Port of Vancouver, USA Terminal 5 Bulk Potash Handing Facility

SEPA Checklist Project Description

The description below discusses the project elements identified in the State Environmental Policy Act (SEPA) checklist submitted to the Port of Vancouver, USA for the Terminal 5 Bulk Potash Handling Facility Project (the proposed project)

As noted in the SEPA checklist, the proposed project is composed of project elements that include:

- *Relocating one existing track (4000) and constructing an additional loop track (4102)*
- *Construction of the following:*
  - *Railcar dumper pit and building*
  - *Potash storage building*
  - *Administration and maintenance building*
  - *Fuel station*
  - *Conveyors, potash transfer towers, and other transfer facilities*
  - *Surge bin tower*
  - *Shiploaders and dock facilities*
  - *Accessways*
  - *New utilities, including stormwater, water, sanitary sewer, electrical, telecommunications, and natural gas*
- *Relocating other utilities where conflicts occur with proposed construction activities*
- *Where conflicts occur with site construction, groundwater monitoring wells will be either decommissioned or relocated in compliance with Washington State Department of Ecology (Ecology) regulations*
- *Site grading activities, including possible pre-load material*
- *Temporary concrete batch plant*
- *Temporary construction trailers*
- *Riparian mitigation including shoreline plantings and pile removal*

A detailed description of these project elements and their operational function, where applicable, follows.

Site Layout and Potash Conveyance

The rail infrastructure for the proposed project will consist of a dedicated loop track (Track 4102) designed to accommodate a single potash unit train of approximately 174 railcars carrying approximately 19,290 tons (17,500 metric tonnes) of potash. Additionally, an existing loop track (Track 4000) will be relocated approximately 50 ft (15.24 m) southward from its existing configuration due to a conflict with the proposed railcar dumper building (see Figure 3).

After entering the loop track, covered potash railcars will circulate in a clockwise direction on Track 4102 along the loop before entering the railcar dumper building (see Plan Sheet 02-101). Inside the railcar dumper building, railcars will be emptied through an automatically activated mechanical bottom into two hoppers contained in an approximately 40-ft (12-m) deep pit designed to ensure potash handling occurs indoors and is protected from weather (see Plan Sheet 02-500). From the bottom of the dumper pit, the potash will be transferred via a covered conveyor in a tunnel, where it will transit via a fully enclosed conveyor to the surface and to a storage building located immediately to the north. Initially, the storage building will be constructed to accommodate up to 4,409,200 tons per annum (4 million tons per annum [Mtpa]) of potash throughput, but will have the ability to be expanded westwards to accommodate the maximum possible throughput for the proposed project of up to 8,818,400 tons per annum (8 Mtpa).

In certain instances when a cargo vessel is at the berth, following the unloading of the potash from the railcars, it may be transferred directly from the dumper pit to an enclosed surge bin and onto the cargo vessel. In these instances, the facility is designed to allow the potash to bypass the storage building while remaining under cover. In all cases, due to the soluble nature of potash, all materials handling will occur within protective structures designed to protect the potash from weather.

The berth will contain a dual-quadrant shiploader system to receive and service the cargo vessels, with the ability to accommodate vessels with carrying capacities ranging from 20,000 deadweight tonnage (DWT) (18,144 deadweight metric tonnage) Handy class vessels up to 60,000 DWT (54,431 deadweight metric tonnage) Panamax class vessels.[1] *The berth will be composed of two shiploader quadrant beams and pivot supports, complete with access roadway, a central maintenance trestle between the quadrant beams, berthing dolphins, mooring dolphins, and interconnecting catwalks (see Plan Sheet 02-200).*

Proposed Rail Improvements

The proposed project has been designed to accommodate the unloading of potash from one unit train on a single track. The dedicated unloading track, a new track, is identified as Track 4102. Track 4000, an existing track, will be used as a running track for queuing of unit trains including potash trains (see Figure 3). Unit trains delivering potash to the site will be approximately 8,362 ft (2,549 m) long and will carry approximately 19,290 tons (17,500 metric tonnes) of potash.

All railcars entering the facilities are proposed to be equipped with radio frequency identification tags (RFIDs) to allow the operator to identify the railcars and the product being delivered prior to initiating the dumping cycle. At a dedicated point on the bulk handling facility rail loop, the crew of the arriving train will switch the control of the train to remote operation, and disembark, and the bulk handling facility staff will operate the train remotely through the dumping cycle.

Both tracks 4102 and 4000 will be constructed over areas that are governed by deed restrictions (deed restricted areas on the site include the former Ingot Plant, former Spent Pot Liner (SPL) Storage Area, shoreline area, and former North/North 2 landfills). The 2009 consent decree and restrictive covenants require coordination with Ecology when development occurs within these areas, and Ecology approval for any uses inconsistent with the terms of the restrictive covenants; the consent decree also provides guidance for acceptable construction approaches. The project will work closely with Ecology to ensure the rail design within the restricted areas complies with the 2009 consent decree and restrictive covenants.

Approximately 12,000 lineal feet (3,658 m) of Track 4000 will be required to be relocated and approximately 3,000 ft (914 m) of re-alignment will be required. Several new turnouts and crossovers will be associated with installation of the relocated track. Adjustment to existing turnouts and crossovers may also be required. These quantities may vary based on final design requirements placed on the project by the Burlington Northern Santa Fe (BNSF) Railway, the Port's exclusive rail operator handling switching and train arrival/departure operation of the rolling stock.

The existing Port track, Track 4000, is planned to be relocated and brought into service prior to commencement of construction activities associated with the dumper building.

Track will be constructed with both wood and concrete ties as determined by the specific use of the track. Minor grading will be required for track bed construction. Crushed rock sub-ballast and ballast will be imported from an approved source, consistent with the Port's Fill Sampling and Acceptance Criteria Standard Operating Procedures, and will provide a structural base for track installation. Selected track will be equipped with inspection and access roads as required by BNSF Railway. Utility relocations and installation of new casings for future utilities will be installed during rail facility construction. Additionally, lighting will be modified as needed to maintain minimum illumination levels at all turnouts and crossovers.

Railcar Unloading

Potash from the railcars will be unloaded via a covered 2-hopper, bottom-dumper system, designed to unload the unit train automatically. The railcar dumper building will include an in-ground concrete pit supporting two stainless steel-lined steel hoppers. The dumper will be protected from the environment by a steel clad building that will also contain backup manual controls, automated gate opening systems, and railcar shaker systems. Semi-automatic, railcar door openers also will be installed, which will allow for the unloading of any manual-gate hopper railcars.

The proposed purpose-built railcars will be designed with a bottom discharge gate and will open without human intervention as the railcar moves through the dumper. The opening of the gates will be

[1] Deadweight tonnage (DWT) refers to the carrying capacity of a ship and is equal in units to metric tonnes.

accomplished by mechanical activators located adjacent to the dumper hoppers. The dumper will be equipped with two dumper pits and the railcars will be alternately activated, where each pit will receive half of the product from the unit train. At the end of the dumper pit, all gates will be closed by an exit-gate closing activator.

The dumper will also be provided with a railcar shaker system to assist with the dislodging dumping of non-free flowing product. The railcar shaker system will consist of two mechanical shaker units that operate on the railcar sills, which are only activated to assist product having difficulty discharging from railcars.

As the train moves through the dumper, the railcars will remain connected to each other and to the locomotives for the duration of the unloading process. Control of the train will be carried out through radio signals, allowing for the continuous control of train speed. In the event of an emergency stop, the control system will automatically halt the train.

Storage Building

Potash from the railcar dumper pit will be transported on a fully enclosed belt-conveyor system, either to the storage building or directly to the berth. When operating with material being directed straight to the berth, shiploading interruptions will be accommodated by redirecting material flow to a storage surge bin capable of accommodating up to 661 tons (600 metric tonnes) of product.

Due to construction materials durability and consistent with industry practice for potash storage, the storage building is proposed to be a wood A-frame structure, and sized initially to store up to 176,370 tons (160,000 metric tonnes) of potash product in one or two piles, based on the potash grade. This storage capacity will sustain an annual throughput of up to approximately 4 Mtpa and accommodate the loading of two successive ships of up to 60,000 DWT size. As the annual throughput of the terminal increases, the storage capacity can be expanded in a phased fashion, by extending the length of the shed and the associated operating ranges of the conveyor tripper and reclaimer systems to accommodate the maximum throughput of 8 Mtpa (see Plan Sheet 02-501).

The width of the storage building is governed by the clearance required for the equipment operating inside. The building will consist of a portal reclaimer that will be located on rails that run the length of the building. The building height is based on the expected angle of repose of potash and the shape of the building envelope required to house the portal reclaimer and tripper. The building will be approximately 244 ft (74.4 m) wide, approximately 136 ft (41.5 m) high at the apex and initially will be 1,190 ft (363 m) long. Extending the building length to approximately 2,000 ft (610 m) will increase the storage capacity to an approximate maximum of 275,576 tons (250,000 metric tonnes), which is necessary for the maximum terminal throughput.

Potash will be transported by conveyor to the apex of the storage building and transferred onto an overhead stacking belt conveyor that will run the full length of the building. The conveyor will be supported on sub-framing and the main A-frame building supports. The stacking conveyor will be equipped with a rail-mounted, automated travelling tripper to discharge potash off the belt. The stockpile will bear on a profiled, asphalt-paved floor, supported on structural fill. Product will be contained between perimeter concrete retaining walls that contain the stockpile and minimize pile toe lengths and storage building size.

To support the weight of the storage building and the maximum capacity of potash storage, the ground will need to be improved. Various alternatives for the storage building foundations are under consideration. They include:

1. *stone columns plus piling*
2. *stone columns plus pre-loading*

Currently, the preferred option is the combination of stone columns for the potash stockpile as well as piling for the storage building and reclaimer rail inside the storage building.

Stone Columns (under the potash stockpile only)
In general, this method consists of forming compacted columns of gravel-size material in an equilateral triangular pattern. The columns are constructed by displacing the in situ soils, without removing any soil. The soil displacement caused by the introduction and compaction of the stone column produces compaction of the soils located between the columns that results in densification of the sands and consolidation of the silts. Additionally, the greater stiffness of the compacted stone columns significantly reduces the vertical load transmitted to the surrounding soils, thus reducing settlement.

Control testing to verify that the specified results have been achieved is generally performed by drilling boreholes with standard penetration tests (SPTs) or pushing cone penetration tests at selected locations in the center of equilateral triangles formed by the densification points.

It has been estimated that ground improved by stone columns alone would be appropriate to support the asphalt floor under the potash pile, as it would reduce the potential for settlements and prevent liquefaction.

Piling (for the Storage Building and Reclaimer Rail Foundation inside the building)
Piling for the storage building and reclaimer rail foundation inside it would be driven to refusal and would be conducted in compliance with manufacturer's requirements. This would also avoid the need for preloading and placing gravel under the footings, resulting in less water management.

In addition, other facilities such as conveyor supports, transfer towers and the storage bin, would be supported on piles.

Pre-Loading (for the Storage Building)
Pre-loading consists of placing a fill surcharge on the ground surface that has been previously densified with stone columns to cause settlement. After settlement has occurred under the fill surcharge, the surcharge is removed and the structure is built. The applied surcharge should be at least equal to the future pressures to be applied by the potash piles and the building foundations.

Pre-loading causes static settlement, but it would not produce adequate densification of the potentially liquefiable sands to the depth required to prevent liquefaction. Therefore, pre-loading was considered in conjunction with stone columns as a second option, but was eliminated from further consideration as the sole ground improvement option.

Conveyors
Material will be transported from train to storage, storage to ship, and from train direct to ship, by fully enclosed belt conveyors, with walkways located within the enclosed space. Conveyors have been designed with variable speed drives. The material will then be transferred from the reclaim feeders onto a series of belt conveyors that will transport it to the storage building. A bypass conveyor will be provided to facilitate direct loading from dumper to ship.

The belt conveyors, with the exception of dumper reclaim feeder belts and the surge bin feeders, will be equipped with electric motors connected to drive pulleys through fluid couplings and swing base shaft mounted reducers. All conveyors have been designed as fully enclosed, in order to prevent the ingress of moisture and foreign objects and to minimize fugitive dust emissions. Conveyor transfers have been designed to minimize vertical drops and direct impact of material at transfer points and will be equipped with skirting systems to minimize spillage. Main transfer points will be equipped with aspiration ductwork. Certified belt scales will be situated between the railcar dumper and the storage building, as well as downstream of the surge bin, for monitoring and inventory control purposes. Belt training will be accomplished through the use of tilt and turn style return belt training idlers and all conveyors will be equipped with primary scrapers, secondary blade scrapers and return belt ploughs.

Dumper Pit
Each of the two hoppers within the dumper pit will receive half of the product from the unit train as it unloads. The dumper pit will be a fully enclosed concrete structure measuring approximately 38 ft (12 m) wide by 146 ft (45 m) long by 37 ft (11 m) deep, located below grade with the top of concrete at the base of the pit at approximately -9.0 ft (-2.7 m) National Geodetic Vertical Datum (NGVD) (see Plan Sheet 02-

500). Construction of the dumper pit and transfer conveyors requires special consideration due to the high water table, and to the earth and water pressures on the dumper pit walls. Options under consideration take into account minimization of water infiltration. Options being considered include a secant wall, diaphragm wall, and cutter soil mixing (CSM) wall.

The general construction sequence being considered for these three options would be as follows:

- *Secant wall, diaphragm wall, or CSM wall installed with additional length below the dumper bottom. Total wall depth is estimated at approximately 75 ft (22.9 m). The additional length is to go below the potentially liquefiable soils and provide confinement for subsequent grouting of soil below the dumper bottom and extend the seepage path, thus reducing infiltration through the bottom during soil excavation inside the dumper area.*

- *In plan view, the footprint of the secant wall or the diaphragm wall would follow the shape of the dumper, so that they become the permanent, structural dumper walls. Alternatively, they could be used as external formwork for the dumper walls. This is more of a structural decision. The footprint of the CSM wall would be such that it would serve as external formwork for the dumper walls.*

- *Regardless of the technology used to construct the perimeter support wall, the soil below the bottom of the dumper bottom slab elevation would be jet grouted. The jet grouting would be completed before excavation of the soil inside the dumper area starts. The purpose of this jet grouting is to stabilize the potentially liquefiable soils and to reduce vertical infiltration during soil excavation inside the dumper area.*

- *Excavation of soil inside the dumper area, with concurrent installation of internal bracing.*

- *Soil from the excavation will be stockpiled temporarily and tested. Depending on the test results, it will either be used on site as an encapsulated fill or disposed of at an appropriate location off site.*

Saturated soil from the excavation will be stockpiled temporarily in a bermed dewatering area connected to a temporary sedimentation pond. The temporary sedimentation pond is proposed to be unlined and will collect water from the soils excavated from the dumper and tunnel, as well as water from dewatering of the excavation (see Plan Sheet 02-152).

The total water drainage from the stockpiled soils has been estimated at up to 1.0 million gallons (3,785 m^3). The total volume to be pumped to the sedimentation pond, including drainage from the stockpiled soils, has been estimated at 5.28 million gallons (19,985 m^3). For the indicated capacity, the temporary sedimentation pond has been sized at 7 ft deep, 80 ft wide, and 273 ft long (2 m by 24 m by 83 m). Preliminary sizing of the sedimentation pond considers temporary storage for one-third of the drainage from the excavated soil plus 10 days of excavation infiltration, or approximately 1.0 million gallons (3,785 m^3). The pond has been designed to accommodate a total storage volume of 1.0 million gallons; the actual daily flow rate into the pond will be significantly less. Based on the proposed construction methodology for the dumper, virtually no seepage is anticipated through the walls. In the case of the bottom concrete slab construction, any vertical infiltration initially detected towards the upper range will be immediately mitigated by plugging the seepage holes with cement and bentonite thus reducing the infiltration rate towards the low range limit. After testing to confirm compliance with regulatory limits, discharge from the sedimentation pond would be directed to the Port's stormwater outfall, which in turn discharges to the Columbia River. Preliminary sizing of the sedimentation pond considers temporary storage for approximately 1.0 million gallons (3,785 m^3). This temporary sedimentation pond would be located more than 200 ft (61 m) from the ordinary high water mark (OHWM). If this option proves unsuitable, an alternate option would be to discharge to the sanitary sewer operated by the City of Vancouver (City).

Based on the proposed construction methodology, previously obtained remedial investigation (RI) data on the site are sufficient to demonstrate that the minimal volume of water that may be generated during the *construction of the dumper pit would meet the freshwater criteria for surface water disposal. Additionally, because active groundwater pumping using well points around the dumper will not be employed, it is not anticipated that groundwater outside the area of the proposed dumper pit will enter the excavations. During construction activities, water from the sedimentation pond will be tested regularly to ensure compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements, and will be tested for parameters which will confirm that migration of groundwater from other areas of the site is not occurring.*

Shiploading

Potash from the storage building or directly from the railcar dumper will be transported to a 661-ton (600-metric tonne) enclosed surge bin located upland of the berth. The function of the surge bin is to provide sufficient time for changes in the shiploading rate (e.g., when the shiploader operation is temporarily suspended during ship hatch changes). The surge bin will be located upland of the berth to allow maintenance accessibility (see Plan Sheet 02-310).

The berth will contain a dual-quadrant shiploader system. The berth structures for the dual-quadrant shiploader system will comprise two ship-loader quadrant beams and pivot supports, complete with access roadway, the central maintenance access platform between the two quadrant beams, berthing dolphins, mooring dolphins, and interconnecting catwalks. The shiploader pivot supports will be sized to accommodate the shiploader feed conveyor transfer and the electrical substation for the wharf facilities. Ground improvements are necessary to reduce the potential for lateral spreading and instability at the shiploading structures. Stone columns may be installed to depths of approximately -40 ft (-12 m) at shiploader pivot points [above the ordinary high water mark (OHWM)] to ensure proper stability of these features.

The deck structure will be constructed of reinforced concrete pile caps, precast box beams, and composite concrete topping. Reinforced concrete up-stands will support the pivot loads for the quadrant loaders. The quadrant beams will consist of short-length concrete box beams with extended flanges for walkways on both sides of the crane rail. The berthing dolphins are piled structures with concrete pile caps, and will be equipped with fender systems and mooring bollards for ship mooring lines. The mooring dolphins are also piled structures with concrete pile caps, and will be placed beyond the berthing dolphins to accommodate bow and stern mooring lines (see Plan Sheet 02-302).

The shiploader feed conveyors will be self-supporting spans, using steel trusses, and will be supported on piled bents and cast-in-place reinforced concrete pile caps.

Shiploading systems have been designed to allow for the loading of vessels from 20,000 DWT to 60,000 DWT. Peak material flow rates from either storage or direct from the dumper are estimated to be approximately 5,512 tons (5,000 metric tonnes) per hour. Taking into account average reclaim rates and hatch changes, the average through-the-ship loading rate will be on the order of 3,858 tons (3,500 metric tonnes) per hour.

Marine Structures

The proposed marine structures may include shiploader support structures, berthing dolphins, mooring dolphins, and a maintenance access/platform that will support the materials handling equipment and moor the design vessels. The berth layout provides sufficient clearance from existing dock structures at the Port's Terminal 5 site and the requisite space for vessel maneuvering during berthing and departure. It is currently anticipated that a new berth will be constructed in deepwater, with the existing dock remaining in place for securing mooring lines as well as providing dock space for other vessels. The position of the berth face is governed by navigational requirements for vessel movement in the Columbia River (see Plan Sheet 02-200).

Potash from the storage building (or direct from the railcar dumper) will be transported on a fully enclosed belt conveyor system to an enclosed surge bin located upland of the berth. As the rate of shiploading changes (e.g., when the shiploader operation stops temporarily while the ship hatch in use changes), the surge bin will hold the product temporarily. From the surge bin, two fully enclosed belt conveyors will transport potash to dual quadrant shiploaders for transfer to the vessels.

The proposed design includes dual quadrant shiploaders that would be supported by pivot pile caps at the shoreline and pile supported quadrant beams at the berth. The upstream (eastern) pivot pile cap is to be located at the OHWM and the downstream (western) pivot pile cap would be located upland approximately 30 ft (9 m) landward of the OHWM. Each pivot pile cap would be cast in place concrete topped by a concrete pivot bearing upstand that supports the end of the shiploader. Two pile supported quadrant beams would support the crane rail, allowing the shiploader truck assemblies to travel along an arc to load the multiple holds on the vessels. Each of the quadrant beams would consist of cast in place concrete pile caps. Nine pre-cast concrete box girders will rest on the pile cap to support the crane rail and provide a maintenance walkway.

For vessel mooring, four breasting dolphins and one center platform (for mooring and vessel access) are proposed. Each breasting dolphin and the center platform would include two cone rubber fenders and steel fender panels attached one above the other to a precast concrete panel. This positioning will allow the berth to operate at a variety of river levels.

The center platform will be connected to the inner two breasting dolphins by an 8-ft (2.4-m) wide walkway constructed of precast concrete box beams. The two outer and two inner breasting dolphins will be connected by a 6-ft 6-¾ in (2-m) steel grated walkway approximately 70 ft (21.3 m) in length.

Two mooring dolphins will be constructed upstream of the shiploaders to provide anchoring points for bow or stern lines. Access to the mooring dolphins will be provided from the shiploader quadrant beams by 6-ft 6-¾ in (2-m) wide steel grated walkways. Downstream anchor points will be provided by newly installed mooring points on the existing dock. Approximately four additional anchoring piles, 36 to 40 in (914-1,016 mm) diameter will be installed to transfer the mooring loads to the shoreline.

To provide vehicle and equipment access to the center platform and the shiploaders, two access trestles will be provided that converge at a central support dolphin with a single trestle extending to the center platform to provide access to the vessel. The two trestle legs are necessary to provide maintenance access to the shiploaders. When maintenance is necessary, the shiploaders will be moved to the most inward position parallel to the access trestle legs. Service vehicles and cranes will be located on the trestle to service the equipment. The maintenance roadway will accommodate a 44-ton (40-metric tonne) mobile crane (see plan sheets 02-200 and 02-302).

The trestle will be 24 ft (7.3 m) wide and constructed of precast concrete box beams supported on steel pipe piles with steel bullrail. Each initial leg will be supported on land by a pile supported abutment located above the OHWM. Each trestle leg will be supported by steel piles. The central support dolphin will consist of a cast in place concrete pile cap supported by steel piles. The central trestle will be supported by the central support dolphin and the center berthing dolphin. The steel piles may be filled with concrete to meet structural load requirements.

Installation of the in-water piles will be accomplished by impact pile driving. Where possible, piles will be driven with a vibratory pile driver to the maximum extent feasible. The characteristics of the substrate and the location of the pile driver will determine the extent to which the pile is advanced by the vibratory method. An impact pile driver will complete driving the pile to the specified depth and load.

The following table shows the numbers and dimensions of the steel piles estimated for the project's marine structures. A total of approximately 95 steel piles are estimated for the in-water elements, with an additional 21 piles estimated to occur above the Corps OHWM, totaling an estimated 116 piles for the project. This total includes approximately 14 piles reserved for contingencies.

Pile Group	Estimated # Piles below Corps OHWM	Estimated # Piles above Corps OHWM	Total Estimated # of Piles
Mooring Dolphins	8	0	8
Berthing Dolphins	30	0	30
Quadrant Beams	36	0	36
Trestle Road	11	5	16
Pivot Supports	0	12	12
Contingency Piles	10	4	14
TOTAL	**95**	**21**	**116**

In addition, temporary piles will be necessary during construction. Three or four piles are anticipated to be installed during construction in up to 23 different locations to total approximately 95 temporary piles. These temporary piles will be 18 to 24 in (457 to 610 mm) diameter open-ended steel pipes and will be driven solely with a vibratory pile driver. These temporary piles include piles that may be installed for the mooring of a work barge during the construction and as templates to aid in the installation of the permanent marine facilities.

Both cast in place and pre-cast concrete elements will be used in the shiploaders. Precast elements will be constructed off site and delivered by barge to the work site where they will be placed by a barge-mounted crane. Cast in place elements will utilize concrete-proof wooden forms that will be attached to piles with friction collars or other appropriate false work. Concrete will be delivered by barge or trucks and pumped into the forms.

Permanent access to the marine facilities will be provided by a newly constructed paved access road from the proposed Gateway Avenue overpass. There is a Port-maintained shoreline access road near the top of the bank of the Columbia River (along the southern perimeter of the site) that will provide access to shiploading facilities and the surge bin. A road will also provide access to trains and maintenance of the rail loop system. Additionally, a pedestrian overpass of the freight rail line will connect portions of the site inside the rail loop with areas south of the rail tracks.

Site Access
Vehicular access to the facility will be provided by a new road connecting to the future Gateway Avenue overpass at an elevated intersection approximately 900 ft (274 m) northeast of the proposed storage building. The Gateway Avenue overpass will be designed and constructed by the Port and is a component of the West Vancouver Freight Access (WVFA) project. The overpass is a project that is required as part of the WVFA and is outside the scope of the bulk handling facility project. The cross section of this new bridge will be similar to what currently exists at the Port's 26th Avenue overpass. In addition to the site access via Gateway Avenue, a secondary at-grade access to the site is planned east of the proposed storage building. This access will intersect with NW Harborside Drive east of Terminal 5 and south of the Clark County Corrections facility.

Utilities
The project will include the installation of water, sewer, stormwater, electrical, and communications facilities for site operations. These improvements include a 6-in (152-mm) sanitary sewer line that will connect to the proposed administration and maintenance building and to on-site process water drains before conveying to a sanitary sewer lift station located north of the project site. An 8-in (203-mm) water line is proposed that will route between the storage building and the railcar dumper building. This waterline will connect to a 12-in (305-mm) waterline extension proposed on the site, connecting to an existing water main stub located at the eastern limits of the project site. Additionally, it is anticipated that a 1-in (25 mm) natural gas line will be extended on to the site to serve the administration and maintenance building.

Administration and Maintenance Building
An approximately 9,152-square foot (SF) (850-square meter [m^2]) two-story administration and maintenance building is proposed on the east end of the site. This structure will be for administrative

offices, washrooms, change rooms, lunchrooms and maintenance use. Sewage from the maintenance building will be discharged by gravity to a lift station located north of the storage building. From there, it will be pumped to the Port sanitary lift station, and pumped and conveyed to the City sanitary sewer.

Sumps within the maintenance shop will collect water from the maintenance bay. Prior to discharge to the sanitary sewer, this fluid will pass through an oil water separator. Oil collected during this process will be disposed of at an appropriate location off site.

A parking lot with approximately 35 parking spaces and vehicular circulation area will be constructed adjacent to the administration building.

A fueling station is proposed immediately east of the administration and maintenance building parking lot (see Plan Sheet 02-153). Fuel stored at this site will be contained to meet EPA standards as well as the stormwater control provisions in VMC 14.25. Tanks will be above ground double walled and contained within a bermed area. Per City requirements, the fueling island pad adjacent to the tanks will be impervious and will be graded with a center drain. This center drain will convey to a dead-end sump with capacity for potential spills. A canopy will be constructed that extends at least 2 ft (0.6 m) beyond the fueling pad area.

Temporary Concrete Batch Plant
A temporary concrete batch plant may be located on the site during construction activities, as an alternative to using ready-mix concrete. This plant would be located approximately 100 ft (30 m) north of the northwest corner of the proposed storage building, outside of the 100-year floodplain/floodway, shorelines jurisdictions, and fish and wildlife habitat conservation areas, per the City Critical Areas Ordinance, VMC Section 20.740.110. This batch plant would be on site only during the approximately 3 years of project construction and would be removed upon completion of the initial 4 Mtpa phase of the project.

The general operation of a temporary batch plant would involve stockpiles of aggregate and sand which would be loaded onto a conveyor. The conveyor would transport the material to a mixing bin, where water would be added from a storage tank. After mixing, the concrete would be discharged from the bin into trucks to be transported to the appropriate area on site.

Temporary Construction Trailers
During construction, temporary construction trailers are planned to be located on the East Landfill site immediately east of the bulk potash handling facility at the Port's Terminal 4. These trailers would require temporary utility access, including water and sewer connections, for operations during construction, but would be removed upon completion of the 4 Mtpa phase of the project. Contamination on the East Landfill site is contained in an impermeable cap and the project will ensure that the containment barrier is not disturbed or breached with the placement and use of trailers on the site.

Riparian Mitigation
To compensate for the loss of productivity attributable to approximately 530 SF (49 m^2) of overwater shading from proposed dock facilities, and to provide ecological lift of riparian function within the watershed, 2,650 SF (246 m^2) of native riparian plantings will be established at Buckmire Slough, near Lake River (see Figure 1). Additionally, to offset any impacts to the benthic environment from in-water construction activities associated with the new dock facilities, the project will remove an existing dolphin and catwalk at Terminal 5, and remove treated timber piles in the river at Terminal 5 as well as at the Port's Terminal 2, approximately 2 miles (3.2 km) east of the site near River Mile 105 (see Figure 2) of the Columbia River. Two treated timber piles will be removed for each pile placed with the project, with 31 piles planned for removal from Terminal 5, and approximately 177 piles planned for removal from Terminal 2.

Stormwater Management
Stormwater runoff from impervious surfaces on site will be collected and conveyed to a permanent concrete detention and settling pond located on the southern side of the storage building. This pond would be approximately 210 ft x 80 ft x 5 ft (64 m x 24 m x 1.5 m), which would yield a volume of approximately 84,000 cubic ft (CF) (2,379 m^3). This pond will be designed to comply with the 2005

Stormwater Management Manual for Western Washington and VMC Chapter 14.25, Stormwater Control. This pond will act as a settlement pond designed to accommodate 64 percent of the 2-year storm event for water quality and will include stormwater pipes and pumps designed for the 10-year storm event. In storm events that exceed the 10-year storm, stormwater will flow to the proposed 48- to 60-in (1,219 to 1,524-mm) stormwater outfall, which will be designed to accommodate the 100-year storm event.

It is expected that stormwater will discharge into an existing outfall to the Columbia River. Initial site infiltration evaluations indicate that the time required to infiltrate 24 hours of precipitation could be up to 1 month for an infiltration area as large as 24,219 SF (2,250 m^2). Site studies indicate that infiltration on that scale is not feasible and it is therefore not proposed.

The proposed project will require stormwater capacity beyond the existing capacity at Terminal 5. Currently, stormwater from Terminal 5 is pumped to existing stormwater ponds to the west of the facility. That system does not have enough capacity for the proposed project. Due to the need for increased conveyance capacity and the need to move existing pipe from under the proposed storage building, the proposed project will install a larger stormwater outfall and move related stormwater pipe. The stormwater pipe will be constructed by the Port, but is a project dependent on and will be permitted with the proposed project. If for any reason, the Port does not move forward with the construction of the stormwater outfall prior to completion of the proposed project, as an alternative, the BHPB site will be served by the existing stormwater outfall and any other stormwater management facilities needed to comply with applicable stormwater discharge permits.

The stormwater outfall will likely be supported in one of two ways. One option will be to support the outfall on underwater precast concrete saddles, which would be spaced to support the weight of the pipe at joint locations. Minor work may be required on the river bottom to allow for the saddles to be placed on a flat grade. The end of the outfall would be equipped with an elastomeric check valve. It is anticipated that small areas of the riverbank may be disturbed to allow for outfall pipe construction. The other option is to install the outfall on a pile and beam support system. With this system, a pair of H-piles would be driven at each joint in the run of an unburied (supported) storm drain pipe. The piling would be driven to adequate depth to achieve fixity and a steel beam would be bolted across the two piles. The storm drain pipe would bear on these beams and would be held in place with a saddle and/or strap which is structurally connected to the beam. This technique requires little earthwork or disturbance to the river bottom, but it does entail driving piling in the river. These piles can be embedded using vibratory equipment without "proofing" the installation with an impact hammer. Areas disturbed by the outfall construction will be restored to pre-construction conditions by either replacing the riprap or planting/seeding the exposed earth. Appurtenant structures, such as manholes, will be required to provide permanent access to the new storm drain.