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CMC Engineering and Management Ltd. (“CMC”) was engaged by Parrish & Heimbecker, Limited (“P&H”) to perform conceptual and preliminary engineering studies for the Fraser Grain Terminal Project (the “Project”). FWS Industrial Projects Canada Ltd. (“FWS”) was engaged by P&H to develop a revised facility design for the Project, to meet design criteria produced by the CMC studies.

Design criteria produced by the CMC studies are referenced in this report, to provide clarity on the design basis for the FWS facility design. FWS has not reviewed the development of the criteria, nor any of the studies performed by CMC prior to their development. FWS does not express an opinion as to the accuracy or completeness of the information provided by CMC, nor any assumptions or conclusions reached by CMC. FWS makes no warranty whatsoever with respect to the information provided by CMC and disclaims any and all liability in respect thereof.

This report is provided to P&H in relation to a permit application to Vancouver Fraser Port Authority (“VFPA”) for the Project and any reliance by any other third party on this report shall be the responsibility of such third party. FWS assumes no liability with respect to any reliance by any such third party on this report.
1- EXECUTIVE SUMMARY

This report replaces the Project Description and Description of Operations document found in Attachment 5 of the Fraser Grain Terminal Construction Permit Application submitted June 2017 (PER NO. 15-041)

The Fraser Grain Terminal ("the Project") layout has been revised in consideration of existing site conditions, seismic code requirements, and overall plant performance.

FWS has been engaged by Parrish & Heimbecker to develop a revised layout for the Fraser Grain Terminal (FGT), based on design criteria produced in earlier studies by CMC. FWS has retained the basic concepts of steel bin product storage and totally enclosed conveyances with dust collection.

This report includes a detailed description of the project design criteria, proposed equipment and operations, required ancillary systems, and construction schedule. Design criteria and additional information is included in Annex A of this report. Drawings referenced throughout this report are provided in the Construction Permit Application Report and as separate digital files.

The proposed Fraser Grain Terminal will trans-ship up to 3.5 million MT per annum (Mt/a) of grain products, including wheat, barley, oil seeds and pulses. Product will be received at the facility by rail, and may be loaded directly to vessels or stored until shipped. A small part of the product volume will be locally distributed by truck or container.

Main project components include:

1) Semi-loop rail track and loading track connected to the adjacent PARY.

2) Rail unloading building and transfer tower with fully-enclosed conveying equipment and a built-in dust suppression system.

3) Three (3) Fixed Tower shiploaders with telescoping spouts, each with dust reducing features during vessel loading, replacing existing shiploader mobile conveyors. Each tower will be supported on steel piles in the foreshore and land side shore area.

4) 25 above-ground steel storage bins (20 x 3,500 MT, 4 x 400 MT and 1 x 710 MT)

5) Ground densification for the silo and shiploader foundations using Rammed Aggregate Pier (RAP) densification. The foundation densification program for the silo area was developed to minimize potential movement of in-situ contamination plumes.

6) Single integrated Container, Bulk Truck, and Rail loading facility and container storage yard.

7) An Administration Building and Maintenance Building and Sample Storage, two control rooms, electrical rooms and container preparation area with fabric rain cover.

The steel storage upper distribution system is completely enclosed and connected to a dust control system. The shiploader system can also be used by the existing JV Facility. Shiploaders will not require vessel warping and will be fitted with a cascading telescopic or choke-fed discharge dust control spout to reduce emissions during loading.
The facility has only three deep excavation areas, ranging from 3.5 to 8.4 metres in depth. These areas may have some localized contamination, and will be managed accordingly during construction.

The entire existing concrete slab under the former Bekaert building will be removed, including any underground utilities, pits, and tanks, to facilitate ground densification via RAPs.

Grouted RAPs will be installed around the perimeter of the densification areas to limit the movement of ground water and changes to existing contaminant plumes. RAPs within this perimeter will be ungrouted.

The project layout avoids interference with the existing Metro Vancouver Annacis Main no.3 that crosses the site. Crossing slabs over the water main are provided for vehicle and rail traffic.

A new substation is proposed along with a new power supply feed. The new substation will have less overall capacity and consumption than the former Bekaert plant. Fewer outdoor lighting fixtures will be required.

A central modular compressed air system will be provided.

Fire safety requirements are aligned with National Fire Prevention Association (NFPA) standards for a facility of this design.

Construction of the facility will be completed in 24 months.
2- PROJECT DESCRIPTION

2.1 GENERAL SCOPE

2.1.1 Background

Fraser Grain Terminal Ltd. proposes to construct a new terminal at 11041 Elevator Road in Surrey (“the Project”). The terminal will act as a trans-shipment terminal for bulk grain products, including wheat, barley, oil seeds, pulses and other specialty grains.

Construction will be primarily on VFPA land, formerly leased to Bekaert Canada Ltd. The site contains several existing buildings and is currently vacant. Some parts of the project will be constructed on Port property leased by Fraser Surrey Docks (FSD). A summary of the project lease areas is shown in Figure 4.

FSD operates Berths #3 and #4 where the Project’s new state-of-the-art three fixed tower shiploaders are proposed. The shiploaders will serve Fraser Grain Terminal (FGT) as well as the existing JV Facility.

Fraser Grain Terminal and FSD will share some of the proposed track at the Port Authority Rail Yard (PARY).

2.1.2 General Description

FGT is designed to receive approximately 3.5 MT/a of product by rail in a new receiving facility, and approximately 547 000 MT/a of canola meal pellets from an existing facility jointly operated by Fraser Grain Terminal Ltd. and FSD (the JV Facility). The total of 4.007 MT/a will be shipped mostly by vessel, with smaller quantities shipped to local markets by container, rail and truck. A summary of the annual throughput capacities is shown in Figure 1 below. FGT’s process flow are shown on FWS Drawings F001 and F002.
2.1.2.1 Vessel Limitations

A summary of vessel size limitations imposed by Fraser Pilots and the usable moorage length of the berth is shown in Figure 2.
2.1.2.2 Description of Facilities

FGT facilities will consist of the following:

1. A semi-loop track connected to the adjacent PARY. This is more fully described in 2.1.3.2. The existing Shed 4 will be demolished to make way for the new rail. This demolition was approved as part of the coal project (Project Permit 12-072-1), and FGT will carry out this work on behalf of FSD under the coal permit.

2. A rail unloading building to empty railcars, located on the semi-loop track.

3. Twenty (20) 3,500 MT, four (4) 400 MT and one (1) 710 MT corrugated and galvanized bins for a total grain storage of nominally 72,300 MT will be constructed on concrete slabs above ground.

4. The existing Bekaert building superstructure will be demolished under separate Project Permit 17-035. The foundations of the former Bekaert’s building shall be removed and a ground improvement program using rammed aggregate piers shall be used to support the main plant to reduce the liquefaction effects during seismic events.

5. Three fixed tower shiploaders, each with a cascading type or similar choke fed dust suppressing telescoping loading spout and enclosed equipment will be installed on existing Berth #4 and a portion of Berth #3 for loading up to Panamax class vessels. These fixed tower shiploaders will be installed on steel pile type foundations independent of the existing wharf. Therefore no additional load will be imposed on the surface of the existing dock. The new shiploaders will have a localized densification
berm installed on the land side of the wharf to minimize lateral spread effects of the foreshore due to liquefaction during a seismic event. The tower sizes and reach will not require vessel warping to load a ship.

6. A steel transfer tower containing two bulkweighers, two grain samplers and three bucket elevators will be located near the unloading station. This transfer tower will serve as the central receiving and dispatch point for directing grain flow from the unloading station to storage silos and shiploaders.

7. A network of totally enclosed belt conveyors, supported by steel trusses, will connect the receiving station to storage silos and shiploaders via the transfer tower.

8. Dust suppression systems will be installed to eliminate dust escaping from all conveyors, and other associated material handling equipment.

9. A rail/truck loading structure with associated container yard for empty and full containers, and preparation area will be constructed to stuff containers with bulk grain for international markets.

10. An Administration Building and a Maintenance Building and Sample Storage will be built to serve the needs of FGT's operational and maintenance staff.

2.1.2.2 Special Remarks

Several site specific geotechnical investigations have been performed on the site to characterize the soil for construction and liquefaction effects during a seismic event. The proposed grain export facility shall be constructed to meet Canadian National Building Code 2015. To conform with the seismic design requirements, a ground improvement program is required to deal with effects of liquefaction. The proposed method of ground improvement in various areas is to use Rammed Aggregate Piers (RAP).

The main bin slab will be located with approximately half the slab area over the in-situ contaminated groundwater area. This ground area shall be improved using a system of RAPs to reduce liquefaction spread and improve bearing capacity. A series of grout filled RAPs will be installed at the perimeter of the densified area, and thus minimize the potential movement of the existing groundwater plumes. Within this grouted perimeter berm, un-grouted RAPs will be installed to provide the balance of ground improvements.

The three fixed shiploader towers shall be founded on marine foundations, primarily steel pipe piles in the foreshore area. This area is not contaminated so standard RAP's shall be installed east of each shiploader foundation. These RAPs shall form a densified berm, that will mitigate liquefaction effects of surrounding un-densified dock soil from impacting the new shiploader. In the event of a significant liquefaction event, the surrounding soil would flow around the new foundations.

To densify the new plant structure, the existing Bekaert building slab, foundations, and existing rail spur shall be removed. The existing slab concrete shall be tested for contamination, prior to removal. Clean concrete shall be crushed on-site, stored temporarily then, used as road subbase, directly under paved areas. Any excavated material requiring to be cut or excavated, shall be tested and stored on site. Clean material shall be re-used on site, where possible or hauled off site. Contaminated materials shall be handled according to the CEMP.
Demolition of the existing 25kV substation is required as the building and equipment does not meet current code, and is a barrier to movement in the new layout. The existing infrastructure, electrical equipment, building and foundation shall all be tested for contaminants before being removed from site. Works to remove the building shall be performed in accordance with Metro Vancouver proximal works requirements as the existing substation is located directly above the Metro Vancouver AN3 water line.

Construction process for the unloading pit and leg pit is as follows:

- Drive sheet pile around the perimeter
- Excavate inside sheet piles
- Pour concrete floor using tremie
- Dewater
- Construct concrete walls and slabs

2.1.3 Project Components

The Project includes the following On-Site and Off-Site components. FWS process flow diagrams F001 and F002, show all on-site and off-site process equipment.

2.1.3.1 Rail System

1. New semi-loop rail for unloading, passing through a new rail unloading building and connected to the existing PARY.
2. Realign an existing spur line and connect to the new semi-loop rail.
3. Extension and switch relocation of tracks in the PARY, to be completed post construction of the initial plant construction.

2.1.3.2 Unloading System

1. An unloading station consisting of a series of shallow unloading hoppers, one railcar door opener, and a car indexer, will be located in the rail unloading building. The rail unloading building is a steel frame building accommodating two railcars plus a drip shed to the north as rain protection. A receiving conveyor will be installed in the basement of the unloading building. The unloading pit approximate dimensions are: 32.2 m long, 7 m wide and 4.8 m deep.

2. A leg pit adjacent to the unloading building to contain the boot of the receiving leg and serving as the foundation for a transfer tower. The leg pit approximate dimensions are: 9.2 m wide, 12.8 m long and 8.4 m deep.

2.1.3.3 Transfer Tower

Transfer tower is 21 m wide x 11 m horizontal depth x 40 m high, containing the following:

- Receiving leg 2,000 t/h
- Transfer leg 2,000 t/h
- Shipping leg 2,000 t/h
- Receiving bulkweigher 2,000 t/h
- Shipping bulkweigher 2,000 t/h
• Receiving sampler
• Shipping sampler

2.1.3.4 Grain Storage System

1. Twenty 3,500 MT, 14.6 m diameter, 35.6 m high, corrugated steel silos, each mounted on steel legs and steel conical discharge.

2. Four, 400 MT, 7.3 m diameter, 16.5 m high corrugated steel silos, each mounted on steel legs and steel cone bottom discharge to serve as surge storage for container stuffing as well as rail and truck loading.

3. One, 710 MT, 10.0 m diameter, 16.5 m high corrugated steel silo, mounted on steel legs and steel cone bottom discharge to serve as surge storage for container stuffing as well as rail and truck loading.

4. A series of totally enclosed inclined idler supported conveyor belts and associated enclosed valves and spouting are installed above centrally between the large bins and will fill all bins. A totally enclosed reclaim belt conveyor is installed below each row of silos for shipping/transfer purposes.

5. All silos are supported by a 1 m thick foundation slab which is supported on grout filled RAP's installed underneath the appropriate footprint.

6. A concrete reclaim tunnel, nominally 61 m long x 4.0 m wide x 2.4 m deep, shall be run perpendicular to the main bins central to the plant to accommodate a common reclaim conveyor feeding a reclaim bucket elevator. The boot of the reclaim bucket elevator is installed in the concrete pit.

2.1.3.5 Conveying System

All conveyors are totally enclosed belt conveyors, running inside steel truss galleries and supported by steel towers or bents, as follows:

1. 2 000 t/h totally enclosed receiving conveyor BC01 from unloading pit to receiving leg in transfer tower.

2. 2 000 t/h transfer conveyor BC02 from Transfer tower to upper distribution conveyors BC03 through BC12 in single central open truss feeding all storage silos. Each conveyor has multiple discharge valves that can direct the grain to each bin. Only specific conveyors required to reach a single bin shall operate at one time.

3. 2 000 t/h totally enclosed reclaim conveyors BC013, BC14, BC15, and BC16 below large silos feeding reclaim conveyor BC 17 located in the concrete reclaim tunnel and in turn feeding reclaim leg BE03.

4. 500 t/h totally enclosed reclaim conveyor BC18, below five (5) smaller silos feeding the container stuffing/truck loading facility, and blending products for loading ships.

2.1.3.6 Container Stuffing

A container stuffing facility will be installed at the east side of the bin storage slab and will have the following features:

• 500 t/h loading leg BE04 for filling
• 100 t surge bin
• Two Container tilting and weighing platforms
• Enclosed product return to storage spouting (no return dump pit required)
• Sampler
• Low velocity loading spouts to minimize dust
• Asphalt and concrete paving for 90 ground slots for empty and 70 ground slots for full containers. Each ground slot can be stacked 5 containers high.
• A 6 m x 6 m vinyl fabric rain over structure mounted on precast support for container preparation prior to stuffing

2.1.3.7 Rail and Truck Loading
A rail loading and bulk truck loading system is integrated into the container stuffing tower at the east side of the Property with the following features:
• One 100 t surge bin mounted on load cells for batch weighing product for rail or truck loading
• A dust suppression hopper on retractable loading spout
• Provision for a future indexer to move the strings of ten railcars
• Enclosed product return to storage spouting (no return dump pit required)
• A sampler

2.1.3.8 Buildings
A prefabricated steel administration building on a concrete slab, 246 m², including:
• Employees lunch and change rooms
• Truck driver washroom
• IT server room and reception area
• Offices

A prefabricated steel maintenance building and sample storage of approximately 200 m², placed on a concrete slab.

2.1.3.9 Dust Control System

2.1.3.9.1 Dust Control Strategy

Applicable NFPA standards will be followed in the management of combustible dust. Please refer to the Fire and Explosion Plan for details.

The mitigation strategies used on this Project to minimize risks of fires and explosions will include the following:
• All material handling equipment will be totally enclosed.
• Installation of special baffles above unloading hopper.
• Installation of special cascading type or choke fed discharge loading spout on the shiploader
• Provision of bag or cartridge type air filters and aspiration fans connected to each conveyor, leg, and containers to create a negative pressure inside the equipment plenum to eliminate dust emission.
• Dust accumulated in the cartridge filters in the form of dust lumps will be returned immediately to the product flow.

See FWS Drawing D001 for a schematic of the dust collection system.
2.1.3.9.2 Central Vacuum System

A central fixed vacuum line shall be installed in the below grade areas and connected to a single vacuum system for cleaning purposes.

2.1.3.9.3 Training of Personnel

FGT will develop a training plan for workers to include the following:

- Fire and dust explosion hazards
- Control of ignition sources
- Housekeeping

2.1.3.10 Civil Services

All piping work will be carried out according to the latest version of the MMCD and efforts will be made to try to restrict excavation work to less than 2.0 m in depth.

2.1.3.10.1 Water Supply

In general, FGT will consume less water than the previous tenant, due to fewer employees and no process water requirements.

A new ring distribution pipe will be installed around the storage bin area perimeter to provide domestic and fire-fighting services.

Existing municipal feed to the site has sufficient capacity to supply the required water volumes. The single fixed standpipe located at the transfer tower will require the local fire department to connect to a site hydrant and use fire truck-mounted pumps to provide water supply for fire-fighting water at the upper elevations of the structure.

2.1.3.10.2 Sanitary Sewer

In general, FGT will have a lower service load than the previous tenant, due to fewer employees and no process water requirements.

Existing services (from previous tenant) include a holding tank in the southwest corner of the property. This feeds a duplex plump to a force main transiting to the municipal sanitary sewer.

New FGT sanitary sewer system will include several smaller pumping stations to created a new forced collection system which will discharge to the existing sanitary sewer holding tank. Force mains are used to reduce the required depth for new piping.

2.1.3.10.3 Storm Sewer

The total area of the FGT property is virtually unchanged after land swaps between FGT, FSD and VFPA, thus the total surface drainage load is unchanged.

Collectors and piping will be revised to suit the new drainage pattern created by the addition of new buildings and structures.
Oil and grit separators will be provided to prevent these contaminants from entering the municipal storm sewer system.

2.1.3.10.4 Natural Gas

Natural gas services will be provided to the new administration office and main control room only.

2.1.3.10.5 Electrical Service

In general, FGT will use less electrical power than the previous tenant. A new 25kV substation will be located at the South end of the facility and will be fed from the existing Robson Road line. The existing Electrical room shall be demolished and removed from site. This existing structure shall be removed from overtop the existing buried Metro Vancouver AN3 line using Metro Vancouver Proximal Work procedures.

2.1.4 LAND

2.1.4.1 Summary of Land Area Affected by the Project

The Project involves work in the FGT lease area, the FSD lease area, and the PARY license area. A summary of affected areas is shown in Figure 3 below.
## FIGURE 3 – Summary of Land Use Affected by Project

### FGT Lease Area

<table>
<thead>
<tr>
<th>Swapped Lands</th>
<th>Area Description</th>
<th>Areas calculated by CMC (ha)</th>
<th>Areas calculated by FWS (ha)</th>
<th>TOTALS by Area (ha)</th>
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<tbody>
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<td>Original FGT Lease</td>
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<td>From FGT to FSD</td>
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<td>SW Corner of FGT Lease</td>
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<td>To FGT from FSD</td>
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<tr>
<td>Incoming Rail curve</td>
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<td>SW rail curve</td>
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<td>Extended Rail curve boundary</td>
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<td>Reduced Incomin rail boundary</td>
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<td>To FGT from VFPA</td>
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<td>North entrance of rail to site</td>
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### FSD Lease Area

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<td>FGT Construction Area for Shipping System</td>
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<td>FGT Construction Area for Shipping and Receiving Construction</td>
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<td>Right of Way for sanitary sewer line to pumping station</td>
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<td>ROW for sanitary line to exist pump station</td>
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<td>TOTAL AFFECTED AREA</td>
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### PARY Licence Area

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<th>Areas calculated by FWS (ha)</th>
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<td>New Lease to PARY Track for FGT (north)</td>
<td></td>
<td>0.017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N entry to FGT loop</td>
<td></td>
<td>0.017</td>
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<tr>
<td>From Lease overlap to PARY</td>
<td></td>
<td>0.766</td>
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<tr>
<td>Potential PARY Expansion</td>
<td></td>
<td>1.128</td>
<td></td>
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<tr>
<td>From Chemetron to PARY</td>
<td></td>
<td>0.013</td>
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<tr>
<td>From North Areas</td>
<td></td>
<td>1.115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From PARY to Chemetron</td>
<td></td>
<td>(0.090)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From PARY to Chemetron</td>
<td></td>
<td>-0.090</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NET CHANGE TO PARY</td>
<td></td>
<td>2.201</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.1.4.2 Components Within the PARY Licence Area

For the blending of FGT with the existing JV facility:

- Removal of the existing spur track entering the old Bekaert site back to the bifurcate rail traffic into FGT (Track FG1).
- The FGT exit track at the south of the facility will join up with the existing JV track (Track 90) that heads into the PARY.
- Full rail development will be done in two phases. In Phase 1, a new loop track will be installed to serve the new rail unloading building, plus a new spur serving the new rail/truck loading structure. This is the minimum change required to allow the Fraser Grain Terminal (FGT) to function under current operating conditions.
- Operation of the JV rail facility will be unaffected by operation of FGT, except for timing of movements on shared tracks in the PARY.
- A future expansion to the Port Authority Rail Yard (PARY) is also to be considered as Phase 2 of this project. Phase 2 of rail construction will be required only when operating conditions at FSD change, such as accommodating a new coal or potash terminal or CN delivery service to the PARY changes. For example, if CN service requires bringing in a full unit train before removing an empty, then Phase 2 PARY extension would be required.
- Phase 2 consists of extending Tracks 94, 95 and 96, and switch changes in the PARY. Track alignment lengths will be extended as follows: Track 94 by 888 m, Track 95 by 877 m, Track 96 by 907 m.
- Implementation of Phase 2 would not significantly increase overall switching time or the number of rail movements per train unloaded. Operation and switching of full and empty cars to/from the PARY will be similar to that indicated in the Phase 1 Time in Motion Study, but starting with cars on Tracks 94 & 95 instead of Tracks 92 & 93. The operation will not result in any additional movements across the road crossings of Robson Road at either Plywood or Elevator Road.
- Phase 2 of rail construction, if required, would not likely need to be completed prior to Fall Harvest of 2021.

2.1.4.3 Components Within the FSD Lease Area

1. Raise existing JV track elevation by addition of ballast east of FSD existing crossing. This vertical realignment does not affect the horizontal alignment of the existing track.

2. 2 000 t/h fixed tower – shiploaders installed at the existing Berth #4 and portion of Berth #3 on FSD leased land. This will have the following features:
   - Capable of loading Handy, Handymax and Panamax vessels with and LOA of 225 m and up to 32.3 m of beam.
   - Will be provided with a special cascade type or choke fed discharge loading spout.
   - Totally enclosed 2 000 t/h conveyors on the boom.
   - The shiploader towers will be supported on piles in the foreshore area and will each have a dedicated berm of densified land to the east of each tower to mitigate liquefaction effects of land during seismic events.
   - The shiploaders will be supplied by a totally enclosed shipping conveyor supported by bents and towers running from FGT and the JV shed to a central tower at Berth #4.

3. 2000 t/h totally enclosed shipping conveyors from the west property boundary to the
shuttle conveyor. These conveyors run overhead, supported on towers and bents.

4. New 1000 t/h bucket elevator and conveyor near existing FSD Shed #1 storage. This replaces the existing JV Facility vessel loading conveyors at Berth #3.

Figure 4 below shows the surrounding area leases. FGT’s site layout is shown on FWS Drawings P001, P002 and P003.

**FIGURE 4 – CMC Report Fig. 2.1-1A**

2.2 PROJECT SITE

2.2.1 General Description of the Land

FGT will be constructed on land adjacent to the FSD land at 11041 Elevator Road in the City of Surrey. The lands are owned by VFPA, and previously leased to Bekaert Canada Ltd.

Per the CMC Project Description and Description of Operations, the existing site (former Bekaert lease) consist of approximately 77,600 m², and P&H is negotiating a land swap with FSD to suit FGT and FSD requirements.
With the proposed land swap, including the PARY extensions in Phases 1 and 2, the new P&H lease with VFPA would consist of approximately 78,160 m$^2$, (19.31 acres).

The only portion of FGT that would not be on P&H land would be the new fixed tower shiploaders to be located on the existing FSD wharf and portion of the rail tracks located on PARY trackage. (The new shiploaders and associated conveyors would also be used to ship from the existing JV Facility jointly operated by P&H and FSD.)

Refer to Figure 6 and Figure 7 below for plans of the leased land and proposed land swap.

**FIGURE 6 – CMC Report Fig 2.1-7**

*Figure 2.1-7*

*Project Site*

*Former Bekaert Leased Land*
The Phase 2 Rail expansion in the PARY yard will require appropriate property rights for the portion of the project outside the FGT leased areas. These areas are limited to the Potential PARY Expansion Areas noted in the Mott Macdonald drawings 397147-MMD-00-P0-DR-RW-1004 and -1005, and lease area proposed to be added to Chemetron.

### 2.2.2 Environmental Issues

Site environmental reviews commissioned by Bekaert and CMC can be summarized as follows:

- Based on conversations between VFPA and P&H, it is understood that as long as the contaminated soil and groundwater are not affected by P&H activities, then P&H will accrue no responsibility for pre-existing contamination upon surrendering the lands back to VFPA in the future (whenever that may be).

Construction of FGT requires excavation in three areas of the site:

1. **Rail Unloading Building and pit:**
   - The rail unloading building is a metal clad structure long enough to house approximately two railcars in length and wide enough to straddle a single railcar clearance envelope. Most of the rail unloading building’s grain conveying occurs underground. The drawings show that the entire rail unloading building sits atop an underground pit approximately 4.8 m deep.
2. Main transfer tower and leg pit:

- The transfer tower is an open steel structure located next to the rail unloading building, which supports conveyors, bucket elevators and two bulkweighers.
- The transfer tower is constructed on top of a pit connected to the unloading pit. The tower pit will house the boot of a bucket elevator and it represents the deepest excavation of the entire FGT site at 8.4 m deep. Please refer to FWS Drawing P011 for depths of foundations on site.

3. Reclaim tunnel:

- As shown on the drawings, it is planned to construct the silos on top of the densified soil within existing building’s slab footprint. The former Bekaert building per se will therefore be demolished and its slab crushed for use as a sub base in other areas of paved areas of the site. Demolition of the Bekaert building will be done under Permit 17-035. A concrete raft approximately 1.0 m thick will then be constructed on top of a series of grout filled Rammed Aggregate Piers (RAPs) with the finished mass acting as a raft for the support of the silos.
- The drawings show the fully developed layout with two (2) rows of ten (10) silos at 14.6 m diameter, 35.6 m high and 3 500 t capacity, and one (1) row of five (5) silos, one (1) at 10.0 m diameter, 16.5 m high and 710 t capacity and four at 7.3 m diameter, 16.5 m high and 400 t capacity. These silos are galvanized steel units.
- A central concrete reclaim tunnel, is located underneath the small bins to gather grain from each row of large bin conveyors and each small bin, to take product back to the bucket elevators in the transfer pit.
- The Reclaim tunnel depth is shallow enough to be above the ground water level and conventional open excavation will be possible. The tunnel excavation shall only require dealing with surface dewatering. This water will be pumped to a temporary holding area on the site and tested. Once the water has been deemed suitable, the water can then be discharged through the existing storm sewer system equipped with a grit separator.

The following techniques will be used to excavate the unloading building tunnel and leg pit areas:

- sheet piling will be driven around the perimeter of the planned excavation
- the area inside the sheet pile walls will be excavated
- the excavated material will be stockpiled on site
- although the excavations will be below the water line, there will be no active dewatering as the excavation proceeds
- upon reaching the prescribed depth, a tremie concrete plug will be poured to plug the bottom of the excavation
- once the tremie plug has set, the excavation will be dewatered
- the water will be treated before it is discharged

This excavation methodology will minimize the amount of dewatering to be done.
Please refer to Hemmera Drawings 2191-001.01 -Figures 4 and 5 for estimated extents of the contaminated areas of the project site with plant areas superimposed.

2.3 FACILITY DESIGN CRITERIA

Refer to Figure 8 below for basic design criteria. New equipment design information for transfer equipment is in section 2.3.2.6.

Bin capacities include 5% pack. All capacities are wheat equivalent (Bulk Density @ 0.77 MT/m³ or 48 lb/ft³).

**FIGURE 8 – CMC Report Table 2.1-2**

<table>
<thead>
<tr>
<th>#</th>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PERFORMANCE TARGETS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>OVERALL</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Total annual throughput</td>
<td>3.5 Mt/a</td>
</tr>
</tbody>
</table>
| 4  | Types of products           | • Large batches suitable for larger storage lots:  
|    |                             |   o Canola  
|    |                             |   o Soya beans  
|    |                             |   o Peas  
|    |                             |   o Feed wheat  
|    | Composite shipment: Up to 112 cars @ 100 t = 11 200 t |
|    |                             | • Smaller batches requiring smaller storage lots:  
|    |                             |   o Feed wheat  
|    |                             |   o Feed barley  
|    |                             |   o Malting barley (principally direct hit)  
|    |                             |   o Oats  
|    |                             |   o Lentil  
|    |                             |   o Rye  |
| 5  | BULK SHIPMENTS (BY VESSEL)  |             |
| 6  | Number of storage turns per year | Target = 45 |
| 7  | Train handling              |             |
| 8  | Typical size                | Up to 112-car unit train of single lot product |
It is anticipated that in future, unit trains of 112 cars will be unloaded without breaking the train up into smaller units. Unit trains contain only cars from the same origin, carrying the same product, and sequentially loaded.

In the interim period to receive unit trains of up to 112 cars, the existing PARY tracks will be used without requiring any track extensions or changes. The rail carrier will deliver the unit train to the PARY, stage the cars on tracks 92, 93, and depart.
A site locomotive will split the train into strings of 14 cars and shunt from/to the PARY to the FGT rail unloading building. A car indexer at the FGT rail unloading building will position each railcar for unloading. This design will have eight – 14 car strings per day pass through the rail unloading building. For a description of rail system service and operation, refer to the FWS Rail Operations Plan (Attachment 10 of the Construction Permit Application Report). For rail typical section and track changes, please refer to Mott Macdonald drawings 397147-MMD-00-P0-DR-RW-1000 through -1002.

The JV Shed operations remain unchanged from existing operations, using the PARY to receive, stage, and unload strings of 10 cars, on Tracks 94, 95 and 96.

2.3.1.2 Rail Service for Rail Loading

The business plan foresees an annual volume of approximately 200 000 MT/annum of product to be shipped to various feed mills in the Fraser Valley region east of Vancouver. This averages out to 10 cars per day on a five day a week operation. To this end, a combination rail/truck loading structure will be integrated into the container loading system. One bay will handle the railcars and bulk trucks and the adjacent bay will be for stuffing containers. This allows for a single feed system from the main storage silos to the loading facility.

The total capacity of the spur is 19 cars which allows for 10 car strings to be handled (always one car in the loading area). Given the 10 cars per day requirement, this will work out to one set per day of railcars.

The 10 car strings will be handled by an indexer installed in the railcar loading area thus avoiding the need for a separate locomotive for indexing.

The loading of the railcars will be accomplished using a dust suppression hopper mounted on a retractable spout allowing for a single operator to monitor and load the cars. Manual intervention will be required for opening and closing of the upper hatches and for overall quality control.

Please refer to FWS drawings P003 and P005 for the layout. See Figure 9 for the dust suppression hopper.
2.3.2 Receiving System

2.3.2.1 Rail Unloading Building

Full railcars will be shunted through the rail unloading building by an indexer. The unloading building protects the unloading operation from inclement weather, and protects degradation of the grain due to exposure to rain.

The rail unloading building consists of two sections:

1. The rail unloading building structure covers the entire length of the two railcars being unloaded. The structure will accommodate the rail car door opener operator and station and extend one car length to the North to act as a drip shed.
2. A drip shed on the north side of the rail unloading building allows water to drip off the next car to be unloaded, before reaching the unloading pit. It also provides weather protection for the indexer and prevents windblown precipitation out of the rail unloading building.

Please refer to FWS Drawing P020 for the rail unloading building layout and sections.

2.3.2.2 Unloading Station

The unloading operator will be located in the rail unloading building on the east side of the track. The following equipment is included in the work area:

1. Hydraulically Powered Gate Opener
   - The operator will utilize this to open and close the railcar discharge gates as well as operate the indexer. Future operations would contemplate a fully robotic rail car gate opener to open and close the rail cars.
2. Control System Human Machine Interface (HMI) Unit
   • Operators use the HMI to communicate with the process control system, request start
     and stop of equipment and confirming storage space. The HMI is located at the
     midpoint of the unloading pit.

3. Voice Communication System
   • Details of the voice communication system with other FGT personnel will be developed
     in the detailed design stage.

2.3.2.3 Receiving Hoppers
The unloading system includes two receiving hoppers which form a single unloading pit.

2.3.2.4 Unloading Transition Sequence
The rail system will initially be operated with ladder tracks at PARY and the car indexer. The
operating system will function with lots of 14 cars being divided into single car motions and
emptying to provide a continuous unloading flow. Once the future loop track is completed, the
unloading system will switch to a continuous process with constant car motion and emptying.

To reduce the depth of the receiving pit, a shallow pit design is used to ensure the railcar loading
operation can happen in both single car unloading operation and continuous car unloading operation
in the future.

2.3.2.5 Transfer from Receiving
Product unloaded from railcars will be transferred at nominal 2,000 MT/h to a ‘direct hit’ to a vessel,
or to storage silos.

2.3.2.6 Transfer Equipment
Each type of equipment shall be designed to meet the following design criteria listed below.

Enclosed Belt Conveyors shall be:
   • Maximum belt speed of 750 ft/min.
   • Maximum incline of 11 degrees.
   • Tail sections shall be self-reloading to reduce buildup
   • Connected to a dust collection system.

Bucket Elevators shall be:
   • Maximum belt speed of 750 ft/min.
   • Centrifugal discharge.
   • Floating self-cleaning boot section with cleanout/inspection doors
   • Connected to a dust collection system.

Shiploader shall be:
   • Using only enclosed belt conveyors
   • Maximum belt speed of 750 ft/min.
• Dust suppressing discharge spout.
• Fitted with a dedicated dust collection system.

Storage Silos shall be:
• Deadstop velocity retarder at inlet to all silos during the loading process to reduce breakage using grain on grain impacts.

Passive vents with reduced air velocities to prevent grain dust emissions.

2.3.3 Storage Configuration
Corrugated, galvanized steel silos have been selected for grain storage.

The actual silos to be constructed are shown in FWS Drawings P004 and P005.

Based on operational requirements and layouts, 14.6 m diameter bins, 7.3 m diameter bins and 10.0 m diameter bins were selected.

Total Bin Capacities are presented in FWS Drawing F001.

There is provision on the densified soil area to add a future ten (10) 3,500 MT capacity bins for future expansion.

Please refer to FWS Drawings P003 through P006.
A typical example of steel silos for a similar project is shown in Figure 10.

**FIGURE 10 - Steel Hopper Storage Bins**
2.3.4 Shipping Berth

2.3.4.1 Introduction

The new shiploader is based on loading and securing vessels at Berth #4. The proposed shiploading system, with a design rate of 2,000 MT/h, will average approximately 1,625 MT/h and will not require any vessel movement or trimming time. The new shiploaders will also be utilized by the existing JV Facility at reduced capacity, dictated by the existing reclaim rate from the storage shed. However, the overall average performance of the JV Facility will increase somewhat with the elimination of vessel movement and of front-end loader trimming requirements.

Berths #1 and #2 and a portion of Berth #3, located just downstream of Berth #4, will be utilized by FSD in the future to load coal onto vessels. An analysis of the operation of the three berths revealed that it will not be possible to warp the grain vessel towards Berth #3 while coal ships are present at Berths #1 and #2 and a portion of Berth #3. As a result, three fixed tower shiploaders for Berth #4 is the only solution considered here.

The new fixed tower shiploaders provide the most flexible operation, due to their complete ship coverage without having to warp the vessel, and the need for only a single operating crew.

The existing dock/wharf is not designed to directly support the loads of the new shiploaders and the landside of the dock is subject to lateral spread due to liquefaction. For these reasons, new independent shiploader foundations are required as well as a means of reducing lateral spread of the land side during a seismic event. The new shiploader foundations will require:

- Locally removing sections of the existing berth deck for pile installation with no contact between the new piles and the existing structural dock supports. Structural dock supports remain unchanged.
- Installation of steel piles and concrete pile cap foundation for mounting the shiploader.
- Installation of a concrete safety barrier at the modified deck perimeter between the existing dock/wharf area and independent pile cap.
- A new densification berm using RAPs spaced on a nominal 2.4 m spacing pattern. See GeoPacific Drawing G-D1A.
- The densification berm RAP locations can be slightly relocated, as directed by the geotechnical engineer supervising installation, to avoid existing underground fixtures such as tie backs.

Please refer to Advisian drawings DSK-1501 to 1506 for details on the proposed shiploader foundations and modifications on the existing wharf.

See FWS Drawings P005, P600 and P601 for fixed tower shiploader layouts and details.

2.3.4.2 Shiploading

The recommended solution involves the construction of a custom designed series of three (3) fixed tower shiploaders of 2,000 MT/h capacity and capable of covering all the hatches of a 225 m long vessel. The shiploader central tower will be fed by one (1) overhead, enclosed, idler
supported, fixed 2,000 MT/h conveyor supported on an open gallery. From the central tower, grain flow can be diverted to either the bow or stern towers via an inclined enclosed, idler supported, fixed belt conveyor. Each loading tower shall have a boom conveyor feeding a dust controlled telescoping spout to load product into each hold.

2.3.4.3 Shipping from Existing JV Facility to Vessel

The new shiploaders will occupy the current location of the shiploading system for the JV Facility. The plant design allows the JV facility to use the new shiploaders.

Two new pieces of equipment will be provided at the existing JV Facility.

- 1,000 MT/h bucket elevator BE05, installed next to the existing 1,000 MT/h bulkweigher
- Diverter at the discharge of the existing bulkweigher, to allow the scale discharge to be diverted to the new BE05.

The storage reclaim system in the JV facility has a peak capacity of 800 MT/h and average capacity of 500 MT/h. The new shiploaders will operate at this reduced capacity when shipping from the JV facility.

2.3.4.4 Shipping from New Storage to Vessel

Reclaim from storage will be accomplished via an enclosed belt conveyor under each row of silos feeding a cross reclaim conveyor located in a tunnel. Each silo will have a single discharge point at the centre of the silo’s bottom hopper with a conveyor mounted at ground level.

The central reclaim conveyor discharges to a 2,000 MT/h bucket elevator and into a similar sized bulkweigh scale located in the transfer tower. Further re-elevation via two (2) long inclined, enclosed belt conveyors after the scale will send the product towards the new shiploader system to be constructed in the existing FSD dock area.

2.3.4.5 Special Loading Spout

Shiploaders will be provided with special loading spouts to minimize dust emissions. The exact type of loading spout will be determined during detailed design.

Refer to Figures 11 through 13 for examples of a choke fed dust suppression loading spout. For other types of dust suppression spouts please refer to Annex A – CMC Report, Figures 2.1-24 to 2.1-30.
FIGURE 11 - Shiploading with Choke Fed Dust Suppression Discharge

FIGURE 12 - Spout with no Special Outlet
No special outlet:

FIGURE 13 - Spout with Dust Suppressor
With Dust Suppressor RGLZ

Source: Buhler Inc.
2.3.4 Container Loading

Based on an operating schedule of 5 days per week and 10 hrs/day, the container loading facility must average 9.49 TEU/hr to achieve the yearly throughput target.

The container handling facility will be located at the east side of the new facility and will be bifurcated by a main road through the site; empty containers will be on the east side of the new site and full containers on the south west.

Shipments will typically be in the 1,200 to 1,500 MT range, thus storage is required for several sets of 50 to 100 containers, in the full container area. The design allows for storage of 400 TEU full and 800 TEU empty containers. Full containers will be loaded onto outgoing trucks.

The basic operation of the container handling facility will be as shown on Figure 14 below. Plant layout of the container loading facility can be seen on the left side of FWS Drawing P005.

*FIGURE 14 – CMC Report Fig. 2.1-31*

Container Handling Schematic

The actual container loading function will take place by loading the empty, but prepared, container on a purpose-built platform that will tilt the container to 55° at which point a low velocity loading spout complete with local aspiration ducting will be inserted into the container opening.

Figure 15 below, taken from the CMC Project Description and Description of Operations, illustrates container handling.
2.3.5 Railcar and Truck Loading

Railcar loading operations will target local users requiring from 1 to 10 cars of product. Truck loading operations will target local users not capable of receiving railcars.

The rail car and truck loading system shall be a common system located in a separate bay of the rail/truck loading structure. This allows a single operator in the container control building to load trucks or railcars. Railcars will be serviced by a short spur track capable of accommodating 19 cars from end to end, as follows:

- 9 cars south of the loading bay (travel limited by a bumping post)
- 1 car in the loading bay
- 9 cars north of the loading bay (travel limited by a moveable derailer)

Expected throughputs for this facility are: 200,000 MTt/a for railcar loading, 30,000 Mt/a for truck loading.

Based on an operating schedule of 5 days/week and 8 hours/day, nominal handling rates will be 9 railcars per day and 3 trucks per day.

The truck and rail loading system will be a semi-automated arrangement utilizing a telescoping dust suppression hopper. This type of dust control device uses a mechanical spring to slow down the product before dropping into the loading vehicle thus minimizing the amount of entrained dust to become fugitive dust, without aspiration. See Figure 9.

2.3.6 Dust Control

At Fraser Grain Terminal, dust emissions will be controlled by enclosing all conveying equipment, and providing dust collection and filtering at critical points.

All conveying equipment from the railcar unloading station to the shiploading spout at the vessel will be totally enclosed. Grain flow be exposed to the environment, with potential for dust emission, at only four points:
• Railcar discharge gates (in rail unloading building)
• Shiploader spout discharge
• Truck/rail loading spout discharge
• Containers, after filling and prior to closing the container door

Special dust suppression features will be introduced to reduce dust emission at these points. See separate Dust Hazard Analysis report for further information on the dust control system.

2.3.7 Ancillary Systems

2.3.7.1 Hydraulic Power

The rail car indexer, rail car door opener, and container tilters are supplied with their own dedicated small hydraulic power units, and are the only hydraulic systems in the plant.

2.3.7.2 Compressed Air

FGT will not require any process air for its primary activities, some compressed air will be required for various ancillary functions. A central modular compressed air system shall be established to provide this for:

- Cleaning of cartridge style air filters.
- Maintenance activities in enclosed areas (reclaim tunnel and receiving/leg pit)

2.3.7.3 Fire Protection

Please refer to the Fire and Explosion Plan – Attachment 22 of the Construction Permit Application Report - for details of fire protection provisions.

As outlined in the Fire and Explosion Plan, the main facility shall be monitored by the PLC control system and hazard monitoring devices. These devices shall provide notification to the manned control room of any issue.

A perimeter fire hydrant loop will be located around the facility to supply local Fire Departments if needed to fight fires on site

2.3.7.4 Electrical System

2.3.7.4.1 General

Electrical components will be selected in the detailed design phase, for continuous heavy-duty operation and with regard for operating and environmental conditions. Electrical components will comply with applicable codes and standards.

2.3.7.4.2 Codes, Standards and Classification

The following standards will be followed:
- CSA C22.1 Safety Standards for Electrical Installations
- CEMA (Conveyor Equipment Manufacturer’s Association) standards
Refer to Figure 16 below for Electrical Hazardous Area Classifications.

### FIGURE 16 – CMC Report Table 2.1-5

#### Table 2.1-5

**Electrical Hazardous Area Classifications**

<table>
<thead>
<tr>
<th>#</th>
<th>AREA</th>
<th>CLASSIFICATION</th>
<th>TYPE OF EQUIPMENT TO BE USED</th>
</tr>
</thead>
</table>
| 1  | • Receiving shed/pit area  
    • Railcar loading building  
    • Truck loading building  
    • Container loading area | Zone 22        | Class II, Division 2, Group G        |
| 2  | Inside material handling equipment:  
    • Inside conveyor casings  
    • Inside bucket elevator casings  
    • Inside spouting         | Zone 20        | Class II, Division 1, Group G        |
| 3  | Other areas                               | Outdoors       | NEMA 4X                               |

Source: CMC Engineering and Management Limited – Project Description and Description of Operations

#### 2.3.7.4.3 Power Distribution

The existing Bekaert electrical substation does not meet current codes. Upon initial review, the cost to bring the existing substation up to current codes is not feasible, thus a new 25 kV substation is proposed to be located at the south end of the FGT site. This new substation will be an exterior location and feed 2 main transformer locations as shown on FWS Drawing P003.

Fraser Grain Terminal’s main electrical load characteristics will be approximately:
- Connected load: under 5,000 hp
- Maximum demand: 4.12 MVA

Fraser Grain Terminal will require approximately six (6) separate electrical rooms located throughout the grain terminal and shiploaders. The new substation will feed the new transformers located outside the two primary Motor Control Centre (MCC) rooms. Each of these MCC rooms will have the centralized MCC controls and starters as well as distribution equipment to feed the four (4) other satellite electrical rooms strategically distributed to minimize wiring costs. Satellite electrical rooms are located by the container loading area, and at the base of each of the three shiploader towers.

The main MCC, located adjacent to the rail unloading building, will be a pre-engineered steel structure, constructed on site as the size is too large to pre-assemble. Generally, the MCCs shall house:
- Motor control centres (low and medium voltage)
- I/O racks for the PLC control equipment
- Lighting distribution equipment
- Special controllers (bulkweighers, metering gates, communications)

The balance of MCCs will most likely be prefabricated, with all possible internal wiring done in the assembly shop. These would be shipped to site on flatbed trucks and placed on prebuilt...
concrete pads at ground level. The pre-built rooms present the following advantages:

- Much of the internal assembly and wiring can be done under enclosed shop conditions. This facilitates the work and promotes standardization.
- This work will be done ahead of time thus eliminating some of the pressure on the field electrical crew.

2.3.7.4.4 Lighting

To minimize the effect of the FGT lighting system on surrounding areas, the following measures are included in the lighting design:

- Outdoor fixtures are LED type, allowing better control of light distribution, plus power savings
- High pole fixtures will only be illuminated when the container yard is in operation.
- Lighting in the following areas is only at full brightness when required for repair or inspection:
  - Conveyor galleries and transfer tower
  - Ground level around storage silos
  - Container loading area
  - Rail unloading building

Emergency lighting will be provided as required by code, utilizing separate battery powered lights, or single fixtures with internal fixtures providing both regular and emergency lighting.

Please refer to COMCO drawings 10022-L01 to L09 for proposed lighting levels and layout.

2.3.7.5 Security Fence and Gates

The FGT security fence system will be designed to meet these objectives:

- Isolation of FGT from outside access, for personal security and property protection
- Easy access for incoming and outgoing traffic (rail, trucks, and personnel)
- Compliance with current FSD standards

Drawings show the planned security fencing arrangement. Special access features will include:

- Manual access gate at main entrance, including necessary equipment to clear and log incoming and outgoing vehicle traffic at adjacent office.
- Remote operated access for rail
- Locked gates with VFPA card access at dockside access points, preventing unauthorized access to water side by overhead routes

2.3.7.6 Fire Access Road

Refer to ISL Drawing 32022-C-16 for the planned primary and alternate access routes for firefighting.
2.4 OPERATIONS

2.4.1 General

FGT operations will consist of the following activities:
- Unloading railcars
- Loading vessels for export
- Loading railcars for local markets
- Loading bulk trucks for local markets
- Loading containers for export markets

2.4.2 Capacities and Throughput

Refer to Figure 17 below for a summary of throughput capacities.
### FIGURE 17 – CMC Report Table 2.2-1

**Table 2.2-1**

**Summary of Throughput Capacities**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>FACILITY</th>
<th>QUANTITY</th>
<th>days/a</th>
<th>holiday</th>
<th>THROUGHPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCOMING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trains</td>
<td>JV Shed 1</td>
<td>22 trains/a @ 5 000 t</td>
<td>22</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Proposed Fraser Terminal</td>
<td>309 trains/a @ 11 200 t</td>
<td>309</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td><strong>TOTAL INCOMING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OUTGOING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vessel loading</td>
<td>JV Shed 1</td>
<td>18 ships/a @ 30 400 t</td>
<td>43</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Proposed Fraser Terminal</td>
<td>62 ships/a @ 42 400 t</td>
<td>67</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td><strong>Sub-total by OGV</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Railcar loading</td>
<td>Proposed Fraser Terminal</td>
<td>8.8 cars/d @ 90 t</td>
<td>253</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Bulk truck loading</td>
<td>Proposed Fraser Terminal</td>
<td>2.6 trucks/d @ 45 t</td>
<td>253</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Container filling</td>
<td>Proposed Fraser Terminal</td>
<td>95 TEU/d @ 25 t</td>
<td>253</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total by land</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL OUTGOING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. 350 days/annum = 7 days/week – 7 mandated holidays on the waterfront – 8 days for miscellaneous repairs and breakdowns.
2. 253 days/annum = 5 days/week – 7 mandated holidays on the waterfront. (Monday to Friday, no weekends)

This table also shows the expected number of unit trains per annum, working hours per day, and working days per annum for all activities.

*Source: CMC Engineering and Management Limited – Project Description and Description of Operations*

#### 2.2.2.2 Change in Capacity at Existing FSD Terminal Berths #3 and #4

Railcars serving the existing JV agriproducts terminal make use of PARY tracks connected to the JV Facility unloading station. Berth #3 of the FSD dock is currently used to load vessels with agriproducts for export.

Refer to Figure 18 below for throughput of existing activities at FSD Berths #3 and #4.
When FGT is constructed, the existing JV facility will be dedicated to handling agriproducts. Grain will be redirected to FGT, limiting the throughput of the JV Facility to 540,000 t.

2.4.3 Traffic

2.4.3.1 Truck Traffic

Refer to Figure 19 for a calculation of daily truck traffic for container and bulk trucks.
### FIGURE 19 – CMC Report Table 2.2-3

**Table 2.2-3**

**Calculation of Daily Total Truck Traffic**

<table>
<thead>
<tr>
<th></th>
<th>TOTAL TRUCK TRAFFIC</th>
<th>TRUCKS FOR CONTAINERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Trucks required for incoming traffic with empty containers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FSD 13.8 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others 33.6 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTALS</strong> 47.4 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Portion of incoming trucks with empty containers that will leave with full containers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FSD 13.8 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others 33.6 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTALS</strong> 47.4 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trucks required for outgoing traffic with full containers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FSD 15.8 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others 79.1 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTALS</strong> 94.9 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Therefore, supplementary trucks needed to carry full containers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FSD 2.0 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others 45.5 trucks/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTALS</strong> 47.4 trucks/day</td>
</tr>
</tbody>
</table>

### TRUCKS FOR BULK HANDLING

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bulk trucks 2.6 trucks/day</td>
</tr>
<tr>
<td></td>
<td>0.3 trucks/h</td>
</tr>
</tbody>
</table>

### TOTAL TRUCK TRAFFIC THROUGH SITE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>INBOUND</strong></td>
</tr>
<tr>
<td></td>
<td>Carrying empty containers 47.4 trucks/day</td>
</tr>
<tr>
<td></td>
<td>Carrying no containers 47.4 trucks/day</td>
</tr>
<tr>
<td></td>
<td>Empty bulk 2.6 trucks/day</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> 97.5 trucks/day</td>
</tr>
<tr>
<td></td>
<td>9.7 trucks/h</td>
</tr>
<tr>
<td></td>
<td><strong>OUTBOUND</strong></td>
</tr>
<tr>
<td></td>
<td>Carrying full containers 94.9 trucks/day</td>
</tr>
<tr>
<td></td>
<td>Full bulk 2.6 trucks/day</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> 97.5 trucks/day</td>
</tr>
<tr>
<td></td>
<td>9.7 trucks/h</td>
</tr>
</tbody>
</table>

Source: CMC Engineering and Management Limited – Project Description and Description of Operations
Refer to Figure 20 for a calculation of daily bulk truck traffic.

**FIGURE 20 – CMC Report Table 2.2-4**

**Table 2.2-4**
Calculation of Daily Bulk Truck Traffic

<table>
<thead>
<tr>
<th>BULK TRUCKS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual throughput</td>
<td><strong>30,000</strong> t/a</td>
<td></td>
</tr>
<tr>
<td>Truck capacity</td>
<td><strong>45.0</strong> t/truck</td>
<td></td>
</tr>
<tr>
<td>Annual handle</td>
<td><strong>667</strong> trucks/a</td>
<td></td>
</tr>
<tr>
<td>Annual work period</td>
<td><strong>253</strong> day/a</td>
<td></td>
</tr>
<tr>
<td>(5 days / week)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shifts per day</td>
<td><strong>1.0</strong> shift/day</td>
<td></td>
</tr>
<tr>
<td>Work hours per shift</td>
<td><strong>10.0</strong> hours/shift</td>
<td></td>
</tr>
<tr>
<td>Work hours per day</td>
<td><strong>10.0</strong> hours/day</td>
<td></td>
</tr>
<tr>
<td>Handle rate</td>
<td><strong>2.64</strong> trucks/day</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td><strong>0.3</strong> trucks/h</td>
<td></td>
</tr>
<tr>
<td>( \lambda )</td>
<td><strong>227.70</strong> min/truck</td>
<td></td>
</tr>
</tbody>
</table>

**Actual cycle time**
- Truck drive in: **60 seconds**
- Lower spout: **60 seconds**
- Fill truck: **648 seconds**
- Stow spout: **60 seconds**
- Truck drive out: **60 seconds**

**TOTAL TIME**
**14.8 minutes/truck**

*Source: CMC Engineering and Management Limited – Project Description and Description of Operations*
Refer to Figure 21 for a calculation of daily container truck traffic.

**FIGURE 21 – CMC Report Table 2.2-5**

<table>
<thead>
<tr>
<th>CONTAINERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
</tr>
<tr>
<td>Annual throughput</td>
</tr>
<tr>
<td>TEU capacity</td>
</tr>
<tr>
<td>Annual handle</td>
</tr>
<tr>
<td>Annual work period</td>
</tr>
<tr>
<td>Shifts per day</td>
</tr>
<tr>
<td>Work hours per shift</td>
</tr>
<tr>
<td>Work hours per day</td>
</tr>
<tr>
<td>Basic handling rate</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>For display purposes</td>
</tr>
</tbody>
</table>

**Table 2.2-5**

<table>
<thead>
<tr>
<th>Calculation of splits between F&amp;G and outside facilities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual throughput</td>
</tr>
<tr>
<td>F&amp;G’s portion</td>
</tr>
<tr>
<td>Incoming</td>
</tr>
<tr>
<td>Turnaround units</td>
</tr>
<tr>
<td>Supplementary units</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>29.2% of annual total</td>
</tr>
<tr>
<td>Outgoing</td>
</tr>
<tr>
<td>Turnaround units</td>
</tr>
<tr>
<td>Supplementary units</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>10.7% of annual total</td>
</tr>
<tr>
<td>Other than F&amp;G’s portion</td>
</tr>
<tr>
<td>Incoming</td>
</tr>
<tr>
<td>Total units required</td>
</tr>
<tr>
<td>Minus F&amp;G portion</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>70.8% of annual total</td>
</tr>
<tr>
<td>Outgoing</td>
</tr>
<tr>
<td>Total units required</td>
</tr>
<tr>
<td>Minus F&amp;G portion</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>83.3% of annual total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Empty Handle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average handle per truck</td>
</tr>
<tr>
<td>Average handle per day</td>
</tr>
<tr>
<td>Average handle per hour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full Handle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single carry</td>
</tr>
<tr>
<td>double carry</td>
</tr>
<tr>
<td>Average handle per truck</td>
</tr>
<tr>
<td>3.8 TEU/truck</td>
</tr>
</tbody>
</table>

**Source:** CMC Engineering and Management Limited - Project Description and Description of Operations
Refer to Figure 22 for a summary of daily truck movements and traffic.

**FIGURE 22 – CMC Report Table 2.2-1**

![Daily Truck Movements and Traffic Diagram](image)

**LEGEND**
1. From or to FSD  (14, 12)  Packed to view
   From FSD  (14, 12)  Packed to view
   Total  (14, 12)

2. **BLUE = EMPTY**
   **RED = FULL**
   **BLACK = NO DISTRICT**

**NOTES**

**General**
1. All quantities have been rounded to the nearest whole number for display purposes.

**Regarding container trucks**
1. 120,000 (17%) shipped through FSD and 500,000 (32%) shipped through Delta Port (162,000 total)
2. Empty TEUs from FSD = 14,000 (12%) and 7,000 (6%) (29%)
3. Empty TEUs from other locations = (28 FSD = 7,000, 35% = 17,000)/annum (71%)
4. All incoming trucks carry 2 empty TEUs
5. All outgoing trucks carry 1 empty TEU
6. Based upon 250 working days per annum.

Source: CMC Engineering and Management Limited – Project Description and Description of Operations
4.3.2 Rail Traffic for Loadout

Refer to Figure 23 for a calculation of daily total rail traffic for loadout.

FIGURE 23 – CMC Report Table 2.2-6

Table 2.2-6
Calculation of Daily Total Rail Traffic for Loadout

<table>
<thead>
<tr>
<th>RAILCAR LOADING</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual throughput</td>
<td>200,000 t/a</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>90.0 t/railcar</td>
<td></td>
</tr>
<tr>
<td>Annual handle</td>
<td>2,222 railcars/a</td>
<td></td>
</tr>
<tr>
<td>Annual work period</td>
<td>253 day/a</td>
<td></td>
</tr>
<tr>
<td>(5 days / week)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shifts per day</td>
<td>1.0 shift/day</td>
<td></td>
</tr>
<tr>
<td>Work hours per shift</td>
<td>10.0 hours/shift</td>
<td></td>
</tr>
<tr>
<td>Work hours per day</td>
<td>10.0 hours/day</td>
<td></td>
</tr>
</tbody>
</table>

| Handle rate | 8.78 railcars/day | 0.9 railcars/h |
|            | 68.31 min/railcar |

| Actual cycle time |                |                |
| Railcar positioning | 90 seconds |                |
| Lower spout and auto adjust | 60 seconds |                |
| Fill railcar      | 810 seconds   | Average fill rate | 400 t/h |
| Stow spout       | 30 seconds    |                |
| Railcar positioning | 0 seconds |                |
| TOTAL TIME       | 16.5 minutes/railcar |          |

Source: CMC Engineering and Management Limited – Project Description and Description of Operations
2.4.3.3 Marine Traffic

Refer to Figure 24 for a summary of expected vessel traffic.

**FIGURE 24 – CMC Report Table 2.2-7**

Table 2.2-7

Expected Average Vessel Traffic

<table>
<thead>
<tr>
<th>VESSEL TYPE</th>
<th>PORTION OF VESSELS</th>
<th>MAX USABLE FILL</th>
<th>ACTUAL NUMBER OF VESSELS</th>
<th>ACTUAL THROUGHPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>JV SHED 1</td>
<td>FGT</td>
<td>JV SHED 1</td>
</tr>
<tr>
<td>PANAMAX</td>
<td>25%</td>
<td>35,000 t</td>
<td>55,000 t</td>
<td>4.6 vessels/a</td>
</tr>
<tr>
<td>HANDYMAX</td>
<td>50%</td>
<td>30,000 t</td>
<td>45,000 t</td>
<td>9.1 vessels/a</td>
</tr>
<tr>
<td>HANDY</td>
<td>25%</td>
<td>25,000 t</td>
<td>25,000 t</td>
<td>4.6 vessels/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30,000 t</td>
<td>42,500 t</td>
<td>18.2 vessels/a</td>
</tr>
</tbody>
</table>

See Note 3
See Note 2

| Average shipment lot size | 30,000 t | 42,500 t | 39,667 t |
| Target annual shipments  | 546,800 t/a | 2,830,800 t/a | 3,177,800 t/a |
| Number of vessels        | 18.2 vessels/a | 61.9 vessels/a | 80.1 vessels/a |

**NOTES**

1. Colour coding as follows:

| GRAY       | ENTERED VALUE |
|           |               |
| WHITE     | CALCULATED VALUE |
| BEIGE     | TRANSFERRED VALUE |

2. Fraser Grain Terminal average batch size calculated as weighted average of usable fills and vessel proportions.
3. JV Shed 1 average batch size based upon empirical data from past operations.
4. JV Shed 1 batch sizes will be smaller due to physical restrictions (storage size and unload rate) of the existing facility.
5. Variations in vessel availability and size may cause the number of vessels to increase.

Source: CMC Engineering and Management Limited – Project Description and Description of Operations

2.4.4 Hours of Operation

Hours of operation at the existing JV Facility have varied over time from 8 to 24 hours per day, depending on railcar receipts and vessel schedules.

Refer to Figure 17 for expected operating hours for each part of the FGT plant.

2.4.5 Parking and Expected Changes to Employment

Parking will be provided for FGT employees, visitors and trade representatives.

Parking has been provided around and near the proposed Administration Building and Maintenance Building and Sample Storage. The maximum number of full-time employees (FTE) is expected to be a total of 35, with functions listed below:

- Office – 16
- Operations – 15
As the plant will be running more than 1 shift per day, not all employees will be onsite at all times. Twelve parking spots have been provided, including parking for non-able persons.

Please refer to FWS Drawing P003 and ISL Drawing 32022-C-17 for signage and parking plan.

2.5 DESCRIPTION OF OPERATIONS

2.5.1 Grain Receiving and Unloading

Grain arrives at FGT in bulk railcars. The unloading area is located in a small one story metal building with concrete basement long enough to cover two railcars. The locomotives pulling the railcars will be passing through the metal building over an unloading pit long enough to capture any unloading grain and direct it to the receiving conveyor.

Railcars will be positioned over the unloading pit by an indexer. Following construction of new loop track, unit trains will be moved continuously through the unloading area by a locomotive, advancing at approximately 0.4 km/hr.

Grain is unloaded into the unloading pit through gates in the bottom of the railcars. The grain flows through grating with gravity baffles, which prevent dust from the pit from blowing back in to the unloading area.

2.5.2 Grain Flow from Unloading Pit to Storage Silos

From the unloading pit, grain is directed either to directly load vessels, or to storage silos.

Grain is discharged from the unloading pit to a totally enclosed belt conveyor by means of metering gates to control flow of grain. By means of a bucket elevator, the grain is elevated and fed to a series of totally enclosed belt conveyors to load the silos. Refer to FWS Drawing F001.

2.5.3 Grain Flow from Railcar Unloading to Vessel

When a vessel is waiting at the dock for loading, grain is directed to the vessel from the unloading pit. Grain is fed to the 2,000 MT/hr shipping bulkweigher by a bucket elevator.

The bulkweigher discharges to a sequence of 2,000 MT/hr totally enclosed conveyors and the fixed tower shiploaders to load the vessels.

Refer to FWS Drawings F001 and F002.

The fixed tower shiploaders are designed to load vessels ranging from Handy class vessels in the range of 20,000 DWT to large Panamax class vessels.

The shiploaders will be provided with a cascading type or choke fed dust suppression loading spout to reduce product breakage and almost eliminate dust emission.
2.5.4 Grain Flow from Storage Silo to Vessel

To dispatch grain stored in steel silos, grain is discharged from silos via metering gates onto 2,000 MT/hr totally enclosed belt conveyors and then lifted by an enclosed bucket elevator to the 2,000 MT/hr shipping bulkweigher.

The shipping bulkweigher discharges to the shipping conveyor in the transfer tower. It is then fed and metered to a 2,000 MT/hr bucket elevator and a series of totally enclosed belt conveyors. These feed the shuttle conveyor at the dock, which feeds the shiploaders.

For physical safety and security, reclaim conveyors below the silos, and conveyors in the shipping stream, are installed above grade. One cross conveyor is installed in an open trench, and one bucket elevator is installed in an open pit.

2.5.5 Grain Flow for Railcar Loading

A small portion of the plant throughput is shipped to local users by railcar.

The grain for this local market is received by railcars, in unit train formation, together with other grain destined for overseas export, temporarily stored in large 3 500 MT silos and/or transferred to smaller steel silos.

When required for dispatch, grain is transferred by means of 500 MT/hr totally enclosed belt conveyors and bucket elevator to the 500 MT/hr rail & truck batch weigh bin and from there to bulk railcars or trucks. To reduce dust emission during loading of railcars and trucks, a specially designed dust suppression hopper will be used.

Please refer to FWS Drawing F001 and Figure 9 - Dust Suppression Hopper in Operation.

2.5.6 Grain Flow for Truck Loading

A small portion of the plant throughput is also shipped to local users by 40 t bulk trucks.

The grain for this market is also received with railcars together with the other grain, but stored in 400 MT steel silos or direct from 3,500 MT silos.

To load trucks, grain is withdrawn from the 400 MT silos and transported by means of 500 t/h totally enclosed belt conveyors and bucket elevator to the 100 MT rail/truck weigh bin. The truck loading bin is provided with the same special dust suppression hopper to reduce dust emission.

Refer to FWS Drawing F001.

2.5.7 Grain Flow for Container Loading

Container stuffing is a small but significant part of the FGT throughput, approximately 600,000 MT. Containers are filled with a variety of special products.

For container loading, grain is withdrawn from the silos and transported by means of 500 MT/hr totally enclosed belt conveyor and bucket elevator to a 100 MT container loading bin.
For loading, the container is lifted by a hydraulic platform to a 55° inclination. A special low velocity spout is inserted on the top section of the open door above the bulk head. There will be local aspiration near the bulkhead opening during filling.

2.6. FIRE AND LIFE SAFETY DESIGN

2.6.1 General Design Considerations

FGT will be designed to employ the best available material handling technology for agricultural products, and to follow best engineering practices where code requirements are not specific or not applicable.

Please refer to the Fire and Explosion Plan – Attachment 12 of the Construction Permit Application Report - for details of fire and explosion prevention and mitigation strategies.

2.6.2 Buildings

Buildings will be designed to minimize enclosed areas, in turn minimizing the risk of explosive dust concentrations.

Except for the rail unloading building, which requires a below grade area for unloading railcars, and one reclaim tunnel, all other structures have been placed above grade and are open to minimize enclosed areas where dust laden air can concentrate.

Only equipment requiring protection from inclement weather such as bulkweighers, and railcar unloading, will be enclosed. All other structures will be of the open type. A small local rain cover will be provided above the open container loading area only as well, without any walls.

Emergency vehicle access to the site shall be from the new Robson Road access road traffic patterns. The future rail loading spur cannot block both access roads with 10 cars. There are generally two, and always at least one road access around the facility for emergency vehicles. Please refer to ISL Drawing 32022-C-16 for Emergency Access Routing details and hydrant locations.

Enclosed buildings where dust is present will be provided with sufficient open area to prevent dust from reaching explosive levels, or provided with explosion venting where practical. Areas below grade have minimal explosion venting.

2.6.3 Storage Silos

Corrugated steel storage silos are designed and constructed so that the roof panels will blow out in the event of an explosion in the silo, preventing structural damage.

2.6.4 Material Handling Equipment

2.6.4.1 Belt Conveyors

All belt conveyors will be totally enclosed, idler-supported type. Refer to Figure 25 below.
Air containing dust will be aspirated from belt conveyors at the head end, and if necessary at loading points, to create negative pressure inside the conveyor enclosure. Aspiration may be by a dedicated point-source filter, or a central dust collector filter. Dust is removed from the air stream by a filter, and returned to the grain stream in the form of lumps.

Refer to Figure 26 below.
2.6.4.2 Bucket Elevators

Bucket elevators will be totally enclosed and centrifugal discharge type. The head discharge chute will be designed to eliminate impact of product to metal. The carrying buckets will be plastic.

The boot section will be aspirated to create a negative pressure inside the casing to prevent dust leakage. Refer to Figure 27 below.
Figure 2.2-14
Boot Section of Typical Bucket Elevator Easy-cleaning

2.6.4.3 Unloading Pit

The unloading pit will be provided with:

- Steel grating to prevent large foreign objects from entering the grain stream
- Baffles to prevent dust blow back when product is being dumped into pit.
- Aspiration to remove air containing dust from the unloading pit. Dust is removed from the
air stream by a filter, and returned to the grain stream in the form of lumps. See FWS Drawing P006.

2.6.4.4 Storage Silos

All storage silos will be provided with dead stop inlet boxes to have grain on grain impact and reduce velocity before entering the storage bin to:

- Reduce product breakage thus eliminating creation of additional dust inside the silo which is typical with standard silo filling techniques.
- Based on the diameter and sizes of storage bins, negligible fugitive dust should discharge from the passive bin vents during filling. The passive vents are sized large enough to ensure air velocities cannot carry dust through the vents during filling.

2.6.4.5 Bulkweighers

Bulkweighers will be provided with inter-venting air ducts to allow movement of air between upper garner, weigh garner and lower garner. Inter-venting duct will be open to atmosphere, but aspiration will be provided to remove air containing dust.

2.6.4.6 Truck, Railcar and Container Loading

Truck loading spout, rail loading spout, and container loading spout will be specially designed for the application, specifically:

- The truck and rail loading spout will be designed to be lowered to the bottom of the truck and provide choke feed loading with a maximum 1-metre product drop during the entire filling cycle to prevent dust from escaping and becoming airborne.
- The container loading spout will be retractable and will aspirate near the door opening of the container while loading. An aspiration fan with cartridge filter will create negative pressure in the container plenum to prevent escape of dust.

2.7 PROPOSED CONSTRUCTION PERIOD

2.7.1 Construction Schedule

The overall construction time on site will be approximately 24 months, or 2 years of construction, starting in Fall of 2018. The target date for main plant and shiploader completion is Fall of 2020. Phase 2 of rail construction would not need to be completed prior to Fall Harvest 2021, unless CN service changes or other operating conditions at FSD change, e.g. building a new coal or potash facility. Refer to Figure 28.
FIGURE 28 – Proposed Construction Schedule
## Fraser Grain Terminal

### Conceptual Equipment Use

<table>
<thead>
<tr>
<th>Construction Equipment</th>
<th>Demolition</th>
<th>Storage Area</th>
<th>Receiving Area</th>
<th>Transfer Equipment</th>
<th>Wharf &amp; Shiploader</th>
<th>Container/Reef Truck Loading</th>
<th>Buildings</th>
<th>Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concretebreaker</td>
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<td>1</td>
<td>1</td>
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<tr>
<td>Mobile Primary Jaw Crusher</td>
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<td>1</td>
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<tr>
<td>Air Compressor</td>
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<td>1</td>
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</tr>
<tr>
<td>Service tarp &amp; bag</td>
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<td>1</td>
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<td>Field laying machine</td>
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<tr>
<td>S Rebel Grade</td>
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<tr>
<td>Hydraulic Truck</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

For a listing of estimated construction equipment requirements, see Figure 29 below.

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![Table](image-url)
2.7.3 Construction Traffic Volumes

Based on the construction duration, FWS has developed a conceptual estimate of construction traffic volumes for the project.

Delivery trucks
- Total Work days – 6 days/week x 4 weeks/month x 24 months = 576 work days
- Average trucks /day = 8 trucks/day

There will be special circumstances, primarily during the large foundation concrete pours, where there will be a peak of truck traffic on those singular days could be very heavy. Maximum number of trucks per day = 100 trucks.

In addition to delivery trucks, there will be worker vehicles driving onto the FGT site. A parking area has been provided for worker vehicles in the FWS drawings. The conceptual estimate for worker vehicles is based on a vehicle occupancy of 1.5 people/vehicle.

Average Attendance = 80 people
Average vehicles = 53 vehicles
Peak Attendance = 160 people (approx. 2x average day attendance)
Peak vehicles = 106 vehicles
3- DRAWING REQUIREMENTS

3.1 SITE LOCATION

Refer to FWS Drawing P001 for a surveyed plan showing the relationship of the Project to the surrounding area.

3.2 SITE PLAN

See Section 2.1.4 for description of the lands involved in the Project.

Refer to FWS Drawing P003 in for the site plan.

3.3 BUILDINGS, STRUCTURES AND EQUIPMENT

The main Administration Building from the former Bekaert’s operations will be retained. All other buildings, and associated foundations and utilities shall be demolished and removed.

The new Administration Building is a pre-fabricated single storey, building with metal cladding roof and walls. Cladding colour for the roof is Silver Galvalume, and for walls is Red. Refer to FWS drawings P009 and P018.

The Main Control Room is a pre-fabricated single storey building with metal cladding roof and walls. Cladding colour for the roof is Silver Galvalume, and for walls is Heron Blue. Refer to FWS drawings P008 and P019.

Maintenance Building and Sample Storage shall be an open cold storage building with only lighting and power plugs. This is nominally 25’ tall at the central gable peak and is a pre-engineered steel building with metal cladding roof and walls. Cladding colour for the roof is Silver Galvalume, and for walls is Red. Refer to FWS drawing P021.

Container Control Building shall be a pre-fabricated, single storey, conditioned control building with metal cladding roof and walls. The building will only house a single operator station and small sample storage area. Cladding colour for the roof is Silver Galvalume, and for walls is Heron Blue. Refer to FWS drawing P022.

The FWS design approach for fire protection is described in the Executive Summary of this report, and in the Fire and Explosion Plan – Attachment 22 of the Construction Permit Application Report. Refer to FWS Drawings P003 through P006 and P010 for more information on the plant and building and dust filter locations.

3.4 MARINE STRUCTURE AND SHIPLoader

Refer to FWS Drawing P600 and P601 for general shiploader arrangements.

Refer to Advisian drawings DSK-1501 to 1506 for details on the proposed marine structures and modifications to the existing wharf.

3.5 LOT GRADING, DRAINAGE, STORM WATER MANAGEMENT AND UTILITIES

The sitework development and construction approach will be phased so early works will continue to
maintain the existing sedimentation pond and stormwater discharge. A new, permanent storm sewer grit interceptor will be installed on site and discharge via a new culvert under the new site access road, complete with an outfall discharging to the current ditch location south of Clearwood Preservers. During utility construction, surface drainage will be directed to the existing sedimentation pond and/or the new storm sewer interceptor before any water discharges the site.

Site utilities will be safely located, cleared, and removed in the required areas for densification and where new utilities need to be installed. The new system and sitework will develop concurrently to ensure proper drainage controls and relatively level, gravel working surfaces during construction.

The permanent storm drains shall be the only services required during construction. Wheel washers shall be operated with self-contained water and sewer tanks. Paving and road construction shall be one of the last activities to take place.

Please refer to ISL Drawings 32022- C-01 to C-15 for details on grading, storm water and utilities for the site.

The site shall operate on temporary power supplied by BC Hydro’s existing feed to the existing overhead line by the existing Administrative office until the new permanent substation, underground feeder cables, and transformers can be energized. At which time the temporary service will be decommissioned and removed from site.

During construction, a temporary fueling station will established on-site on a graveled working surface that drains to the stormwater controls listed above. A permanent fueling containment area will be established with a non-pervious surface draining to an oil/water separator that discharges to the permanent storm sewer drainage system.

### 3.6 LIGHTING

Please Refer to COMCO Drawings 10022-L01 to L08 for site lighting Layout and details.

### 3.7 PARKING AND ACCESS

Refer to FWS Drawing P003 and ISL Drawings 32022- C-16 and C-17.

### 3.8 RAIL SERVICE

Refer to the Rail Operations Plan (Attachment 10 of the Construction Permit Application Report) for further information.

### 3.9 CONSTRUCTION LAYDOWN AREAS

Construction Laydown areas are required for staging material, pre-assembly of equipment and structures, and crane placement. On the FGT site, once the sitework has begun and most utilities and sitework is complete, a finished gravel surface will be used for the construction site laydown as shown in FWS Drawing P012.

There are temporary construction right-of-ways required for the project during construction on FSD leased land as shown in FWS drawing P017. These areas require temporary fencing to delineate a safe work area for material staging and pre-assembly for the shiploader, equipment tie-ins to the JV
Facility and crane placement. Temporary fencing within the Construction Right of Way on FSD land will be installed as needed and relocated during different construction phases in coordination with JV Facility operations. Construction laydown areas within the FSD lease area shall not have any underground utilities or other surface preparation required.
4- REFERENCES

- CMC Engineering and Management Ltd. – Project Description and Description of Operations Report – June 2017