west end of the berth extension to the Terminal; and
  - using structural fill to infill areas to the east and west of the Centerm dock.
- Prior to construction, the Design Builder will identify any additional pre-construction fish and fish habitat surveys that may be required.
- The potential for physical harm to fish during dredging, infilling, and demolition will be reduced by:
  - salvaging and relocating crab and sea cucumbers prior to the start of dredging or deposition of sand for infilling;
  - using a diver or other underwater observation techniques to assess the presence of fish and determine whether additional measures are required to move fish or exclude fish from the work area;
  - implementing methods to reduce the risk of fish entrapment during dyke construction and infilling of the eastern and western expansion areas;
  - starting work at a slow pace to provide mobile species the time to move from the construction area; and
  - using clean fill (i.e., less than 5 percent fines) that has limited potential to elevate TSS or turbidity outside the construction area.

- The productivity of fish and fish habitat will be maintained around Centerm by finishing the rock dykes with rock of diameters ranging from 195 mm to 600 mm. Where practical, additional larger riprap shall be included to increase habitat for macrophytes and macro invertebrates, and interstitial habitat for adult fish.
- A monitoring plan will be developed to assess the effectiveness of the replacement habitat prescribed for the proposed Project.
- The following will be implemented to manage demolition of structures in or near water:
  - Demolished concrete shaft foundations will be cut off below grade or buried within fill.
  - Demolition of the pile supported structures (above-water demolition) will, to the extent practicable, be managed to avoid any products of demolition from entering the water.
  - Measures will be implemented to prevent materials falling into bodies of water during the course of demolition, construction, and stockpiling of materials. This will include barriers, hoardings, and netting as appropriate.
  - Containment booms will be placed around the demolition area to contain any fugitive floating materials or other potentially deleterious substance that may enter the marine environment.
  - Construction debris or material not contained will be recovered from the marine environment at the earliest opportunity.
- Potentially adverse lighting effects will be reduced by adopting BMPs for lighting as described in Section 5.4.
- Barges or other vessels will not be allowed to ground on the foreshore or seabed, or to otherwise disturb the foreshore or seabed, including disturbance from vessel propeller wash.
- Work plans for marine works will include procedures to identify any potential risks to mammals present in the adjacent waters and to establish mitigation measures. Mitigation measures will include:
- Observing existing requirements for vessel speeds within Vancouver Harbour to mitigate potential interactions between vessels and marine mammals; and
- Implementing slow start-up procedures for dredging, infilling, and vibro-densification in-water work. This measure will alert marine mammals and fish in the vicinity of the activity to leave the area.
- Piling in the water is not currently part of the design for the proposed Project, but should piling be incorporated into the design, the following measures will be taken during pile driving:
  - To the extent practicable, a vibratory pile driver will be used rather than an impact hammer. The piles will initially be installed using vibratory methods, with an impact hammer only employed for the final embedment into till and bedrock
  - Simultaneous driving of multiple piles will be avoided to the extent possible
  - An exclusion zone for marine mammals will be established based on hydrophone monitoring and recording of pile driving-generated noise. The extent of the exclusion zone will include all marine areas where Project-generated noise (measured in SPL) exceeds the level of 160 dB root-mean-square (RMS) re: 1  $\mu$ Pa
  - If the amount of in-water noise is anticipated or observed to change, Project-generated noise will be reassessed and the extent of the marine mammal exclusion zone may be adjusted as necessary
  - Pile driving will be stopped immediately if threshold noise limits are exceeded (described under monitoring measures below) or distressed, injured or dead fish are observed

- If work is stopped due to elevated underwater noise levels, one or more of the following additional measures to reduce the sound pressure waves will be implemented before the work is resumed:
  - installing single or double bubble curtains
  - using noise-abatement pile sleeves
  - installing hydro-sound dampers (net mounted foam or plastic elements to limited sound)
- Post-construction survey of the footprint of the actual development will be conducted to confirm that the final areas affected are consistent with the areas described in the *Fisheries Act* Authorization application or any modifications made during the final design and approved prior to the start of construction.

#### 5.10.2.4 Dredging – Load Site

- A Draft Dredging Plan will be developed in support of a Disposal at Sea permit. The dredging methods that will be used to minimize turbidity and achieve turbidity performance levels will be finalized during the final design. The Design Builder will update the Dredging Plan to ensure that it is consistent with site-specific dredging procedures and is sufficiently robust to ensure the continued protection of marine resources.
- To minimize turbidity, dredging activities will be planned to take into account optimal tidal conditions.
- Fugitive dredgeate will be managed by using sediment booms or semi-permeable enclosures (silt curtains) that create a barrier to constrain the movement of fugitive sediment particles and reduce the magnitude and distance of construction-related turbidity plumes. The Dredging Plan will include methodology and design specification for installation of silt curtains.
- Any anthropogenic material found during the dredging program will be separated and contained on-site and then disposed of off-site at an approved facility.
- Communications and logistics procedures will be established for all dredging work, particularly with regard to the navigation dredge near the SeaBus terminal.
- Procedures will be established to identify “hot spots” in the top 1 m (or deeper if necessary) of sediments within dredge areas that do not meet CCME Soil Quality Guidelines for Protection of Environmental and Human Health (CCME 2007) for industrial land use and divert them for disposal at an approved off-site facility.
- Procedures will be established to conduct confirmatory sampling following the completion of initial dredging of unsuitable material to provide assurance that the remaining sediments are suitable for disposal at sea. All sampling and testing will be carried out in accordance with the confirmatory Sampling and Analysis Plan that was submitted to Environment & Climate Change Canada (ECCC) with the Disposal at Sea permit application (AECOM 2017d).
- Procedures to manage the upper 1 m of marine sediments prior to placement in the secure area of the eastern expansion (i.e., behind the east water lot dyke (Area 1 Dyke) and to ensure that sediments are not deposited in this area until it is isolated from marine waters. Surficial sediments will be removed using an environmental clamshell bucket for precise removal.

#### 5.10.2.5 Dredging – Disposal Site (Point Grey DAS Site)

- The Design Builder will develop a Dredge Material Disposal Plan that includes transit to and disposal at the proposed disposal site.
- Vessel operators will be appropriately trained and qualified and familiar with the operational area.
- Vessels will be appropriately marked in accordance with regulations administered by Transport Canada.

- The dredge material to be disposed of will have the appropriate physical characteristics for disposal and will meet the criteria outlined in the Disposal at Sea Regulations of CEPA 1999. The suitability of sediment for disposal at sea will be confirmed through additional sampling subsequent to the removal of surficial sediment but prior to removal of deep sediment.
- Every reasonable effort will be made to minimize any overflow or spillage from the barges during transit.
- Direct or indirect releases of water containing elevated TSS or elevated turbidity will be minimized or managed in transit.
- Barges destined for the disposal site will only transit under suitable conditions to minimize chances of spillage en-route.
- The most direct navigational route from the load site to the disposal site will be taken.
- All disposal activity will occur within the specified disposal site boundaries.
- Disposal time will be minimized to the extent possible.
- Work will be coordinated with optimal tidal conditions to avoid maximum tidal currents that could increase the transport distance of turbidity.
- Timing windows specified by DFO will be followed to protect sensitive species at vulnerable times.

#### 5.10.2.6 Fill Placement

A detailed Fill Placement Plan will be developed by the Design Builder and will include the following BMPs.

- To minimize turbidity, infilling will be planned to take into account optimal tidal conditions.
- Current design indicates that the rock dyke and fill placement will be done in stages. If there is a prolonged stoppage of work between stages, subtidal and intertidal areas will be surveyed for the presence of juvenile and adult crabs and fish. If any are found, attempts will be made to capture and relocate the animals to a suitable adjacent area away from construction.
- Construction materials will be used that are free of organic material, contaminants, and deleterious substances (i.e., substances harmful to fish) for works associated with the proposed Project, including materials to be used for fill, ground improvement, and seabed armouring or surfacing.
- Placement of dredge sediments in the east water lot will only occur after the Area 1 Dyke is completed and fully contains the east water lot as a temporary lagoon in preparation for infill.
- Prior to construction of the containment dyke for the east side expansion area, initial dredgeate (i.e., the top 0 to 1.0 m) will be temporarily stockpiled with suitable containment, either on barges or on land within or near the project area.
- Dredgeate handling and transfer procedures shall be required and could include:
  - Sediment is transferred to a containment facility on a barge or on an upland containment area on site where the water and solids are separated.
  - The decant water is collected in a containment tank.
  - The water is tested to determine whether it meets CCME Water Quality Standards.
  - Water that meets CCME standards can be discharged to the marine environment.
  - Water that does not meet the standards will require treatment before it is discharged or it will be collected and hauled away for disposal at a suitable location.

- Construction of the Area 1 Dyke will require the adoption of a filter layer system combined with geotextile (filter cloth).
- Dredgeate material suitable for beneficial reuse will be placed behind the Area 1 Dyke at a depth at least 1 m below low low water level and at least 25 m (plan distance) from the high high water level mark where the marine waters meet the outer face of the perimeter dyke.
- Groundwater monitoring wells will be installed in the east dyke during construction to facilitate a multi-year post-construction groundwater monitoring program.

## 5.11 Archaeological Resources Management

### 5.11.1 Introduction

The 2016 Archaeological Overview Assessment (AOA) for the proposed Project indicates a possibility that archaeological sites at and near the proposed Project site may have been affected by historical industrial development of the shoreline, which has been extensively modified and disturbed, including considerable filling and capping of the foreshore.

The AOA identified that any disturbances to the foreshore area and/or the removal of the pre-existing capping would have the potential to disturb existing (but currently unrecorded) subsurface archaeological deposits. The potential for archaeological sites is constrained due to the past impacts of construction and ground disturbance since the establishment of Hastings Saw Mill and the Canadian Pacific Railway. The mitigation measures will be used to minimize the risk of affecting archaeological resources.

### 5.11.2 Mitigation and Management Measures

The following BMPs will be applied as part of the archaeological resources management component of the Draft CEMP.

- Archaeological monitoring will be conducted during any work potentially affecting deposits below historic fill at the original shoreline.
- A Chance Find Protocol will be implemented in the unlikely event that archaeological materials are identified during construction and will include:
  - an archaeological monitor to be on-site during any deep excavations;
  - an archaeologist to provide awareness training to equipment operators so that they know what artifacts might look like; and
  - a stop work and notification protocol if potential archaeological resources are identified.
- Personnel will be trained on how to recognize archaeological materials and how to implement the Chance Find Protocol.

## 5.12 Sensitive Habitat Features and Species

### 5.12.1 Introduction

No SARA-listed fish species were recorded during the dive surveys around Centerm. Five SARA listed marine mammal species and subspecies have the potential to occur in the proposed Project area. The following mitigation

measures will reduce the risk of harm to marine mammals in the harbour listed on Schedule 1 of SARA, including injury due to noise or vessel strike, during in-water activities:

- Observing existing requirements for vessel speeds within Vancouver Harbour to minimize potential interactions between vessels and marine mammals
- Establishing an appropriate marine mammal exclusion zone for the work activity. Exclusion zones for specific work activities will be established based on potential for noise generation and risk of injury to marine mammals
- Stopping work if a marine mammal is observed within the prescribed exclusion zone for the activity, and recommencing work only when the animal has moved out of range
- Implementing slow start-up procedures for dredging, infilling, and vibro-densification in-water work (and pile driving work if piling is selected as an option). This measure is expected to result in marine mammals leaving the work area

As described above, should species of conservation concern or marine mammals be observed within the work area, measures to monitor and mitigate disturbance to these animals will be taken. Any incident or shut down of operations associated with species of conservation concern or marine mammals must be reported to the PER Team (via CEP Team reporting protocols).

## 5.12.2 Mitigation and Management Measures

Protection of marine resources (fish and fish habitat, marine birds, and marine mammals) will be a priority during any in-water marine works. This component of the Draft CEMP is also supported by other components, including Marine Works (Section 5.10) and Erosion and Sediment Control (Section 5.6). Terrestrial resources (vegetation and wildlife) protection is also supported by the Vegetation and Wildlife Management (Section 5.8) component.

## 5.13 Water Quality Monitoring

### 5.13.1 Introduction

Water quality will be monitored where and when there is a risk that work activities could adversely affect water quality (e.g., exposure of soils or concrete work close to waterbodies, in-water work).

### 5.13.2 Mitigation and Management Measures

The following BMPs will apply:

- The Design Builder will specify the water quality monitoring procedures that apply to work activities that could adversely affect water quality either as part of the environmental work plans for the work activity or as a separate monitoring plan. Water quality monitoring procedures will include:
  - the water quality parameters to be monitored;
  - sampling frequency;
  - location of monitoring points taking into account safety and navigational constraints associated with maintaining local marine traffic throughout the construction period;
  - actionable thresholds that trigger management response if limits are not met;
  - compliance limits consistent with federal and provincial water quality guidelines; and

- documentation and reporting requirements.
- Recordkeeping and environmental monitoring reports will be produced relating to any water quality sampling program.
- Monitoring procedures will be developed for managing pH during any concrete work in close proximity to a waterbody.
- Water quality sampling stations will be identified both within and outside (control site) of the work areas to be monitored during the construction phase.
- On-site monitors will be scheduled to observe the receiving environment for evidence of turbidity plumes, hydrocarbon sheens, grease, and iron bacteria.
- The results will be reported and adaptive management plans will be developed should the mitigation measures in place fail to achieve the required water quality criteria.
- Details for monitoring TSS/turbidity are contained within the Draft TSS/Turbidity Monitoring Plan (AECOM 2017c). The Design Builder will implement and update the Draft TSS/Turbidity Monitoring Plan as appropriate to reflect actual dredging procedures, site-specific conditions, and results of field testing the protocol. Implementing the protocol will include:
  - turbidity measured as nephelometric turbidity units will be used as a proxy measurement for TSS to enable real time measurement in the field;
  - monitoring will be conducted for the purpose of establishing whether actions are needed (e.g., temporary cessation or relocation) of dredge units, or other measures (such as silt curtains) to ensure compliance with CCME WQGs for Protection of Aquatic Life and policy; and
  - turbidity will be monitored against pre-defined turbidity limits as a way of guiding the rate of dredging to keep sediment levels to acceptable levels.
- The TSS performance standard of 5 mg/L above background for events more than 24 hours or 25 mg/L above background for events less than 24 hours (CCME WQGs), after cessation of activity, will not be exceeded. These standards are to be achieved within a mixing zone of 100 m from the dredge or infill area.
- Results will be reported and adaptive management plans invoked should the mitigation measures in place fail to achieve the required water quality criteria.

## 5.14 Stormwater Management

### 5.14.1 Introduction

Centerm has an established stormwater management system that includes remote-controlled outfalls on each side of the Terminal (north, east, south, and west) with oil/water separators to prevent any contaminated run-off from entering the marine environment. The existing systems would be maintained and expanded during construction to handle the surface flow from all new land surfaces. The stormwater system will remain operational during all periods of construction. However, disturbed soils and demolition of on-site structures have the potential to contaminate stormwater and divert stormwater away from the existing system. Stormwater is not considered wastewater by default, unless it becomes contaminated from interaction with pollutants on-site. Consideration of how the construction activities will affect the existing stormwater system and the measures that need to be applied to ensure any contaminated stormwater is captured and treated appropriately prior to release will be required. Stormwater will be managed according to the measures listed below and all applicable legislation.

Details on the proposed stormwater management measures are contained within the already developed Draft Stormwater Pollution Prevention Plan (AECOM 2017b).

## 5.14.2 Mitigation and Management Measures

The following BMPs will apply to stormwater management.

- All drainage and stormwater flows in and around the work sites will be managed.
- Physical barriers will be placed to prevent unrestricted passage of stormwater flows from the work sites to marine environments, including concrete walls, silt curtains, booms, and straw bales as appropriate.
- Flow-velocity controls will be instituted, such as sumps, baffles, and other containment measures.
- Stormwater flows from construction work sites will be regularly monitored to determine water quality and flow volumes.
- All outfalls will be equipped with remote-controlled oil/water separators.
- The Design Builder will adopt the Draft Stormwater Pollution Prevention Plan (AECOM 2017b) and update and expand the plan based on final design.
- The Design Builder's Stormwater Pollution Prevention Plan will detail the integration with existing stormwater systems, which must remain functional throughout the construction phase. Construction activities will include stormwater management measures to ensure discharges to the marine environment meet CCME WQGs for the Protection of Aquatic Life, and therefore, fish and fish habitat, marine birds, and marine mammals will not be affected.

## 5.15 Hazardous Materials Management

### 5.15.1 Introduction

The proposed Project will include the demolition or alteration of a number of on-site buildings. In addition, a portion of one off-site building (Canfisco) is expected to be demolished to facilitate the East Waterfront Road expansion. In February 2016, an *Asbestos Hazard Emergency Response Act* accredited building inspector and an Environmental Scientist performed a visual site assessment and identified a number of hazardous materials on-site, including asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCBs), ozone-depleting substances (ODSs), mercury and other heavy metals, abandoned chemicals, silica, and mould.

Based on the initial findings, subsequent hazardous materials site survey and sampling was conducted in August and September 2016. Suspected asbestos-containing materials and lead-containing paint were collected and submitted for laboratory analysis and came back negative. Sources of PCBs in electrical equipment (i.e., light ballasts), mercury switches, and ODS refrigerants were identified.

Alternative disposal options will always be considered. Guidelines are outlined in Metro Vancouver's Demolition, Land Clearing, and Construction DLC Waste Management Toolkit, which is a reference guide created for contractors, design professionals, and building owners to help maximize the amount of construction waste diverted from disposal through salvage, reuse, and recycling (Metro Vancouver 2008).

Prior to demolition or renovation, sampling will be conducted to confirm the hazards that will be encountered. The initial hazards and measures should be taken into account by the Design Builder in preparing the Demolition Plan and updating the Soil Management Plan. Discovery of contaminated materials within the electrical equipment or previously unassessed areas of the building during demolition, construction, or renovation will be sampled and analyzed and the Demolition Plan and Soil Management Plan updated.

Excavations will be generally limited to pavement structure depth and utility trenches and in many cases it will be appropriate to monitor the excavations for signs of contamination with confirmatory testing of excavation spoil. The Design Builder will develop activity-specific requirements for additional investigation and sampling for each required excavation.

## 5.15.2 Mitigation and Management Measures

The following BMPs will be applied as part of the hazardous materials management component of the Draft CEMP.

### 5.15.2.1 Asbestos-Containing Materials (ACM)

- If materials suspected of containing asbestos and not already identified by the surveys are encountered during demolition work, representative samples of the material will be collected and submitted for laboratory analysis to verify asbestos content.
- Disturbance of identified ACMs will be controlled during any renovations by using work procedures that meet WorkSafeBC requirements, specifically those prescribed in Parts 5.48-5.59 – Exposure Control Plan, and Parts 6.1 – 6.32 – Asbestos.
- The WorkSafeBC publication “Safe Handling of Asbestos, A Manual of Standard Practices” (WorkSafeBC Guideline) will be referenced during demolition activities. This document provides a guide to current practices that are to be followed in BC, basic information on asbestos and asbestos products, health hazards and requirements for worker protection, safe work procedures, and principles that should be followed in selecting the most suitable technique for the safe abatement of ACMs. Based on recommendations in the WorkSafeBC Guideline, asbestos-containing vermiculite block wall insulation will be abated following high risk asbestos abatement protocols. A structural engineer will be retained to review and approve the methodology for selective demolition or disturbance of the cinder block wall to remove vermiculite insulation.
- Wastes containing asbestos will be managed in accordance with requirements of the BC Ministry of Environment, and be transported in accordance with requirements of the Federal *Transportation of Dangerous Goods Act*.

### 5.15.2.2 Lead-Based Coatings

- LBCs that may be affected during restoration will be removed in accordance with the requirements of WorkSafeBC.
- Disturbance of LBCs will be controlled by using safe work procedures developed in accordance with the requirements of WorkSafeBC, specifically those prescribed through Parts 5.48-5.59 – Exposure Control Plan.
- Toxicity Characteristic Leaching Procedure testing will be conducted on identified lead-based paint, to identify the proper method for disposal of lead-containing wastes.
- Refer to the WorkSafeBC publication “Lead – Preventing Exposure at Work,” as it provides a guide to current practices that are to be followed in BC, including basic information on lead and lead products, health hazards and requirements for worker protection, safe work procedures, and principles that should be followed in selecting the most suitable technique for the safe abatement of lead.

### 5.15.2.3 Polychlorinated Biphenyls

Due to the operation of the building at the time of the survey, fluorescent light ballasts (in services) were not inspected; however, it is expected that the fluorescent light ballasts within the CEP do not contain any PCBs based on the age of the building. Upon the shutdown of the building, all fluorescent light ballast (out of services) within the CEP will be checked to confirm PCB content and verified by the date code (i.e., date code may be indicated at the back side of the ballast) referenced by Environment Canada’s publication – Identification of Lamp Ballasts Containing PCBs (August 1991) or manufacturer labeling.

- When each fluorescent lamp ballast is taken out of service, its PCB-content will be verified by comparing it with criteria in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, “Identification of Lamp Ballasts Containing PCBs.”
- Any light ballasts identified to contain PCBs will be removed in accordance with WorkSafeBC requirements.
- Wastes containing PCBs will be managed in accordance with requirements of the BC Ministry of Environment and transported in accordance with the requirements of the Federal *Transportation of Dangerous Goods Act*.
- If any operational fixtures contain PCBs, do not sell them for reuse.

#### 5.15.2.4 Ozone-Depleting Substances

- When taken out of service, ODS-containing equipment will be managed in accordance with requirements of the BC Ozone-Depleting Substances and Other Halocarbons Regulation.
- ODS-containing wastes will be transported in accordance with requirements of the Federal *Transportation of Dangerous Goods Act*.

#### 5.15.2.5 Elemental Mercury and Other Heavy Metals

- When taken out of service, mercury-containing wastes will be managed in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the Federal *Transportation of Dangerous Goods Act*.

#### 5.15.2.6 Abandoned Chemicals

- In the event of demolition, an inventory of abandoned chemicals will be generated in accordance with the *Hazardous Products Act*. The identification of chemicals with respective Material Safety Data Sheet will be completed prior to the demolition of the building.

#### 5.15.2.7 Silica

- The disturbance of silica will be controlled through the use of safe work procedures. Work procedures will be developed in accordance with the requirements of WorkSafeBC, specifically but not limited to include those requirements prescribed through Parts 5.48-5.59 – Exposure Control Plan.

#### 5.15.2.8 Mould

- Prior to demolition of the West Ballantyne Building, an intrusive mould assessment and sampling will be conducted to determine the demolition and disposal methodologies.

#### 5.15.2.9 Creosote Treated Timber

- The Design Builder, as part of the Demolition Plan and when updating the Soil Management Plan, will identify the procedures and handling technique, including stockpiling, for creosote-treated timber (including piles and rail ties).

### **5.15.2.10 Other Environmental Concerns**

- Any aboveground storage tanks and underground storage tanks will be decommissioned or relocated only in accordance with CCME's Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products, and other applicable regulatory requirements (CCME 2013).
- Based on available information, the subject property is located in an area of low radon potential. Radon is not expected to be an issue on-site.
- In the event of demolition, construction, or renovation of a building, unidentified hazardous materials found within the mechanical and electrical equipment of the building, and any other areas unable to be adequately assessed; representative samples will be sampled and analyzed.

## 6. Emergency Response

### 6.1 Emergency Communication

Communications for spill incidents will follow the requirements outlined in Section 6.3. Contact numbers for spill and any other emergency communications are listed in Table 6-1. This table will be finalised with the details for all organisations involved in emergency response.

**Table 6-1: Emergency Communications Contacts**

Organisation	Number
Emergency Services	911
Port Authority Operations	(604) 665-9086
Non-emergency police	(604) 717-3321
Non-emergency fire	(604) 215-4842
Coast Guard (non-emergency)	(604) 775-8881
Ambulance	(604) 872-5151
St. Paul's Hospital	(604) 682-2344

### 6.2 Environmental Emergency Plan

Risks of potential environmental emergencies may occur while construction is ongoing include, but are not limited to:

- reportable fuel spills
- sediment laden water leaving the site or entering a waterbody
- negative interactions with fish, fish habitat, marine birds, marine mammals, or terrestrial wildlife

The EM should be notified of all environmental emergencies. The EM should assess and record all incidents and determine appropriate action. All significant emergencies should be reported to Emergency Management BC (formerly Provincial Emergency Program) and the port authority's Operations Centre.

### 6.3 Spill Response Plan

#### 6.3.1 Introduction

DPWV has formalized spill response procedures within their Emergency Response Manual. This should be referred to for detailed information on spill response for land and water spills on and adjacent to the proposed Project site. The following spill-related elements are included in the Emergency Response Manual:

- chemicals or hazardous materials spill
- flammable liquid spill on dockface (no fire)
- major fuel or oil spill
- propane leak (no fire)
- reporting of spills

- procedures for reporting
- other immediate reporting
- water-side spills (including land spills)
- level above which spills must be reported
- spill containment and cleanup
- responsibility for cleanup
- containment of spills
- recovery and cleanup
- disposal of spilled materials

This existing DPWV Spill Response Plan applies to all areas under the direct control of DPWV throughout the duration of the project. Where sections of the Centerm project site are assigned to the Design Builder for construction activities, a Spill Response Plan covering all proposed activities on that section will be required, and must meet requirements of the existing DPWV Spill Response Plan, and as a minimum:

- Identify potential environmental emergencies that may occur.
- List spill abatement materials/equipment to be stored on the Project Site.
- Identifies responsible project personnel and contacts.
- Describe education procedures for training personnel with regard to emergency and spill response.
- Identify the containment and clean-up procedures.
- Describes the communications and reporting procedures.
- Is consistent, for activities occurring on the Terminal, with established protocols in operation as part of the DPWV Spill Prevention and Emergency Response Plan (DPWV 2016) for the reporting of spills of hazardous materials and other environmental incidents.

## 6.3.2 Mitigation and Management Measures

### 6.3.2.1 Spill Response Process

Figure 6-1 depicts two flowcharts from the DPWV Spill Response Plan that summarize the procedure for chemicals or hazardous material spills and major fuel or oil spills, respectively. The staff responsibilities, reporting of these and other incidents, and the level above which spills must be reported are also discussed below.

Additionally, there are a number of shut-off valves located throughout the site that are used by DPWV to isolate the site in the event of spill. These existing shut-off valves are to be incorporated into Design Builder's spill response process.

As described in the DPWV Operating Procedure Container Operations Spill Response V1.3, the following actions are implemented upon detection of a spill of deleterious substance within the storm water system:

- When an oil spill, fuel spill, or dangerous goods (IMDG/TDG) spill has leaked into or may potentially enter the drainage slots or catch basins shut down the storm outfall (if safe to do so).
- Refer to the Storm Sewer and Storm Shutoff Valve drawing and verify the drainage system by color. Note: Detailed drawing is located under the lid of all Yellow Spill response bins. Refer to Appendix D for a general layout of the outfalls and corresponding shutoff keys.

- Locate the appropriate storm shutoff valve and key.
- Remove the cover from the storm shut off valve.
- Insert the key and turn clockwise to close (until the key cannot turn anymore).
- Do not open the valve until spill has been cleaned up and the Manager of Safety & Environment has given permission.

### 6.3.2.2 Spills: General Staff Responsibilities

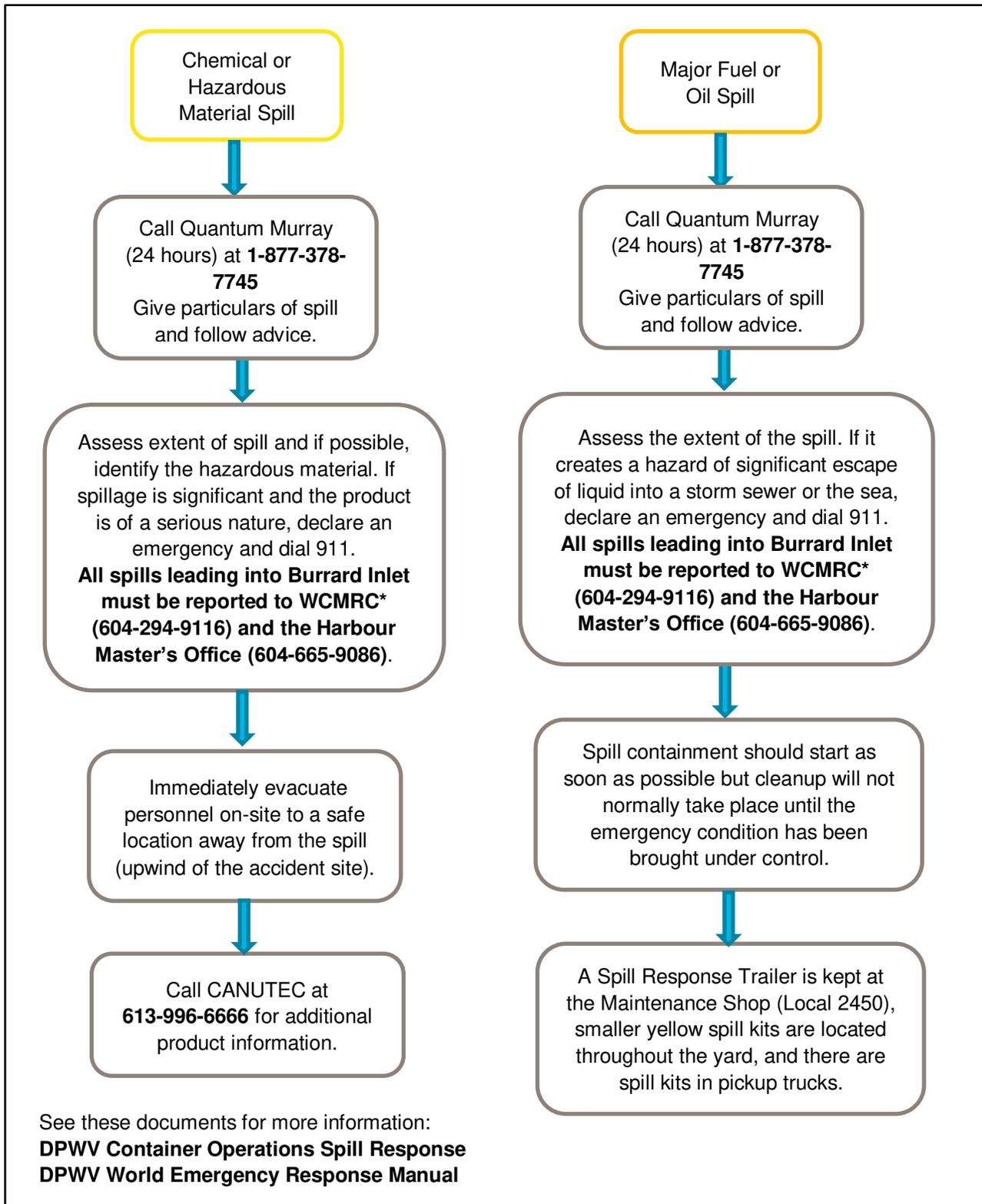
Everyone involved at site has the responsibility to take proper action when confronted with a spill. Depending on the size and nature of the spill, a person may attempt to clean up the spill themselves, but only if they are trained. A person should ask themselves the following questions:

- Are sufficient personnel available to clean up the spill?
- Do I know the hazards of the spilled material?
- Do I know how to protect myself from those hazards?
- Is the spill contained within the building? (Material entering the air, land, or water, or any drain, outlet, or exhaust fans is not contained.)

If the answer is “NO,” or “I DON’T KNOW,” to any of these questions, then LEAVE THE SPILL ALONE and call Quantum Murray (24 hours) at **1-877-378-7745**.

### 6.3.2.3 Reporting of Spills

All spills on the terminal will be reported to the DPWV Manager of Safety and Environment, who holds all responsibility for spill reporting. They will determine the need to notify regulatory agencies.



**Figure 6-1: Summary of Two Types of Spill Response Contained in the DPWV Emergency Response Manual**

\* WCMRC = Western Canada Marine Response Corporation

### 6.3.2.4 Spill Thresholds for Reporting

Within the *Transport of Dangerous Goods Act*, reportable levels for certain substances are listed, which depends on the material and circumstances.

Table 6-2 provides a breakdown of the substance spilled and specified amount at which point a spill must be reported.

**Table 6-2: Reportable Levels for Certain Substances**

Substance Spilled	Reportable Amount
Flammable, Non-Flammable and Non-Toxic Gases	10 kg
Flammable Liquids	100 L
Flammable Solids	25 kg
Toxic or Corrosive Materials	5 kg or 5 L
Dangerous Wastes	5 kg or 5 L
Pulp	200 kg
Agri Products	200 kg
PCB Wastes	25 kg or 25 L
Biomedical Waste	1 kg or 1 L

### 6.3.3 Plan Development and Further Measures

The Design Builder will develop site/activity specific plans for construction activities proposed. These plans must also meet the requirements of the existing DPWV Spill Response Plan and the requirements of this section of the Draft CEMP. The plan will be continually reviewed by the Design Builder, with communications and response processes refined throughout the construction phase.

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# 7. Fuel Management Plan

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## 7.1 Introduction

Fuel management is used to minimize the risk of fuels entering the terrestrial or marine environment. Spill response measures are provided in Section 6.3.

The location of the existing terminal vehicle fuel tanks and refueling areas is immediately west of the existing Container Site Servicing Facility, as shown on Figure 7-1.

New terminal fuel tanks and refueling areas are proposed in the north yard, adjacent to the internal transfer vehicle parking. Once these are established and operational, the existing fueling area will be decommissioned; no temporary, or intermediate fueling stations are anticipated.

The terminal fuel tank farm will be situated below the surface and designed and installed utilizing a non-combustible containment liner and concrete barrier perimeter, and will meet or exceed current fuel storage BMPs. The fuel farm will be signed and labeled to properly identify the contents, spill cleanup procedures, and fueling procedures and to prohibit smoking within 15 m of fuel storage facilities. This location is greater than 30 m from any water body.

Fuelling for Design Builder equipment will be managed from the Design Builder's site compound. Portable fuelling equipment may be used; however, fuelling procedures, CSA approved equipment, and BMPs will be required.

The fuel tank containment measures and setbacks from waterbodies for refueling and fuel storage areas will be confirmed prior to construction.

Refueling procedures specific to marine based equipment used for construction will be developed and provided by the marine subcontractor(s) as part of marine work methods (Section 5.10).

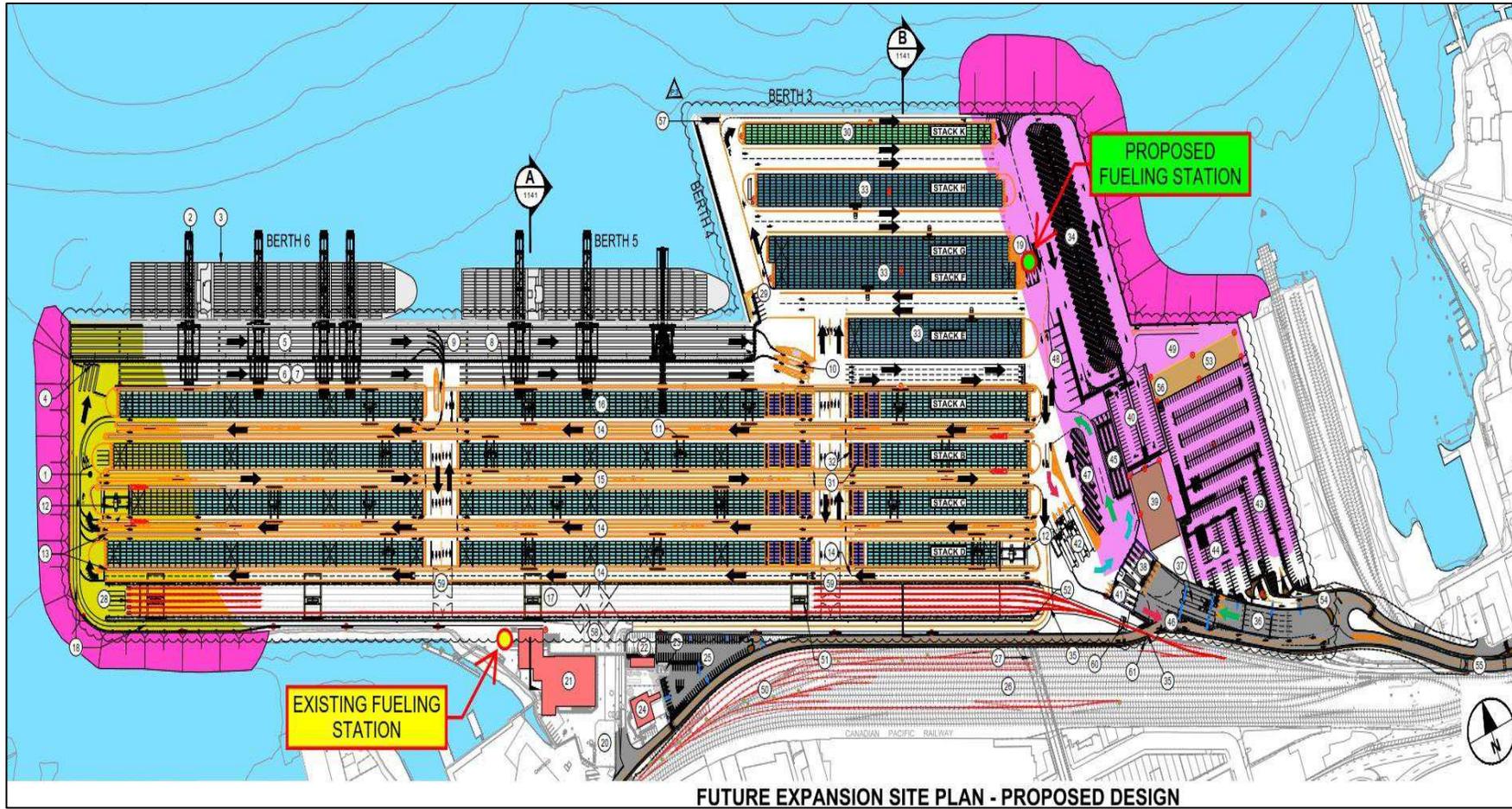


Figure 7-1: Fueling Station Locations

## 7.2 Mitigation and Management Measures

The following BMPs will apply to fuel management.

- Terminal fuel tanks and refueling areas will be sited away from the shoreline of the terminal.
- Established fueling locations and practices will be employed for marine operations, including refueling from barges, and work plans and methodologies will be established for fueling activities.
- Storage tank removal, installation and operation will meet the requirements of the Petroleum Products and Allied Petroleum Products Storage Tank Systems Regulations and the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- Fuel storage and refueling systems will be inspected and maintained in accordance with a regular schedule.
- Fuel deliveries and refueling will be conducted by trained personnel.
- All dispensing or transferring of fuel will be attended (by personnel trained in fueling procedures) for the duration of the operation.
- Re-fueling of equipment will comply with safe operating procedures to avoid leakages and spills to land or water.
- Refueling of equipment on barges will follow best management practices including double hulled tanks, automatic shutoff mechanisms on fueling hoses, etc.
- Refueling on land of excavators and other large-tank capacity machines will be set back at least 30 m from the water's edge and other ESAs (unless otherwise reviewed and accepted by the Environmental Manager).
- Appropriate spill kits will be available at the refueling site.
- Machinery will be washed, refueled, and serviced and fuels and other materials will be stored at a sufficient distance from the water to prevent any deleterious substances from entering the water.
- Refueling on land will be set back at least 30 m from the water's edge. Appropriate spill kits will be available at the refueling site.
- When fuel is being transferred from the mobile tank to large machines, sorbent material will be placed around the fuel inlet prior to dispensing and pumping equipment with an approved hose and top-fill nozzle will be used.
- It will be verified that there is a proper connection between the fuel fill hose and the fill pipe of the tank, mobile refueling tank, or the equipment being filled, and that the fill valve is open.
- The receiving fuel tank will not be allowed to overflow.
- While refueling, the operation of moving equipment in the immediate vicinity of the refueling activities will be suspended.
- The EM will conduct regular inspections of fuel systems and their components (check for leakage, deterioration, or damage).
- Smaller equipment can be refueled using CSA approved portable fuel container(s).
- When not in use, portable fuel containers should be placed in portable secondary containment rather than placed directly on the ground.

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## 8. Waste Management

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### 8.1 Introduction

Waste management is used to minimize waste and avoid any long-term effects on the site through the construction and operations phases. Waste that may be generated during the lifespan of a project will include construction wastes, food, and other waste material produced in terrestrial and marine environments. The management of hazardous wastes is described in Section 5.15.

### 8.2 Mitigation and Management Measures

A detailed Waste Management Plan will be developed by the Design Builder and will include the following BMPs.

- The Design Builder will contain all garbage and construction wastes related to the work and dispose of it at an approved disposal facility in compliance with applicable legislation and regulations of all authorities having jurisdiction.
- Sanitary facilities, in the form of portable toilets, will be provided for the use of workers. Sanitary facilities will be secured to ensure they do not fall over, and will be located at least 15 m from any waterbody.
- Restrictions will be applied pertaining to the stockpiling of construction wastes in proximity to the waterbody.
- Garbage bins will have lids and be labelled, and recycling containers will be provided for food waste and recyclable office waste.
- A waste minimization policy will be implemented for procurement of construction materials and services (e.g., request suppliers to minimize packaging).
- Site cleanliness (i.e., “good housekeeping”) will be maintained by cleaning up construction debris, garbage, and other non-hazardous solid waste materials on a regular basis.
- Non-hazardous solid waste will be removed for off-site disposal at an appropriate frequency (e.g., before on-site containment facilities become overfilled, and before garbage becomes too smelly).
- Food and/or domestic waste will be removed from the construction site daily or, if such waste is to remain on-site overnight, they will be stored in animal resistant waste receptacles.
- Concrete-related waste will be managed according to its characteristics (cured, uncured, washwater). In the case that batch plants are used, the Concrete Code of Practice will be adhered to.
- Key waste management information will be posted at each work site for easy reference.
- Site-specific training will be provided on relevant waste management strategies and expectations.
- Site security and/or individually secured bins will be implemented to prevent the public from gaining access to bins and possibly contaminating recyclables (for example, by disposing of their garbage in recycling bins).
- Non-hazardous solid waste material that is discovered in or adjacent to marine water or other environmentally sensitive areas within the project right-of-way will be removed and disposed of off-site in compliance with applicable environmental requirements.

- Detailed specification of waste management procedures for specific wastes, locations, and work phases, including specification of how different types of construction wastes will be handled (i.e., recycled, reused, disposed of).
- Specification of the schedule of regular cleanup and disposal programs to prevent the unnecessary accumulation of construction wastes.
- Construction personnel should provide feedback on waste management practices to correct methods that are not working or are too difficult to follow.

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