

JSS LOAD-OUT GRAVEL BED AND EAST INFILL PROJECT CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

JUNE 2020



Prepared for:

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Appendix A1	Engineering Drawings
Appendix A2	Spill Response Reporting

LIST OF ACRONYMS

BC	British Columbia
BMP	Best Management Practices
CD	Chart Datum
CCME	Canadian Council of Ministers of the Environment
CEMP	Construction Environmental Management Plan
DFO	Fisheries and Oceans Canada
DNV	District of North Vancouver
EMA	<i>Environmental Management Act</i>
EMBC	Emergency Management BC
FA	<i>Fisheries Act</i>
HADD	Harmful Alteration, Disruption or Destruction
IAA	Impact Assessment Act
JSS	Joint Support Ships
NSS	National Shipbuilding Strategy
OHWM	Ordinary High-Water Mark
PER	Project and Environmental Review
QEP	Qualified Environmental Professional
SDS	Safety Data Sheets
VFPA	Vancouver Fraser Port Authority
WHMIS	Workplace Hazardous Materials Information System

1.0 INTRODUCTION

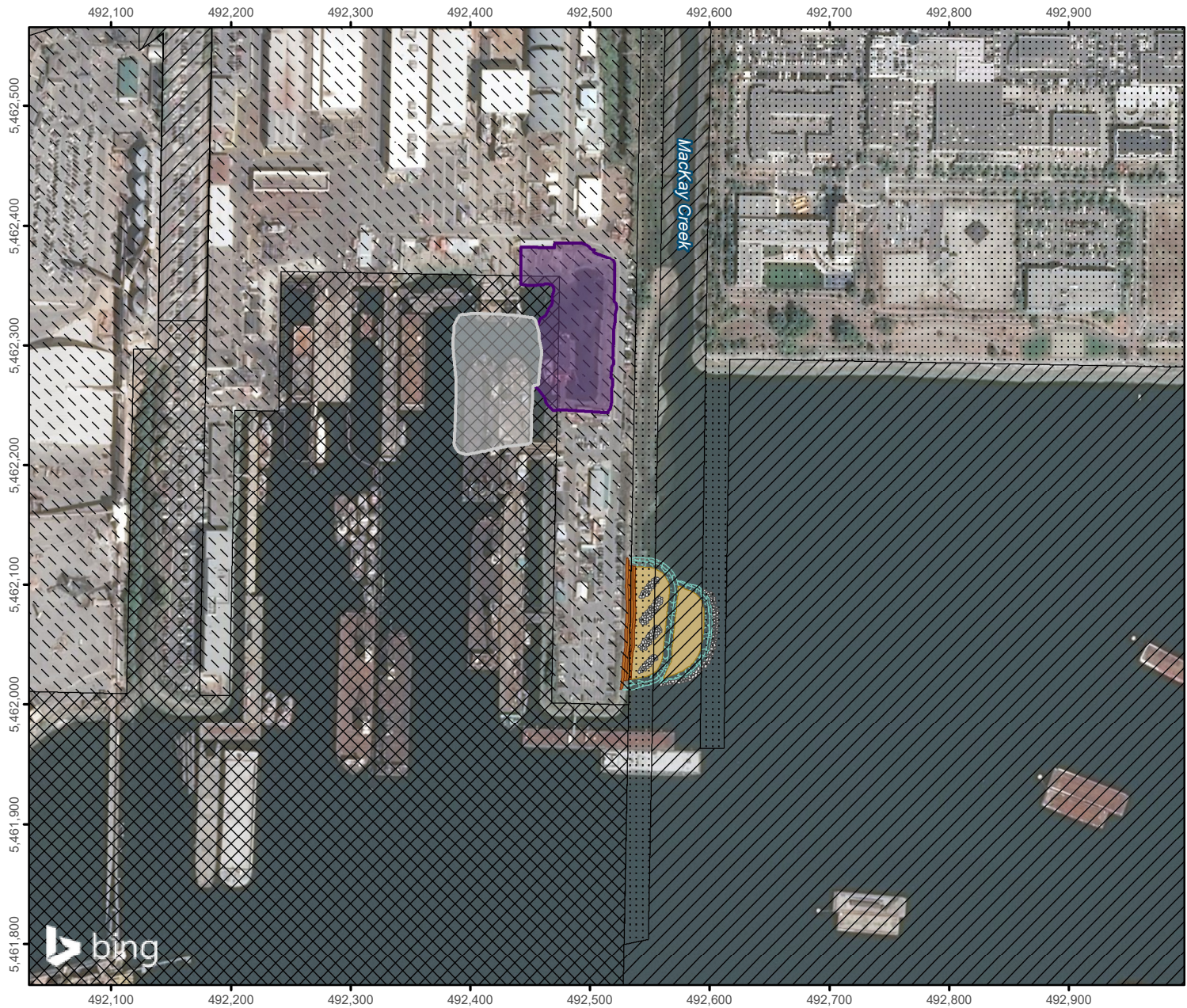
Seaspan ULC. (Seaspan) has been competitively selected as the non-combat shipbuilder for the Government of Canada under the National Shipbuilding Strategy (NSS). The Government of Canada and Seaspan have entered into a long-term strategic relationship to build vessels for the Canadian Coast Guard and the Royal Canadian Navy. Seaspan proposes two upgrades at their Vancouver Shipyard (the Shipyard) to deliver commitments under the Joint Support Ships (JSS) program, a component of the NSS. The upgrades involve construction of the JSS Load-Out Gravel Bed (Gravel Bed) and infill of an area of the East Spit, named the East Infill. These upgrades are collectively and henceforth referred to as the Project.

The Project is sited within the north-east corner of the Shipyard basin adjacent to the existing load-out pier, (the Site). For the purposes of this document, the Site includes the waters surrounding the infill areas (see Figure 1).

This Construction Environmental Management Plan (CEMP) supports the application to Vancouver Fraser Port Authority (VFPA) under the Project and Environmental Review (PER) Process and other permit applications. Although the East Infill is largely outside of VFPA jurisdiction, all construction activities are included within this CEMP. The CEMP will also be provided to the construction contractor as the basis for the development of their work plans and associated Environmental Protection Plans.

The objective of the CEMP is to support environmental compliance by defining both general and specific environmental requirements and providing methods to facilitate the attainment of those environmental requirements. It has been prepared following the VFPA CEMP Guidelines (VFPA 2018).

Figure 1 Project overview.



Legend

Boundaries

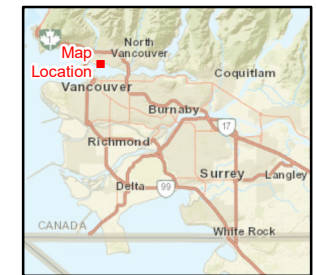
- City of North Vancouver
- VFPA managed federal lands and waters
- Shipyard within DNV jurisdiction
- Shipyard within VFPA federal lands and waters

Infrastructure

- East Infill Footprint
- JSS Load-Out Gravel Bed Footprint

Habitat Offsetting

- Boulder
- Habitat Bench
- Rock Berm
- Tidal Area



0 50 100 m
 Scale: 1:5,000
 Projection: NAD 1983 UTM Zone 10N

- Data Sources:
- a) East Infill, JSS Load-out Gravel Bed, and Offsetting, Westmar, 2019.
 - b) Municipal Boundaries, District of North Vancouver, 1997.
 - c) VFPA federal waters, Port of Vancouver 2018.
 - d) Base image - Bing Maps



2.0 PROJECT DESCRIPTION

2.1 LOCATION AND JURISDICTION

The Site is located within VFPA and District of North Vancouver (DNV) jurisdiction on the north shore of Burrard Inlet, at 10 Pemberton Avenue, DNV, British Columbia (BC).

The Gravel Bed is located wholly within the VFPA managed federal waters. The East Infill is largely within DNV jurisdiction, with only a small section of the rip-rap slope extending into VFPA managed waters. The geographical coordinates for the approximate center of the Site are 49° 18' 48" North 123° 06' 15" West. The Site location is shown in Figure 1.

2.2 SITE DESCRIPTION

The Site is occupied by Seaspan, and their wholly-owned subsidiary, Vancouver Shipyards Company. The Site currently consists of an on-land barge and ship repair and manufacturing facility, and water lots for moorings, vessel outfitting, and loading/off-loading. The Shipyard is an active worksite and is used for shipbuilding and ship repair activities.

2.3 JSS LOAD-OUT GRAVEL BED UPGRADE

The engineering drawing for the Gravel Bed is in Appendix A1.

The Gravel Bed will be approximately 7,500 m² in size and -1 m Chart Datum (CD) to allow the Careen to be level with the load-out pier when grounded. The estimated volume of gravel fill is 24,000 m³. Angular gravel of 25 to 50 mm mesh (1 to 2 inch mesh), is proposed. Slopes of the Gravel Bed will be lined with larger grade rock (large cobble – 260 mm minus filter stone) to protect against propeller wash. A total of approximately 3,000 m³ of rock will be required.

Any large debris within the Gravel Bed footprint will be removed using a barge-mounted crane and removed from site by barge or truck for appropriate disposal. The barge that is currently moored within the footprint of the Gravel Bed will be moved and the associated infrastructure, including mooring dolphins and access ramp will be removed. This includes a small number of piles (8 in total, see Appendix A1) that will be extracted using a barge-mounted crane. A vibratory hammer may be used to assist with pile extraction. Where piles cannot be fully extracted, they will be cut at the seabed (below mudline). Materials will be reused where possible, e.g. the access ramp, with the remainder taken offsite by barge for recycling or disposal.

The gravel will be deposited onto the seabed from a marine barge using a clamshell bucket or similar. Slope protection will also be placed from a barge-mounted crane.

Two concrete channels will be installed in the Gravel Bed to direct and manage the ballast water exchange of the grounded Careen. These channels will be pre-cast off-site, transported to site by barge, and placed within the Gravel Bed using a barge-mounted crane. Construction activities will not involve cast-in-place or in-water concrete works.

The bed will be load tested to measure settlement and additional material will be placed to maintain the required elevation. No densification of the seabed is planned.

Construction is expected to take 1 to 3 months and require the following equipment:

- Barges for transportation of gravel material;
- Barge-mounted crane; and
- Support work boats.

2.4 EAST INFILL UPGRADE

Engineering drawings for the East Infill are in Appendix A1. Decommissioning of existing infrastructure is required. The side launch skids within the East Infill will be removed from the Site and the floating repair facility will be decommissioned and removed as part of the East Infill upgrade. Waste and other materials will be taken from the Site by barge and reused, recycled, or disposed at appropriate licensed facilities. Hazardous materials, if any, will be identified and managed appropriately as defined in this CEMP. These decommissioning works are largely outside of VFPA federal waters.

A small number of timber piles associated with the floating dock will be extracted using a barge-mounted crane. Where piles cannot be fully extracted, they will be cut at the seabed (below mudline). Larger pieces of rip-rap will be removed using a crane prior to infill, and reused on the Project, where possible.

The East Infill will be filled to the existing grade of the East Spit at +6.65 m CD and be paved. Permanent buildings are not planned for this area. The footprint of the East Infill is approximately 8,400 m², of which only the lower 20 m of the rip-rap slope or approximately 1,500 m² falls within VFPA managed waters.

The first stage of construction involves the placement of a rock berm to allow for the infill. The berm will be protected by rip-rap. The basin will then be filled with sand and gravel behind the berm. The fill will be offloaded directly from a barge using a clamshell or conveyor system. There may be a requirement for ground improvements, for example the installation of stone columns or densification or removal of a layer of soft sediment. Ground improvements will occur after berm construction and therefore will be isolated from marine waters and will be outside of VFPA managed federal lands.

The following volumes of rock and fill have been estimated during preliminary design:

- Rip-rap – 3,750 m³
- Filter stone – 1,250 m³
- Berm material – 8,950 m³
- General fill – 17,750 m³

Asphalt will be placed once settlement has occurred. Construction is expected to take 3 to 6 months.

2.5 HABITAT OFFSETTING

The habitat offsetting (the Offsetting) involves the regrading of an area of the intertidal and subtidal shoreline of the East Spit. The Offsetting design stretches from the HWM (approximately 5 m CD) to the subtidal basin (-4 m CD). The conceptual design for the Offsetting is provided in the Engineering Drawings in Appendix A1. The aim of the offsetting is to begin a process to naturalize the shoreline and to increase kelp and other macroalgae abundance and spatial coverage, as fish habitat, with a focus on juvenile salmon. The majority of the existing rip-rap on the slope will be removed and reused in the construction of

the Offsetting. As the top of the bank is considerably higher (6.65 m CD) than the beach, stepped habitat benches are proposed for the transition between the riparian and upper intertidal beach. These benches will be lined with geotextile bags to stabilize the upper slope and planted with native species. The existing riparian zone will be fenced prior to construction and remain undisturbed.

The beach will be constructed using sand and gravel that will stretch from 1.5 to 4 m CD, compared to the current flat beach that lies around 1 to 1.9 m in elevation. A rock berm or sill to support and protect the beach. The existing large intertidal boulders will be carefully moved to construct this sill, with additional rock used to supplement as required. Boulder clusters will be placed within the planned sandy beach to increase the stability of the beach and provide hard substrate for marine vegetation.

In the subtidal, a rock berm will be constructed to provide stability for the slope. Fill material will be placed behind the rock berm to create a continuous gradual slope between approximately 0 to -3 m CD over a distance of 25 m. Cobbles and small boulders (100 to 450 mm; MoTI Class 10-25kg) will be placed on the surface to facilitate kelp recruitment. Large rock will also be placed seaward of the berm, creating a continuous subtidal rock sill ranging from -2 m to -5 m CD. The Offsetting will likely be undertaken as part of the same construction contract as the Shipyard upgrades.

2.6 SCHEDULE

The Project schedule is driven by the requirement for launching vessels in 2022. Permitting will take place during 2020, with an objective of securing key permits by August 2020. Further engineering design will take place during 2020.

The Project construction phase is expected to begin in August 2021 and be completed by March 2022. This construction timeframe coincides with the Fisheries and Oceans Canada (DFO) defined Least Risk Timing Window for the Protection of Fish and Fish Habitat (Least Risk Window) in Burrard Inlet.

The following sequence of Project construction is planned:

- Decommissioning of the floating repair facility and other infrastructure within the Project footprint.
- Ground improvements for the East Infill (if required).
- Construction of the East Infill berm.
- Placement of fill within the East Infill (out-of-water).
- Placement of the Gravel Bed, including concrete channels.
- Placement of rip-rap protection around the Gravel Bed and installation of the ballast water channels.
- Construction of the Offsetting, including removal of rip-rap from the East Spit slope,. Placement of the rock berm around the subtidal kelp bed and intertidal beach. Placement of fill within both berms.

There may be some early works during the Least Risk Window of 2020/2021, assuming the necessary permits are in place. These early works may include the decommissioning of the floating repair facility, ground improvements if required, and potentially moving into construction of the East Infill berm.

2.7 ROLES AND RESPONSIBILITIES

Seaspan shall be responsible for verifying that the Project is constructed in compliance with environmental legislation and regulations, permitting requirements, Best Management Practices (BMPs) and other Project environmental documents. Seaspan’s Environment Manager will oversee construction supported by consultants, as required.

Qualified Environmental Professionals (QEPs) will be responsible for monitoring during Project construction. Contractual arrangements for environmental monitoring are yet to be determined. It is likely that both Seaspan and the Contractor will retain Environmental Monitors and/or Inspectors. Environmental Monitors shall demonstrate a working knowledge of the Site, be knowledgeable of the status of the Project work, and all environmental issues and conditions associated with the Project and the Site works. Contact details for Key Project Personnel are in Table 1.

Table 1 Key Project contacts.

Name	Company	Responsibility	Contact Information
Project Team			
George Geatros	Seaspan	Project Manager	TBD
Daryl Lawes	Seaspan	Environment Manager	TBD
Daniel Leonard	Westmar	Engineering Consultant	TBD
Stewart Wright	Hatfield	Environmental Consultant	TBD
TBD	TBD	Construction Contractor	TBD
TBD	DFO	Conservation and Protection Field Supervisor for Lower Mainland / Squamish	604-664-9250
Environmental Programs	VFPA		EnvironmentalPrograms@portmetrovancouver.com
Harbour Master	VFPA Operations Centre		604-665-9086 / Harbour_Master@portmetrovancouver.com
TBD	District of North Vancouver		604-990-2311
Navigation Protection Program	Pacific Regional Office		604-775-8867
Environment Canada	BC Office		604-664-9100

2.7.1 Typical Responsibilities of Seaspan or their Representative

- Review the Environmental Protection Plan (EPP) and Environmental Monitoring Reports.
- Provision of Seaspan site Environmental Management Plans to the Contractor.
- Engage VFPA, other regulators and Indigenous communities, as required.
- Oversight to verify the Contractor is conforming to and complying with permit conditions, legislation, regulations, and the requirements of this CEMP.

2.7.2 Typical Responsibilities of the Environmental Monitors

- Verify that all works are carried out in compliance with the environmental obligations set out in the environmental legislation and permit conditions and in conformance with this CEMP.
- Oversee preparation and submission to VFPA of all reports required under this CEMP and all other reports required under permits and approvals.
- Prepare environmental monitoring reports.
- Where warranted, stop construction activity and issue a Stop Work Order if work fails to meet environmental requirements as described in this CEMP, environmental approval and permits conditions, legislation, regulations and BMPs, or that in their professional judgement, represents significant or unacceptable risk to the environment.
- Liaise with Seaspan and the Contractor.
- Oversee the successful implementation of the CEMP and environmental compliance.
- Review the Contractor and sub-Contractor work procedures to verify functionality and compliance with the CEMP and applicable regulations, standards and BMPs.
- Complete sampling (e.g., water quality) and assessments, as required.
- Facilitate resolution of any identified environmental issues.

2.7.3 Typical Responsibilities of the Contractor

- The Contractor shall prepare an EPP based on this CEMP, to be reviewed and agreed by Seaspan.
- The Contractor shall comply with the VFPA Project permit and any other permit or licence issued for the Project as well as all other applicable federal, provincial, and municipal laws, statutes, by-laws, regulations, orders and policies.
- The Contractor shall cooperate with the Environmental Monitor appointed for the work. The Contractor shall comply with written or verbal instructions with respect to conducting activities in compliance with mitigation measures outlined in the CEMP.
- The Contractor shall correct deficiencies and any non-compliance issues upon direction from the Environmental Monitor whether written or verbal. Corrections shall be made as soon as reasonably possible.
- The Contractor shall provide an environmental induction to all staff and sub-contractors and provide a copy of this CEMP and/or the associated EPP for review prior to working on the Project.

3.0 RELEVANT ENVIRONMENTAL LEGISLATION

Table 2 describes relevant environmental legislation for the Project works.

Table 2 Relevant environmental legislation.

Legislation	Agency	Description	Approval or Permit in Place/Forthcoming; or Requirements Met
<i>Federal</i>			
<i>Fisheries Act (FA)</i>	DFO	The FA is the main federal legislation providing protection for fish and fish habitat (section 35). Also, the FA prohibits the deposit of deleterious substances into water frequented by fish (section 36).	A Request for Review was submitted to DFO in 2018. DFO determined that the Project would result in Serious Harm (now Harmful Alteration, Disruption or Destruction (HADD) of Fish Habitat under the revised FA) and an authorization is required. A FA authorization application has been submitted to DFO. Protection measures for fish and fish habitat and the avoidance of deleterious substances entering the water are provided in Section 4.0 of this CEMP.
<i>Canada Marine Act</i>	VFPA	The <i>Canada Marine Act</i> is the main federal legislation that recognizes the significance of marine transportation to Canada and its contributions to the Canadian economy. A Port Authority is designated under this act to oversee port operation and is the principal authority for shipping and port-related land and sea use.	VFPA is responsible for overseeing the Port of Vancouver under the <i>Canada Marine Act</i> . This responsibility is covered by the PER process.
<i>Impact Assessment Act (IAA)</i>	VFPA	The IAA governs the environmental assessment of certain activities and the prevention of significant adverse environmental effects. IAA regulations identify the physical activities that may require an Environmental Assessment. The requirements for projects on federal land are also defined in the IAA (sections 82 to 89).	The VFPA must determine that the Project is not likely to result in significant adverse effects before allowing it to proceed. This responsibility is covered by the PER process.
<i>Canada Shipping Act</i>	Transport Canada	The <i>Canada Shipping Act</i> is Transport Canada's regulatory framework surrounding marine pollution and its enforcement. In the case of a report of pollution in the water, including oil or fuel spills, Canada operates under the National Spill Response Protocol, which specifies that the Canadian Coast Guard is responsible for all spill response and recovery in the marine environment.	An Environmental Emergency Plan and a Spill Response Plan have been developed for the construction phase of the Project and are provided in Section 7.2 and Section 7.3 of this CEMP, respectively.

Table 2 (Cont'd.)

Act, Regulation or Bylaw	Agency	Description	Approval or Permit in Place/Forthcoming; or Requirements Met
<i>Federal (Cont'd.)</i>			
<i>Canadian Navigable Waters Act</i>	Transport Canada	The <i>Canadian Navigable Waters Act</i> is the federal legislation that protects the public right to free and unobstructed passage over navigable waters.	A 'Notice of Works' will be submitted to Transport Canada. Works are not expected to substantially interfere with navigation and therefore it is expected that they will be permitted by Transport Canada. Navigation will also be dealt with by VFPA under the PER process as the Site is within the VFPA navigational jurisdiction.
<i>Provincial</i>			
Spill Reporting Regulations of the <i>Environmental Management Act</i>	Ministry of Environment and Climate Change Strategy	The regulation establishes procedures for reporting the unauthorized release of substances into the environment as well as outlining details of reportable amounts for certain substances for sites having Provincial jurisdiction.	Substances (e.g., hydrocarbons) that may be harmful to the environment may be used during the construction period of the Project. An Environmental Emergency Plan and a Spill Response Plan have been developed for the construction phase of the Project and are provided in Section 7.2 and Section 7.3 of this CEMP, respectively.
Contaminated Sites and Hazardous Waste Regulations of the <i>Environmental Management Act</i>	Ministry of Environment and Climate Change Strategy	These regulations govern the handling, storage, transportation, treatment and disposal of contaminated material and hazardous waste.	Contaminated material will be removed from the Site during the Project. Hazardous waste (e.g., used oil) will be generated during work activities. A Waste Management Plan is provided in Section 6.0 of this CEMP.
<i>Municipal</i>			
Noise Regulation Bylaw No. 7188	DNV	The Noise Regulation Bylaw regulates or prohibits the making of certain noises in the District and includes information on objectionable noises or sounds, exclusions, enforcement, penalty, and ticketing.	Noise levels from construction will be conducted in accordance with the DNV Noise Regulation Bylaw. This includes compliance with the defined hours for construction unless a Noise bylaw variance is obtained from DNV. Mitigation measures to be implemented to minimize noise emissions resulting from Site activities are provided in Section 4.4 of this CEMP.

4.0 POTENTIAL IMPACTS AND MITIGATION

4.1 GENERAL MEASURES

The following construction mitigation measures are recommended to avoid or minimize impacts resulting from operation and storage of equipment during construction:

- All equipment and machinery used on Site shall be maintained in good working order, free of leaks, excess oil and grease, invasive species, and noxious weeds.
- All equipment and machinery used on Site shall be inspected regularly. Equipment maintenance shall be conducted at appropriate intervals to assess belts and hoses, fluid levels, and to identify mechanical defects or worn materials as applicable to each piece of machinery.
- All works within the Site shall comply with Seaspan's BMP-04 Site Management and Housekeeping (Seaspan ULC 2017a).

4.2 SITE ACCESS, MOBILIZATION AND LAYDOWN AREAS

Access to the Site and most of the Project work, including the import of fill material, will be marine based on barges and/or other vessels resulting in little to no trucking of materials. Importing fill materials by barge greatly reduces, if not eliminates, congestion and delays caused by trucking. Land-based works could include the installation of equipment used for drainage and paving activities. The use of trucks would be minimal if at all, and congestion and delays are not expected due to these works. A small laydown area and parking for workers may be required. This will be within the Shipyard on the East Spit, which is already used for this purpose to support shipbuilding.

A Traffic Impact Study is not required for the Project and therefore has not been included as part of this CEMP.

4.3 AIR QUALITY

Air quality, including dust and fugitive emissions, management issues have the potential to occur during Site preparation, stockpiling, vehicle and equipment operations, transport of materials, and other Project construction activities producing deleterious air emissions and/or fugitive dust. Potential exposure pathways include dust from aggregate materials and air pollution from machinery and equipment.

Air quality and dust-related issues, if apparent, are expected to be limited in duration to working hours, except for exposed aggregate material, which could potentially generate dust if left uncovered or under dry conditions and limited to the extent of the Site boundaries and major haul roads. Impacts are expected to be low provided appropriate mitigation measures outlined below are employed during the works.

Air emissions such as vehicle/equipment exhaust, dust and vapours associated with construction-related activities should be minimized and managed to avoid adverse health, safety, nuisance, and other environmental effects on and off-site. The following mitigation measures shall be implemented to reduce dust and air emissions resulting from Site activities:

- Dust and odour emissions shall be controlled at the source where possible to contain and limit the release of particles to acceptable levels.

- No burning of any materials shall be permitted at the Site.
- Drop heights shall be minimized during material offloading from haul trucks/barges.
- Aggregate stockpiles are not expected to be required because fill material will arrive by barge. If there is need for any temporary stockpiling of material, they shall be covered or shielded from wind as necessary or stabilized with water or other dust control agents.
- Aggregate materials shall be handled using appropriate machinery and direct contact shall be limited where possible.
- Mud and dirt track-out onto the public road is not expected and shall be managed within Seaspan's existing operational management.
- Loads carrying bulk fine materials entering or exiting the Site shall be covered as appropriate.
- All equipment, vehicles and stationary emission sources shall be well-maintained and used at optimal loads to minimize emissions. A preventative maintenance program shall be implemented for all diesel and gasoline-powered equipment (e.g., 500 hours or sooner if required by manufacturer). Any parts showing excessive signs of wear or malfunction shall be promptly repaired or replaced prior to mobilizing to the Site. Electric equipment shall be used where practical.
- All equipment shall be fitted with standard emission control devices in compliance with federal, provincial, regional district, and municipal regulations and standards.
- Heavy-duty diesel-powered road licensed vehicles used during construction shall be model year 2007 or newer where possible.
- Equipment shall be in compliance with Greater Vancouver Regional District (GVRD) Non-Road Diesel Engine Emission Regulation Bylaw as applicable (GVRD 2012).
- Vehicle and equipment idling time shall be restricted and minimized during construction to the greatest practical and safe extent. Employees shall be required to turn off vehicles or heavy equipment when not in use. Idle reduction initiatives shall be communicated and encouraged during Site orientations and health and safety, Pre-Task Plan, and progress meetings.
- Stationary emission sources (e.g., portable diesel generators, compressors, etc.) shall be used only as necessary and turned off when not in use.

4.4 NOISE AND VIBRATION

The Site is in a largely industrial area. Noise during construction is not expected to be any greater than existing noise levels generated through shipbuilding and other activities within the Shipyard and neighbouring industrial properties. The Project will not require any pile driving. However, mitigation measures are included to minimize noise generation.

Underwater noise and vibration are also likely to occur during various in-water works for the Gravel Bed and East Infill upgrades, including the deposition and stabilization of materials, the removal of large debris, and vibratory pile extraction from the Gravel Bed footprint. Noise levels are expected to be below thresholds for the protection of fish and marine mammals.

The following land and underwater mitigation measures and BMPs shall be implemented to minimize noise emissions resulting from Site activities:

- On-site construction activities are planned for Monday to Saturday between 7:00 a.m. and 8:00 p.m., excluding holidays, as per VFPA standard work hours and the DNV Noise Restriction Bylaw (DNV 2000).
- All equipment shall be properly maintained to limit noise emissions to the extent practical and fitted with functioning exhaust and muffler systems. Machinery covers and equipment panels shall be well fitted and remain in place to muffle noise. Bolts and fasteners shall be tight to avoid rattling.
- Engines shall be turned off when not in use. Vehicle and equipment idling time shall be restricted and minimized during construction to the greatest practical and safest extent.
- Works shall be planned efficiently to minimize the duration and extent of noise disturbance to avoid wildlife disturbance or displacement to the extent practicable (e.g., coordination and scheduling of activities; appropriate location of particularly noisy equipment; selection of less noisy equipment where possible; etc.). Worksites shall be planned to minimize the need for the reversing of trucks and other equipment and in this way reduce the frequency of backup alarms.
- Where practical, noisy equipment shall be stationed as far away as possible from receptors (e.g., workers, offices). Material stockpiles and other construction material shall be placed strategically or stored around noise sources to reduce the hazard to receivers.

4.5 EROSION AND SEDIMENT CONTROL

The release of sediment and other deleterious substances into Burrard Inlet has the potential to occur during Project works, leading to water quality and fish and fish habitat concerns.

Because works will be primarily marine-based the potential for erosion and sediment run-off is relatively low. During the construction of the East Infill, there is potential for surface/storm runoff during infilling and paving.

4.5.1 Erosion Prevention

- Any erodible construction spoils/materials stockpiled shall be placed so that erosion into the marine environment is prevented. Methods to prevent erosion may include coverings or shields, as necessary.
- Place protection rip-rap over erodible slopes within the marine environment.

4.5.2 Run-off Prevention

- The East Infill will be isolated from the Shipyard basin through construction of the berm, prior to any infilling.
- Surface water shall be diverted around disturbed construction areas, stockpiles and lay down areas (e.g., by installing temporary curbs along road access points in the East Infill). Diversion shall avoid significant alteration of pre-existing down slope drainage.

- Run-off from the East Infill shall be diverted to the existing stormwater system. Stormwater shall be treated as required to meet the water quality criteria defined in Section 8.0.
- It may be necessary to pump water out of the East Infill, this water shall be treated and discharged to the stormwater system.

4.5.3 Sediment Control

- All physical activities shall be conducted in a manner that prevents the mobilization of sediment into the foreshore and nearshore areas, induced turbidity of Burrard Inlet, and the release of sediment-laden waters. Induced turbidity shall be monitored in accordance with the Environmental Monitoring Plan (Section 8.0). Silt curtains will be available on-site throughout construction and will be installed and maintained, if the turbidity criteria defined within Section 8.0 are exceeded, under the guidance of the Environmental Monitor.
- The Contractor will be prepared to erect erosion and sediment control measures to minimize sediment entering receiving waters, if run-off cannot be prevented.
- Material stored on barges should not result in run-off that could result in increased turbidity in surrounding waters, due to the grade and requirements of infill material. However, this will be monitored by the EM, in accordance with Section 8.0.

4.6 FISH AND FISH HABITAT PROTECTION

The Site is located within Burrard Inlet, the principle aquatic receptor of the Project. Project works could potentially lead to water quality, and fish and fish habitat concerns. Activities that have the potential to cause adverse environmental effects on water quality and fish and fish habitat in a marine environment include:

- Decommissioning of the floating repair facility.
- Construction of a rip-rap berm to protect and isolate the east basin infill.
- Installation of the granular fill for the Gravel Bed.
- Handling, transfer, and storage of debris and aggregate.
- Other activities that could potentially result in the introduction of deleterious substances into Burrard Inlet (e.g., accidental spills of petroleum-based products).

Dredging is not required to construct the Project, and therefore the potential for resuspension of sediment is low. Propeller wash from tugs has the highest likelihood of resuspending sediment, which is an ongoing operational activity in the Shipyard anyway.

The following mitigation measures will be implemented to protect fish and fish habitat and avoid causing death of fish or HADD beyond that authorized:

- All marine in-water works shall be conducted between the period of August 16 and February 28 inclusive.
- Barges or other vessels used during construction shall not be permitted to ground on the foreshore or seabed or otherwise disturb the foreshore or seabed (e.g., disturbance as a result of vessel propeller wash). Appropriate use of spuds to secure barges is acceptable.

- Barges and other marine vessels shall not ground on the foreshore or river/seabed or otherwise disturb the foreshore or river/seabed, during construction.
- No equipment shall operate on the intertidal foreshore outside of the Project footprint. All equipment working on or near the top of bank shall not disturb riparian habitat.
- Existing rip-rap and boulders within the Project footprint, including the Offsetting, shall be moved prior to infilling, temporarily stored (e.g., on the seabed) as required, and reused on the Project, where possible. The rock will be handled carefully to maintain existing biota, where possible.
- Rip-rap and other materials used for the works shall be free of fines and shall be lowered through the water column and deposited near the seabed and not dumped or deposited from above or near the water surface.
- Contaminant concentrations within any fill material that is to be placed in marine waters, shall comply with the chemical criteria defined in the Disposal at Sea Regulations under the *Canadian Environmental Protection Act*.
- The direct or indirect release or deposit of sediment, sediment-laden water, or other deleterious substances into the aquatic environment shall be prevented during the works.
- During decommissioning of the floating repair facility, potentially deleterious materials shall be prohibited from entering the aquatic environment. Debris, removed paint, and other residues shall be 100% contained, as will cuttings, if piles cannot be extracted and require cutting.
- A crab salvage program shall be implemented within the Project footprint immediately prior to the commencement of the placement of aggregate fill for the East Infill berm and Gravel Bed to reduce potential injury or mortality to crabs. A Scientific Licence for this salvage program shall be obtained from DFO prior to work commencing.
- A fish salvage program shall be implemented if fish become isolated within the East Infill during berm construction. This applies to all fish species, as far as practical, including finfish and invertebrates. For the Gravel Bed, there will be no isolation that could allow for salvage of finfish and based on the habitat assessment survey the number of sessile or motile invertebrate species that may be buried or crushed is very low. This will be reviewed by the Environmental Monitor prior to construction to confirm salvage requirements.
- A Spill Response Plan is included in this CEMP (see Section 7.3).

5.0 FUEL MANAGEMENT

The following mitigation measures are recommended to reduce the risk and potential environmental effects from the handling, transportation, and storage of fuels.

- Fuel handling and storage shall occur on stable ground > 30 m from the ordinary high-water mark (OHWM) of Burrard Inlet, except on a barge.
- Drip containment shall be used for all fueling activities.
- Fuel containers or tanks shall not be filled above the manufacturers' assigned, safe filling level.

- Containment systems for any storage areas shall be designed and constructed with due consideration for potential rainfall volumes.
- Fuels shall be stored separately from corrosive materials.
- Storage containers shall be fit for purpose, shall not leak, and shall be properly sealed so that they do not leak if overturned.
- Fuels shall be labelled and transported in accordance with the *Transport of Dangerous Goods Act* Regulations and WHMIS 2015.
- All containers, hoses and nozzles shall be free of leaks.
- Fuel nozzles shall be equipped with automatic shutoffs.
- Fuel remaining in the hose shall be returned to the storage facility.
- Smoking shall be prohibited in the vicinity of fuel storage and dispensing facilities in accordance with Seaspan's BMP-04 Site Management and Housekeeping (Seaspan 2017a).
- Spill kits shall be provided wherever fuel handling and storage will occur.
- Fuel management within the Shipyard shall comply with Seaspan's BMP-03: Spill Prevention and Response (Seaspan ULC 2013).

6.0 WASTE MANAGEMENT

Hazardous and non-hazardous wastes potentially generated by the Project include:

- Garbage (e.g., waste food, paper and other garbage produced by Site workers).
- Other non-hazardous solid waste.
- Waste petroleum products (engine oils, lubricants, filters, etc.) from machinery and equipment.
- Batteries and battery fluid.
- Oily rags or sorbents containing flammable liquids.
- Other waste materials from the decommissioning of the floating repair facility (e.g., old creosote piles).
- Other debris or infrastructure removed from the seabed (e.g., side launch skids and small amounts of waste materials, such as tires, observed on the seabed).

6.1 GENERAL

The following mitigation measures are recommended when dealing with wastes generated on Site:

- Contractors shall adhere to all applicable legislation with respect to the handling, transportation, and/or disposal of all materials related to the Project works.
- Contractors shall provide properly labelled separate containers for hazardous wastes, such as for oily rags and hydrocarbon absorbing pads.

- All debris and waste materials resulting from the Project shall be contained in the immediate working area and shall be removed as soon as possible. Any submerged debris and waste material shall be removed by means of a diver or other non-intrusive method.
- Specific locations for waste collection and sorting shall be identified before the start of construction and communicated to employees in the pre-work environmental orientation training session.
- Outdoor refuse containers shall always remain sealed except when filling or emptying. Any refuse containers that are damaged or leaking shall be repaired or replaced.
- All waste shall be stored in the appropriate locations at the end of each day.
- Waste material shall be stored in a manner that is secure and protected from the elements.
- No burning of wastes shall be conducted on Site.
- All temporary sanitary facilities shall be self-contained with no septic fields. Portable sanitary facilities shall be located a minimum of 30 m from Burrard Inlet, on flat ground, in an area that is protected from damage resulting from construction activities, vandalism, or environmental factors. Sanitary facilities shall be regularly maintained by an approved operator for disposal (i.e., vac truck) off-Site. The use of supplied washroom facilities is mandatory for all construction personnel.
- Old structures or pilings removed during decommissioning of the floating repair facility, and during clearing of the Site prior to infill, shall be transported to an appropriate licensed upland disposal facility.
- Waste shall be transported by barge with containment to avoid the release of deleterious substances to Burrard Inlet (e.g., due to run-off).
- Soils shall be removed to a permitted off-Site facility for proper disposal or re-use.
- Waste management within the Shipyard shall comply with Seaspan's BMP-02 Waste Management and Recycling (Seaspan ULC 2017b).

6.2 NON-HAZARDOUS WASTE

Project works may generate non-hazardous waste. The following mitigation measures are recommended to reduce the potential for releases of non-hazardous waste materials to the environment:

- Littering shall be prohibited on Site. Measures shall be implemented to prevent and control litter.
- All recyclable or compostable materials shall be collected separately from general waste as per DNV requirements.
- Designated areas and repositories shall be labelled for all recyclable and non-recyclable wastes. Construction personnel shall be trained in determining whether wastes can be recycled on-site, off-site or must be disposed of as wastes. Labelling of waste containers shall include a description of what materials are and are not accepted in each container.
- Cigarettes shall be discarded in an appropriate receptacle in designated smoking areas and not be left or buried on the Site, as per existing Seaspan requirements.

- Food and food wastes shall be stored in a manner that is not readily accessible to wildlife. All food and other wildlife attractants, which may contain any substance with a strong smell, shall be stored appropriately in a wildlife-proof container or building and removed from the Site at the end of each day. Feeding of wildlife shall be prohibited on Site.
- Regular disposal or recycling shall be carried out at a frequency sufficient to prevent accumulating large quantities of waste. All solid waste shall be handled in accordance with applicable municipal, provincial, and federal regulations and disposed of at an authorized receiving facility. All materials shall be transported in accordance with the *Transportation of Dangerous Goods Act* and regulations and the BC Hazardous Waste Regulations.
- Records indicating volumes and dates of non-hazardous waste materials removed from Site and sent to off-site disposal facilities shall be kept on Site. Waste materials generated that do not pose a risk to contamination of the Site shall be reused where possible. Non-hazardous waste materials generated on Site that cannot be reused shall be recycled at an approved facility, where practicable.

6.3 HAZARDOUS WASTE

Project works may generate hazardous waste including waste oils, chemical wastes, and used absorbent materials and filters.

The following mitigation measures are recommended to reduce the potential for releases of hazardous waste materials to the environment.

- Workers handling hazardous wastes shall be appropriately trained in handling, storage, and disposal methods. Training records for those involved with the handling and transportation of hazardous waste shall be kept at the Site office.
- Hazardous wastes shall be managed, transported, labelled, stored, and disposed of according to the BC Hazardous Waste Regulations via licensed transportation and disposal facilities.
- Hazardous wastes shall be segregated from non-hazardous wastes and stored and transported in a manner that prevents incompatible materials from being mixed. Wastes contaminated with flammable liquid shall not be mixed with wastes contaminated with oil.
- Each container or area used to store hazardous waste shall be clearly labelled as containing hazardous waste and shall be equipped with adequate secondary containment. Hazardous waste containers shall be kept closed except when being filled or emptied.
- Hazardous waste storage areas shall be checked weekly and a corresponding inspection log shall be kept in the Site office.
- Hydrocarbon products and other hazardous wastes potentially present during Site activities shall be identified and the associated WHMIS and Safety Data Sheets (SDS) made available to the construction crew.
- Hazardous waste containers shall be labelled and stored in accordance with all requirements of the *Transportation of Dangerous Goods Act* and *Workers Compensation Act* (WHMIS SDS labelling requirements).

- Waste rags and sorbents shall be stored in containers with self-closing lids, with the bottom of the container raised and vented.
- Used oil and antifreeze shall be collected by the BC Used Oil Management Association.
- If necessary, hazardous waste shall be temporarily stored in designated, secure areas with secondary containment and protected from the weather. The storage areas shall be located at least 30 m away from Burrard Inlet. Hazardous wastes shall be managed in compliance with applicable fire codes.
- Stockpiled contaminated and hazardous materials shall be separated from non-contaminated materials and segregated according to material quality classes. Hazardous waste and Industrial Land materials shall not be mixed together, nor shall they be diluted with clean water or materials.
- Spills of hazardous materials shall be cleaned-up and immediately reported to the Environmental Monitor and to appropriate regulatory agencies in accordance with the Spill Response Plan (Section 7.3).
- Hazardous Waste management within the Shipyard shall comply with Seaspan's BMP-01 Hazardous Materials Management (Seaspan ULC 2017c).

7.0 EMERGENCY RESPONSE

Prevention is the first line of defence against environmental emergencies. Mitigation measures that are properly implemented reduce the risks and magnitude of potential impacts.

Potential environmental emergencies that could occur during construction include:

- Reportable fuel spills.
- Sediment laden water leaving the Site or entering a waterbody.
- Negative wildlife interactions.
- Observation of previously unidentified sensitive environmental features.

The Environmental Monitor shall be notified of all environmental emergencies. The Environmental Monitor shall assess and record all incidents and determine appropriate action. All significant emergencies shall be reported to Emergency Management BC (EMBC) and the VFPA Operations Centre. All spills, releases, or compliance incidents, must be reported to Seaspan.

The following mitigation measures are recommended to avoid or reduce the potential for environmental emergencies as a result of Project construction activities:

- Incoming severe weather warnings shall be observed and responded to accordingly.
- Personnel, tools, equipment, and supplies shall be made as safe and secure as possible prior to storm events.
- Exposed areas shall be protected with tarpaulins or temporary sheeting.
- Construction activities that cause soil disturbance shall be minimized during periods of high erosion potential events (e.g., high rainfall), where practical.

- During and/or immediately after a major storm event, facilities and work areas shall be inspected for damage and repaired as required.
- Although seismic activity is not expected to affect marine-based equipment, North Vancouver is located in a high-risk earthquake zone that encompasses the Lower Mainland coast. Workers shall familiarize themselves with earthquake preparedness measures. In the event of an earthquake, all gas, electricity, and water sources shall be immediately shut off and workers shall stay clear of any hazardous material storage areas, trees, power poles, or other objects that could fall.

7.1 EMERGENCY CONTACTS

Clear and rapid communication is essential during emergency situations. Contact information for emergency response or reporting of accidents or environmental emergencies are in Table 3.

Table 3 Emergency response contact numbers.

Nature of Incident/Emergency	Authority/Company Name	Contact	Timeframe
Emergency Services	Emergency Services	911	Immediately
	RCMP	911 / 604-985-1311	Immediately
	Lions Gate Hospital	604-988-3131	As Required
	Local Fire Department-North Vancouver City Fire Department	911/ 604-980-5021	As Required
	Ambulance	911	Immediately, As Required
	North Shore Emergency Management Office	778-338-6300	
Seaspan Emergency Contacts	Dispatch	604-988-3111	As Required
	Security	604-990-3371	As Required
	Marine Safety	604-250-4096	As Required
	Environment	604-290-6422	As Required
Reportable Spills under EMA and Spills to Water >100 L	EMBC	1-800-663-3456	Immediately
Spills to Water Having Potential to cause Death of Fish or HADD	DFO	1-866-845-6776	Within 24 hours
Spills to Marine Environment	Canadian Coast Guard (Marine Pollution)	1-800-889-8852	Immediately
Spills of Dangerous Goods in Transport	EMBC	1-800-663-3456	Immediately
	RCMP	911	Immediately
	Canadian Transport Emergency Centre (CANUTEC)	613-996-6666 or *666 on a cell phone	Immediately
	Employer/Person in Control of the Dangerous Goods	TBD	Immediately

7.2 ENVIRONMENTAL EMERGENCY PLAN

Emergency response equipment shall be stored in clearly signed, easily accessible and identified locations. Spill containment and clean-up supplies shall always be made available on Site including during non-operating hours. Details of reportable volumes of substances and agency reporting procedures, along with a list of emergency contacts, are outlined in the Spill Response Plan (Section 7.3).

Emergency response equipment shall be appropriate to the situation and could include, but is not limited to:

- Emergency kits (e.g., spill kits, earthquake kits, first-aid etc.) and hazard-specific personal protection equipment (e.g., flame resistant clothing, rubber gloves for electrical work, fall arrest harness, respirators, etc.).
- Emergency washing equipment at Site locations where a worker's eyes or skin may be exposed to harmful or corrosive substances or other substances that may burn or irritate.
- Burn kits, at Site locations where potential exposure to electrical arcs is high or where thermal burns may be encountered.
- Fire alarm systems, gas detectors, and firefighting equipment.
- Emergency backup generators, as required, located at critical facilities that require power to prevent injury to workers and impact to property and the environment (e.g., pumps, communications systems etc.).
- First aid equipment, attendants, and supplies. Minimum levels of first aid equipment, first-aid attendants, supplies, services, and facilities in accordance with WorkSafe BC guidelines.
- Clean-up materials and equipment.

Procedures and schedules for the maintenance and replacement of emergency equipment (e.g., fire extinguishers, ladders, emergency earthquake kit, etc.) shall also be provided.

7.2.1 Emergency Response Training

- Construction personnel shall have the appropriate training and skills to perform their job in a safe manner.
- Construction personnel shall be trained in the use of spill containment equipment/items.
- An environmental component shall be included in the Site orientation that outlines sensitive features of the Site and Project works; proper storage, handling and use of controlled products; orientation to spill kit contents and their proper usage; and spill response procedures.
- Construction personnel who regularly handle hazardous materials and waste shall be trained for product-specific hazards and mitigation measures, as well as clean-up and emergency response procedures.

7.3 SPILL RESPONSE PLAN

Hazardous and potentially hazardous fuels, chemicals and other materials are likely to be on Site. An inventory of hazardous materials anticipated to be handled or stored on Site during normal operations shall be kept on Site.

Spill response procedures vary based on the quantity, type, and location of the substance and/or spill (Appendix 2). All spills, regardless of type or volume, are to be reported to the Environmental Monitor and Seaspan Project and Environmental Managers. Spills of flammable liquids, hydrocarbons, and oils >100 L are reportable to EMBC.

Spill response procedures are defined in the following sections.

7.3.1 For Spills Above Spill Reporting Regulations, Reportable Under EMA

1. Make areas safe.
2. Call for assistance from co-workers / Supervisor / Safety Department or Seaspan Dispatch.
3. Stop the flow (where possible and safe to do so).
4. Secure the area.
5. Contain the spill.
6. Clean-Up:
 - The Environmental Monitor, Seaspan Project and Environmental Managers, and the Contractor shall coordinate spill clean-up.
 - Additional assistance on clean-up procedures and residue sampling shall be available from the Environmental Monitor as required.
 - Clean affected area(s), including confirmatory testing of the cleaned area(s).
 - Remove impact/debris and decontaminate any equipment or tools used during clean-up.
 - Dispose of waste materials at an approved disposal facility in compliance with the BC *Environmental Management Act* and Hazardous Waste Regulations.
 - Dispose of all materials used in the clean-up (e.g., used sorbents, oil containment materials, etc.) in accordance with the above regulatory requirements.
 - Treat and dispose of contaminated material in compliance with the BC *Environmental Management Act*, Contaminated Sites Regulations and Hazardous Waste Regulations.

7.3.2 For Spills below Spill Reporting Regulations, that are Non-Reportable under EMA

All spills, regardless of type or volume are to be reported to the Environmental Monitor and the Seaspan Project and Environmental Managers. The Environmental Monitor shall provide recommendation on appropriate clean-up and disposal of potentially contaminated materials.

7.3.3 Spills to Water

In the event of spills of oil or petroleum lubricating products entering Burrard Inlet, the following steps will occur:

- The Environmental Monitor, Seaspan Project and Environmental Managers, VFPA, Marine Communications and Traffic Service, and Canadian Coast Guard Oil Spill Reporting Line (for spills), shall be notified.
- Aquatic booms shall be used to contain any fuels, oils, or other surfactants at the source of the spill.
- The spill area shall be lined with absorbent padding to absorb contaminants from the water surface, as practical.

8.0 ENVIRONMENTAL MONITORING

The Environmental Monitor shall be responsible for monitoring during Project construction. Contractual arrangements are yet to be determined. It is likely that both Seaspan and the Contractor will retain an Environmental Monitor. The Environmental Monitor shall be a Qualified Professional that demonstrates a working knowledge of the Site, knowledge of the status of the Project work and environmental issues and conditions associated with the Project and the site.

8.1 ON-SITE MONITORING

Monitoring of the Project works shall take place according to the construction schedule.

Visual monitoring and turbidity measurement shall be the primary monitoring methods used by the Environmental Monitor(s) to determine any environmental issues associated with construction.

Turbidity monitoring shall take place during placement of the fill material and rip-rap for the Gravel Bed and East Infill berm to provide real-time analysis and determine the effectiveness of mitigation measures (i.e., silt curtain). The following turbidity requirements shall be applied to the Project as per the VFPA guidelines (VFPA 2018):

- When background is less than or equal to 50 NTU, induced turbidity should not exceed 5 NTU above background values.
- When background is greater than 50 NTU, induced turbidity should not exceed background values by more than 10%.

Compliance monitoring locations shall be defined by the Environmental Monitor and shall be between 10 and 30 m from the activity. A background monitoring location shall be selected that is not influenced by construction activities but is representative of conditions within the Shipyard basin.

There is not expected to be a requirement for underwater noise monitoring or for an associated marine mammal exclusion zone, as the underwater noise generated during construction is expected to be within thresholds for the protection of marine mammals and fish, and in line with ambient noise, such as shipping in Burrard Inlet. The Environmental Monitor will monitor for marine mammals and record observations. The Environmental Monitor will stop the construction activity, if a marine mammal is at risk of harm.

8.2 REPORTING

8.2.1 Monitoring Reports

Environmental monitoring reports shall be produced weekly throughout Project construction. The environmental monitoring report shall be submitted to VFPA within seven days after the end of each week. Weekly environmental monitoring reports shall include, at a minimum, the following information:

- Name(s) of Environmental Monitor(s).
- Period covered by the report.
- Contractor(s) undertaking work during the reporting period.
- Overall weather conditions during the reporting period.
- Description, photos, and status of Project work activities.
- List of meetings and any other material communications (both those that occurred during the reporting period and any that are scheduled or anticipated in future reporting periods) and a summary of key issues discussed or expected to be discussed.
- A summary of environmental incidents that may have occurred during the reporting period.
- A description of outstanding environmental issues and/or non-compliance with environmental laws, permits or other environmental obligations and corrective actions taken or that will be taken and a schedule for such actions.
- Any issues or concerns raised by the Environmental Monitor and measures taken or that will be taken to address those issues or concerns.
- A summary of any environmental monitoring data collected, and all results received during the reporting period, including water and sediment sampling.
- An organized checklist or table of key mitigation requirements of the CEMP – including those of VFPA, DFO, and DNV – to verify implementation and effectiveness at the relevant stages of the Project.
- An overview of marine mammal, fish or wildlife observations, and potential negative interactions with construction activities.

8.2.2 Incident Reporting

Environmental incident reporting shall be carried out for incidents that pose or may pose a threat to the environment, such as spills, encroachment into sensitive areas or outside the Project Site, disruption or destruction of wildlife or wildlife habitat, or effects on water quality that result in an exceedance of the BC water quality guidelines for aquatic life. Reporting shall be carried out in accordance with the requirements of all regulatory agencies, as well as the requirements of VFPA and Seaspan. Spills may be reportable to EMBC under the Spill Reporting Regulation and/or the *Transportation of Dangerous Goods Act*. In addition, spills of any volume to fish-bearing waters must be reported to DFO. Spills must be reported verbally to a Seaspan Supervisor, Seaspan Dispatch (for vessels), to the Seaspan business unit Environmental Representative or to the Seaspan Safety Department.

An Environmental Incident Report shall be generated for any of the following occurrences:

- Spills reportable to EMBC.
- Spills of any amount to water (surface or groundwater), any spill within 15 m of the wetted perimeter, any spill to a dewatered area, or any spill with the potential to introduce a harmful substance to the aquatic environment.
- Spills on land greater than 5 L or with a surface area greater than 1 m² and/or deeper than 300 mm, or any release of a hazardous substance that could cause contamination of the Site or any lands or waters in the vicinity of the Site.
- Any incident that poses a safety or health risk, including but not limited vehicle collisions and fire.
- Any repetitive occurrence (i.e., an occurrence of 2 times or greater).
- Any occurrence involving more than 1 piece of machinery.
- Adverse publicity with respect to the environment.
- Alteration or damage to archaeological resources.
- External reporting requirements derived from a Project approval condition, especially if attached to a non-routine or unexpected event.

In the event of a spill, the following reporting steps will be followed:

- Notify the Environmental Monitor immediately (provide spill details).
- Report as per Section 7.3.
- If a reportable spill has occurred the Environmental Monitor or Seaspan Environmental Manager or a designate shall call **EMBC at 1-800-663-3456 (24 Hour)**.
- When reporting a spill, the caller shall be prepared to provide the dispatcher with the following information as accurately as possible:
 - Location and time of spill.
 - Type and quantity of substance spilled.
 - Cause and effect of spill.

- Details of action taken or proposed.
- Description of spill location and surrounding area.
- Names of agencies/responders on the scene.
- Names of other persons or other agencies advised or to be advised concerning spill.
- Inform Seaspan immediately of a hazardous materials spill.
- Complete an Environmental Incident Report.
- For spills >100 L or reaching Burrard Inlet, contact back-up commercial spill clean-up companies and local fire response teams.

9.0 ORIENTATION AND TRAINING

All site personnel shall be properly trained in all components of this CEMP and records shall be retained for the duration of the Project or as required by Seaspan. Training may be provided through any (or all) of the following means:

- General Environmental Orientation – This would be provided to all persons who access the Site and shall be performing work on the Site. The orientation would include an overview of environmental sensitivities for the Project and an overview of environmental obligations, roles, and responsibilities.
- Pre-Work Construction Environmental Orientation Meetings – This training would be provided to all personnel involved in a specific scope of work (as defined by an approved Project work plan or equivalent) that has an elevated risk to the receiving environment. The pre-work construction environmental orientation meeting would be completed prior to the start of work, defined in the relevant work plan, and include a detailed description of the activities to be completed, how these activities interface with environmental receptors, the potential effects these activities may have on said environmental receptors, and the mitigation measures developed to prevent or minimize these effects.
- Toolbox Talks/Tailboard Meetings/Morning Safety Meetings – This training would be opportunistic in that it would provide field personnel with an informal venue in which they may voice concerns, ask questions, or provide a recommendation on matters of environmental importance to the Project, as appropriate. The Environmental Monitor would attend these trainings to support discussions on a rotation basis (or as described in the monitoring plan) or at the request of field supervision.

Records shall be maintained for all instances of environmental training and shall include (at a minimum):

- Full names (First, Last) of all individuals who attended the training.
- The date the training occurred.
- Topics discussed.
- Name of Trainer or Supervisor.

10.0 REFERENCES

- DNV. 2000. Noise Regulation Bylaw 7188. The District of North Vancouver. Effective Date – August 14, 2000.
- [GVRD] Greater Vancouver Regional District. 2012. Non-Road Diesel Engine Emission Regulation Bylaw No. 1161. Retrieved 2019-03-11 From:
http://www.metrovancouver.org/boards/Bylaws1/GVRD_Bylaw_1161.pdf
- Seaspan ULC. 2013. Environmental Best Management Practices (BMPs), BMP-03: Spill Prevention and Response, Version D.
- Seaspan ULC. 2017a. Environmental Best Management Practices (BMPs), BMP-04 Site Management and Housekeeping (Yards, Shops, and Vessels), Version E.
- Seaspan ULC. 2017b. Environmental Best Management Practices (BMPs), BMP-02 Waste Management and Recycling, Version E.
- Seaspan ULC. 2017c. Environmental Best Management Practices (BMPs), BMP-01: Hazardous Materials Management, Version E.
- VFPA. 2018. Project & Environmental Review Guidelines – Construction Environmental Management Plan (CEMP). Vancouver Fraser Port Authority. April 2018.

APPENDICES

Appendix A1

Engineering Drawings



SEASPAN VANCOUVER SHIPYARD WATERFRONT INFILL PROJECT

DRAWING LIST

<u>DRAWING NO.</u>	<u>DESCRIPTION</u>
1190039-00-0100	COVER SHEET AND DRAWING LIST
1190039-00-0102	EXISTING SITE PLAN
1190039-00-0103	DEMOLITION PLAN
1190039-00-0104	GENERAL ARRANGEMENT – NORTH EAST INFILL
1190039-00-0105	GENERAL ARRANGEMENT – JSS LOAD OUT BED
1190039-00-0110	SECTIONS – SHEET 1
1190039-00-0111	SECTIONS – SHEET 2
1190039-00-0115	HABITAT COMPENSATION

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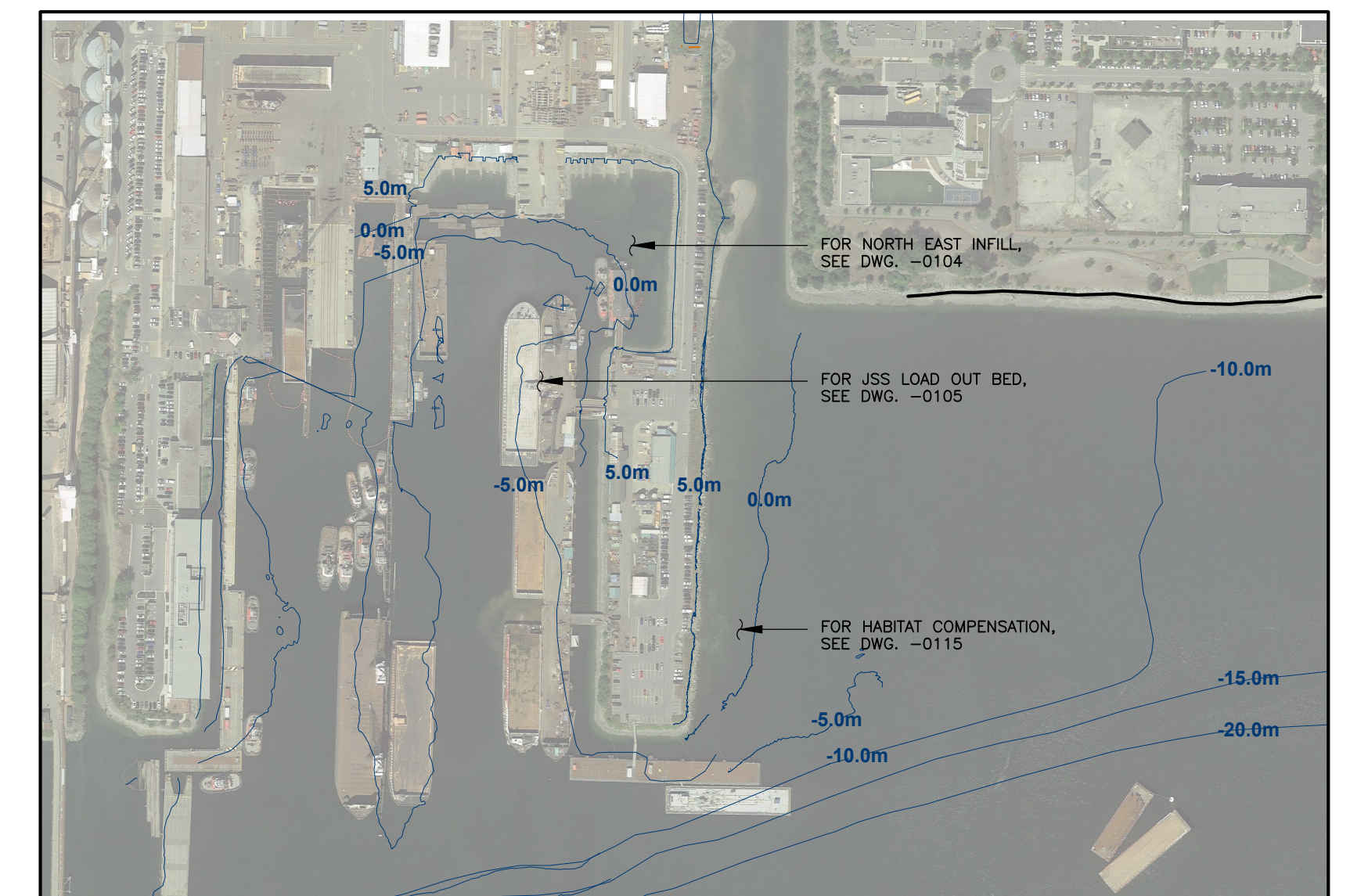
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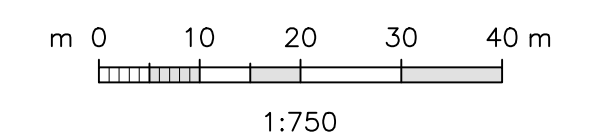
EXISTING SITE PLAN
1:750



KEY PLAN



LOCATION PLAN
1:4000



NOTES:

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3. CONTRACTOR TO FIELD VERIFY SITE INFORMATION PRIOR TO CONSTRUCTION.

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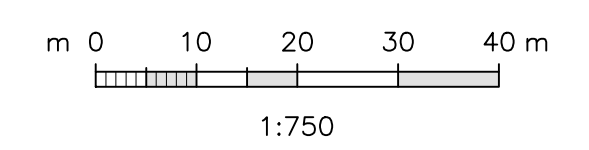


DEMOLITION PLAN
1:750



0 KM 1.0 KM

KEY PLAN



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P1	MAY02/19	ISSUED FOR CLIENT REVIEW	RM	DL	DL	DL	DL								
ISSUE / REVISIONS															

CLIENT



PROJECT

SEASPAN VANCOUVER SHIPYARD
WATERFRONT INFILL PROJECT

MGR

WESTMAR ADVISORS

TITLE

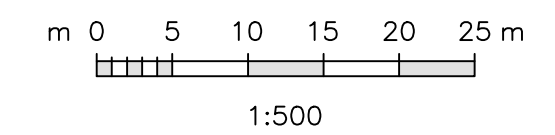
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PLAN - NORTH EAST INFILL
1:500



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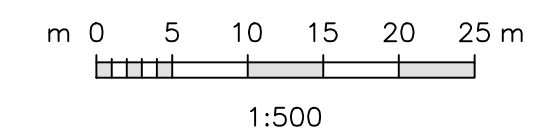
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DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.			
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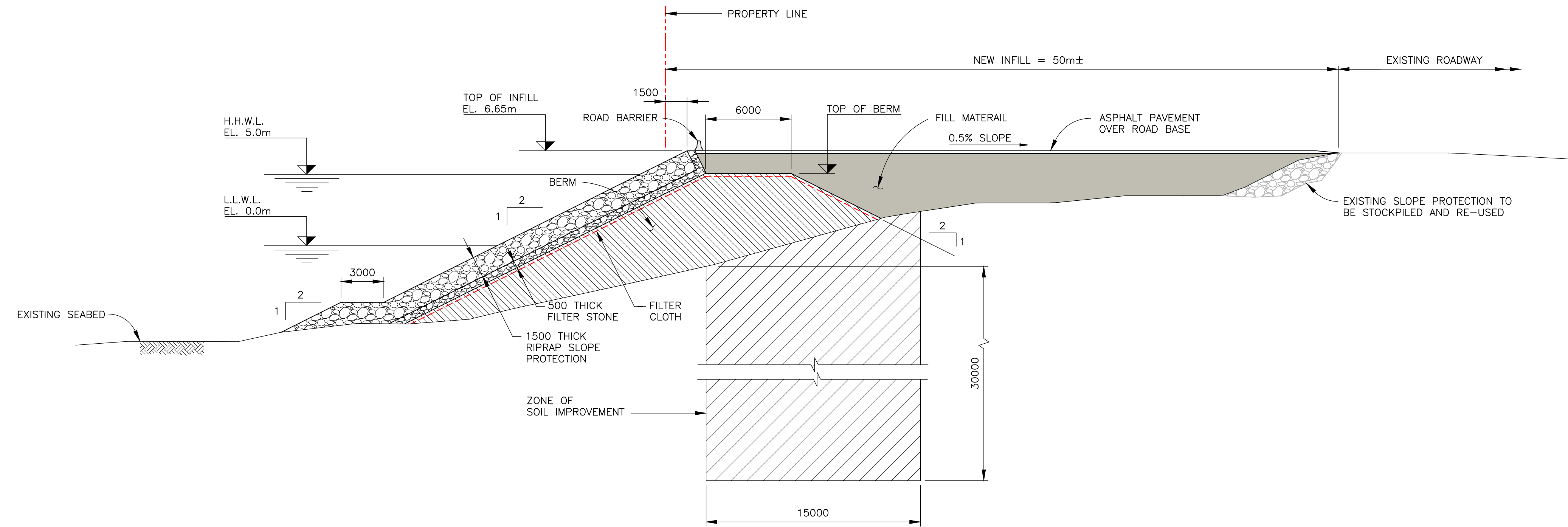
PLAN - JSS LOAD OUT BED
1:500



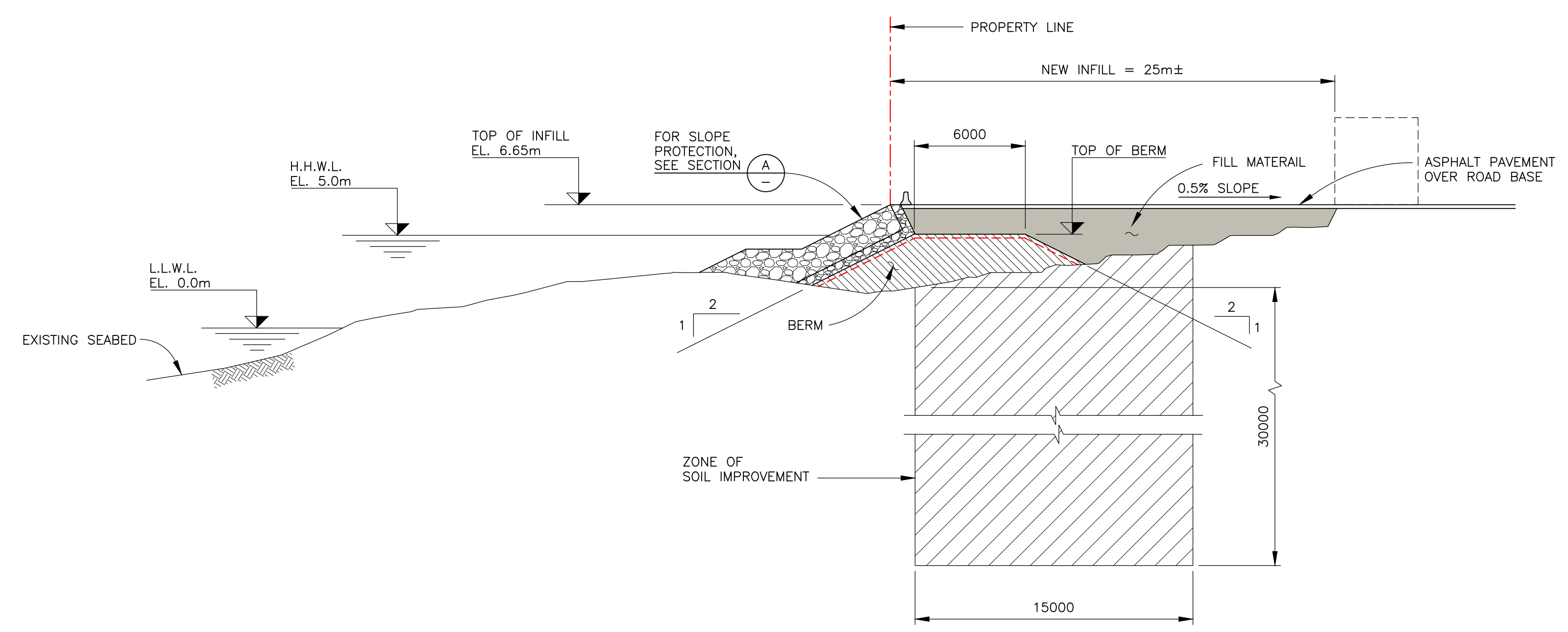
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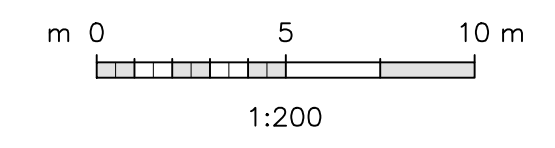
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SHOWN	1190039	00-0105	P3



SECTION A
1:200
0104



SECTION B
1:200
0104



NOTES:

- 1. ALL ELEVATIONS ARE TO CHART DATUM.

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P1	MAY02/19	ISSUED FOR CLIENT REVIEW	RM	DL	DL	DL	DL

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

CLIENT

PROJECT

SEASPAN VANCOUVER SHIPYARD
WATERFRONT INFILL PROJECT

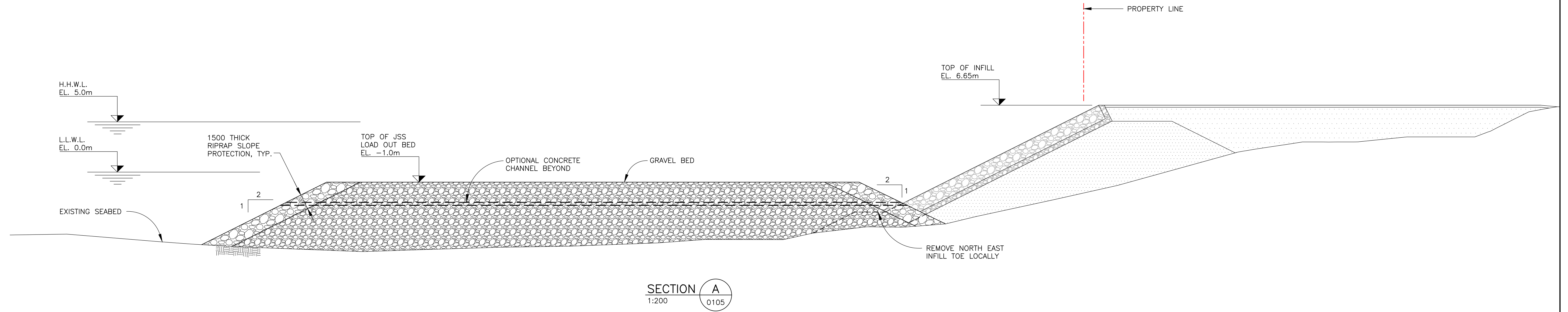
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TITLE

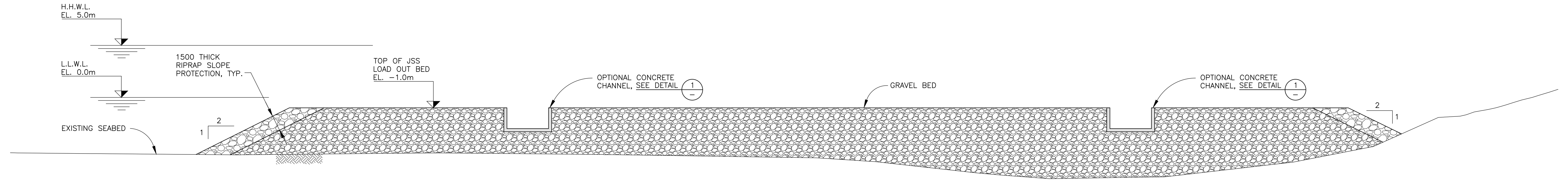
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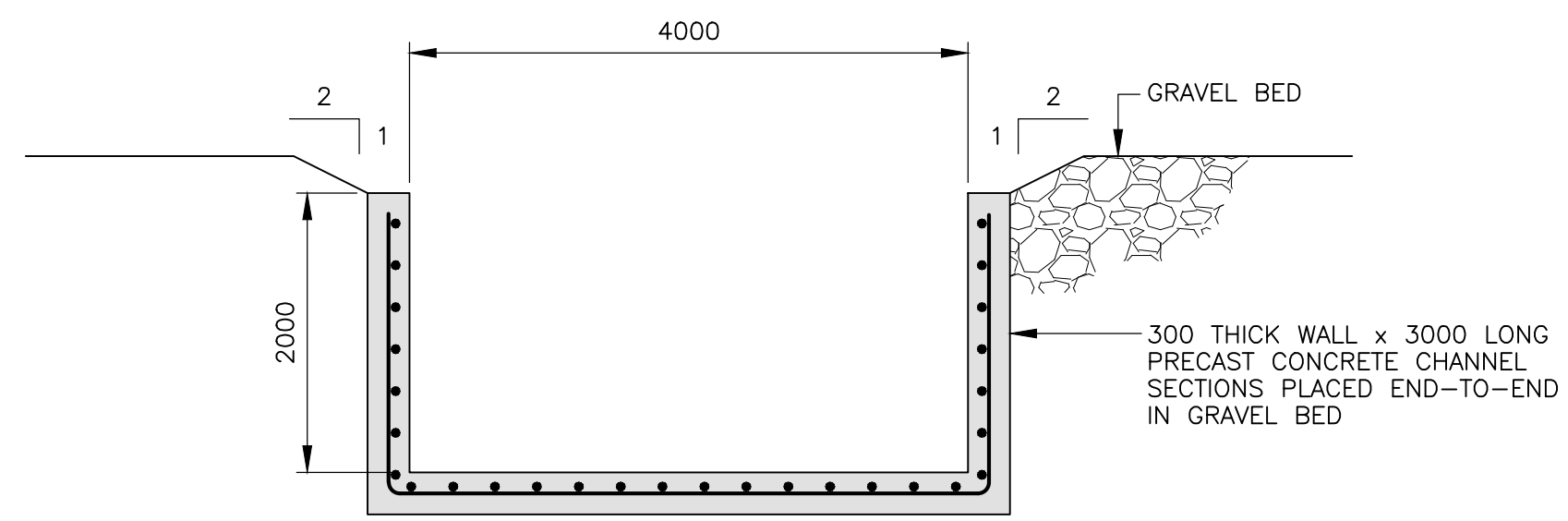
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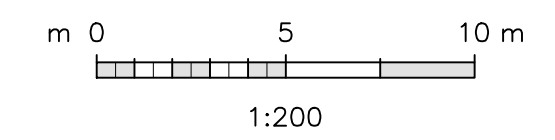
SECTION A
1:200 0105



SECTION B
1:200 0105



DETAIL 1
1:50



NOTES:
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P1	MAY02/19	ISSUED FOR CLIENT REVIEW	RM	DL	DL	DL	DL									
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CLIENT



PROJECT

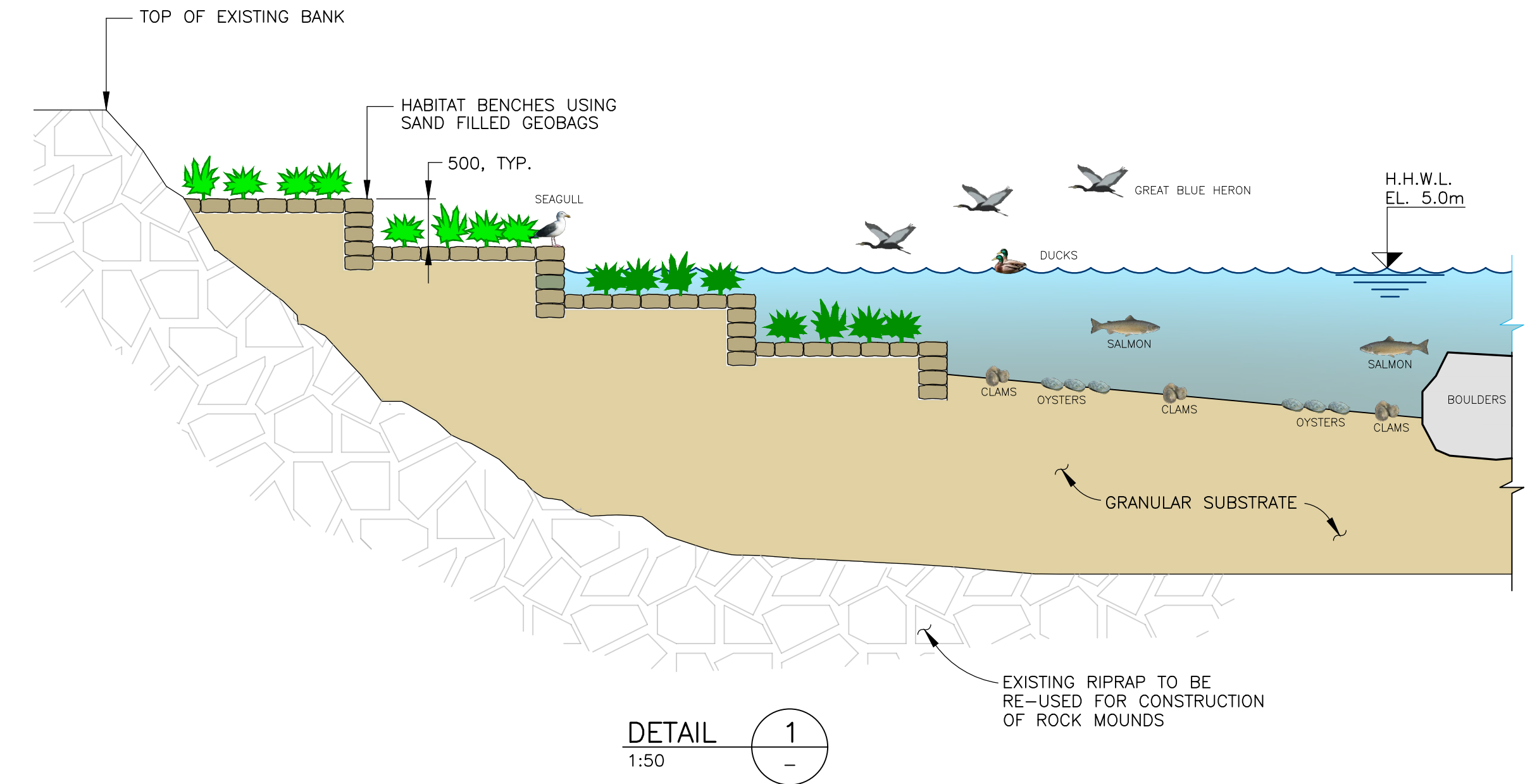
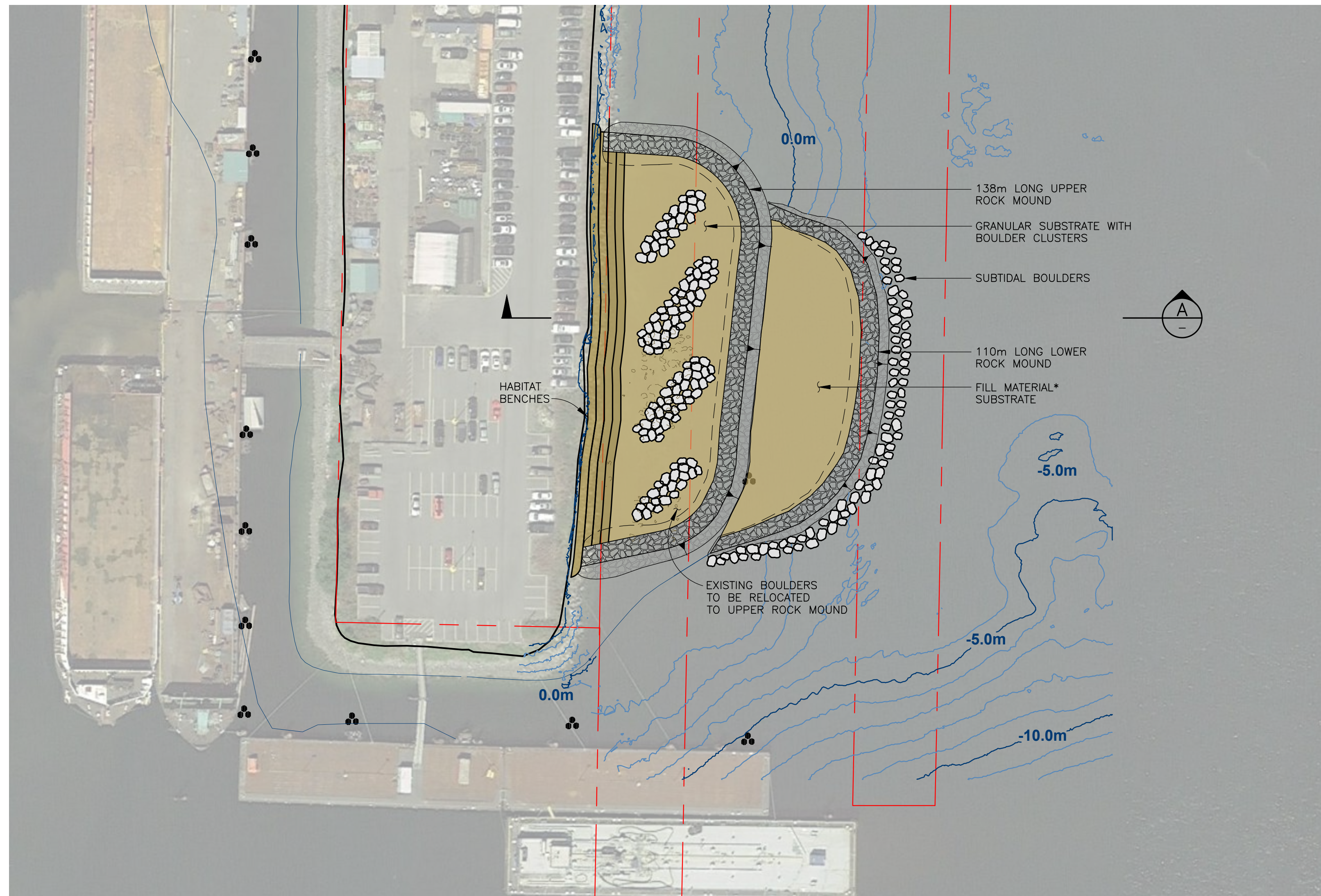
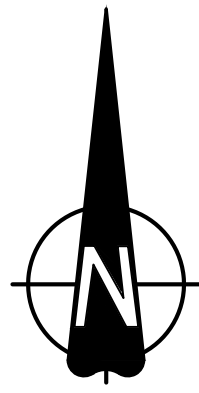
SEASPAN VANCOUVER SHIPYARD
WATERFRONT INFILL PROJECT

TITLE

WESTMAR ADVISORS

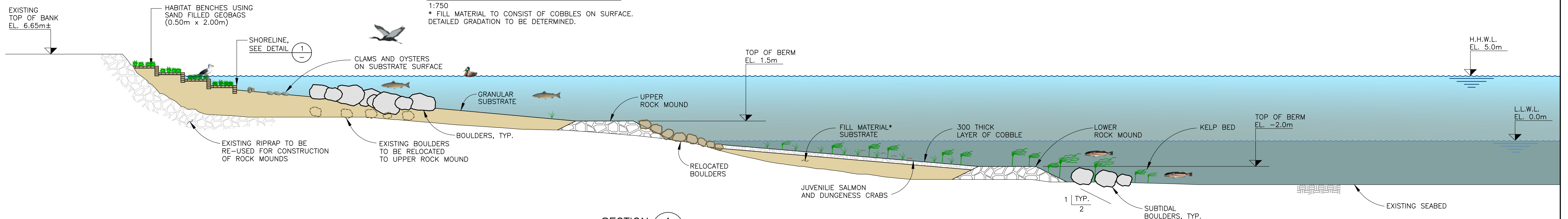
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DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
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PLAN - HABITAT COMPENSATION

1:750
 * FILL MATERIAL TO CONSIST OF COBBLES ON SURFACE. DETAILED GRADATION TO BE DETERMINED.



SECTION A

1:150

NOTES:

- 1. ALL ELEVATIONS ARE IN METRES AND TO CHART DATUM.

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CLIENT



PROJECT

SEASPAN VANCOUVER SHIPYARD
 WATERFRONT INFILL PROJECT



TITLE
 HABITAT COMPENSATION

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1190039	00-0115	P9

Appendix A2
Spill Response Reporting



Environmental Management Act
SPILL REPORTING REGULATION
B.C. Reg. 187/2017

Deposited October 13, 2017 and effective October 30, 2017
Last amended December 5, 2017 by B.C. Reg. 221/2017

Consolidated Regulations of British Columbia

This is an unofficial consolidation.

B.C. Reg. 187/2017 (M329/2017), deposited October 13, 2017 and effective October 30, 2017, is made under the *Environmental Management Act*, S.B.C. 2003, c. 53, ss. 92.1 and 139.

This is an unofficial consolidation provided for convenience only. This is not a copy prepared for the purposes of the *Evidence Act*.

This consolidation includes any amendments deposited and in force as of the currency date at the bottom of each page. See the end of this regulation for any amendments deposited but not in force as of the currency date. Any amendments deposited after the currency date are listed in the B.C. Regulations Bulletins. All amendments to this regulation are listed in the *Index of B.C. Regulations*. Regulations Bulletins and the Index are available online at www.bclaws.ca.

See the User Guide for more information about the *Consolidated Regulations of British Columbia*. The User Guide and the *Consolidated Regulations of British Columbia* are available online at www.bclaws.ca.

Prepared by:
Office of Legislative Counsel
Ministry of Attorney General
Victoria, B.C.

Environmental Management Act

SPILL REPORTING REGULATION

B.C. Reg. 187/2017

Contents

1	Definitions	1
2	Reportable spills	1
3	Reportable spills of natural gas	1
4	Initial report	2
5	Updates to minister	2
6	End-of-spill report	3
7	Lessons-learned report	4
8	Emergency response completion date	4
9	Application to oil and gas permit holders	5
	SCHEDULE	5

Environmental Management Act

SPILL REPORTING REGULATION

B.C. Reg. 187/2017

Definitions

1 In this regulation:

“**Act**” means the *Environmental Management Act*;

“**body of water**” includes

- (a) a stream, as defined in the *Water Sustainability Act*,
- (b) an aquifer, as defined in the *Water Sustainability Act*,
- (c) fish habitat, as defined in the *Water Sustainability Regulation*, B.C. Reg. 36/2016, and
- (d) any of the following that could drain or empty directly into a body of water:
 - (i) a naturally formed pool of water other than one referred to in paragraph (a), (b) or (c);
 - (ii) a ditch;

“**contact information**”, in relation to a person, means the address, telephone number and, if any, email address of the person;

“**emergency response completion date**”, in relation to a spill, has the meaning given in section 8 [*emergency response completion date*];

“**listed quantity**”, in relation to a listed substance, means the quantity listed in Column 2 of the Schedule opposite the listed substance or, if more than one quantity is listed, the highest of those quantities;

“**listed substance**” means a substance listed in Column 1 of the Schedule;

“**Provincial Emergency Program**” has the same meaning as in the *Emergency Program Act*.

Reportable spills

2 This regulation applies for the purposes of section 91.2 (1) (a) [*responsible persons – spill response*] of the Act in relation to a spill of a listed substance, other than natural gas, if

- (a) the spill enters, or is likely to enter, a body of water, or
- (b) the quantity of the substance spilled is, or is likely to be, equal to or greater than the listed quantity for the listed substance.

Reportable spills of natural gas

3 This regulation applies for the purposes of section 91.2 (1) (a) [*responsible persons – spill response*] of the Act in relation to a spill of natural gas if

- (a) the spill is caused by a break in a pipeline or fitting operated above 100 psi that results in a sudden and uncontrolled release of natural gas, and

- (b) the quantity of natural gas spilled is, or is likely to be, equal to or greater than the listed quantity for natural gas.

Initial report

- 4
- (1) If a spill occurs or is at imminent risk of occurring, a responsible person must ensure that the actual or potential spill is immediately reported to the Provincial Emergency Program by calling 1-800-663-3456.
 - (2) A report under this section must include, to the extent practicable, the following information:
 - (a) the contact information for
 - (i) the individual making the report,
 - (ii) the responsible person in relation to the spill, and
 - (iii) the owner of the substance spilled;
 - (b) the date and time of the spill;
 - (c) the location of the spill site;
 - (d) a description of the spill site and the surrounding area;
 - (e) a description of the source of the spill;
 - (f) the type and quantity of the substance spilled;
 - (g) a description of the circumstances, cause and adverse effects of the spill;
 - (h) details of action taken or proposed to comply with section 91.2 (2) [*responsible persons – spill response*] of the Act;
 - (i) the names of the government, federal government, local government and first nation government agencies at the spill site;
 - (j) the names of other persons or government, federal government, local government or first nation government agencies advised about the spill.

Updates to minister

- 5
- (1) A responsible person for a spill that occurs on or after October 30, 2018 must, until the emergency response completion date, submit written reports on the spill to the minister in accordance with subsection (2).
 - (2) A report under subsection (1) must be made
 - (a) as soon as practicable on request of the minister,
 - (b) at least once every 30 days after the date the spill began, and
 - (c) at any time the responsible person has reason to believe that information previously reported by the responsible person under section 4 or this section was or has become inaccurate or incomplete.
 - (3) A report under this section must be made in the manner and form specified by the minister and must include, to the extent practicable, the information set out in section 6 (2).

End-of-spill report

- 6** (1) The responsible person for a spill that occurs on or after October 30, 2018 must submit a written report on the spill to the minister within 30 days after the emergency response completion date for that spill.
- (2) A report under this section must be made in the manner and form specified by the minister and must include the following information:
- (a) the contact information of
 - (i) the responsible person, and
 - (ii) the owner of the substance spilled;
 - (b) the date, time and duration of the spill;
 - (c) the location of the spill site, which must be specified by
 - (i) its address, if any, and
 - (ii) its latitude and longitude;
 - (d) a description of the spill site and sites affected by the spill;
 - (e) a description of the source of the spill;
 - (f) the type and quantity of the substance spilled;
 - (g) a description of the circumstances, cause and adverse effects of the spill, including, without limitation, a description of the following:
 - (i) the activity during which the spill occurred (e.g., transportation, transfer of cargo, fuelling, cleaning, maintenance);
 - (ii) the incident leading to the spill (e.g., tank rupture, overfill, collision, rollover, derailment, fire, explosion);
 - (iii) the underlying cause of the spill (e.g., human error, external conditions, organizational or management failure);
 - (iv) the adverse effects of the spill to human health, which must specify
 - (A) the number of injuries,
 - (B) the number of fatalities, and
 - (C) the number of evacuees;
 - (v) the adverse effects of the spill to the environment and infrastructure at the spill site and the area surrounding the spill, which description must specify
 - (A) the size of the area adversely affected by the spill,
 - (B) the biological and other resources adversely affected by the spill, including, without limitation,
 - (I) bodies of water,
 - (II) flora and fauna, and
 - (III) animal, fish and plant habitat;

- (h) details of action taken to comply with section 91.2 [*responsible persons – spill response*] of the Act;
- (i) how and where waste from the spill was disposed of;
- (j) a copy of data from and reports of sampling, testing, monitoring and assessing carried out during spill response actions;
- (k) a map of the spill site and the area surrounding the spill and photographs of the spill;
- (l) the names of agencies on the scene;
- (m) the names of other persons or agencies advised about the spill.

Lessons-learned report

- 7
- (1) A director may order a responsible person in relation to a spill of a listed substance to submit a written report on the spill to the director.
 - (2) An order under subsection (1) must be made in writing and within 6 months after the emergency response completion date for the spill.
 - (3) A responsible person to whom an order under subsection (1) is directed must submit the report to the director in the manner and form specified by the director and must include
 - (a) a description of the effectiveness of the spill response actions,
 - (b) a description of actions taken to prevent future spills and improve response to future spills,
 - (c) if the responsible person is a regulated person,
 - (i) a description of any changes that the person intends to make to the person's spill contingency plan to improve response to future spills,
 - (ii) if the spill occurred in a geographic response area, a description of any changes that the person considers should be made to the related geographic response plan to improve response to future spills, and
 - (iii) if spill response actions were carried out by a PRO, a description of any changes that the person considers should be made to the PRO's area response plan to improve response to future spills, and
 - (d) responses to any specific questions the director asks in the order.

Emergency response completion date

- 8
- For the purposes of this regulation, the emergency response completion date for a spill is the date on which all of the following criteria are met:
- (a) the incident command post is disestablished;
 - (b) the source of the spill is under control and is neither spilling nor at imminent risk of spilling;
 - (c) emergency actions to stabilize, contain and remove the spill have been taken;

Schedule

- (d) the waste removed from the spill site has been
 - (i) received at a facility for disposal, or
 - (ii) received for transportation to a facility for disposal;
- (e) if applicable, all notices respecting evacuation from the spill site have expired or been rescinded;
- (f) all equipment, personnel and other resources used in emergency spill response actions have been removed from the spill site, other than equipment, personnel or other resources required for
 - (i) sampling, testing, monitoring or assessing at the spill site, or
 - (ii) recovery or restoration of the spill site.

Application to oil and gas permit holders

- 9 The following sections do not apply to a person who holds a permit to carry out an oil or gas activity to which the Emergency Management Regulation, B.C. Reg. 204/2013, applies:
- (a) section 5 [*updates to minister*];
 - (b) section 6 [*end-of-spill report*];
 - (c) section 7 [*lessons-learned report*].

SCHEDULE

[am. B.C. Reg. 221/2017.]

Definitions

- 1 In this Schedule, “**Federal Regulations**” means the Transportation of Dangerous Goods Regulations made under the *Transportation of Dangerous Goods Act, 1992* (Canada).

Item	Column 1 Substances	Column 2 Quantity
1	Class 1, Explosives as defined in section 2.9 of the Federal Regulations	50 kg, or less if the substance poses a danger to public safety
2	Class 2.1, Flammable Gases, other than natural gas, as defined in section 2.14 (a) of the Federal Regulations	10 kg
3	Class 2.2 Non-flammable and Non-toxic Gases as defined in section 2.14 (b) of the Federal Regulations	10 kg
4	Class 2.3, Toxic Gases as defined in section 2.14 (c) of the Federal Regulations	5 kg
5	Class 3, Flammable Liquids as defined in section 2.18 of the Federal Regulations	100 L

Schedule

Item	Column 1 Substances	Column 2 Quantity
6	Class 4, Flammable Solids as defined in section 2.20 of the Federal Regulations	25 kg
7	Class 5.1, Oxidizing Substances as defined in section 2.24 (a) of the Federal Regulations	50 kg or 50 L
8	Class 5.2, Organic Peroxides as defined in section 2.24 (b) of the Federal Regulations	1 kg or 1 L
9	Class 6.1, Toxic Substances as defined in section 2.27 (a) of the Federal Regulations	5 kg or 5 L
10	Class 6.2, Infectious Substances as defined in section 2.27 (b) of the Federal Regulations	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
11	Class 7, Radioactive Materials as defined in section 2.37 of the Federal Regulations	Any quantity that could pose a danger to public safety and an emission level greater than the emission level established in section 20 of the Packaging and Transport of Nuclear Substances Regulations, 2015 (Canada)
12	Class 8, Corrosives as defined in section 2.40 of the Federal Regulations	5 kg or 5 L
13	Class 9, Miscellaneous Products, Substances or Organisms as defined in section 2.43 of the Federal Regulations	25 kg or 25 L
14	waste containing dioxin as defined in section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
15	leachable toxic waste as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L
16	waste containing polycyclic aromatic hydrocarbon as defined in section 1 of the Hazardous Waste Regulation	5 kg or 5 L
17	waste asbestos as defined in section 1 of the Hazardous Waste Regulation	50 kg
18	waste oil as defined in section 1 of the Hazardous Waste Regulation	100 L
19	waste that contains a pest control product as defined in section 1 of the Hazardous Waste Regulation	5 kg or 5 L
20	PCB wastes as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L

Schedule

Item	Column 1 Substances	Column 2 Quantity
21	waste containing tetrachloroethylene as defined in section 1 of the Hazardous Waste Regulation	50 kg or 50 L
22	biomedical waste as defined in section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
23	a hazardous waste as defined in section 1 of the Hazardous Waste Regulation and not covered under items 1 to 22	25 kg or 25 L
24	a substance, not covered by items 1 to 23, that can cause pollution	200 kg or 200 L
25	natural gas	10 kg

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