FGT

FRASER GRAIN TERMINAL

PROJECT DESCRIPTION
AND
DESCRIPTION OF OPERATIONS

CMC ENGINEERING AND MANAGEMENT LIMITED

2017 June **CMC File: 1419-204**

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TABLES

FIGURES

REVISION CONTROL

NUMBER	REVISION	DATE	CHANGES	REMARKS
76				
77	V 10.11	2017 06 21	Edits after 2017 June 21 review meeting. Re-issued for PER	mvn
78				
79				
80				
81				
82				

GLOSSARY

The following abbreviations, acronyms and consecrated terms are used in this document:

ITEM	MEANING
AGT	Alliance Grain Terminal
BATNEC	Best Available Technology Not Entailing Excessive Cost
Bekaert	Bekaert Canada Limited
CEMA	Conveyor Equipment Manufacturing Association
CEMP	Construction Environmental Management Plan
CGC	Canadian Grain Commission
CMC	CMC Engineering and Management Ltd.
CSA	Canadian Standards Association
DWT	Dead Weight Tonne
FEED	Front End Engineering Design
FGT	Fraser Grain Terminal, the proponent for the Project
FSD	Fraser Surrey Docks
FTE	full-time employees
HMI	Human-machine Interface
IEC	International Electrical Code
IH&S	Industrial Health and Safety Regulations
JV Facility	the existing joint venture facility operated by P&H and FSD
LOA	length overall
m/s	metre(s) per second
Mt/a	million tonnes per annum
MMCD	Master Municipal Construction Documents.
OGV	ocean-going vessels
P&H	Parrish & Heimbecker, Limited
PARY	Port Authority Rail Yard
PER	Project and Environmental Review
Property	The parcel of land adjacent to the FSD property, formerly leased by Bekaert, that is targeted for the construction of the new Fraser Grain Terminal
Project	Generic term for the FGT project as a whole
t	tonne (1 000 kg)
T	Imperial ton (2 000 lbs)
t/a	tonne per annum
TEU	twenty foot equivalent unit
VFPA	Vancouver Fraser Port Authority

1. EXECUTIVE SUMMARY

Fraser Grain Terminal Ltd. is proposing to construct a grain export facility, Fraser Grain Terminal (FGT or the "Project") to receive, store and ship bulk grain products. Fraser Grain Terminal Ltd. (the "Proponent") is a Canadian family-owned and operated grain company with more than 100 years of experience in agribusiness and locations across Canada. Serving more than 10 000 Canadian farmers and producers, we market grain to over 40 countries. The Project is located adjacent to Fraser Surrey Docks, at 11041 Elevator Road in Surrey, BC on Vancouver Fraser Port Authority (VFPA) land designated as Port Terminal.

This Project Description is part of the Project and Environmental Review (PER) Application (the "Application") to VFPA for a PER Project Permit.

The Project will trans-ship up to 3.5 million tonnes per annum (Mt/a) grain products including wheat, barley, oil seeds, and pulses. Grain will be received by rail and either loaded directly to vessels or stored temporarily prior to loading. A small proportion of the total volume will be loaded to containers or trucks for local distribution. Layout of the new facility is shown in the figure below and includes state-of-the art grain handling features to minimize noise and dust.

The 24-month construction period will include the following new components:

- Unloading station and transfer tower with fully-enclosed conveying equipment and a built-in dust suppression system
- Up to 34 above-ground steel storage bins (24 x 3 000 t and 10 x 500 t)
- Travelling shiploader with telescoping cascading spout to reduce dust during vessel loading, replacing existing shiploader
- Semi-loop rail track and holding tracks to reduce railcar shunting during unloading
- Container loading facility and storage yards
- Rail and truck loading facility
- An administration building and maintenance shop.

This Project Description describes the following:

- Operational objectives
- Details of each Project element from receiving to shipping
- Ancillary systems required to operate the Project
- Project operations summary
- Details of each of the key operations
- Construction schedule, staging/sequencing, and activity descriptions
- A "road map" to navigate through the Project drawings.

2. PROJECT DESCRIPTION

2.1 GENERAL SCOPE

2.1.1 Background

Fraser Grain Terminal Ltd is a Canadian family-owned and operated grain company with more than 100 years of experience in agribusiness with locations across Canada. Serving more than 10 000 Canadian farmers and producers, we market grain to more than 40 countries.

Canadian grain exports are constrained by two major factors: limited Western Canada rail capacity and a shortage of port industrial land. To address this constraint, Fraser Grain Terminal Ltd. proposes to build a state-of-the-art terminal primarily on VFPA land located at 11041 Elevator Road in Surrey (the Project). This land was formerly leased by Bekaert Canada Limited, a steel wire manufacturer. This site, including several buildings, is currently vacant. Several project elements will be built on the surrounding Port Terminal property leased by Fraser Surrey Docks (FSD). An overview of the Project lease areas is shown on Figure 2.1-1A. The proposed grain export terminal, Fraser Grain Terminal (FGT or the “Project”) will act as a trans-shipment terminal for bulk grain products including: wheat, barley, oil seeds, pulses and other specialty grains.

Fraser Grain Terminal Ltd., in partnership with FSD, operate an existing agriproducts handling terminal at FSD built in 2011 (the “JV Facility”). The JV Facility consists of a small rail unloading facility, an 18 000 t storage shed (Shed #1) and a series of portable conveyors to load vessels. In 2015, the JV Facility handled more than 800 000 t of agriproducts.

FGT will receive grain by rail then transfer the products to storage silos with a small amount loaded directly to vessels on a “Direct Hit” basis. Grain will be loaded from the storage silos onto cargo ships and into bulk containers, railcars or trucks. Ocean-going cargo vessels will be partially loaded at FGT and then topped up at a deep water grain terminal, such as AGT in Burrard Inlet, if required. The majority of containers will be trucked to Deltaport, and then loaded onto container ships for export. (Future opportunities for short sea shipping from FSD to Deltaport may be explored at a later time.) Railcars and trucks will distribute small volumes of grain to customers in the Fraser Valley.

FSD operates Berths #3 and #4 where the Project’s new state-of-the-art travelling shiploader is proposed. The shiploader will serve FGT as well as the existing JV Facility.

FSD and FGT will also share use of some of the proposed rail track at PARY.

2.1.2 The Proposed Fraser Grain Terminal Project

2.1.2.1 General Description

FGT is designed to unload ≈3.5 Mt/a of grains from railcars and load ≈2.6 Mt/a of grains onto vessels consisting of wheat, barley, canola, soybeans, peas, and lentils.

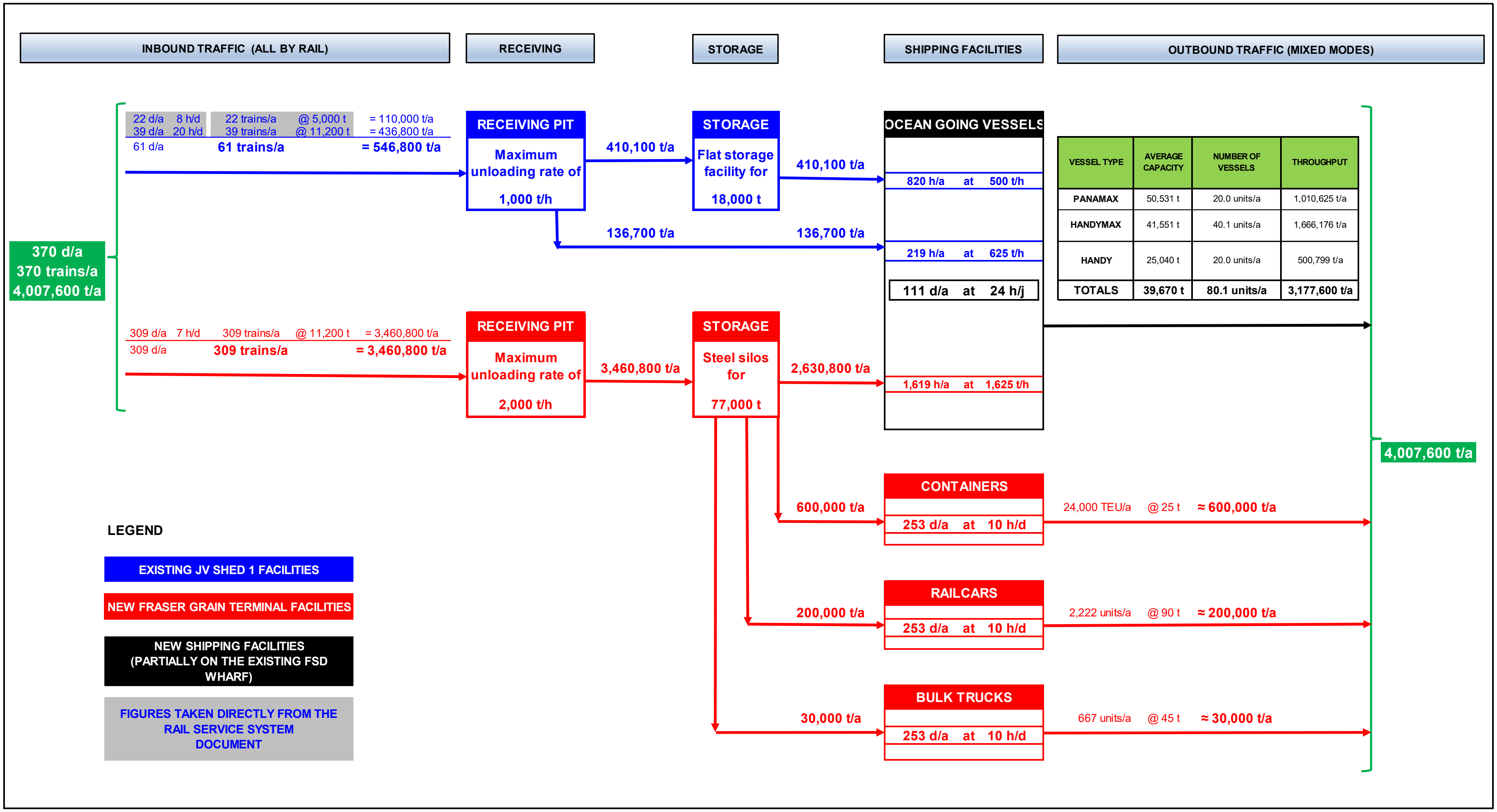
The existing JV Facility will remain in operation to unload up to ≈547 000 t of canola meal pellets but will use the FGT's new travelling shiploader.

FGT will receive grain from the Canadian prairies by unit trains of which:

- ≈76% will be shipped by bulk via ocean-going vessels.
- ≈17% will be loaded into 20 foot containers (TEU) for export.
- ≈7% will be loaded onto railcars and trucks for the Fraser Valley feed industry.

FGT's product and process flow are shown on Figure 2.1-1 – Product Flow Diagram and Figure 2.1-2 – Process Flow Diagram. The quantities shown in Figure 2.1-1 represent yearly aggregates. Vessel traffic is expected to be generally spread evenly throughout the year although there may be a seasonal slow-down during summer months

Figure 2.1-1
Product Flow Diagram



The existing bathymetric profiles will limit the maximum useable draft at the FSD berth. As a result, some of the vessels will be only partly loaded at the FGT and then topped up at nearby grain terminals (most likely the AGT Terminal in Vancouver Harbour).

The vessel limitations for FGT are as follows:

1. Fraser River

Current (2016) regulations from Fraser Pilots stipulate the following maximum dimensions for vessels in transit on the Fraser River:

LOA: 270 m
Beam: 32.2 m
Draft: 11.5 m (Fresh water)

2. Fraser Surrey Docks

The wharf area reserved for the agri-product loading (the "Agri Berth") will consist of Berth 4 on the north and a portion of Berth 3 on the south. The current usable moorage length of the Agri Berth is limited as follows:

- On the north: by the proximity to the silt fence at the end of Berth 4.
- On the south: by the vessels that will be moored at the southern portion of Berth 3. (This latter portion will be utilized by FSD for other products.)

Under these current conditions, the Agri Berth will be able to accommodate vessels with an LOA of up to 225 m.

FGT construction requires demolition of the former Bekaert's structures located on the property (under PER Application 2015-255).

FGT will consist of the following:

.1 A semi-loop track, located within the property boundaries, will connect to the adjacent Port Authority Rail Yard (PARY). Although PARY is not actually a part of the FGT lease area some modifications to PARY will be required for the proper operation of FGT.

These PARY modifications are more fully described in Section 2.1.3.2.

.2 An unloading station to empty railcars will be located on the semi-loop track.

.3 Twenty-four (24) 3 000 t corrugated and galvanized silos and ten (10) 500 t corrugated and galvanized bins for a total grain storage of 77 000 t will be constructed on concrete slabs above ground.

.4 A travelling shiploader with a cascading type telescoping loading spout with special dust suppression will be installed on existing Berth #4 and a portion of Berth #3 for loading Panamax class vessels.

The travelling shiploader will be installed on rails supported by new steel piles driven within the existing dock apron. Therefore no additional load will be imposed on the surface of the existing dock.

.5 A transfer steel tower containing two bulk weighers, a shipping surge bin, 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 shiploader.

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

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

.8 A truck and railcar loading facility.

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

.10 An administration/welfare building and a maintenance shop will be built to serve the needs of FGT's operational and maintenance staff.

.11 Several valve rooms will be constructed throughout the site for firefighting purposes.

2.1.2.2 Special Remarks

Due to existing underground contaminated soil and water, foundations for all structures located above the contaminated area will be constructed above the existing ground elevation.

The unloading pit structure and its associated support piles, a shallow conveyor trench, and a bucket elevator leg pit, which will require excavation, has been located away from the contaminated area.

The storage silos will be constructed on a one metre thick concrete slab poured above existing ground elevation. To avoid ground penetration, the various conveyor trusses' support bents, in the contaminated area will also be supported on the new concrete slab.

The construction methodology for the unloading pit and leg pit consists of the following:

- drive sheet pile around the unloading pit perimeter
- excavate area inside sheet piles
- pour tremie concrete
- pump water out
- construct concrete walls and slabs to define unloading pit.

This procedure is best described in the CEMP report in appendix.

Figures 2.1-1A and 2.1-1B below shows the overall site layout.

More details of FGT's components are described in Section 2.1.3.

Figure 2.1-1A
Overall Site Layout A

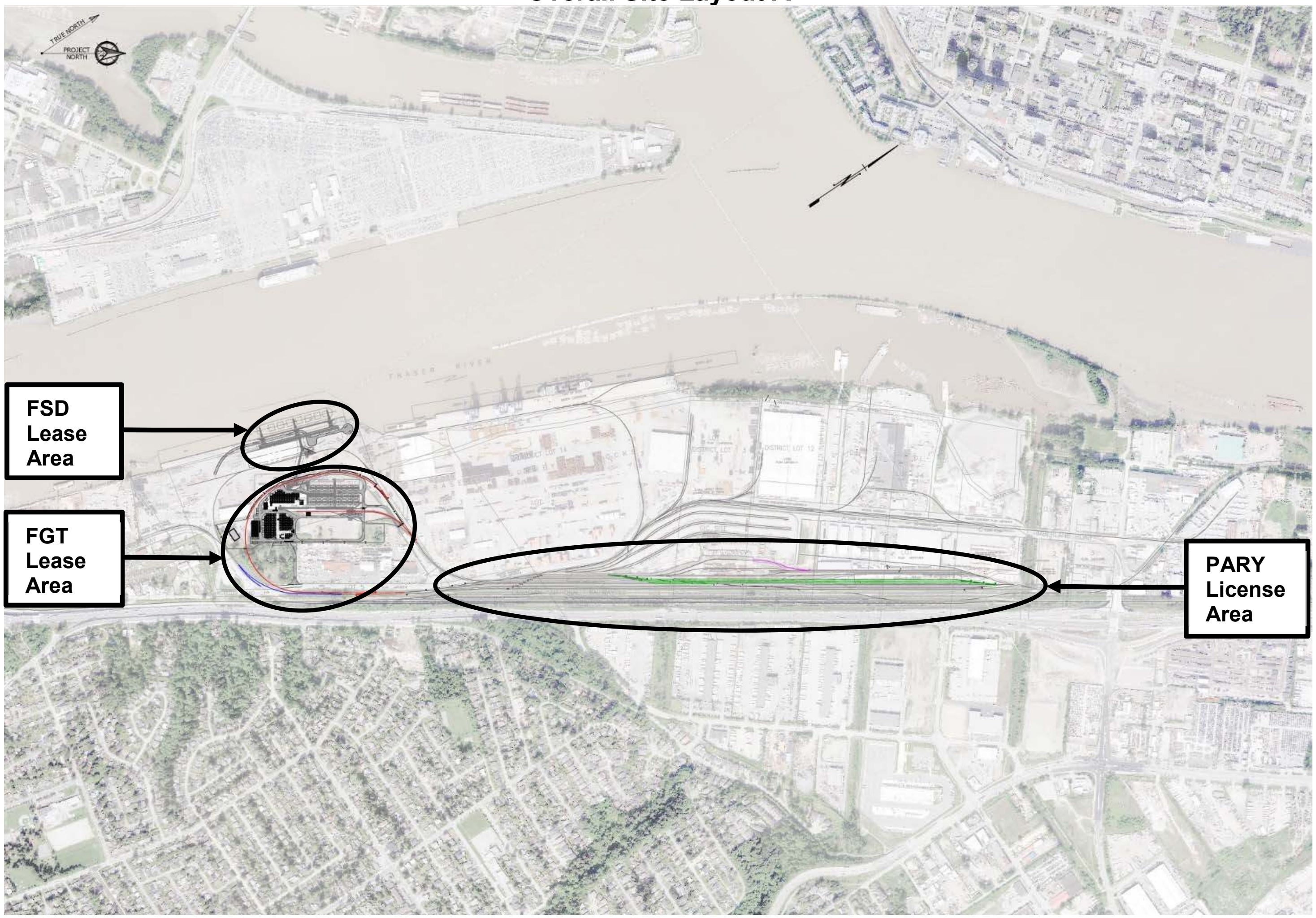
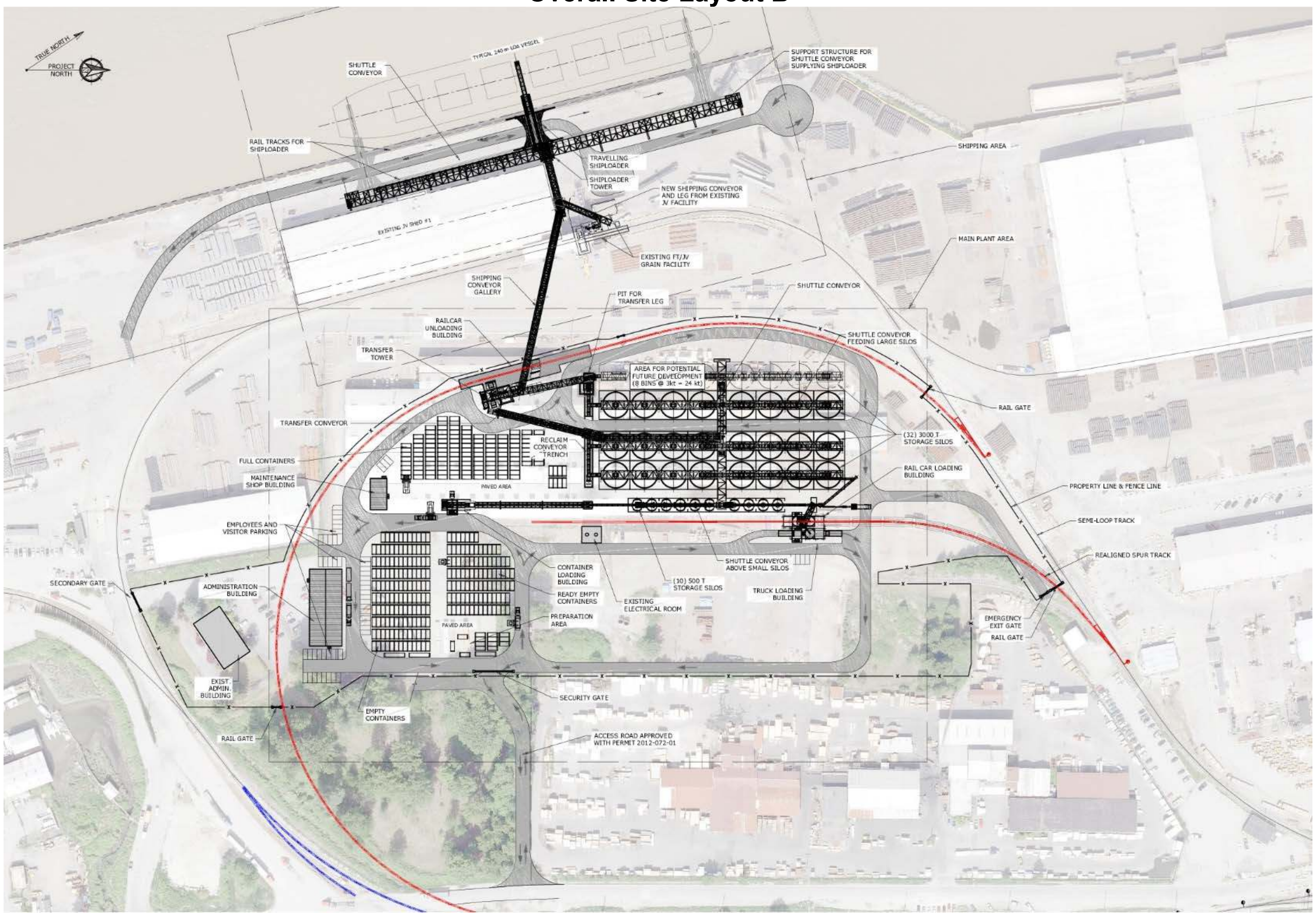


Figure 2.1-1B
Overall Site Layout B



2.1.3 Project Components

The Project will include the following On-Site and Off-Site Components. Figure 2.1-2 – Process Flow Diagram, shows all on-site and off-site process equipment.

2.1.3.1 Components within the FGT lease area

The following components will be installed and incorporated within the property boundaries for the proposed Fraser Grain Terminal.

2.1.3.1.1 Rail System

.1 New semi-loop rail for the unloading of railcars. The rail loop transits through an unloading building. This semi-loop is connected to the PARY trackage.

.2 Realignment of an existing spur line which will be connected to the semi-loop rail track transiting through the railcar loading building.

2.1.3.1.2 Unloading System

.1 An unloading station consisting of a 150 t unloading hopper, one railcar door opener, and a car indexer. The unloading station is enclosed by a steel frame building accommodating two railcars plus a drip shed to the north and south as rain protection. A receiving conveyor will be installed in the basement of the unloading building. The unloading pit approximate dimensions are: 38.0 m long, 7 m wide and 6.8 m deep.

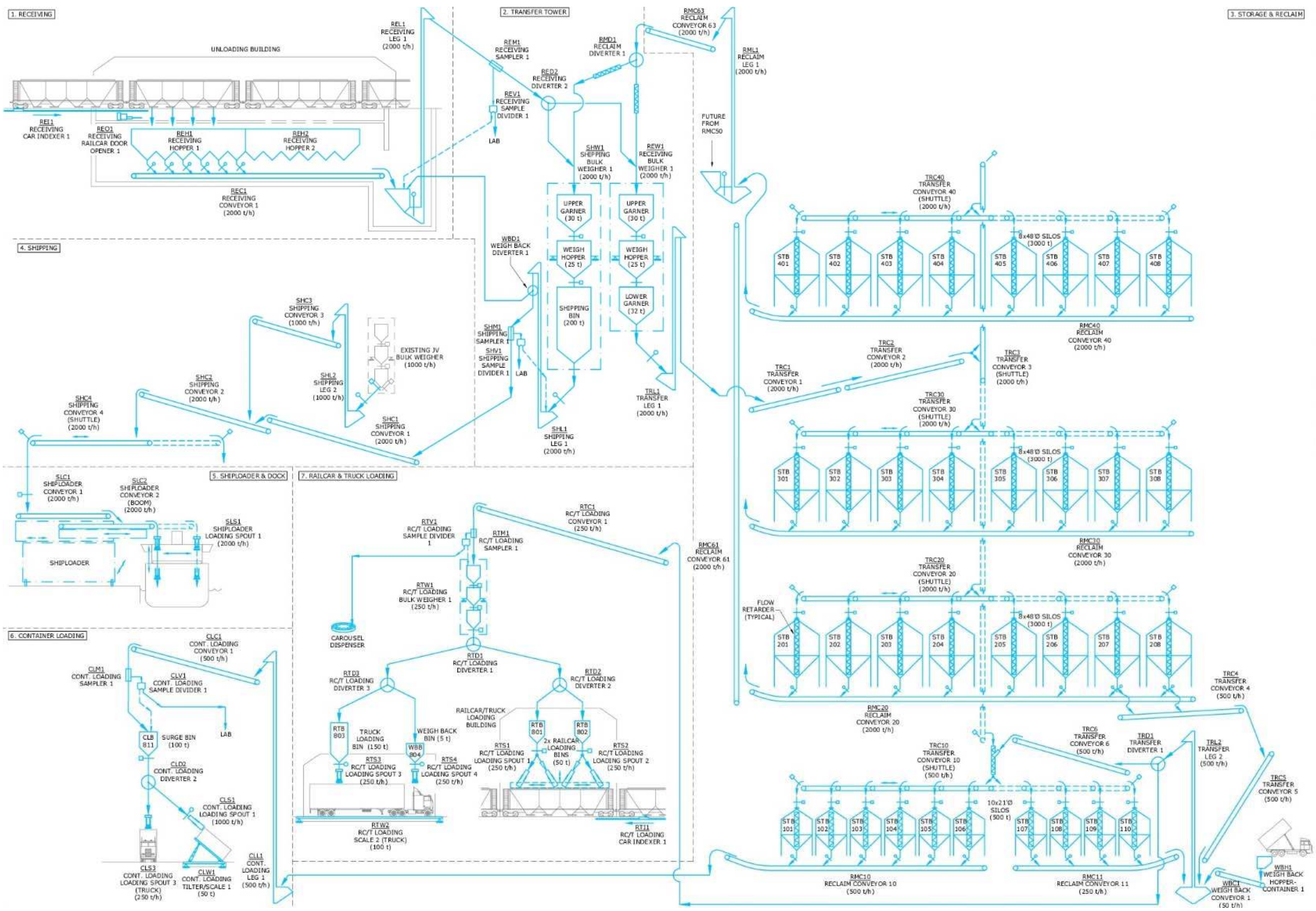
.2 A leg pit adjacent to the unloading building to contain the boot of the receiving leg and serving as the foundation for a transfer tower. The leg pit approximate dimensions are: 9.3 m wide, 12.0 m long and 12.5 m deep.

2.1.3.1.3 Process Tower

A steel frame tower 21.0 m wide x 11.0 m deep x 40.0 m high which accommodates the following equipment:

- Receiving leg 2 000 t/h
- Transfer leg 2 000 t/h
- Shipping leg 2 000 t/h
- Receiving bulk weigher 2 000 t/h
- Shipping bulk weigher 2 000 t/h
- 200 t shipping bin
- Receiving sampler
- Shipping sampler
- Three diverter valves.

Figure 2.1-2
Process Flow Diagram



2.1.3.1.4 Grain Storage System

.1 Twenty-four, 3 000 t, 14.6 m diameter, 33.3 m high, corrugated steel silos, each mounted on a circular concrete wall with conical discharge.

.2 Ten, 500 t, 6.4 m diameter, 25.2 m high corrugated steel silos to serve as surge storage for container stuffing as well as rail and truck loading. These small silos are also mounted on circular concrete pony walls.

.3 A totally enclosed shuttle conveyor is installed above each row of silos for filling purposes. A totally enclosed reclaim belt conveyor is installed below each row of silos for shipping/transfer purposes.

.4 All silos are supported by a 1 m thick foundation slab which is installed mostly on the existing concrete slab of the former Bekaert building.

.5 A concrete trench 4.6 m x 2.3 m x 54.0 m long terminating with a concrete pit (7.0 m x 8.0 m x 13.0 m deep) is located at the south end of the large silos will accommodate a common reclaim conveyor feeding a reclaim bucket elevator. The boot of the reclaim bucket elevator is installed in the concrete pit.

2.1.3.1.5 Conveying System

A network of totally enclosed transfer conveyors running either inside steel trusses and supported by steel bents and towers or at ground level as follows:

.1 2 000 t/h totally enclosed receiving conveyor REC1 from unloading pit to receiving leg in process tower.

.2 2 000 t/h transfer conveyors TRC1 and TRC2 from process tower to transfer shuttle conveyor TRC3 on top of storage silos.

.3 2 000 t/h transfer shuttle conveyors TRC20, TRC30, TRC40, and TRC50 above large storage silos and TRC10 above smaller silos.

.4 2 000 t/h totally enclosed reclaim conveyors RMC20, RMC30, RMC40, and RMC 50 below large silos feeding reclaim conveyor RM61 located in the concrete trench and in turn feeding reclaim leg RML1 and reclaim conveyor RMC63 to the process tower.

.5 500 t/h totally enclosed reclaim conveyor RMC10, below six (6) smaller silos feeding the container stuffing facility.

.6 250 t/h totally enclosed reclaim conveyor RMC11 below four (4) smaller silos feeding the rail and truck loading facility.

.7 500 t/h transfer conveyors TRC4, TRC5, and TRC6 and transfer bucket elevator leg TRL2 used to transfer grain from certain large silos to smaller silos and for recirculation/consolidation purposes for smaller silos.

2.1.3.1.6 Container Stuffing

A container stuffing facility will be installed at the south end of the Property and will have the following features:

- 500 t/h loading leg CLL1 and conveyor CLC1 for filling
- 100 t surge bin
- Container tilting and weighing platform
- Emergency truck loadout station
- Sampler
- Asphalt and concrete paving for 800 empty and 400 full containers.

2.1.3.1.7 Rail and Truck Loading

A rail loading and truck loading building at the northeast corner of the Property with the following features:

- Steel frame building 23.0 m x 16.0 m x 20.0 m high
- 250 t/h totally enclosed feed conveyor
- 250 t/h bulk weigher
- Two surge bins for rail loading
- A fully automated railcar loading spout
- An indexer to move the strings of ten railcars
- A 150 t surge bin for truck loading
- A 5 t weighback bin
- Special loading spout for bulk trucks and for emergency loadout
- A sampler with automated carousel
- A platform scale for trucks.

2.1.3.1.8 Buildings

.1 An 800 m^2 administration building including the following:

- Administration offices
- Laboratory
- Control room
- Employees dining and change rooms
- IT maintenance shop
- Sample storage room

The administration building will be a pre-fabricated steel building placed on a concrete slab.

.2 A prefabricated steel maintenance shop of about 200 m^2 placed on a concrete slab.

2.1.3.1.9 Dust Control System

Dust Control Strategy

The WorkSafe BC document "Combustible Dust Strategy – Phase I (Sawmills)" provides guidance for hazard mitigation strategies for sawmill operations. The document, although intended for sawmills, is also applicable to grain handling facilities and specifies that hazard mitigation strategies for combustible dust should, *inter alia*, include:

- Facility risk management
- Written combustible dust control program, and
- Implementation of the program, including training.

The mitigation strategies used on this Project to minimize risks of fires and explosions will include the following:

- Reduction of air turbulence and dust production inside material handling equipment by reducing product flow speed.
- Reduction of airborne dust in silos by installing proprietary designed grain flow retarders inside silos and bins.
- All material handling equipment will be totally enclosed.
- Installation of special baffles above unloading hopper.
- Installation of special cascading type loading spout on the shiploader.
- Installation of cartridge type aspiration fan and air filter on 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.

Central Vacuum System

Several vacuum systems will be installed for dust cleaning purposes throughout FGT.

Training of Personnel

Proper training of FGT personnel relative to the fire and explosion hazards, operational procedures, and emergency procedures will be an important factor in promoting a safe work environment and mitigating the risk. The emphasis of the training will concentrate on the following areas:

- Fire and dust explosion hazards
- Sources of ignition and their control
- Confined spaces and bin entry and cleaning
- Fumigation
- Housekeeping.

Civil Services

The referenced drawings show the extents of the civil works required for FGT; the highlights are as follows:

- Water supply:
    - In general, FGT will use less water than the previous tenant:
        - Fewer employees
        - No process water requirements.
    - A new ring distribution pipe will be installed around the perimeter to provide domestic and fire-fighting services.
    - Although the existing municipal feed to the site has sufficient capacity to supply the requited water volumes, the supply pressure will be insufficient for proper fire-fighting services at the upper elevations of the structures. As such, a booster pump will be provided for use during fire-fighting activities.

- Sanitary Sewer:
    - As with the domestic water, FGT will have a lower service load than the previous tenant.
    - The existing services (inherited from the previous tenant) utilizes a holding tank in the south-west corner of the property. This holding tank feeds a duplex pump arrangement to feed a forced main transiting to the municipal sanitary sewer system.
    - The new FGT sanitary sewer system will utilize several smaller pumping stations to create a new forced collection system which will discharge into the existing sanitary sewer holding tank. The use of the forced mains reduces the required depth of the new piping system.

- Storm Sewer:
    - After the land swaps between FGT, FSD and VFPA, the total area of the FGT property remains virtually the same.
    - As such, the total surface drainage load will remain virtually unchanged.

    - The addition of multiple new structures and buildings however, will change the drainage and collection patterns. As such, the collection system (collectors and piping) will be altered to accommodate these new flow impediments.
    - Although very little fugitive dust or grain is expected at FGT, oil and grit separators will be included to capture unwanted contaminants to the municipal storm sewer system.

  - Natural Gas:
    - No natural gas services will be required for the new FGT development.

  - Electrical Services:
    - In general, FGT will use less electrical power than the previous tenant. As such, the existing medium voltage feed (25kV), a buried line running from Robson Road, will be retained along with the existing electrical room next to the old production building (to be demolished).
    - Sub-feeds from this electrical room will buried where required.
    - All other buried wiring (control or power) will be run in plastic piping approximately 1.0 m below the ground surface and will be designed and executed according to the latest applicable codes and guidelines (BC Electrical Code, CSA 22, BC Hydro guidelines, etc.)

- 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.3

2.1.3.2 Components within the PARY license area

The following components will be installed outside the property boundaries but are necessary for the operation of the proposed Fraser Grain Terminal.

.1 The extension of Tracks 94, 95, and 96 at the PARY.

.2 A realignment of a small portion of the existing Track 93 to accommodate the extension of Track 94.

.3 The relocation of a few existing turnouts and the installation of new turnouts in PARY necessary for the extension of the tracks.

.4 Some of the tracks serving Chemetron will be realigned to make space for the track extensions.

.5 A existing lead line into the Chemetron site will be lengthened to form a through line.

.6 Some of the tracks at the south end of the PARY ladder will be realigned to improve access routes into FGT.

.7 For the blending of FGT with the existing JV facility:

- The addition of a new turnout on the existing JV lead line (Track 45) to bifurcate rail traffic into FGT (Track FG1).
- The relocation of an existing turnout (to access the relocated spur line for railcar loading).
- The re-alignment of the JV's exit track to an existing track on the east side of Robson Road. (The exit track from FGT will take over the track on the east side of Robson Road currently used by the JV facility.

2.1.3.3 Components within the FSD lease area

.1 2 000 t/h mobile shiploader 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 an LOA of 225 m and up to 32.3 m of beam.
- Will be provided with a special cascade type loading spout.
- Totally enclosed 2 000 t/h conveyors on the boom.
- The shiploader rails will be supported on piles along the berth face.
- The shiploader will be supplied by a totally enclosed shuttle conveyor supported by bents and towers along Berth #4 and portion of Berth #3.

.2 2 000 t/h totally enclosed shipping conveyors from the property boundary on the west side to the shuttle conveyor. These conveyors are running overhead on FSD property supported by bents and towers.

.3 A new 1 000 t/h bucket elevator and conveyor will also be installed on FSD leased land near the existing FSD Shed #1 storage. This is to replace the existing JV Facility vessel loading conveyors located on Berth #3.

2.1.3.4 Summary of Land Area Affected by the Project

The Project involves work in three major areas:
- FGT lease area
- FSD lease area
- PARY license area.

The summary of these areas is as shown in the following table.

Table 2.1-1
Summary of Land Area Affected by Project

FGT LEASE AREA	
Swapped lands	
Original FGT lease	7.758 ha
From FGT to FSD	(0.490 ha)
To FGT from FSD	0.515 ha
To FGT from VFPA	0.047 ha
FINAL FGT LEASE	**7.830 ha**

For details, refer to CMC drawing:
1419-G-05-111

FSD LEASE AREA	
Affected areas	
FGT limited construction license for shipping system	1.251 ha
Right of way for sanitary sewer line to pumping station	0.013 ha
TOTAL AFFECTED AREA	**1.264 ha**

For details, refer to CMC drawing:
1419-G-05-111

PARY LICENSE AREA	
Swapped lands	
New lease to PARY for JV track	0.125 ha
New lease to PARY for FGT track (south)	0.180 ha
New lease to PARY for FGT track (north)	0.017 ha
From lease overlap to PARY	0.766 ha
From Chemetron to PARY	0.013 ha
From TMS to PARY	0.111 ha
From Rabanco to PARY (part 1)	0.928 ha
From Rabanco to PARY (part 2)	0.076 ha
From PARY to Chemetron	(0.090 ha)
NET CHANGE TO PARY	**2.126 ha**

For details, refer to Stantec document:
Conceptual Review Package
Rail Conceptual Plan
Fraser Grain Terminal

2.1.4 Project Site

2.1.4.1 General Description of the Land

FGT will be constructed on land adjacent to the FSD lands located at 11041 Elevator Road in the City of Surrey. See Figures 2.1-3 to 2.1-6 below. These lands (the Property) are owned by VFPA and were leased by Bekaert Canada Limited (Bekaert); the latter having already shut down its operations and partially liquidated its hard assets on site. Bekaert has already signed an exit agreement with VFPA and P&H has now taken over the site.

The existing site (former Bekaert lease) consists of approximately 77 600 m^2 (19.18 acres). P&H is negotiating a land swap with FSD to suit FGT and FSD requirements.

With the land swap the new P&H lease with VFPA would consist of about 77 800 m^2 (19.22 acres). See Figures 2.1-7 and 2.1-8.

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

Figure 2.1-3
Overview of Site Location Showing Shipping Access Route

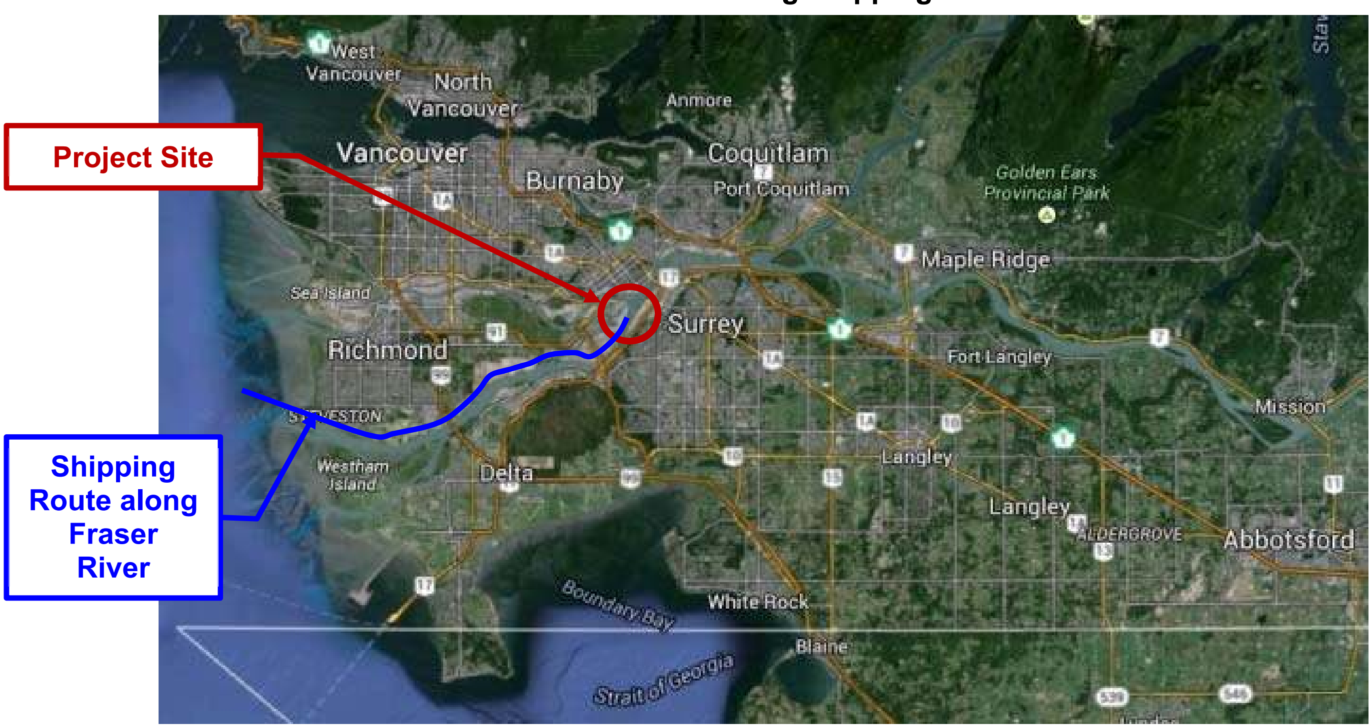


Figure 2.1-4
Enlarged View of Site Location

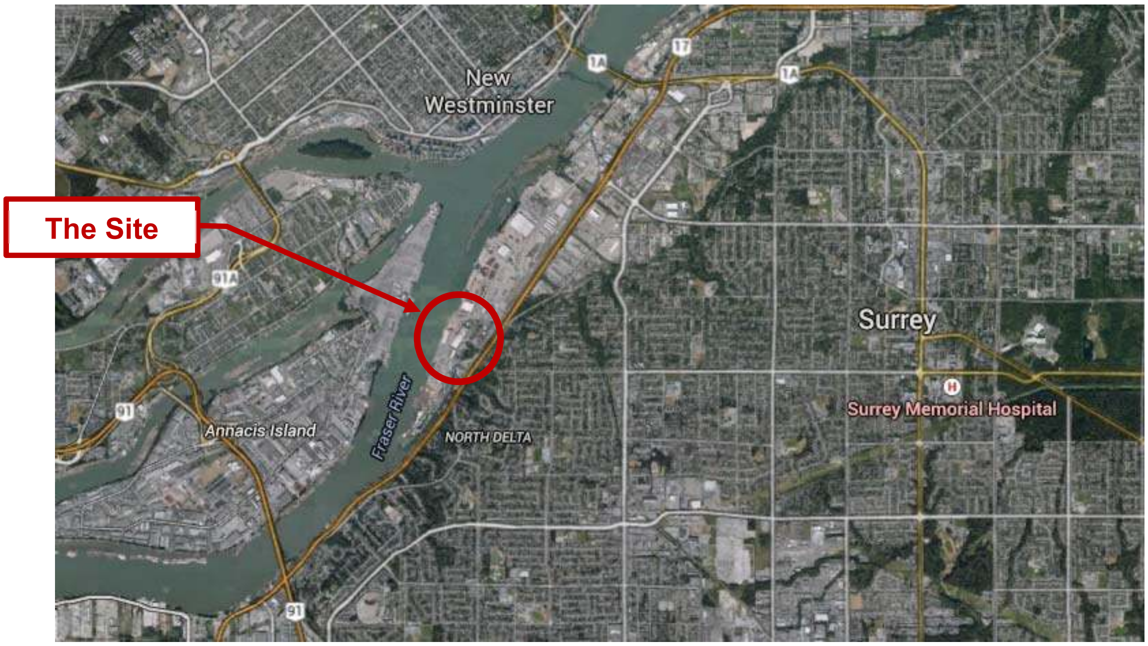


Figure 2.1-5
Aerial Photo of the Property

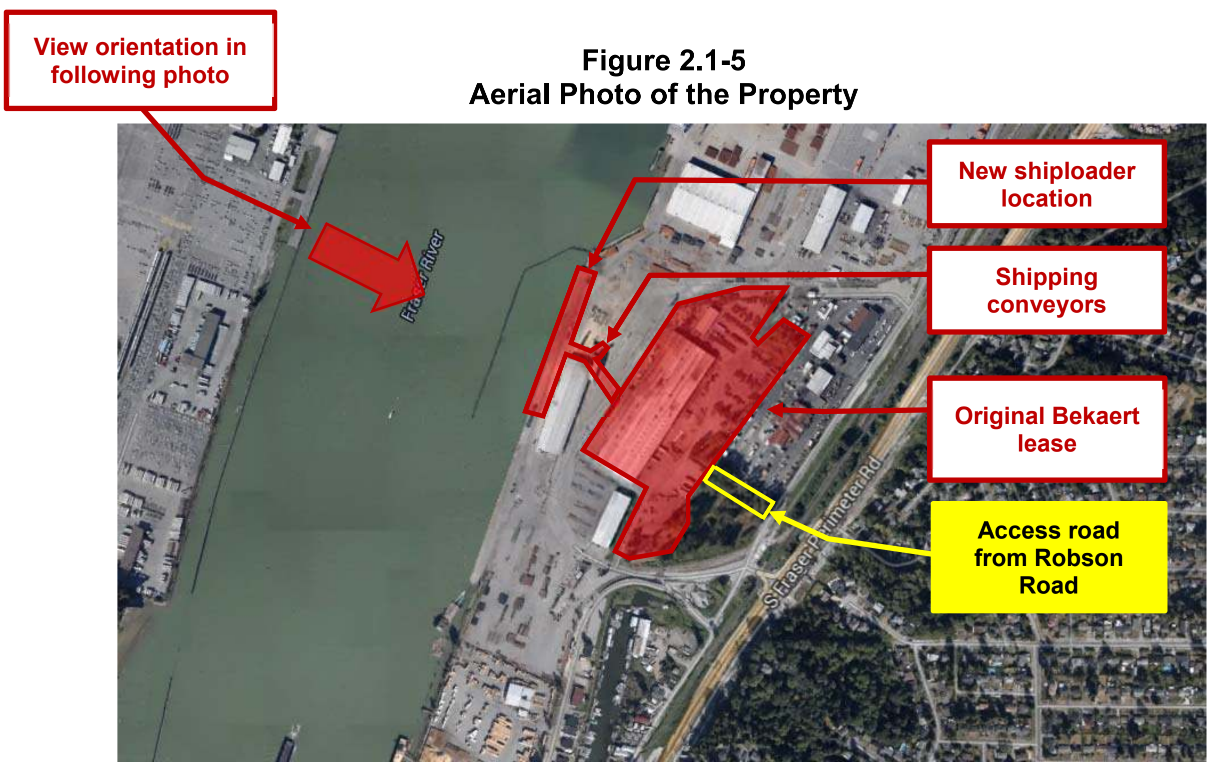


Figure 2.1-6
Aerial View from New Westminster across the Fraser River

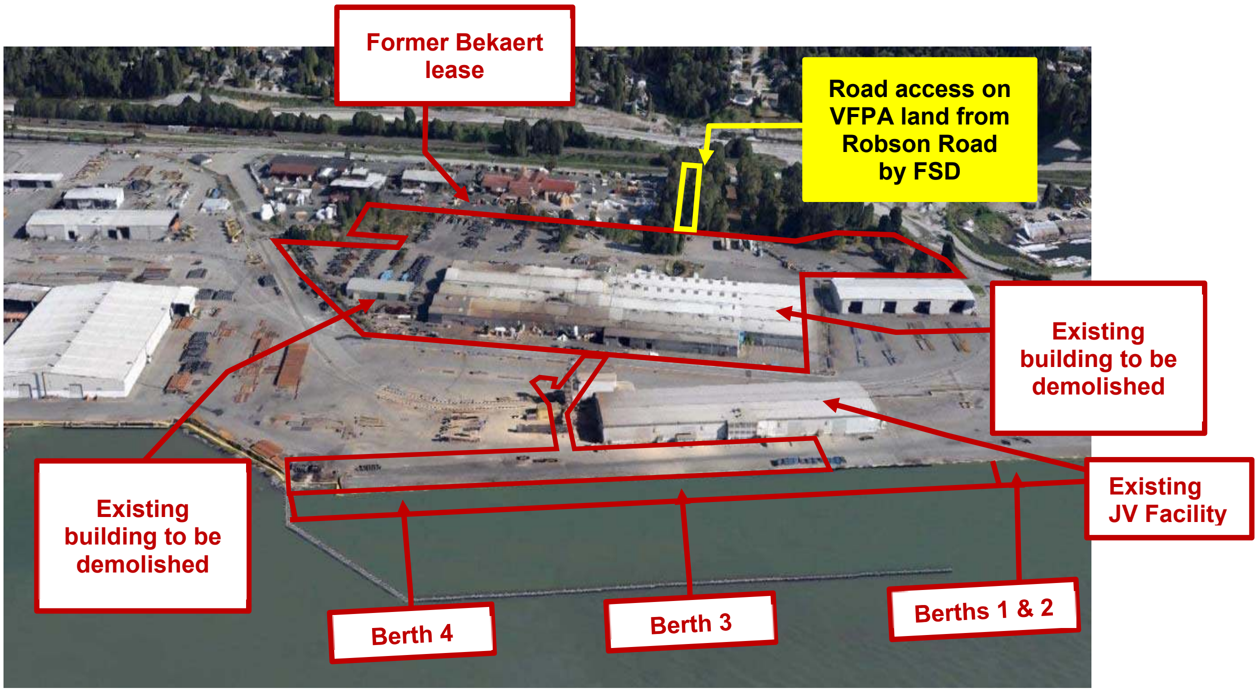


Figure 2.1-7
Project Site
Former Bekaert Leased Land

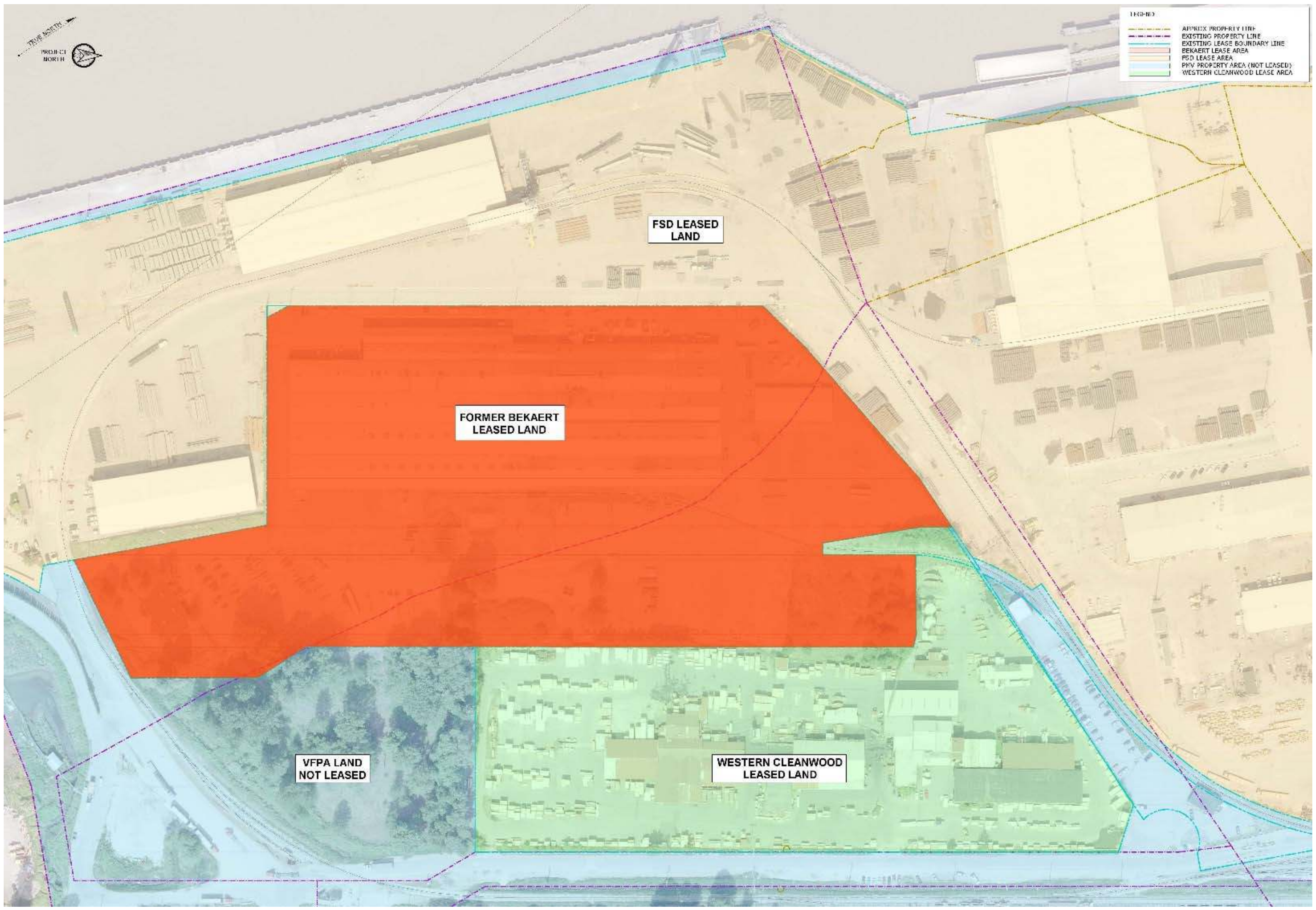
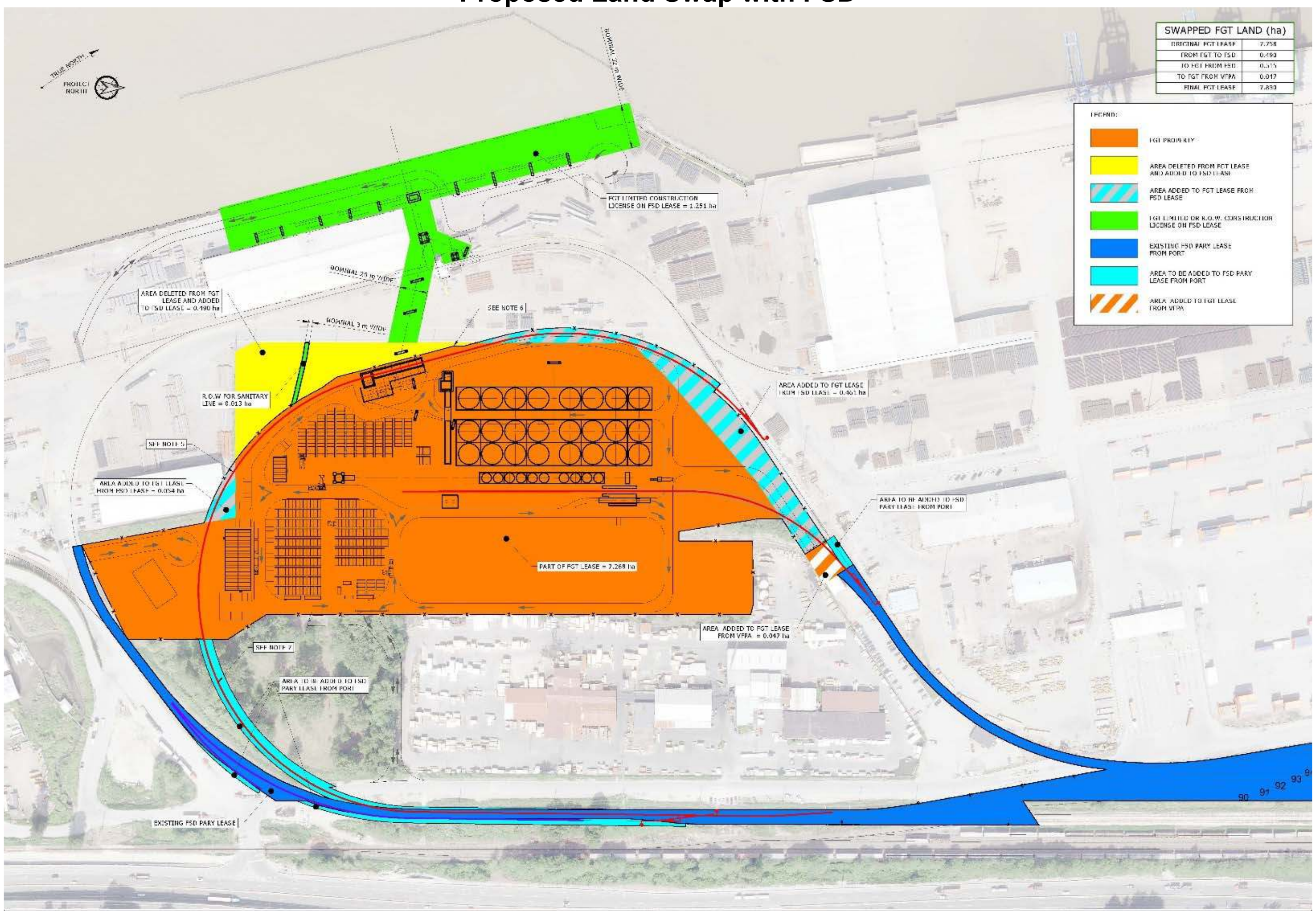


Figure 2.1-8
Project Site
Proposed Land Swap with FSD



2.1.4.2 Environmental Issues

The prior tenant, Bekaert, ran a metal processing and galvanizing operation for several decades. This process required the use of various chemicals for cleaning and finishing the steel products, and over the years some of these hazardous products as well as leakage from some underground fuel tanks made its way into the soil.

As part of its exit requirements, Bekaert commissioned an environmental examination (Detailed Site Investigation) of the Property which revealed two principal contamination issues:

.1 Confirmation of the presence of various contaminants in the soil throughout the old footprint of operations. These contaminants are mainly various metals as well as the aforementioned hydrocarbons from the underground storage tanks which have been decommissioned a few years ago.

.2 Transfer of these contaminants into the groundwater table. Because of the movement of the ground water, the groundwater contamination envelope extends beyond the identified soil contamination areas.

P&H commissioned Envirochem Services Inc. to perform an independent review of the original report provided by Bekaert. In this review, Envirochem:

- Verified the procedural correctness of the original report.
- Confirmed the reasonableness of its findings.
- Prepared a Construction Environmental Management Plan (CEMP) describing how to deal with future requirements and remedial actions.

The summary of the findings are as follows:

- As long as the contaminated ground and water are left untouched, then P&H will accrue no responsibility for these existing problems upon surrendering the lands back to VFPA in the future (whenever that may be).
- Given that the planned facility has no process related contaminants, P&H should not create any supplementary contamination issues in the future (barring unforeseen extraordinary accidents).
- The construction of FGT will require excavations in three of the areas on the site:
    - **Unloading building and pit:**
      The unloading building is a metal clad structure long enough to house approximately two railcars in length and wide enough to straddle a rail track. The

majority of the unloading facility's action occurs underground. The drawings show that the entire unloading building sits atop an underground pit some 6.0 m deep.

- **Main transfer tower and leg pit:**
  The transfer tower is an open steel structure approximately 40.0 m high located next to the unloading building; all product transiting through or within the unloading facility passes through this structure. The structure acts as physical support for various conveyors and bucket elevators and houses a set of bulk weighers.

  The transfer tower sits atop of a pit adjacent and connected underground 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 13.3 m deep.

- **Silo trench and leg pit:**
  As shown on the drawings, it is planned to construct the silos on top of the existing building's slab. The building per se will therefore be demolished and its slab leveled for use as a sub base (fills holes and remove protrusions). A concrete raft approximately 1.0 m thick will then be constructed mostly on top of the existing slab with the finished mass acting as a raft for the support of the silos.

  The drawings show the fully developed layout with four (4) rows of eight (8) silos at 14.6 m diameter, 33.3 m high and 3 000 t capacity, and one (1) row of ten (10) silos at 6.4 m diameter, 25.2 m high and 500 t capacity. These silos are galvanized steel units.

  A trench will run along in front of three (3) rows of silos to accommodate a collecting conveyor which will feed a bucket elevator in a pit at the end of the trench.

  In all areas to be excavated (unloading building, transfer tower, and silo trench and leg pit) the following techniques will be used:

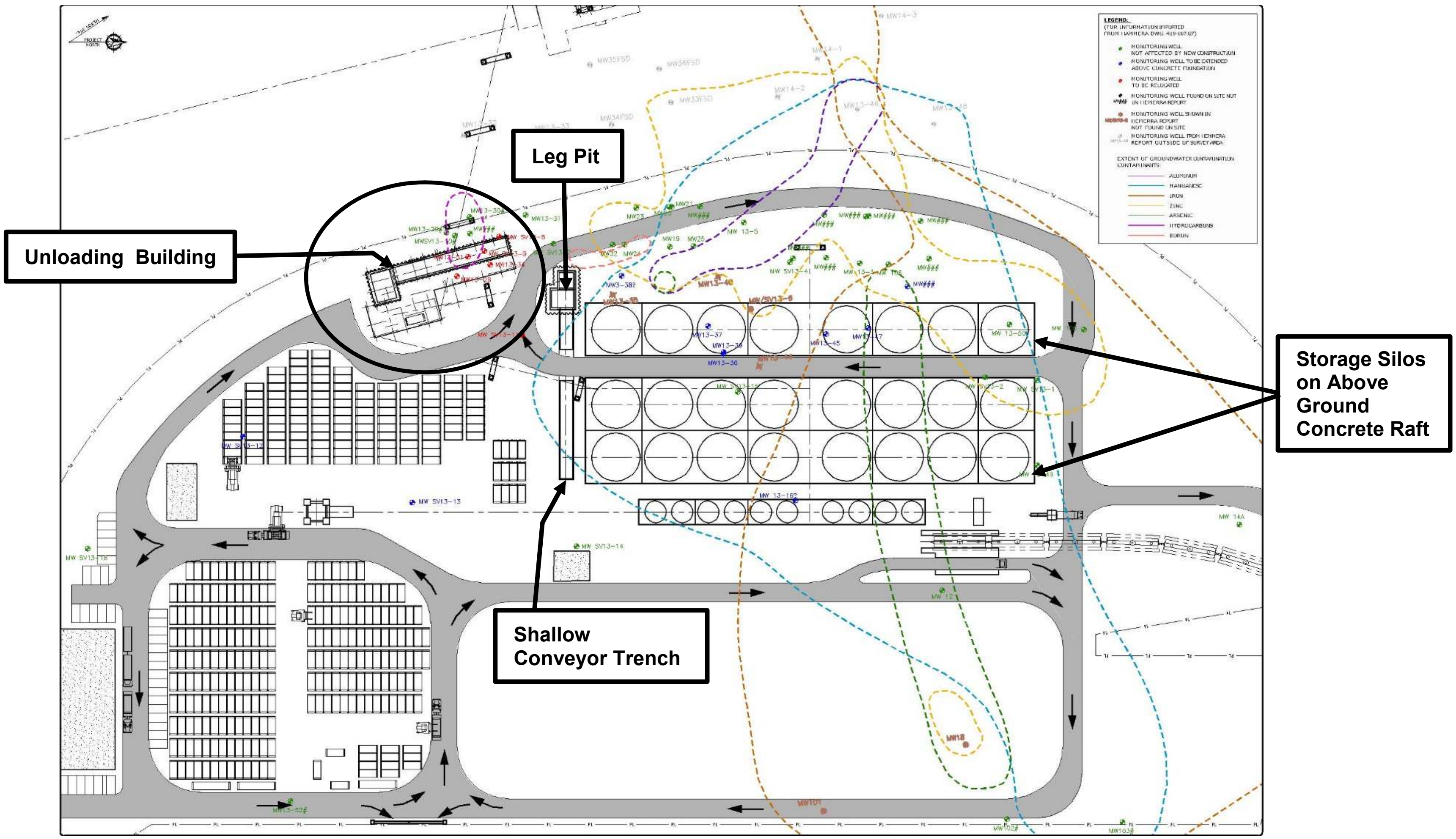
  - sheet piling will be driven around the perimeter of the planned excavation
  - the area inside the sheet pile walls will be excavated
  - the excavated material will be stockpiled on site
  - although the excavations will be below the water line, there will be no active dewatering as the excavation proceeds
  - upon reaching the prescribed depth, a trémie concrete plug will be poured to plug the bottom of the excavation

- once the trémie 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.

Figure 2.1-9 shows the contaminated area of the project site with On-Site Components superimposed.

Figure 2.1-9
Contamination Areas and Underground Water Plume



2.1.4.3 Design Criteria

Table 2.1-2
Basic Design Criteria

#	ITEM	DESCRIPTION
1	**PERFORMANCE TARGETS**	
2	**OVERALL**	
3	Total annual throughput	3.5 Mt/a
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

#	ITEM	DESCRIPTION
9	Allotted time to unload unit train	24 hours
10	Vessel handling	
11	Vessel size (maximum)	225 m LOA, 32.3 m beam 70 000 DWT but maximum 55 000 t of product with top up in Vancouver harbour
12	Shipping rate	2 000 t/h peak
13	**CONTAINER SHIPMENTS**	
14	Total annual throughput	600 000 t/a
15	Container size	• 20 foot units • Capacity ≈ 25.0 t (at 55° fill inclination)
16	Number of containers	• 24 000 TEU/a, or • ≈ 95 TEU in a 10 hour day (at 253 days/a)
17	Container storage capacity empty	minimum 400 containers
18	Container storage capacity full	minimum 400 containers
19	**RAIL SHIPMENTS TO LOCAL MARKET**	
20	Total annual throughput	200 000 t/a
21	Railcar size	• "Standard" grain cars • Capacity ≈ 90.0 t
22	Number of railcars	• 2 222 railcars/a, or • ≈ 8.8 cars/day (at 253 days/a)
23	Railcar storage capacity empty	10 railcars
24	Railcar storage capacity full	10 railcars
25	**TRUCK SHIPMENTS TO LOCAL MARKET**	
26	Total annual throughput	30 000 t/a
27	Truck sizes	• 45 t units
28	Number of trucks	• 667 units/a, or • ≈ 2.6 units/day (at 253 days/a)
29	Truck staging storage capacity	• Nil; all trucks are loaded on demand

#	ITEM	DESCRIPTION
30	**DESIGN PARTICULARITIES**	
31	Conveyors	• Completely enclosed to minimize fugitive dust emissions • Low speed (below 500 feet/minute or 2.54 m/s) to minimize product breakage and dust production • Maximum 10 degree inclination to minimize rollback of products being conveyed
32	Bucket elevator (if used)	• Floating boot design to minimize cross-contamination of products • Low speed design (around 500 feet/minute or 2.54 m/s) to minimize product breakage and dust production
33	Flow retarders	To be installed in appropriate silos and spouting to limit travel product velocity to 7 km/h to reduce product breakage and dust production

Note: All capacities are wheat equivalent: (ρ = 0.77 t/m^3 or 48 pounds/ft^3)

2.1.5 Rail Service

2.1.5.1 Rail Service for Unloading

In the future it is anticipated to unload a unit train without stopping rather than using the traditional “stop and go” technique commonly used in Canada. This alternative technique is common in certain high-capacity grain terminals in the USA where grain handling rules are different. This non-stop technique is more efficient but has traditionally been impossible in Canada because of the need to segregate and identify each car as a separate lot.

The recent changes in the CGC’s rules regarding the processing of incoming grain shipments has opened the door to being able to handle individual lots of larger sizes, even up to a complete unit train. A unit train has 112 cars of product meeting the following criteria:

- Same origination point.
- Same product (as per CGC grading rules)

- Sequential loading of railcars.

If these parameters are met, then the entire unit train can be unloaded continuously as one batch with one overall weight and one average grade.

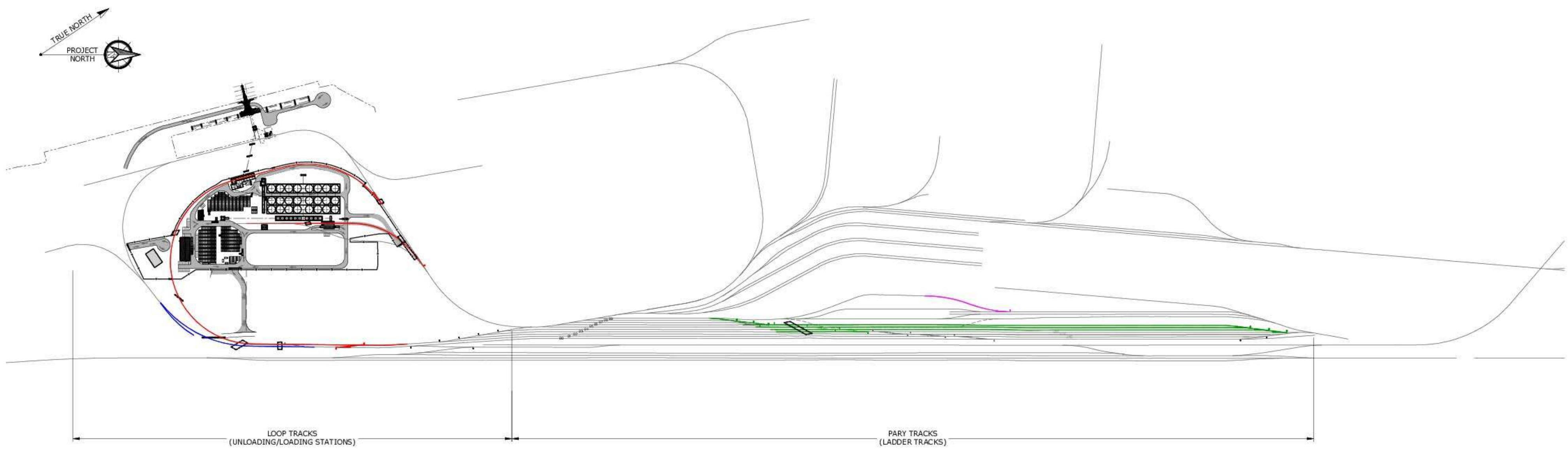
The complete loop track for servicing FGT does not exist at the moment and forms part of a long-term plan by FSD which also includes loop tracks for other bulk products. As such, the date for the full build out of these loop tracks is still unknown but it is envisaged to be between five and ten years in the future.

In the interim period to receive unit trains of up to 112 cars, the PARY tracks will be used. To accommodate unit trains Track 94 will be extended. The rail carrier will deliver the unit train to the PARY, stage the cars on two of the following three tracks, Tracks 92, 93, and 94 and depart.

A site locomotive will shunt strings of 19 cars from/to PARY to the FGT unloading station. A car indexer at the FGT unloading facility will position each railcar for unloading. PARY will also be used to receive, stage, and unload unit trains at the existing FSD unloading facility, but in strings of 10 cars instead of 19 cars – Figure 2.1-10 shows the overall rail layout.

For description of rail system service and operation refer the appendices.

Figure 2.1-10
Overall Rail Layout



2.1.5.2 Rail Service for Rail Loading

The business plan foresees an annual volume of approximately 200 000 t / annum of product to be shipped to various feedmills 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 and truck loading facility will be built at the north end of FGT. One bay will handle the railcars and the adjacent bay will handle the trucks. Building the two loaders side by sided allows for a single feed system from the main storage silos to the loading facility.

The rail design and location of the loading systems take advantage of an existing spur line on the north side of the Property which had been used by the previous tenant to ship out their finished products. The line will be partially realigned to bring it closer to the new railcar loading shed. The total capacity of the spur is 19 cars which allows for 10 car strings to be handled (always one car in the shed). Given the 10 car 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 shed thus avoiding the need for a separate locomotive for indexing.

The loading of the railcars will be accomplished using a dust-free, twin spout loader allowing for fully automated operation. Manual intervention will be required for opening and closing of the upper hatches and for overall quality control.

For railcar loading concept see Figures 2.1-11 and 2.1-12.

Figure 2.1-11
Layout of Rail and Truck Loading Building

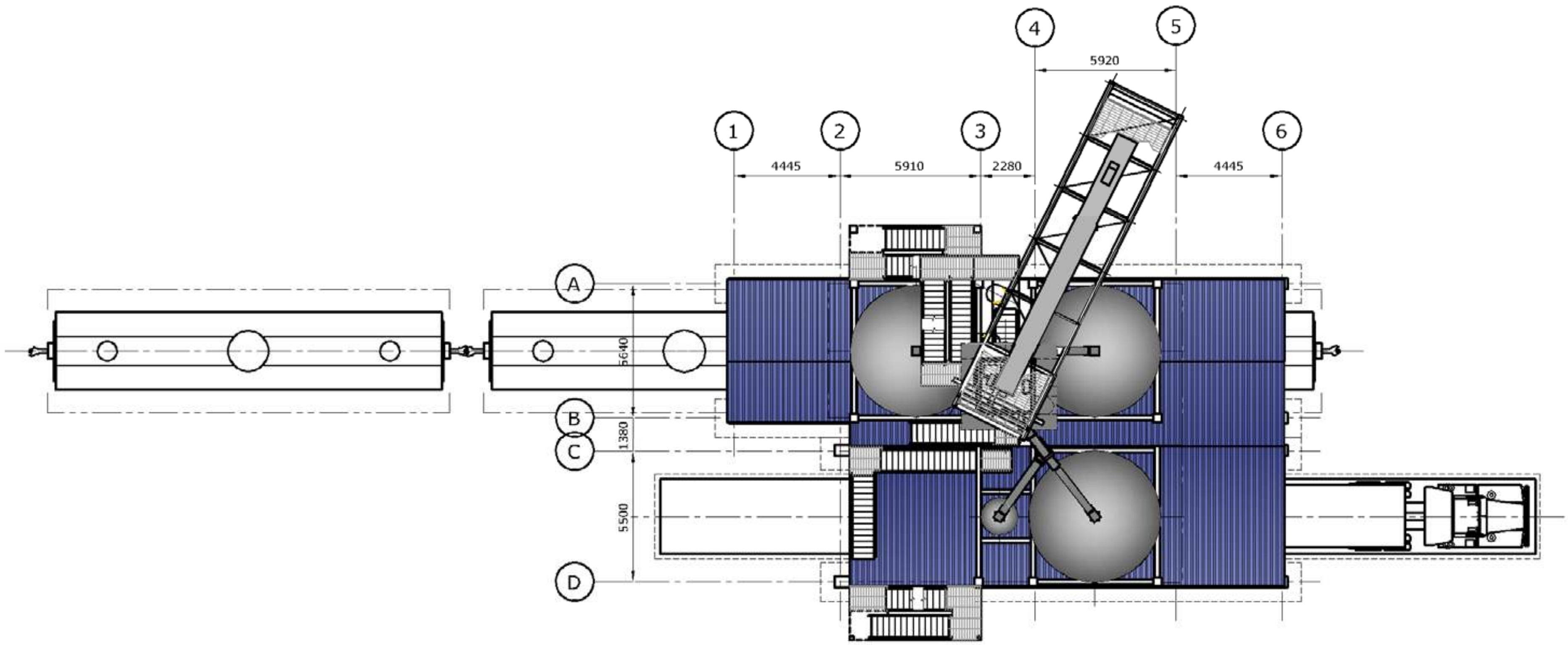
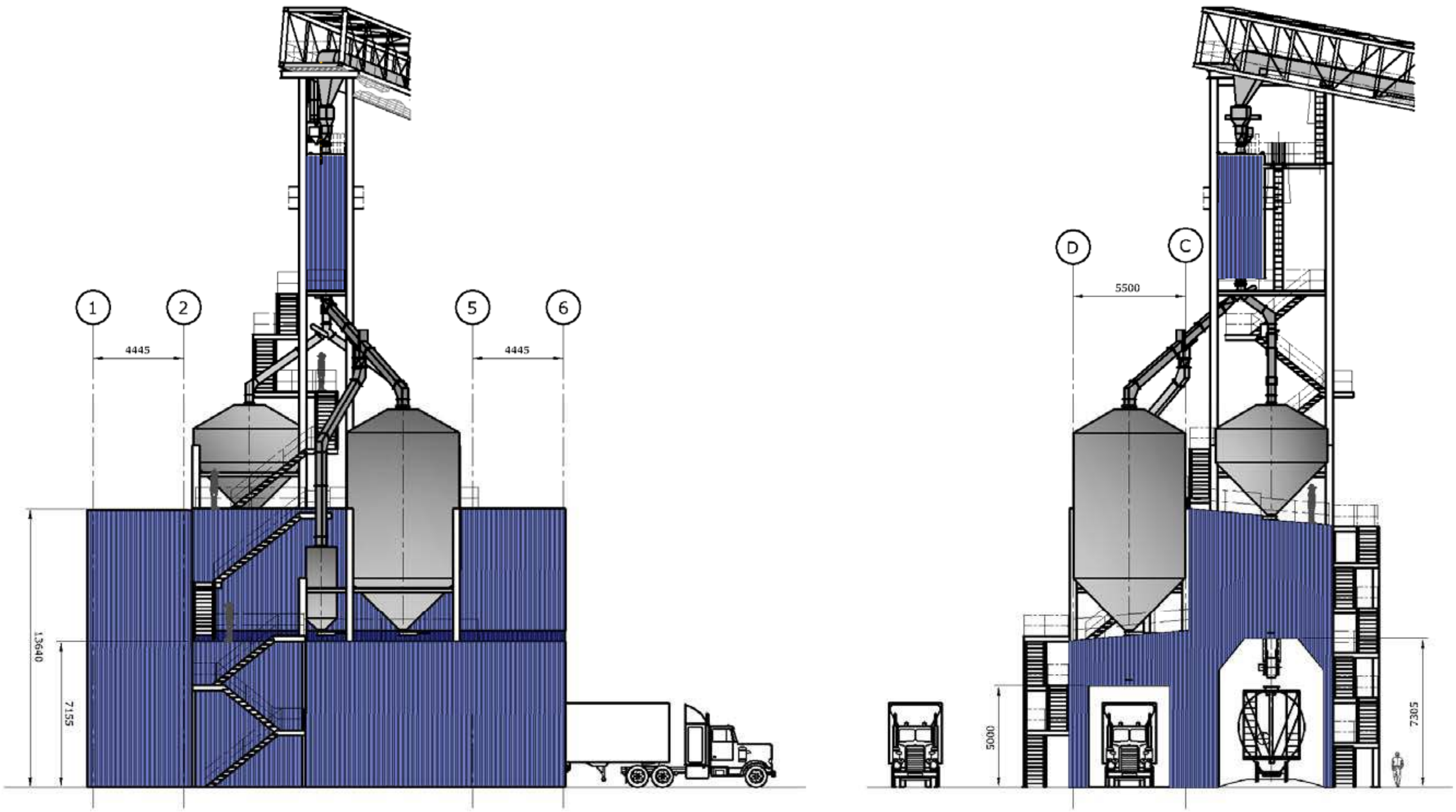


Figure 2.1-12
Elevation of Railcar and Truck Loading Building



2.1.6 <u>Receiving System</u>

2.1.6.1 **Receiving Building** – See Figures 2.1-13, 2.1-14 and 2.1-15

Prior to the construction of the complete loop track (initial period), the full railcars will be shunted through the unloading building by an indexer as indicated in Section 2.1.5.1. The purpose of the building is to shield the unloading operation from the inclement weather. Indeed without this shelter the unloaded grain as well as the hoppers into which they unload would be exposed to the rain thus leading to a serious degradation in the quality of the grain.

The unloading building therefore consists of three principal sections:

.1 The unloading building structure covers the entire length of the two railcars being unloaded. The structure will also be able to accommodate the unloading operator's work station as well as two railcar door openers. Only one railcar door opener will be used initially.

.2 An extension to the north which will cover approximately the length of a railcar. Commonly known as the "drip shed" it will provide shelter to the next car in the unloading lineup and allow most of the moisture on the car to drip off before reaching the unloading pit. This extension will also act as a shield to minimize the amount of windblown precipitation that would otherwise enter the main building and will provide weather protection for the indexer.

.3 An extension to the south which will cover approximately half of a car. The purpose of this extension will be strictly as a weather shield.

Figure 2.1-13
Plan View of Receiving Area

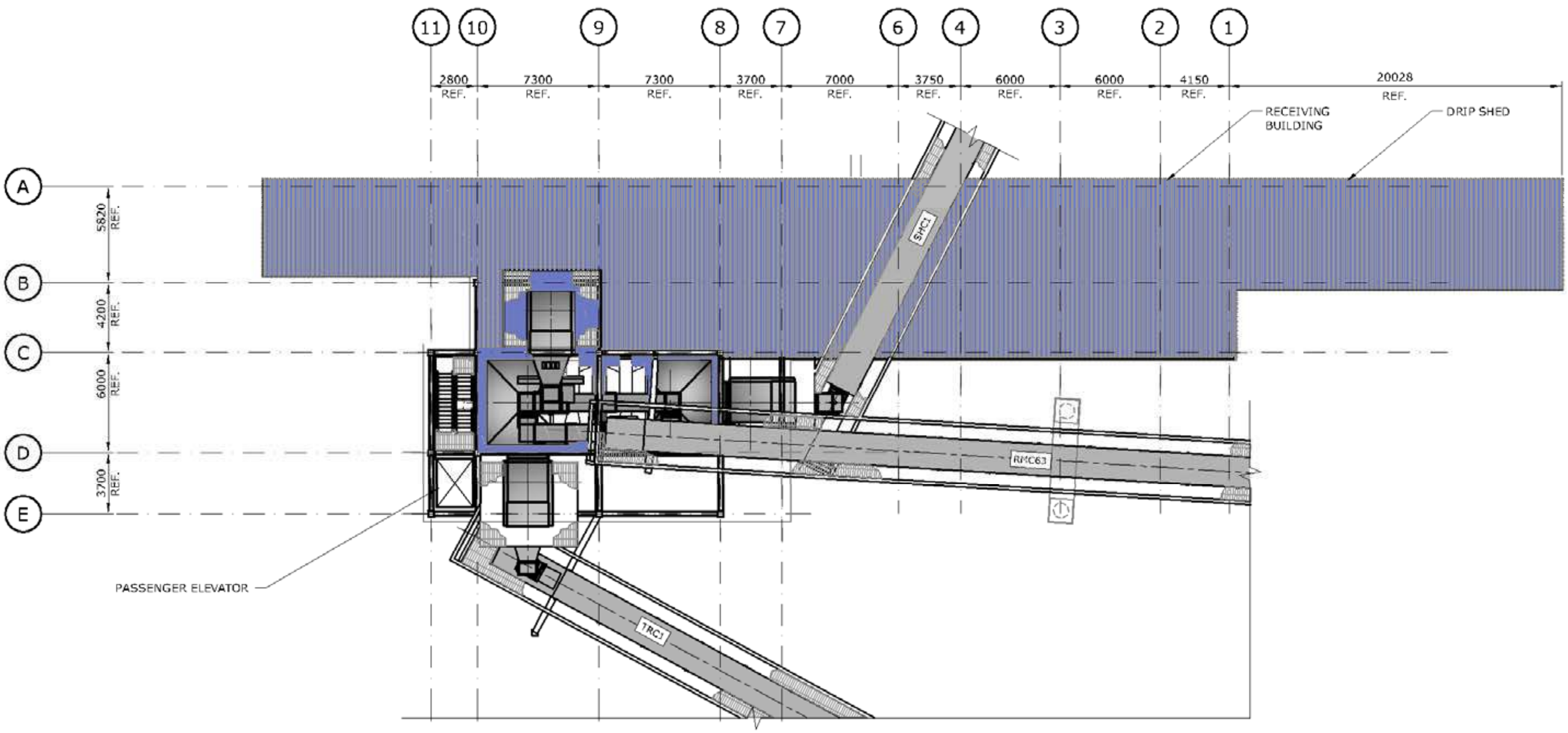


Figure 2.1-14
Elevation of Unloading Building

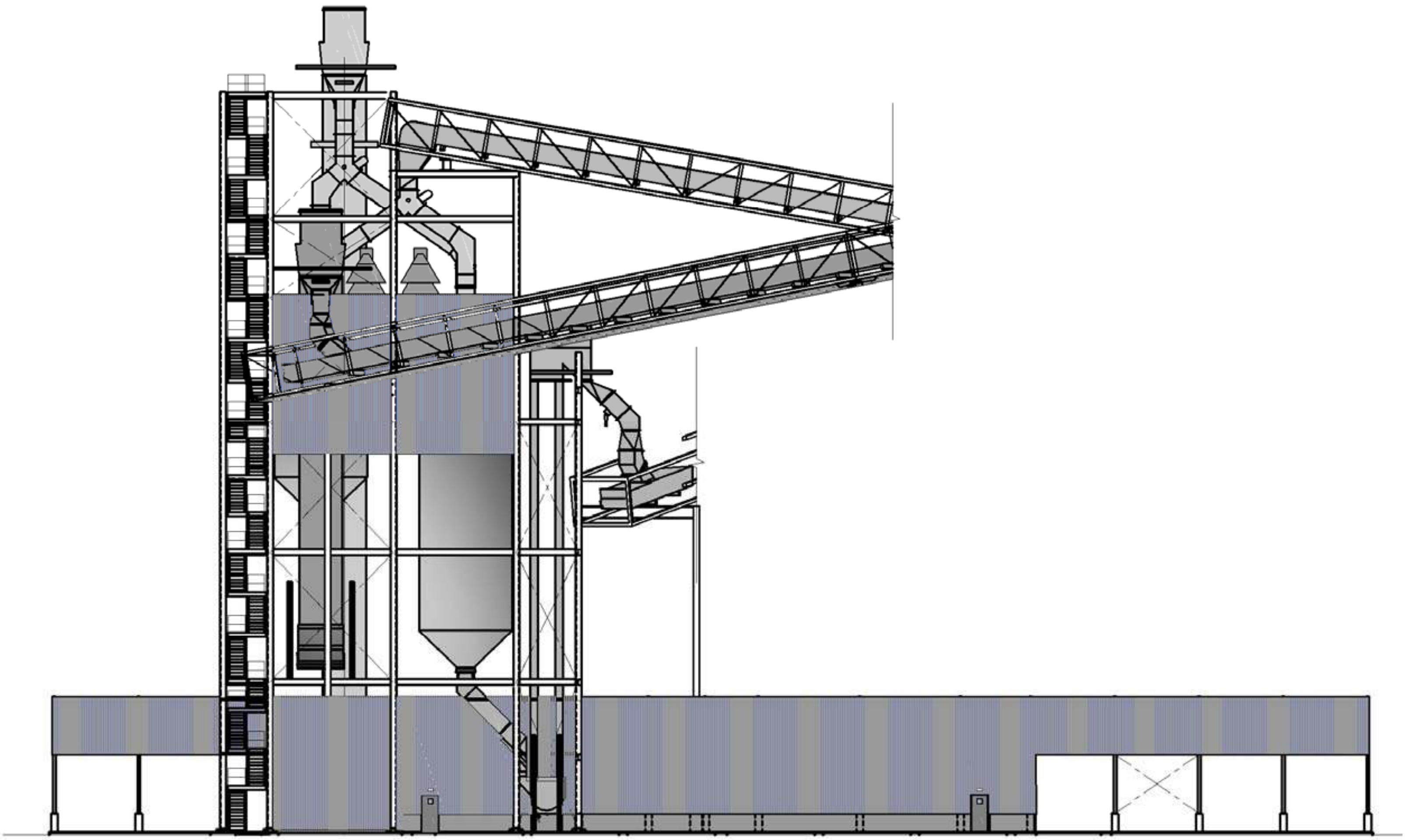
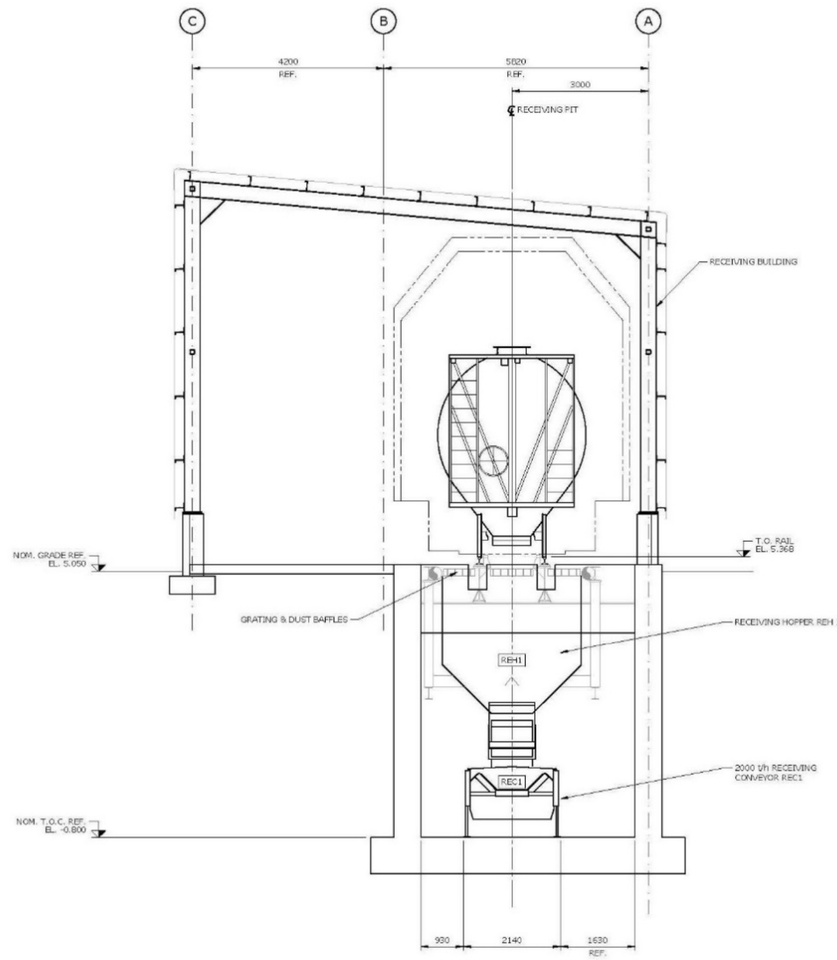


Figure 2.1-15
Cross Section of Unloading Building
Looking South



2.1.6.2 Unloading Station

The unloading operator(s) will be located in the unloading building proper on the east side of the tracks. Their work area will be equipped with the following:

.1 Two Hydraulically Powered Gate Opener
The operators will utilize this to open and close the railcar discharge gates as well as operate the indexer. In the future, with the completion of the loop tracks, one additional railcar gate opener will be installed: one upstream to open the gates, the other downstream to close the gates. At this point, the railcar will be unloaded while in motion by the locomotive and the indexer will become obsolete.

.2 One Control System HMI Unit
The unloading operator(s) will utilize this HMI to communicate with the FGT control system, requesting the starting and stopping of downstream equipment and collecting information on the amount of storage space available. The HMI will be located at the mid-point of the full unloading pit REH1.

.3 Voice Communication System with Other FGT Personnel
The details of this system will need to be developed during the detailed design stage with options such as:

- Hard wire base system (telephone style)
- Portable radio based system (“walkie-talkies”)
- Fixed radio based system.

In the future, when the unit train is unloaded while in motion, the unloading operator(s) will need to be in constant communication with the locomotive operators in order to synchronize the car placements, and with the shiploader operator when doing a direct hit operation.

2.1.6.3 Receiving Hoppers

The receiving car unloading system will be designed with two separate hoppers.

The two hoppers will actually form a continuous unloading pit over which the railcars will travel and unload.

Initially with indexer advancing railcars, the capacity of the hopper is dictated by the buffering role that it will play between the railcar unloading and the receiving conveyor. The railcar unloading process will necessarily be interrupted every time the railcars are indexed forward, yet the receiving conveyor will need to operate at a continuous rate of 2 000 t/h.

2.1.6.4 Unloading Transition Sequence

As indicated above, the rail system will initially be operated with ladder tracks at PARY and the car indexer. Therefore, the operating system will function in a dual nested batch mode with lots of 19 cars being sub-divided into sub-lots of single car motions and emptying to provide a continuous unloading flow. Once the loop track is completed, the unloading system will switch to a continuous process with constant car motion and emptying.

During the initial period, the receiving system will require only one unloading hopper stretching the length of a single car. This will be the classic style of unloading system, but with a receiving hopper capacity large enough to fully buffer the belt feed during the car advancing portion of the cycle; this will allow the receiving system to operate under continuous load.

2.1.6.5 Transfer from Receiving

The product unloaded from the railcars will have three different major destinations available, namely:

i) Direct hit to vessel

ii) To storage silos

iii) To existing P&H/FSD Shed #1 storage.

Routes i) and ii) will operate at a nominal 2 000 t/h. Route iii) will operate initially at 800 t/h to match existing bulk weigher and 2 000 t/h in the future with the replacement of the existing flat storage shed with more efficient silos.

2.1.7 <u>Transfer Equipment</u>

An important factor in the operation of a grain shipment terminal is the need to preserve the quality of the product being handled. The material handling equipment, in particular the conveyors and bucket elevators, play a major part in this quality control. In general, the faster the speed at which the product travels, the higher will be the breakage by impact at transfer and discharge points and the amount of dust created due to the turbulence and the air displaced by the product at these points.

Therefore, the following parameters were set for the material handling equipment.

Table 2.1-3
Design Characteristics for Material Handling Equipment

#	ITEM	VALUE
1	**BELT CONVEYORS**	
2	Design speed	≈500 feet/min (2.5 m/s)
3	Maximum incline	10 degrees
4	Construction type	Totally enclosed
5	Self-cleaning features	At the tail end
7	**BUCKET ELEVATORS**	
8	Design speed	≈500 feet/min (2.5 m/s)
9	Discharge type	Non-impacting
10	Boot type	Contoured self-cleaning system
11	**DUST CONTROL CONSIDERATIONS**	
12	Unloading	Aspiration to create negative pressure inside the unloading hopper.
13	Storage silos	Bean ladder (all silos) Install exhaust blower(s) with reloading cartridge type filter unit in order to create negative pressure inside the silo during the loading process.
14	Shiploader	Use of totally enclosed cascading type spout.
15	Conveyors and bucket elevators	Aspiration fan and cartridge type filter to provide negative pressure inside casing.

2.1.8 Storage Configuration

Based upon past experience with other projects of this type, corrugated, galvanized steel silos will be installed for the following reasons:

- Lowest cost alternative.
- Available in multiple sizes and configurations.
- Adequate suitability for grain storage.

Typical examples of steel silos for similar projects are shown on Figure 2.1-16 below.

The actual silos to be constructed are shown in Figures 2.1-17, 2.1-18, and 2.1-19 below.

Figure 2.1-16
Typical Corrugated Steel Silos

Completed battery of 48' diameter silos

48' diameter silos under construction

Further analysis of the projected business volumes allowed for a refinement of the size selection, and ultimately, two sizes were selected:

- 21 foot (6.4 m) diameter units each with a capacity of 500 tonnes
- 48 foot (14.6 m) diameter units each with a capacity of 3 000 tonnes.

The storage silos are planned to be constructed on the concrete slab forming the footprint of the existing building from the previous tenant. The total buildup of silos in this area will consist of:

Table 2.1-4
Recommended Silo Sizes

#	DESCRIPTION	DIAMETER (m)	HEIGHT (m)	CAPACITY (t)	QUANTITY	SUB-TOTAL CAPACITY (t)
1	Silos (corrugated steel with conical bottoms)	6.4	33.3	500	10	5 000
2	Silos (corrugated steel with conical bottoms)	14.6	25.2	3 000	24	72 000
	TOTAL CAPACITY					**77 000**

It is expected that FGT's business will ramp up over several years after the initial start-up, and that, as such, the silos could be built in stages.

Figure 2.1-17
Plan View of Steel Storage Silos

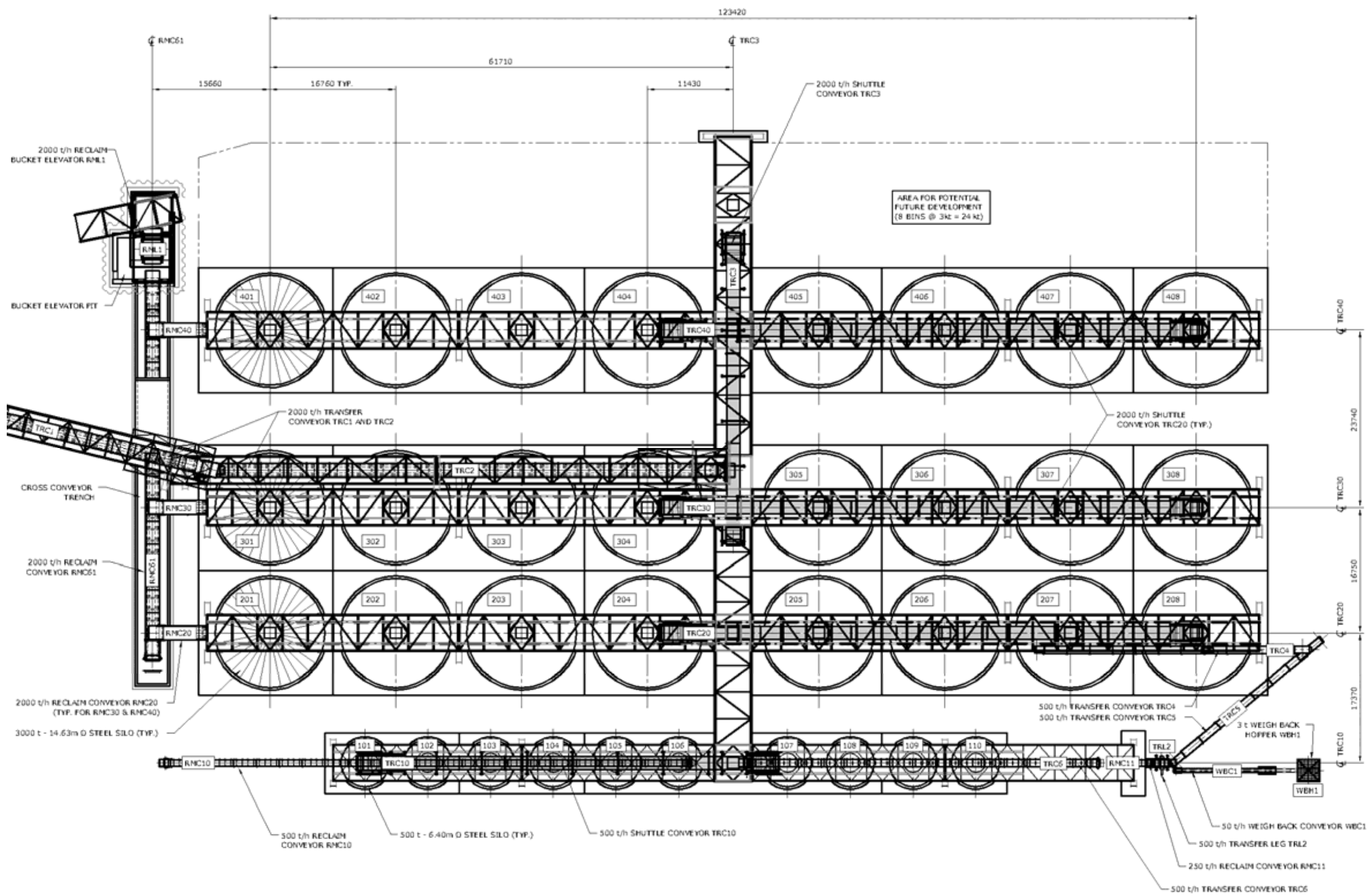


Figure 2.1-18
Elevation of Storage Silos

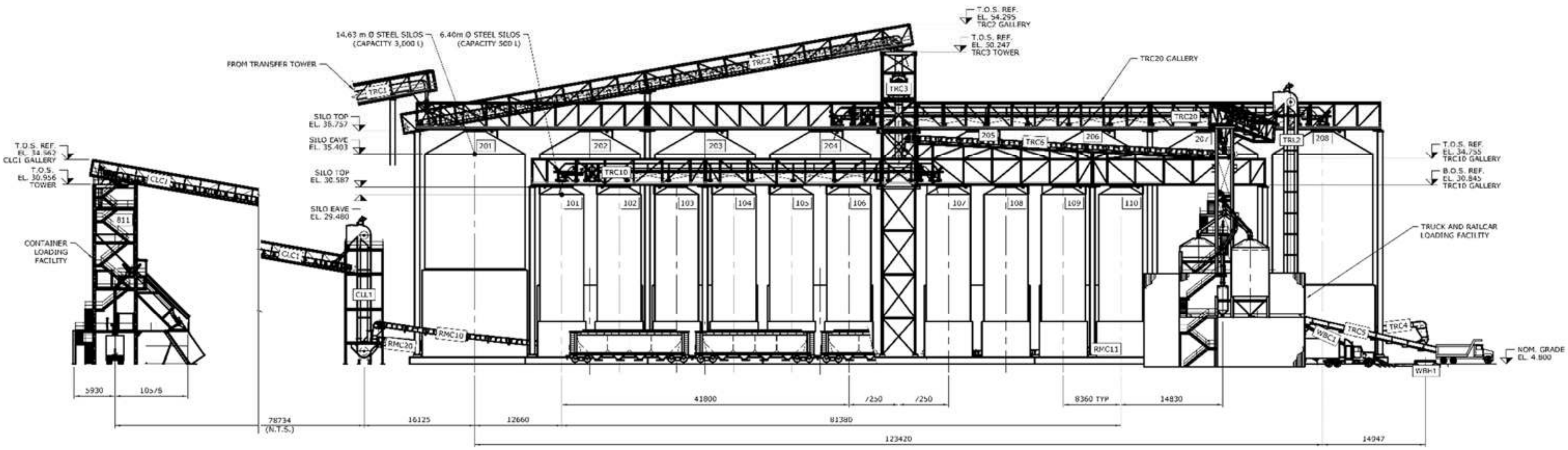
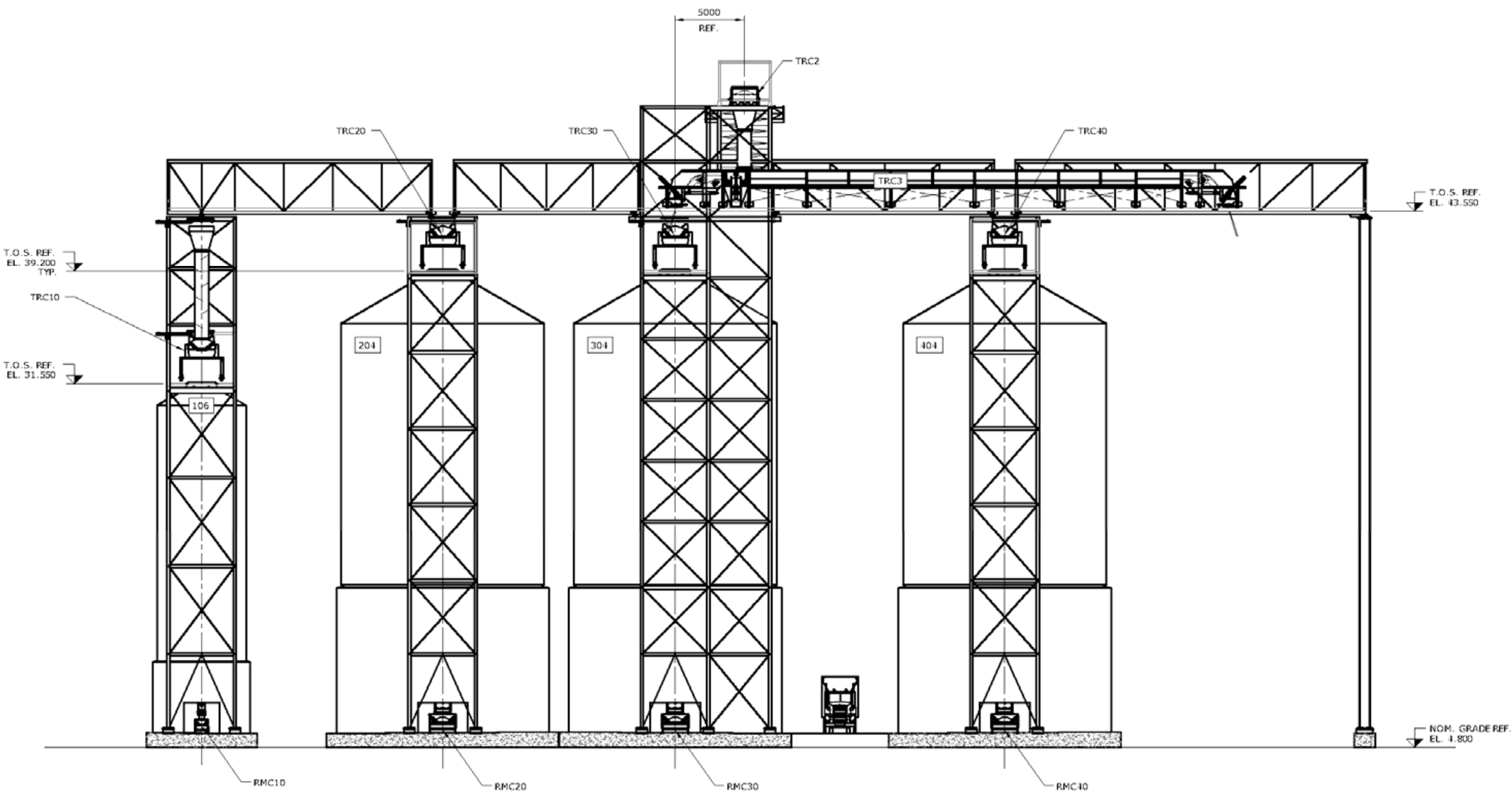


Figure 2.1-19
Cross Section of Storage Silos



2.1.9 Shipping Berth

2.1.9.1 Introduction

The shiploading system is one of the most critical elements for an export grain terminal of this type. A properly designed and executed system allows for rapid and clean loading of vessels with a minimum of vessel movements.

The wharf to be used is located on the FSD property, and the berth to be utilized is known as Berth #4 and portion of Berth #3.

Berth #3 is currently utilized by the existing JV Facility to load vessels with outbound product. The existing system utilizes a series of wheeled conveyors initially fed by front end loaders inside the storage shed and discharging into a single hatch on the vessel. Wheeled and motorized, the discharge conveyor can be oriented to sweep across a portion of each hatch but it can reach only the land side half of the vessel; in order to completely fill the vessel, it must be turned about and rewarded from hatch to hatch. Furthermore, because of its limited capacity averaging 500 t/h, and limited throw characteristics a front-end loader must be introduced into each hatch in order to level the load and reach under the coamings.

The new, proposed shiploading system, with a peak rate of 2 000 t/h, will average approximately 1 625 t/h and will not require any vessel movement or trimming time. The new shiploader 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 a travelling shiploader for Berth #4 is the only solution considered here.

The new travelling shiploader, although not the least expensive solution up front, provides the most flexible operation due to its complete ship coverage without having to move the vessel and the need for only a single operating crew. See Figure 2.1-21.

2.1.9.2 Condition of Existing Dock

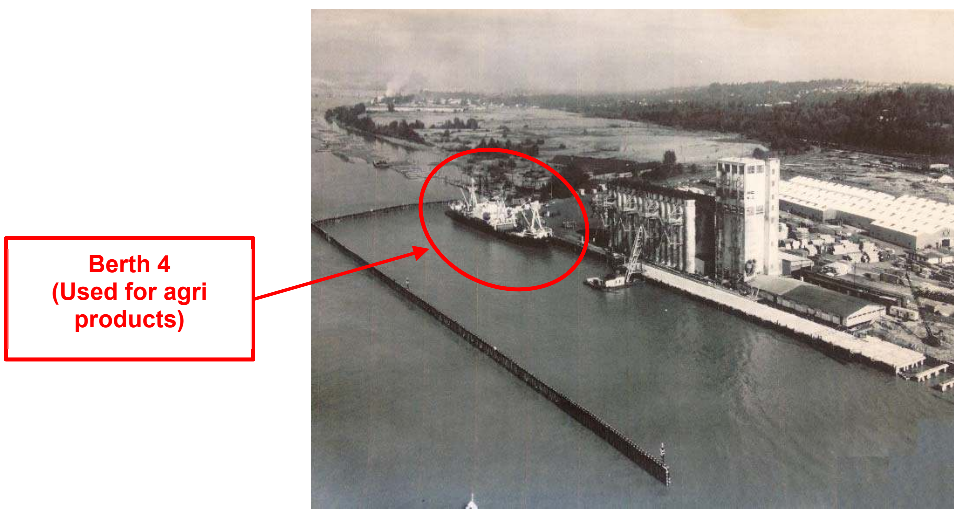
The review of the geotechnical report of the existing wharf area generated a certain number of limitations regarding what can be built in that area and in particular, where it can be constructed.

The existing dock was originally constructed around 1929, was expanded at least twice with the latest session in 1968 and a recent remediation within the last few years. See Figure 2.1-20 below. The major issue with the dock area is the existence of extensive underground foundation fixtures (piling, retaining walls, and tie backs). These elements limit the location of the new installations as follows:

- The new shiploader and its cross gallery will be too heavy to be supported by the existing wharf and will require their own piling system to carry the loads. Figure 2.1-21.

- These supporting piles will need to be judiciously placed to miss the existing underground fixtures.

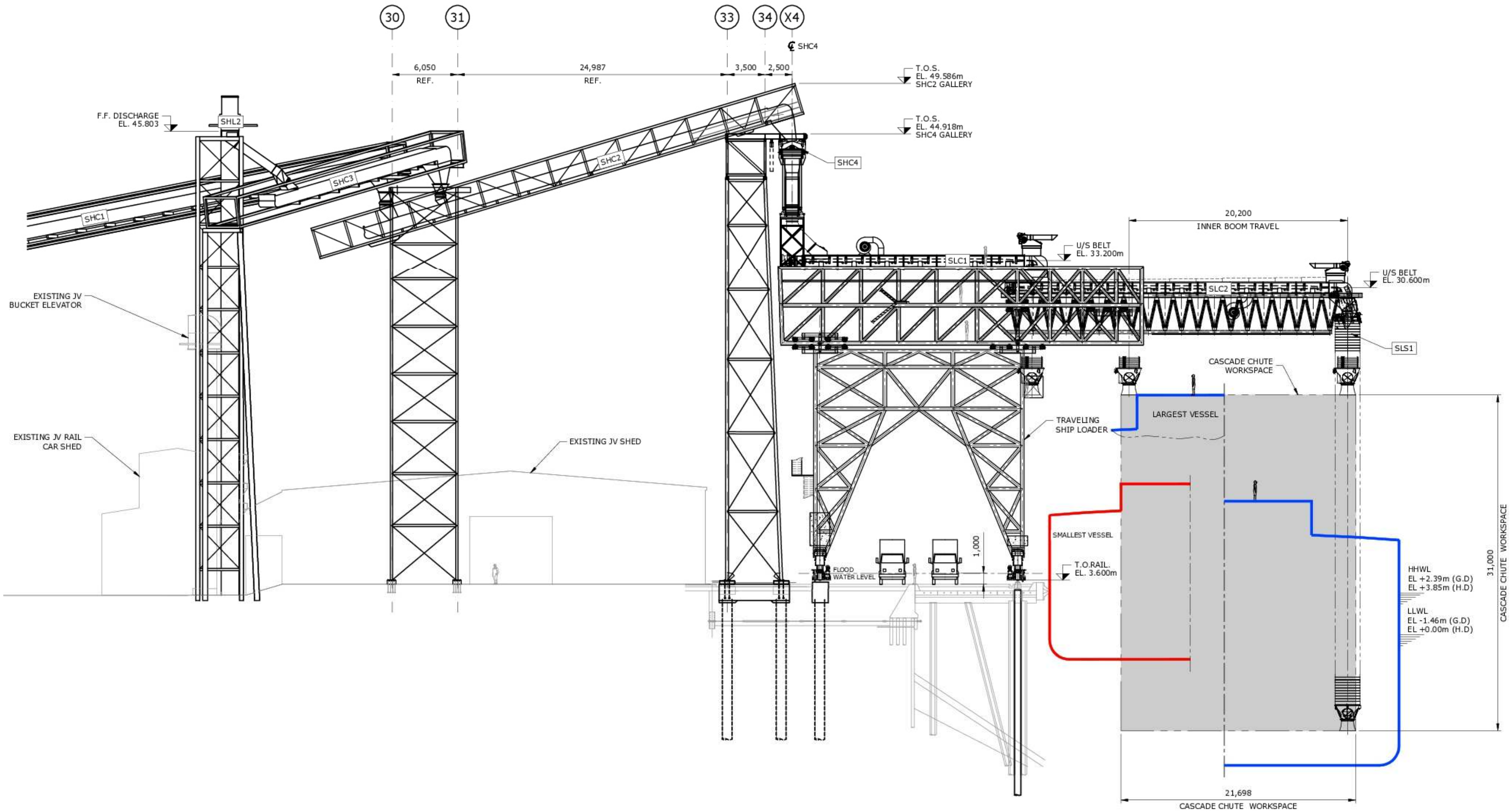
Figure 2.1-20
Berths #1, 2, 3 Under Expansion
(Date Unknown)



An assessment of the existing dock structure has been undertaken to determine the condition and capacity of the dock by an independent engineer.

The result of the assessment can be found in the appendices.

Figure 2.1-21
Cross Section of New Shiploader and Dock



2.1.10 Shipping System

2.1.10.1 Shiploading

The recommended solution involves the construction of a custom designed travelling shiploader of 2 000 t/h capacity and capable of covering all of the hatches of a 225 m long vessel. The shiploader will be fed by a 2 000 t/h shuttle conveyor arrangement travelling underneath an overhead gallery some 35 m above the dock level. The feed conveyor to this shuttle unit will therefore need to rise even higher in order to feed the latter.

2.1.10.2 Shipping from Existing JV Facility to Vessel

Because the new shiploader will take over the area currently used by the existing JV Facility's shiploading system, provisions will be made to allow the existing JV Facility to use the new shiploader.

To that extent, three new pieces of equipment will need to be supplied and installed at the existing JV Facility:

- 1 000 t/h bucket elevator SHL2: This piece of equipment will be installed next to the existing 1 000 t/h bulk weigher.
- Diverter at the discharge of the existing bulk weigher: To allow the scale discharge to be diverted to the new SHL2.
- Shipping conveyor SHC3: Which will transfer the discharge from SHL2 to the shipping conveyor SHC2 feeding the shiploader shuttle conveyor (from FGT).

The reclaim system in the JV Facility is rated at a peak capacity of only 800 t/h (average capacity 500 t/h) vs. FGT's 2 000 t/h, therefore, when the new shiploader is used by the JV Facility, it will operate at this lower capacity. (Technically, this does not pose a problem; the larger downstream conveyors will operate at their regular speed but only half-full.)

2.1.10.3 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 conveyor located in a trench. Each silo will have a single discharge point at the centre of the silo's bottom hopper with the conveyor mounted at ground level.

Once the cross conveyor is out of the trench, it will converge on a 2 000 t/h bucket elevator and into a similar sized batch scale located in the transfer tower. Further re-elevation after the scale will send the product towards the new shiploader system to be constructed on the existing FSD dock.

2.1.10.4 Special Loading Spout

The shiploader will be provided with a special loading spout. Loading spouts used at traditional or old granular bulk handling facilities such as AGT or Prince Rupert Grain allow the product to free fall into the ship hold from heights at times exceeding 40 m. In doing so, the product pulls a large quantity of air down the chute with it. The entrapped air travels down the spout and escapes at the base of the spout causing highly visible dust emissions. More dust is released when the product flow hits the bottom of the ship hold or product pile.

The loading spout proposed for this project gently supports the product being loaded all the way down the vertical length of the chute and thus maintains a constant low velocity and keeps the material in a mass-flow form that entraps and holds the dust within. Material travelling at low velocity does not pull air down with it and therefore, if there is no air to escape, there is no dust emission.

Pictures below (Figures 2.1-22 and 2.1-23) show the difference in dust production with material in free fall versus the use of special loading spout (flow retarder).

Figures 2.1-24 to 2.1-30 show different types of special loading spouts.

Figure 2.1-22 – Demonstration of dry bulk material in free fall where the particles of dust separate and then are lifted out and up by the air that has been pulled down by the material itself.

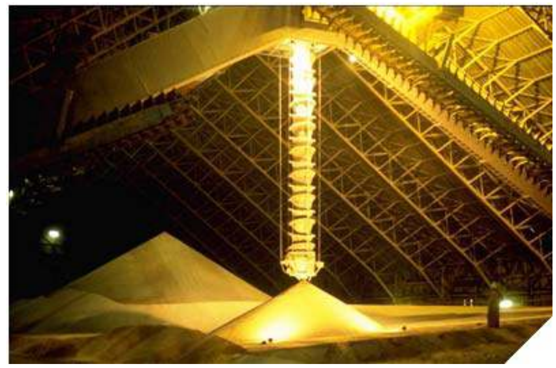


Figure 2.1-23 Same demonstration as on the left but with a special loading spout (similar to what would be used on the shiploader) controlling dust emission. (The shroud on the spout has been removed for the demonstration.)

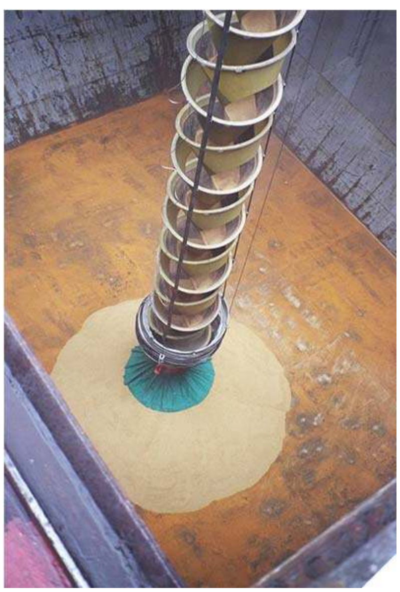


Figure 2.1-24 – Loading grain at 1 500 t/h.

The shroud is lowered to allow good view of cascade effect.

Figure 2.1-25 – Ship's hatch partially loaded with 200 tonnes of material but the floor of the hatch is clean. The spout here is provided with a rotating trimming chute.

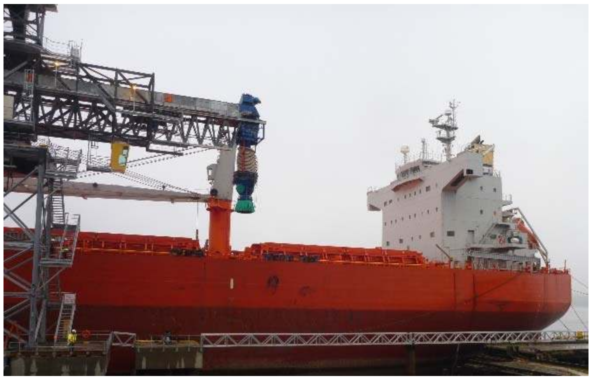


Figure 2.1-26 – Spout fully retracted
(Note clearance above vessel deck)

Figure 2.1-27 – Spout fully extended
(Note depth below vessel deck)

Figure 2.1-28 – Discharge tip of spout on inspection platform
(Note dust skirt and instrumentation)

VIEWS OF A 2 000 t/h, DUST REDUCING, CASCADING TYPE, SHIPLOADING SPOUT
(External shroud lowered for inspection purposes for all photographs except Figure 2.1-26 where unit is in operation)

Figure 2.1-29
Preparing to load

Figure 2.1-30
Loading hold
(Note lack of dust)

2.1.11 Container Loading

With an estimated throughput of up to 600 000 tonnes / annum, the container loading facility could be a stand-alone business, but by integrating it with FGT, it will be able to take advantage of the bulk rail handling rates accorded to the latter.

Based upon a five days/week, 10 hours/day operation, the container loading facility will need to average 9.49 TEU/hour to achieve the yearly throughput target.

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

Typical shipment batches will be in the order of 1 200 t to 2 500 t meaning that several lots of 50 to 100 containers would need to be stored in the full container area. Space for 400 TEU full and 800 TEU empty containers has been allowed in the design.

These full containers will be loaded onto outgoing trucks which will normally head to the Deltaport Container Terminal less than 30 km. In fact, Fraser Grain Terminal is ideally located for this purpose having immediate access to the newly constructed South Fraser Perimeter Road which was specifically built to service Deltaport.

The basic operation of the container handling facility will be as shown on Figure 2.1-31 below.

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 loading spout complete with aspiration duct will be inserted into the container opening.

Handling of empty containers with forklift.

Handling of full containers with top pick.

Figure 2.1-31
Container Handling Schematic

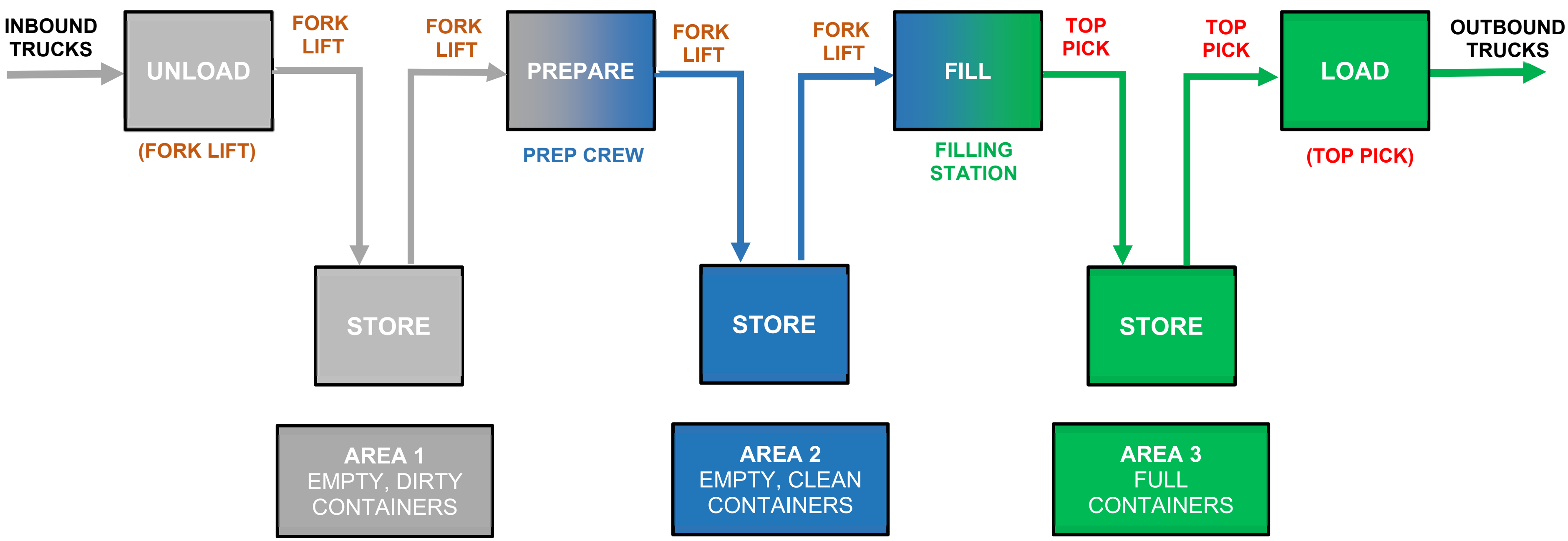
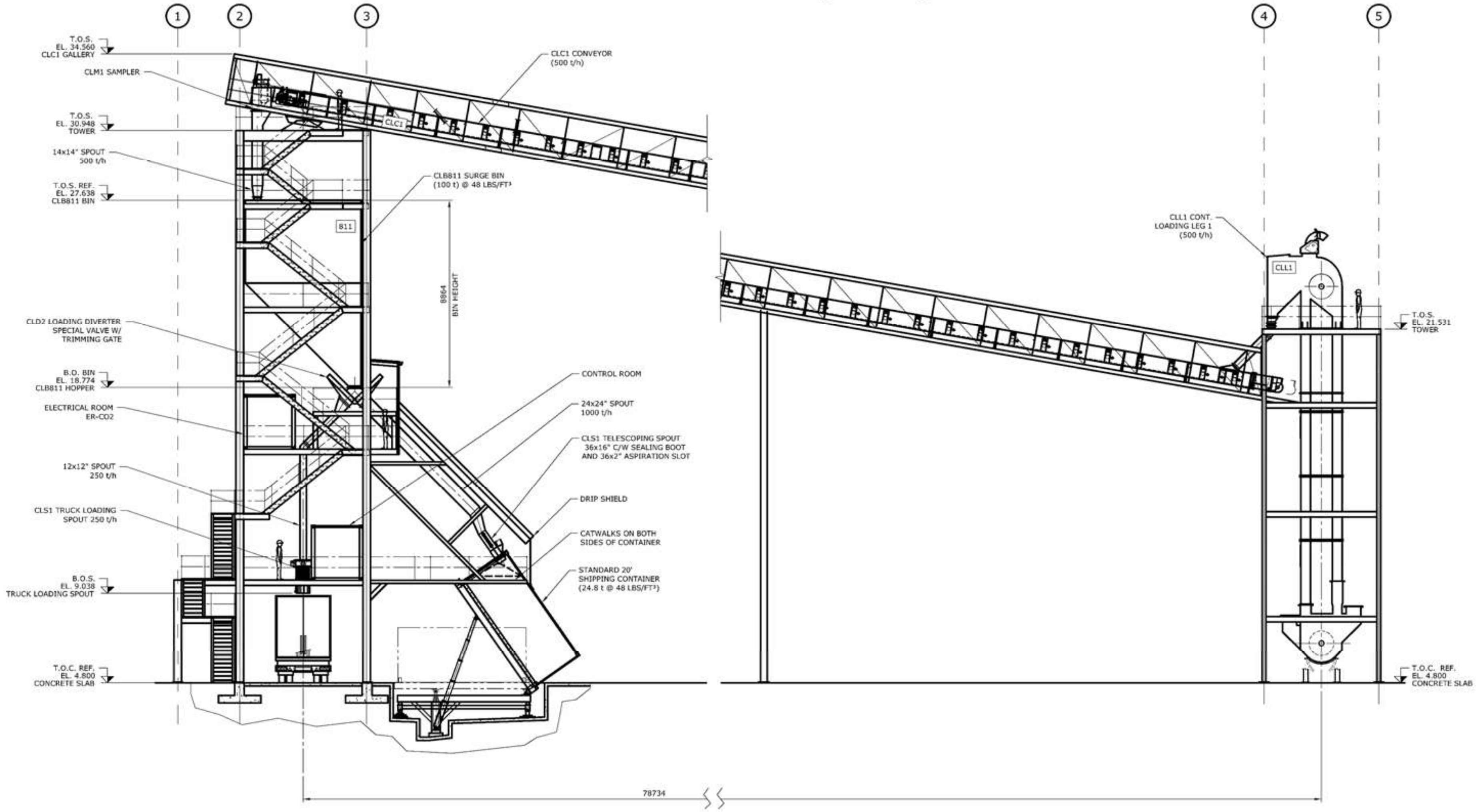


Figure 2.1-32
Section of Container Loading Building



2.1.12 Railcar and Truck Loading

The railcar loading operations will target users in the Fraser Valley area (mainly feedmills) that require small batches (1 to 10 cars) of product. The truck loading business will target the same geographical area but in smaller batches and with clients not capable of handling railcars.

As with the container business, the railcar and truck loading business elements will take advantage of Fraser Grain Terminal's bulk handling rates in order to more competitively accommodate these smaller users.

The railcar and truck loading systems will be located, side by side, in a common building at the north end of FGT. Refer to Figures 2.1-11 and 2.1-12. The latter will be serviced by a short spur track capable of accommodating 19 cars from end to end:

- 9 cars to the south of the loading bay (travel limited by a bumping post)
- 1 car in the loading bay
- 9 cars to the north of the loading bay (travel limited by a moveable derailer that will assure that cars are not pushed beyond the foul point to the adjoining rail line).

As indicated in Section 2.1.8, the expected throughputs for these two facilities will be:

- Railcar loading: 200 000 t/a
- Truck loading: 30 000 t/a

Based upon a five days/week, 8 hours/day operation, the handling rates will be:

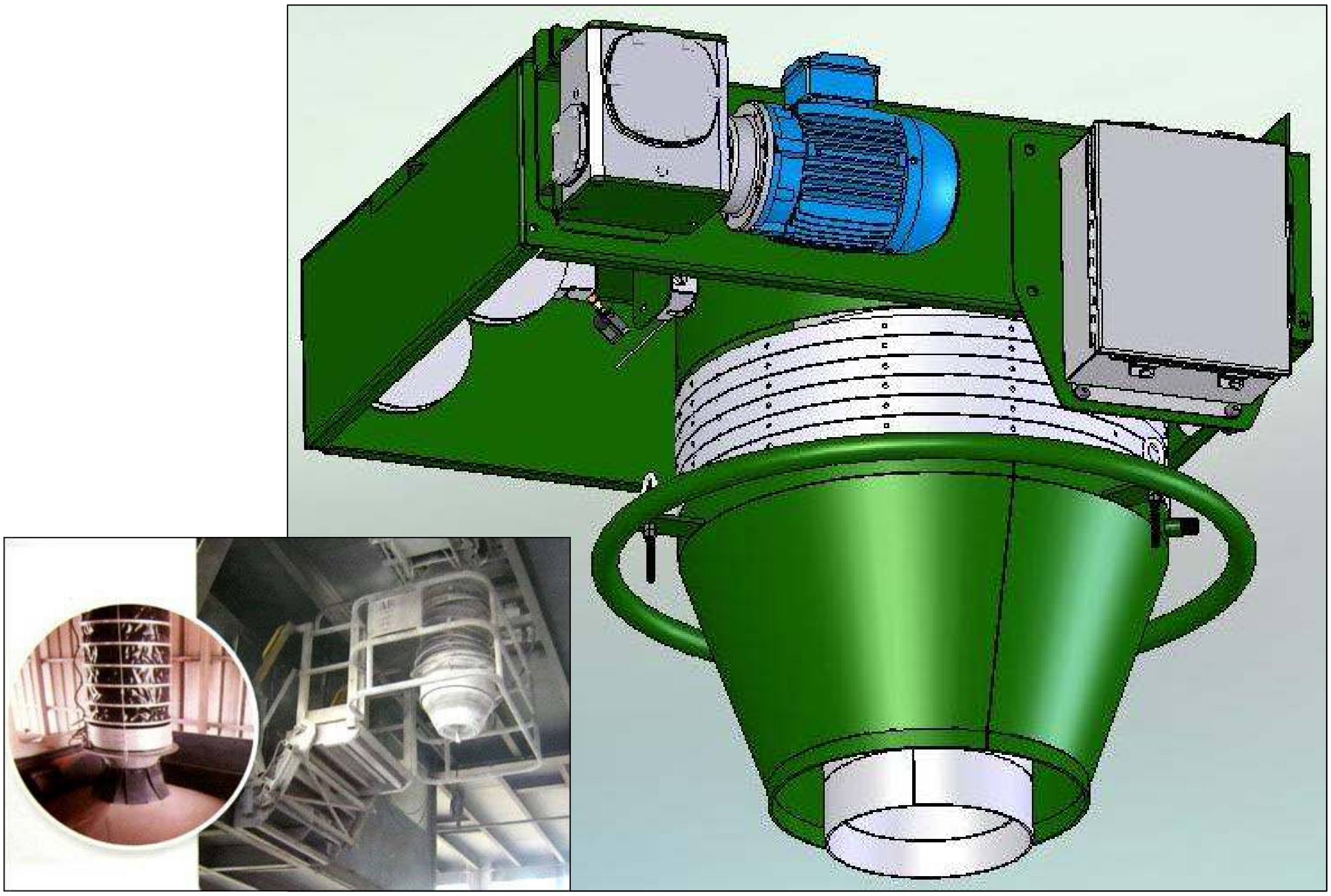
- Railcar loading: 8.8 railcars/day
- Truck loading: 2.6 trucks/day

2.1.12.1 Railcar Loading System

This type of loader has been successfully utilized in various locations worldwide. It provides rapid, semi-automated loading of the railcar without the dust emanation problems of traditional loaders.

2.1.12.2 Truck Loading System

The truck loading system will be a semi-automated arrangement utilizing a telescoping dust reducing spout.



2.1.13 Dust Control

Traditional dust control philosophy has centered on the principle of capturing airborne dust, transporting it to centralized dust filters and then consolidating the collected dust in powder form for treatment (usually pelletizing) or disposal.

At Fraser Grain Terminal, dust emissions will be controlled differently using a three part approach:

- Elimination of grain cleaning and processing.
- Emphasis will be placed upon reducing the amount of dust that is created during handling that could become airborne.
- What little dust is created and becomes airborne will be collected as close as possible to its source and then returned to the main product stream.

As a result, Fraser Grain Terminal will not require the large, centralized, bag-houses that are prevalent in the other grain terminals around the VFPA area. These bag-house filters have traditionally been the largest user of electrical power in the grain terminals and also the highest source of explosion risks and noise pollution. Most bag-house filters, at traditional houses, are dictated by the need to clean and process grain.

This new, “state of the art” approach, will involve several key features:

Isolation

All conveying equipment from the railcar unloading station to and including the shiploading spout at the vessel will be totally enclosed. At only four locations will the grain be exposed to the environment with the potential escape of dust:

.1 At the rail unloading station, at the railcar discharge gates.

.2 At the discharge of the shiploading spout.

.3 At the discharge of the truck loading spouts.

.4 At the railcars, after filling the car.

Special dust suppression features will be introduced to reduce dust emission at these points.

2.1.14 Ancillary Systems

2.1.14.1 Hydraulic Power

Although electric actuators will be used for many of the applications at FGT, there are a number of instances where hydraulic actuators will be preferable generally because of:

- Speed requirements (fast closing and opening of certain gates).
- Failsafe requirements (close all gates on power failure).
- Operating frequency (high duty cycle).

2.1.14.2 Compressed Air

FGT will not require any process air for its primary activities, some compressed air will be required for various ancillary functions. As such, no central compressed air system will be provided, rather, a distributed network of smaller, screw-type compressors placed at strategic locations will be used. Each of the ancillary activities will be equipped with their own local compressor.

2.1.14.3 Fire Risk and Life Safety Assessment – Refer to appendices.

FGT's fire protection system will be divided into two major categories:

- The occupied facilities such as the office building which will fall under the classic design of such systems for occupied facilities.
- The balance of the grain terminal in which there is little or no human presence and where prevention of explosions and protection of lives and assets will involve application of best available technology and good engineering practices.

2.1.14.4 Electrical System

General

Electrical components shall be selected and detailed in the final design for continuous heavy duty operations with due regard to the environmental conditions existing at the site. All electrical and controls components shall comply with the applicable product standards.

Codes, Standards, and Classifications

The following standards will be followed in the final design:

- CSA C22.1 - Safety Standards for Electrical Installations

- CEMA - Conveyor Equipment Manufacturing Association
- IH&S - Industrial Health and Safety Regulations.

Table 2.1-5
Electrical Hazardous Area Classifications

#	AREA	CLASSIFICATION	TYPE OF EQUIPMENT TO BE USED
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

<u>Power Distribution</u>

Although the existing Bekaert facility has been largely gutted, some of the main power distribution equipment is still on site. For the most part, this equipment is in good condition and could be reused for the Fraser Grain Terminal.

The following equipment is available.

Table 2.1-6
Recoverable Electrical Equipment

#	DESCRIPTION	SPECIFICATION	REMARKS
1	**PRIMARY BUS LEVEL**		
2	Incoming feed section: • Main breaker • Primary bus	25 kV / 3 Φ at 450 A 25 kV / 3 Φ at 600 A	Electrical room 0
3	Transformer bank “C”	25 kV to 480 V / 3 Φ 1.5 MVA	Electrical room 0
4	Transformer bank “D”	25 kV to 480 V / 3 Φ 2.0 MVA	Electrical room 0
5	**AVAILABLE CAPACITY AT 25 kV LEVEL**	**Minimum 8.0 MVA**	Based upon service to prior tenant (Bekaert).

The old Bekaert system was modified and expanded upon over the years but it originated with the start of this factory in the 1960s. As a result, the main power power utilization level is at 480 V / 3 Φ / 60 Hz as opposed to today's more prevalent 600 V level. Although there is no problem in finding equipment that operates at this lower voltage, the resultant 25% higher current levels result in more expensive motors and cabling. These supplementary costs will be offset by the savings in being able to reuse some of the existing distribution equipment.

During the detailed design phase, a verification of the exactness of this cost savings will be carried out to assure that the proper solution has been retained.

Two new distribution transformers fed from the 25 kV distribution board in Electrical Room 0 will be installed as follows.

Table 2.1-7
New Transformers

#	LABEL	LOCATION	AREAS SERVED
1	TX-A	In the new tower located next to the JV Shed 1	• Shipping stream from main Transfer Tower to the wharf • Shipping stream from JV Shed 1 to the wharf • Shiploader
2	TX-B	Foot of the main Transfer Tower	• Transfer Tower • Unloading Building

The remainder of FGT will be powered by the two existing transformers TX-C and TX-D.

Fraser Grain Terminal's main electrical load characteristics will be in neighbourhood of:

- Connected load: **Over 7 000 HP**
- Maximum demand: **4.5 MVA**

Fraser Grain Terminal will require approximately fourteen (14) separate electrical rooms spread throughout the grain terminal. As shown on the drawings, Electrical Room 0 will be the existing building with the service entrance and the primary switchgear. The other electrical rooms will be strategically distributed in order to minimize wiring costs. These satellite electrical rooms will contain:

- Motor control centres (low and medium voltage)
- I/O racks for the PLC control system
- Lighting distribution equipment
- Fire alarm wiring panels

- Special controllers (bulk weighers, metering gates, communications…)

These electrical rooms will most likely be prefabricated, with all possible internal wiring done in the assembly shop. The "e-rooms" would be shipped to site on flatbed trucks and placed on prebuilt concrete pads at ground level or hoisted on top to the upper levels of the towers as they are being assembled. The pre-built rooms present several advantages:

- Much of the internal assembly and wiring can be done in 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.

2.1.14.5 Lighting

During the nighttime hours the visual impact of FGT will be dictated by its lighting. FGT will be visible to the residents along the hillside to the east of SFPR and to a lesser extent the residents on the Queensborough and New Westminster waterfronts.

In order to minimize the effect of FGT's lighting system on these surrounding areas the following parameters will be implemented into the design:

- All outdoor lighting fixtures will be of the LED type. Although this does provide power savings for FGT, the principle reason for their choice is the better distribution control that these fixtures offer in order to achieve the desirable "dark sky" propagation.

- The high pole (≈20 m high) fixtures illuminating the container yard will be turned on to full brightness only when the container yard is in operation.

- The lighting in the following areas will be turned on to full brightness only when access is required for repair or inspection:

  - superstructure (galleries and transfer towers)
  - ground level area around the silos
  - container loading area
  - railcar and truck loading building
  - rail receiving building.

Emergency lighting will be provided as required by code and this will be accomplished either as separate battery supported lights, or as ad hoc fixtures with internal batteries providing both regular and emergency lighting.

Refer to the drawings for details on the planned arrangement and choices of lighting fixtures.

2.1.14.6 Fire Detection and Alarm

The fire detection and alarm system forms one portion of the overall fire protection system, with the firefighting systems (see Section 2.1.14.3) completing the loop.

The office and lab facilities will have their own stand-alone fire alarm systems and the "industrial" portion of FGT will be equipped with initiation devices as follows.

Table 2.1-8
Fire Alarm System Initiation Devices

#	DEVICE TYPE	LOCATION
1	Manual pull stations	Throughout FGT in the access areas
2	Smoke detectors	Electrical rooms
3	Point type heat detectors	In all other enclosed, or semi-enclosed areas such as: • Receiving shed • Receiving pit/tunnel • Bucket elevator heads • Silo tunnel area.
4	Temperature detection in conveyors	After each feeder: • Some conveyors, such as the reclaim units, will require multiple detectors due to the multiple feed points. • Most transfer conveyors will have only one feed point and thus one detection point.
5	Temperature detection in bucket elevators	A heat detector will be placed at the top of each bucket elevator.

2.1.14.7 Security Fence and Gates

FGT 's security system will need to meet several specific design objectives:

- Isolation of FGT from outside access (personal security and protection of property).
- Easy access for incoming and outgoing traffic (personnel, trucks for container and bulk business and rail traffic.
- Respect for MARSEC regulations.

The drawings show the planned security fencing arrangement around the property. The special access features to meet the noted objectives will be as follows:

- Manned access gate at the main entrance. This gate will include the necessary equipment to clear and log incoming and outgoing vehicle traffic.

- Remote operated access gates for the rail system.

- Locked gates with VFPA card access at the dock side access points to prevent unauthorized access to water side via the overhead routes.

2.1.14.8 Fire Access Road

Refer to the drawings for the planned primary and alternate routes for access to and egress from FGT.

2.2 OPERATIONS

2.2.1 General

The operations at the FGT will consist of the following activities:

- Unloading trains
- Loading vessels for export
- Loading railcars for local markets
- Loading bulk trucks for local markets.

2.2.2 Capacities and Throughput

2.2.2.1 Proposed Fraser Grain Terminal

The summary of the capacities and throughput of the proposed Fraser Grain Terminal is shown on Table 2.2-1 below.

Table 2.2-1
Summary of Throughput Capacities

<table>
<tr><th colspan="3">DESCRIPTION</th><th>FACILITY</th><th>QUANTITY</th><th>days/a</th><th>h/day</th><th>THROUGHPUT</th></tr>
<tr><td rowspan="2">INCOMING</td><td rowspan="2" colspan="2">Trains</td><td>JV Shed 1</td><td>22 trains/a @ 5 000 t
39 trains/a @ 11 200 t</td><td>22
39</td><td>8
19</td><td>≈ 547 000 t/a</td></tr>
<tr><td>Proposed Fraser Terminal</td><td>309 trains/a @ 11 200 t</td><td>309</td><td>≈ 13
≈ 16</td><td>≈ 3 461 000 t/a</td></tr>
<tr><td colspan="7">TOTAL INCOMING</td><td>≈ 4 008 000 t/a</td></tr>
<tr><td rowspan="7">OUTGOING</td><td rowspan="2">OGV</td><td rowspan="2">Vessel loading</td><td>JV Shed 1</td><td>≈ 18 ships/a @ ≈ 30 400 t</td><td>≈ 43</td><td>24</td><td>≈ 547 000 t/a</td></tr>
<tr><td>Proposed Fraser Terminal</td><td>≈ 62 ships/a @ ≈ 42 400 t</td><td>≈ 67</td><td>24</td><td>≈ 2 631 000 t/a</td></tr>
<tr><td colspan="6">Sub-total by OGV</td><td>≈ 3 178 000 t/a</td></tr>
<tr><td rowspan="3">Land</td><td>Railcar loading</td><td>Proposed Fraser Terminal</td><td>8.8 cars/d @ 90 t</td><td>253</td><td>10</td><td>200 000 t/a</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>30 000 t/a</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>600 000 t/a</td></tr>
<tr><td colspan="6">Sub-total by land</td><td>830 000 t/a</td></tr>
<tr><td colspan="7">TOTAL OUTGOING</td><td>≈ 4 008 000 t/a</td></tr>
</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.

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

As indicated above, the JV is operating an agriproduct terminal at the existing FSD dock.

The railcars for this operation make use of the PARY tracks which is connected to the JV Facility unloading station.

Berth #3 of the FSD is presently used to load vessels with agriproducts destined for export.

The throughput for the JV Facility for the past few years is shown on Table 2.2-2 below.

Table 2.2-2
Existing Activities at FSD Berths #3 and #4

YEAR	NUMBER OF VESSEL CALLS	THROUGHPUT (tonnes)
2011	7	122 599
2012	12	261 817
2013	31	405 182
2014	31	436 511
2015	56	805 543

With the commissioning of the proposed Fraser Grain Terminal, the existing JV Facility will be dedicated to handling agriproducts.

Grains will be redirected to the Fraser Grain Terminal which will be best suited for the purpose. As a result, the throughput at the existing JV Facility will be limited to 540 000 t.

2.2.3 Traffic

2.2.3.1 Truck Traffic

Table 2.2-3 shows the summary of anticipated daily truck traffic for both container movements and bulk truck shipments.

Table 2.2-3
Calculation of Daily Total Truck Traffic

TOTAL TRUCK TRAFFIC

TRUCKS FOR CONTAINERS

Trucks required for incoming traffic with empty containers:

FSD	13.8	trucks/day	(29% of annual total)
Others	33.6	trucks/day	(71% of annual total)
TOTALS	47.4	trucks/day	*47.4*
	9.5	trucks/h	

Portion of incoming trucks with empty containers that will leave with full containers:

FSD	13.8	trucks/day	**100% re-usage**
Others	33.6	trucks/day	
TOTALS	**47.4**	**trucks/day**	*47.4*

Trucks required for outgoing traffic with full containers:

FSD	15.8	trucks/day	(17% of annual total)
Others	79.1	trucks/day	(83% of annual total)
	94.9	**trucks/day**	*94.9*

Therefore, supplementary trucks needed to carry full containers:

FSD	2.0	trucks/day	
Others	45.5	trucks/day	
TOTALS	**47.4**	**trucks/day**	*47.4*

TRUCKS FOR BULK HANDLING

Bulk trucks	2.6	trucks/day
	0.3	trucks/h

TOTAL TRUCK TRAFFIC THROUGH SITE

INBOUND		
Carrying empty containers	47.4	trucks/day
Carrying no containers	47.4	trucks/day
Empty bulk	2.6	trucks/day
TOTAL	**97.5**	**trucks/day**
	9.7	**trucks/h**
OUTBOUND		
Carrying full containers	94.9	trucks/day
Full bulk	2.6	trucks/day
TOTAL	**97.5**	**trucks/day**
	9.7	**trucks/h**

Table 2.2-4 below shows the detailed breakdown of bulk truck loading capacity and anticipated daily truck traffic.

Table 2.2-4
Calculation of Daily Bulk Truck Traffic

BULK TRUCKS					
Overall					
Annual throughput	30,000	t/a			
Truck capacity	45.0	t/truck			
Annual handle	667	trucks/a			
Annual work period (5 days / week)	253	day/a			
Shifts per day	1.0	shift/day			
Work hours per shift	10.0	hours/shift			
Work hours per day	10.0	hours/day			
Handle rate	**2.64**	**trucks/day**			
or	**0.3**	**trucks/h**			
λ	**227.70**	**min/truck**			
Actual cycle time					
Truck drive in	60	seconds			
Lower spout	60	seconds			
Fill truck	648	seconds	Average fill rate	250	t/h
Stow spout	60	seconds			
Truck drive out	60	seconds			
TOTAL TIME	**14.8**	**minutes/truck**			
		OK			

Table 2.2-5 below shows the detailed breakdown of container loading capacity and anticipated daily container traffic.

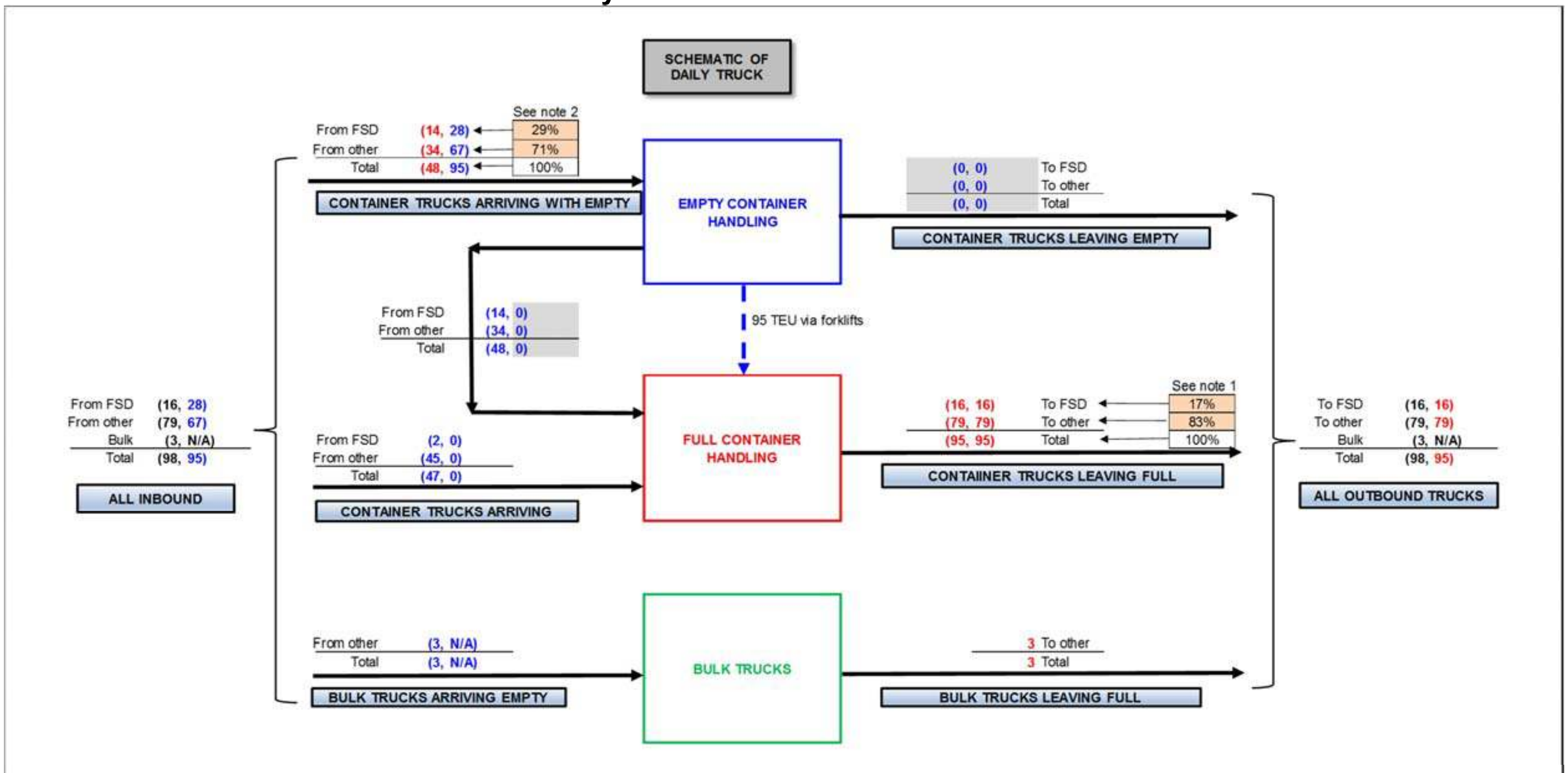
Table 2.2-5
Calculation of Daily Container and Associated Truck Traffic

CONTAINERS		
Overall		
Annual throughput	600,000	t/a
TEU capacity	25.0	t/TEU
Annual handle	24,000	TEU/a
Annual work period	253	day/a
Shifts per day	1.0	shift/day
Work hours per shift	10.0	hours/shift
Work hours per day	10.0	hours/day
Basic handling rate	**94.9**	**TEU/day**
or	**9.49**	**TEU/h**
λ	**6.33**	**min/truck**
For display purposes	**95**	**TEU/day**
Calculation of splits between FSD and outside facilities.		
Annual throughput	600,000	t/a
	24,000	TEU/a
FSD's portions		
Incoming		
turnaround units	4,000	TEU/a
supplementary units	3,000	TEU/a
Total	**7,000**	**TEU/a**
	29.2%	**of annual total**
Outgoing		
turnaround units	4,000	TEU/a
supplementary units	0	TEU/a
Total	**4,000**	**TEU/a**
	16.7%	**of annual total**
Others' portions		
Incoming		
Total units required	24,000	TEU/a
Minus FSD portion	7,000	TEU/a
Total	**17,000**	**TEU/a**
	70.8%	**of annual total**
Outgoing		
Total units required	24,000	TEU/a
Minus FSD portion	4,000	TEU/a
Total	**20,000**	**TEU/a**
	83.3%	**of annual total**
Empty Handle		
Average handle per truck	2.0	TEU/truck
Average handle per day	47.4	trucks/day
Average handle per hour	4.7	trucks/h
Full Handle		
single carry	100%	
	1.0	TEU/truck
double carry	0%	
	2.0	TEU/truck
Average handle per truck	1.00	TEU/truck
Handle rate	**94.9**	**trucks/day**
or	**9.5**	**trucks/h**
λ	**6.33**	**min/truck**

Figure 2.2-1 below is a representation of containers movement logistics and anticipated daily truck traffic.

Please see next page.

Figure 2.2-1
Daily Truck Movements and Traffic



LEGEND

1- From or to FSD (14, 28)
From or to other (34, 68)
Total (48, 96)
→ Number for TEUs
→ Number of trucks

2- **BLUE = EMPTY**
RED = FULL
BLACK = NO DISTINCTION

NOTES

General

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

Regarding container trucks

1- 100 kt/a (17%) shipped through FSD and 500 kt/a (83%) shipped through Delta Port (= 600 kt/a total)
2- Empty TEUs from FSD = (4000 + 3000)/annum = 7000/annum (29%).
3- Empty TEUs from other locations = (24 000 - 7 000)/annum = 17 000/annum (71%).
4- All incoming trucks carry 2 empty TEUs.
5- All outgoing trucks carry 1 empty TEU.
6- Based upon 253 working days per annum.

2.2.3.2 Rail Traffic for Loadout

The rail traffic consists of incoming unit trains of up to 112 cars long and outgoing railcars in strings of up to 10 cars destined to users in the Lower Mainland. Table 2.2-6 shows the rail loading capacity and anticipated daily rail traffic.

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

RAILCAR LOADING					
Overall					
Annual throughput	200,000	t/a			
Capacity	90.0	t/railcar			
Annual handle	2,222	railcars/a			
Annual work period	253	day/a			
(5 days / week)					
Shifts per day	1.0	shift/day			
Work hours per shift	10.0	hours/shift			
Work hours per day	10.0	hours/day			
Handle rate	**8.78**	**railcars/day**			
or	**0.9**	**railcars/h**			
λ	**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**			
	OK				

2.2.3.3 Marine Traffic

The volume of grain loaded onto vessels at the proposed FGT at FSD is composed of grain received and flowing through the new FGT plus agriproducts received and flowing through the existing JV Facility. The grain flowing through the FGT directed to vessels in bulk form is expected to be maximum 2.631 Mt/a. The additional volume received at the FGT of 830 000 t/a will be dispatched in containers, railcars, and trucks also in bulk form.

The agriproduct received and flowing through the existing JV Facility directed to vessels in bulk form using the new shiploader of the FGT will be maximum 540 000 t/a.

With a total volume of products dispatched by vessels will be 3.177 Mt/a, the resulting total vessel traffic loaded at the FGT is shown on Table 2.2-7 below.

Table 2.2-7
Expected Average Vessel Traffic

VESSEL TYPE	PORTION OF VESSELS	MAX USABLE FILL		ACTUAL NUMBER OF VESSELS		ACTUAL THROUGHPUTS	
		JV SHED 1	FGT	JV SHED 1	FGT	JV SHED 1	FGT
PANAMAX	25%	35,000 t	55,000 t	4.6 vessels/a	15.5 vessels/a	159,483 t/a	851,141 t/a
HANDYMAX	50%	30,000 t	45,000 t	9.1 vessels/a	31.0 vessels/a	273,400 t/a	1,392,776 t/a
HANDY	25%	25,000 t	25,000 t	4.6 vessels/a	15.5 vessels/a	113,917 t/a	386,882 t/a
		30,000 t	**42,500 t**	**18.2 vessels/a**	**61.9 vessels/a**	**546,800 t/a**	**2,630,800 t/a**
				80.1 vessels/a		**3,177,600 t/a**	
		See Note 3	See Note 2				
Average shipment lot size		30,000 t	42,500 t	**39,657 t**			
Target annual shipments		546,800 t/a	2,630,800 t/a	**3,177,600 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.

2.2.4 Hours of Operation

The hours of operation at the existing JV Facility over the years have varied from 8 hours to 24 hours per day depending on railcar receipts and vessel schedule. The expected hours of operation for the various activities to be performed at the proposed new FGT is shown on Table 2.2-1.

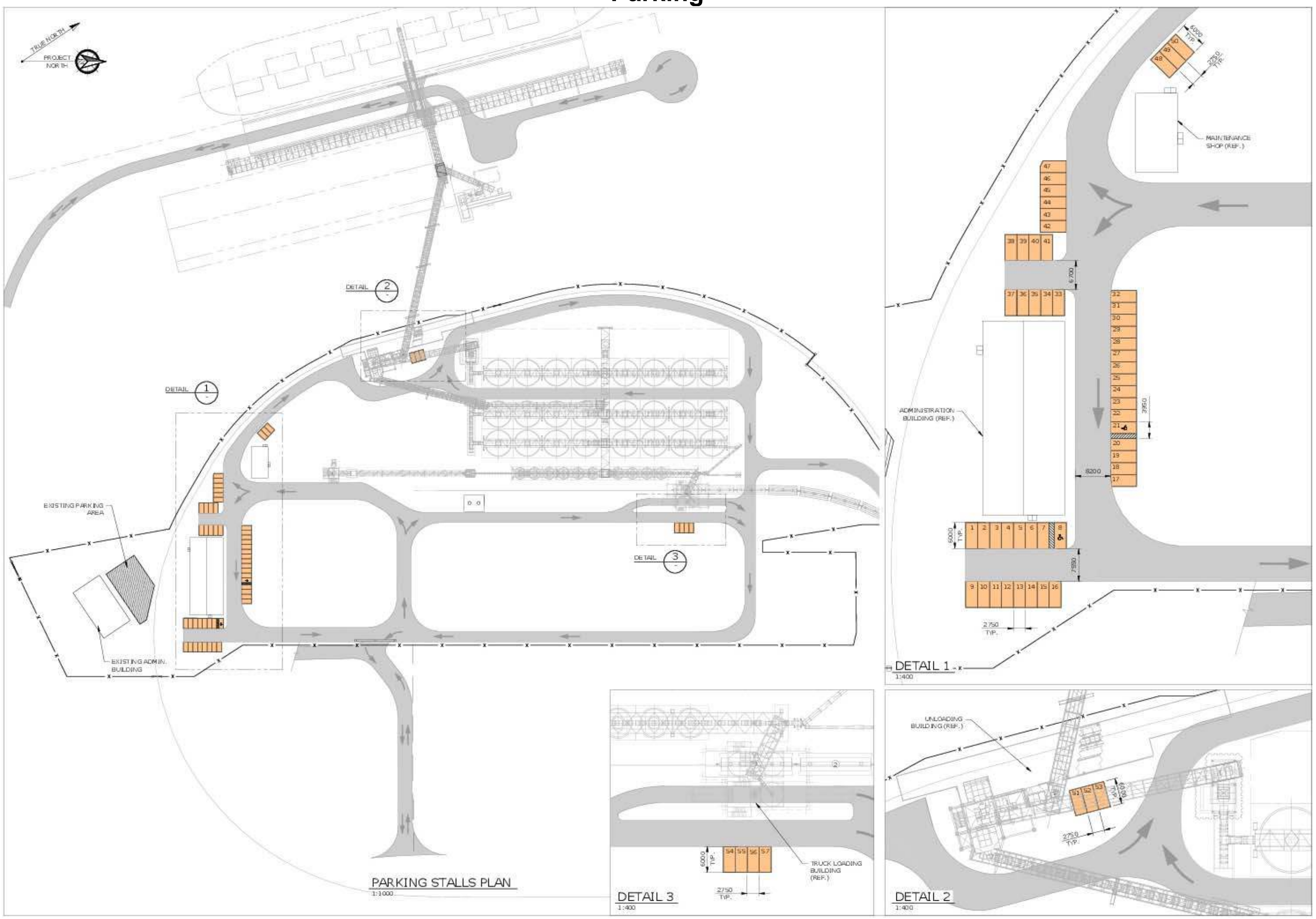
2.2.5 Parking

Parking at the FGT will be required for FGT's employees, visitors and trade representatives directly associated with the FGT.

Parking has been provided around and in the vicinity of the proposed administration building and maintenance shop. The maximum number of full-time employees (FTE) is expected to be around 51.

Fifty seven parking spots have been provided including parking for non-able persons. Refer to Figure 2.2-2.

Figure 2.2-2
Parking



2.2.6 Expected Changes to Employment

FGT expects to require the following personnel for full operation at the planned capacity:

Positions	Personnel
Office	9
Operations	32
Maintenance	8
Quality Control	2
Totals	**51**

Personnel from FSD for the rail services and shipping are already in place and working on the JV Facility.

2.2.7 Description of Operations

2.2.7.1 Grain Receiving and Unloading

The grain arrives at FGT in bulk railcars. The unloading area is located in a small one storey 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 large enough to accommodate the contents of two railcars, about 200 t.

In the initial phase, railcars are pulled by an indexer and each railcar is placed on a predetermined position on the unloading pit for unloading while stationary.

When the loop tracks are constructed the railcars in a unit train formation will be moved by a locomotive and the railcars unloaded while advancing at a speed of about 0.4 km/h.

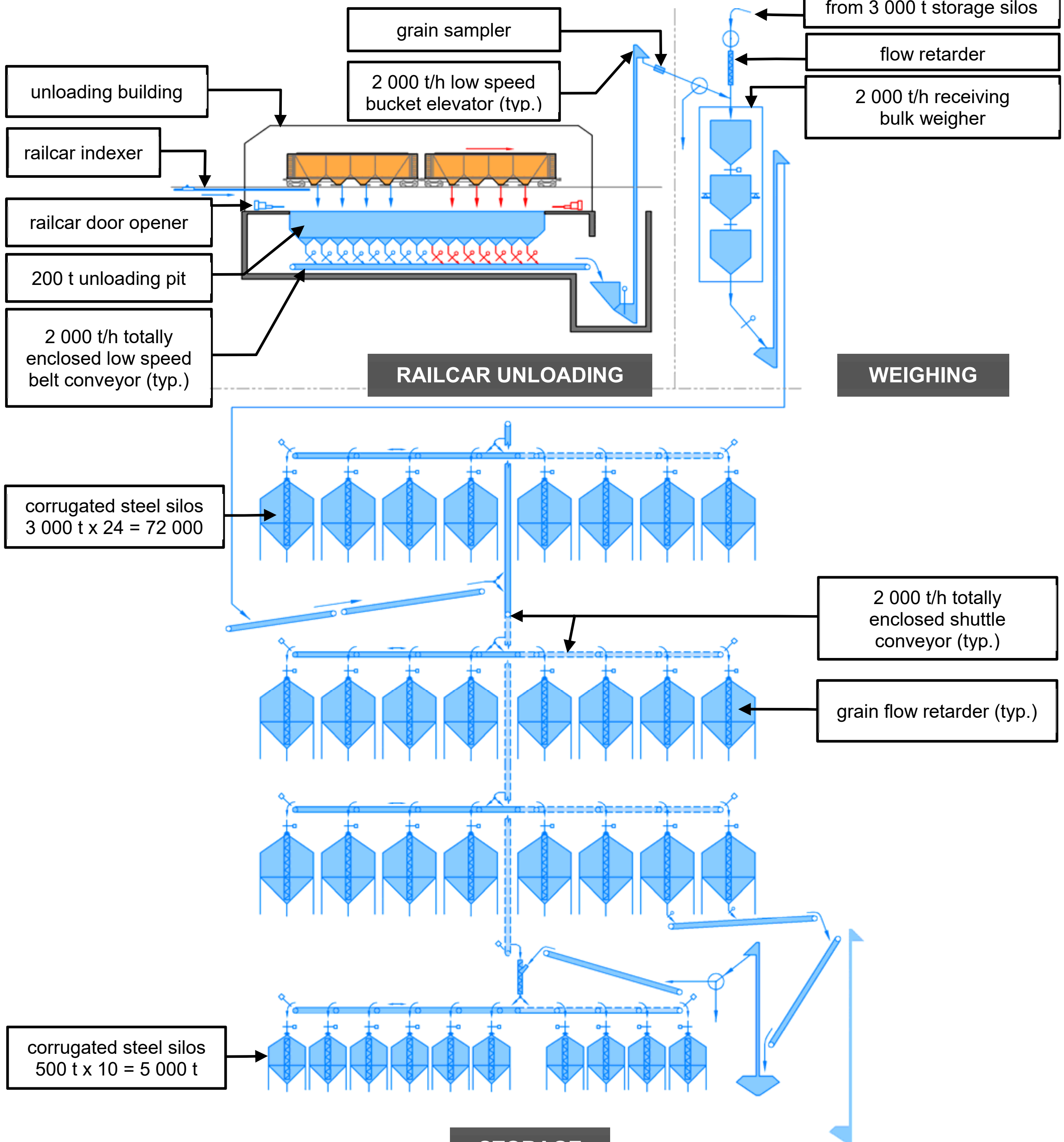
The grain is unloaded into the unloading pit through gates in the bottom of the railcars through grating and counterweighted baffles. The counterweighted baffles are installed to prevent blow back of dust from the pit onto the unloading building while dumping the grain.

2.2.7.2 Grain Flow from Unloading Pit to Storage Silos

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

Grain is discharged from the unloading pit to a low speed totally enclosed belt conveyor by means of metering gates to control flow of grain. By means of a low speed bucket elevator, the grain is elevated and fed to a series of totally enclosed belt conveyors and shuttle conveyors to load the silos. Refer to Figure 2.2-3 below.

Figure 2.2-3
Grain Flow from Unloading to Storage



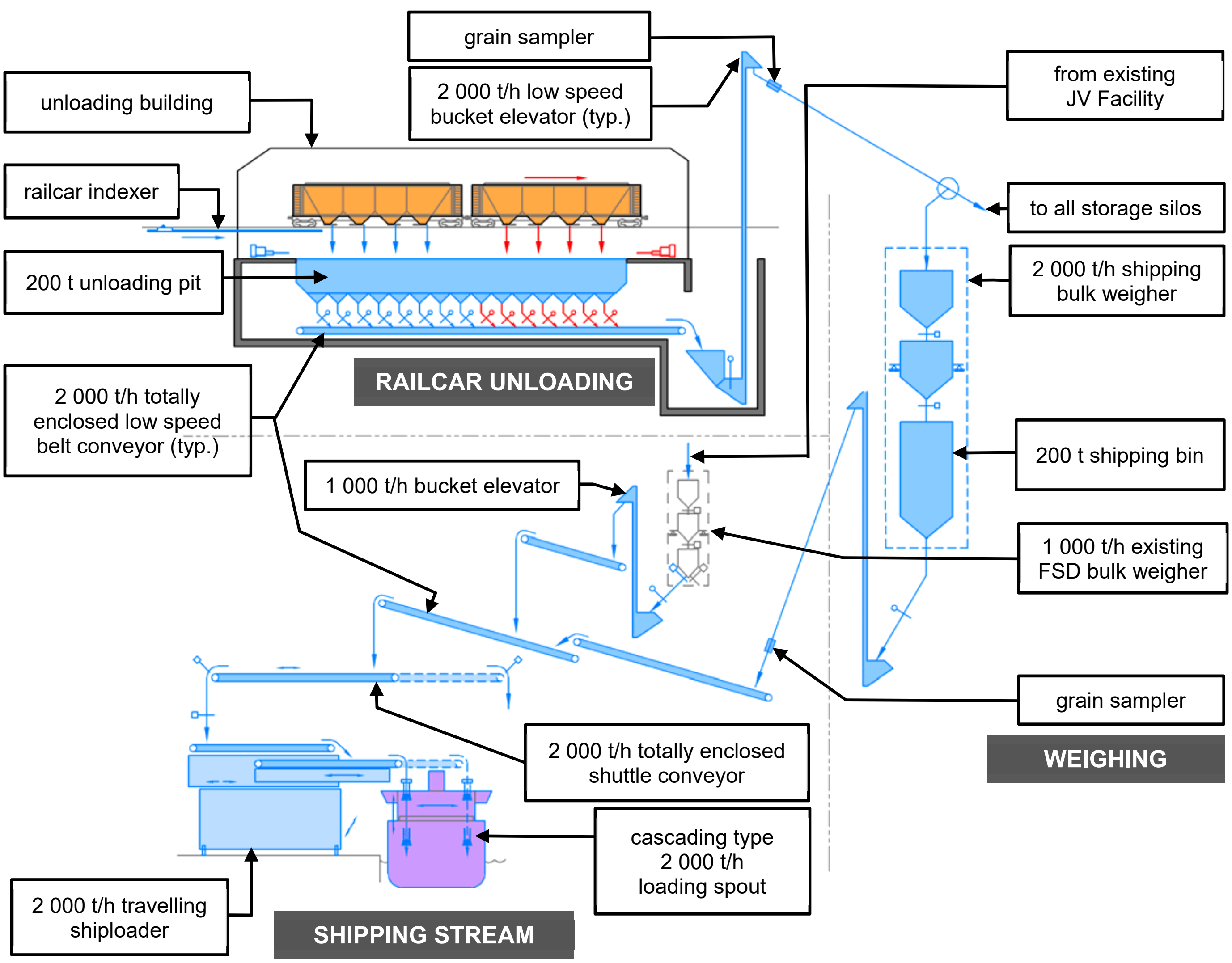
2.2.7.3 Grain Flow from Railcar Unloading to Vessel

If a vessel is waiting at the dock and ready to be loaded, the grain can be directed to the vessel from the unloading pit. In this case, the grain from the unloading pit is fed to the 2 000 t/h shipping bulk weigher via the bucket elevator.

The bulk weigher discharges into a 2 000 t surge bin and from this latter the grain discharges to a sequence of 2 000 t/h totally enclosed conveyor and shuttle conveyor along the dock to feed a 2 000 t/h travelling shiploader.

Refer to Figure 2.2-4 below.

Figure 2.2-4
Grain Flow from Receiving to Vessel



The travelling shiploader is designed to load vessels ranging from Handy class vessels in the range of 20 000 DWT to large Panamax class vessels.

The shiploader will be provided with a cascading type loading spout to reduce product breakage and almost eliminate dust emission.

2.2.7.4 Grain Flow from Storage Silo to Vessel

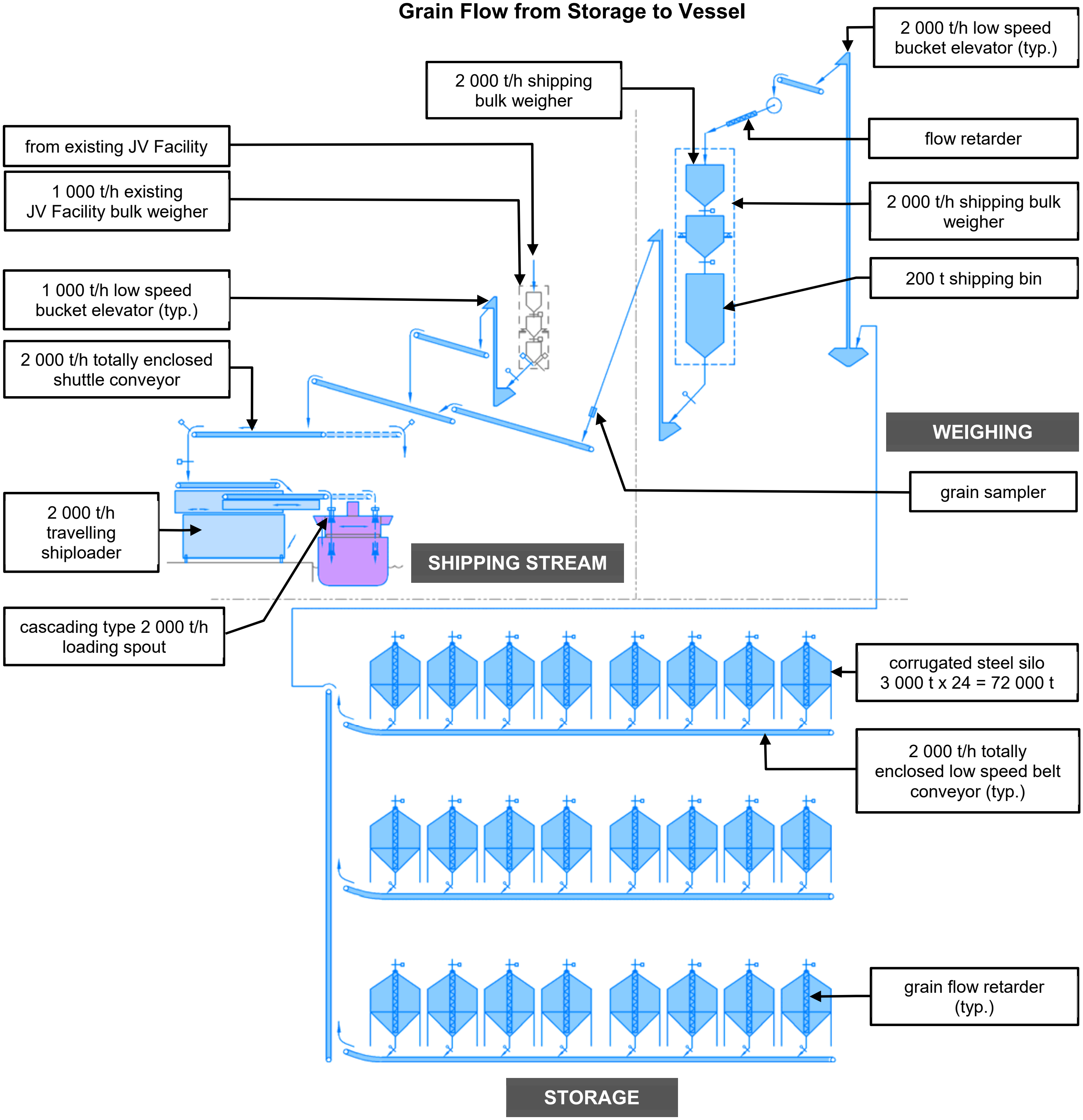
To dispatch grain stored in steel silos, grain is discharged from silos via a metering gates onto 2 000 t/h totally enclosed belt conveyors and then lifted by a low speed bucket elevator to the 2 000 t/h shipping bulk weigher.

The shipping bulk weigher loads a 200 t shipping bin located in the transfer tower.

From here, the grain is fed and metered to a 2 000 t/h bucket elevator and to a sequence of variable speed totally enclosed belt conveyors to feed the shuttle conveyor along the dock which feeds the shiploader. Refer to Figure 2.2-5.

For physical and personnel safety and security, the conveyors below the silos, together with the shipping conveyors in the shipping streams, are all installed above grade and in the open, except for a cross conveyor installed in an open trench and the boot of a bucket elevator installed in an open pit.

Figure 2.2-5
Grain Flow from Storage to Vessel



2.2.7.5 Grain Flow for Railcar Loading

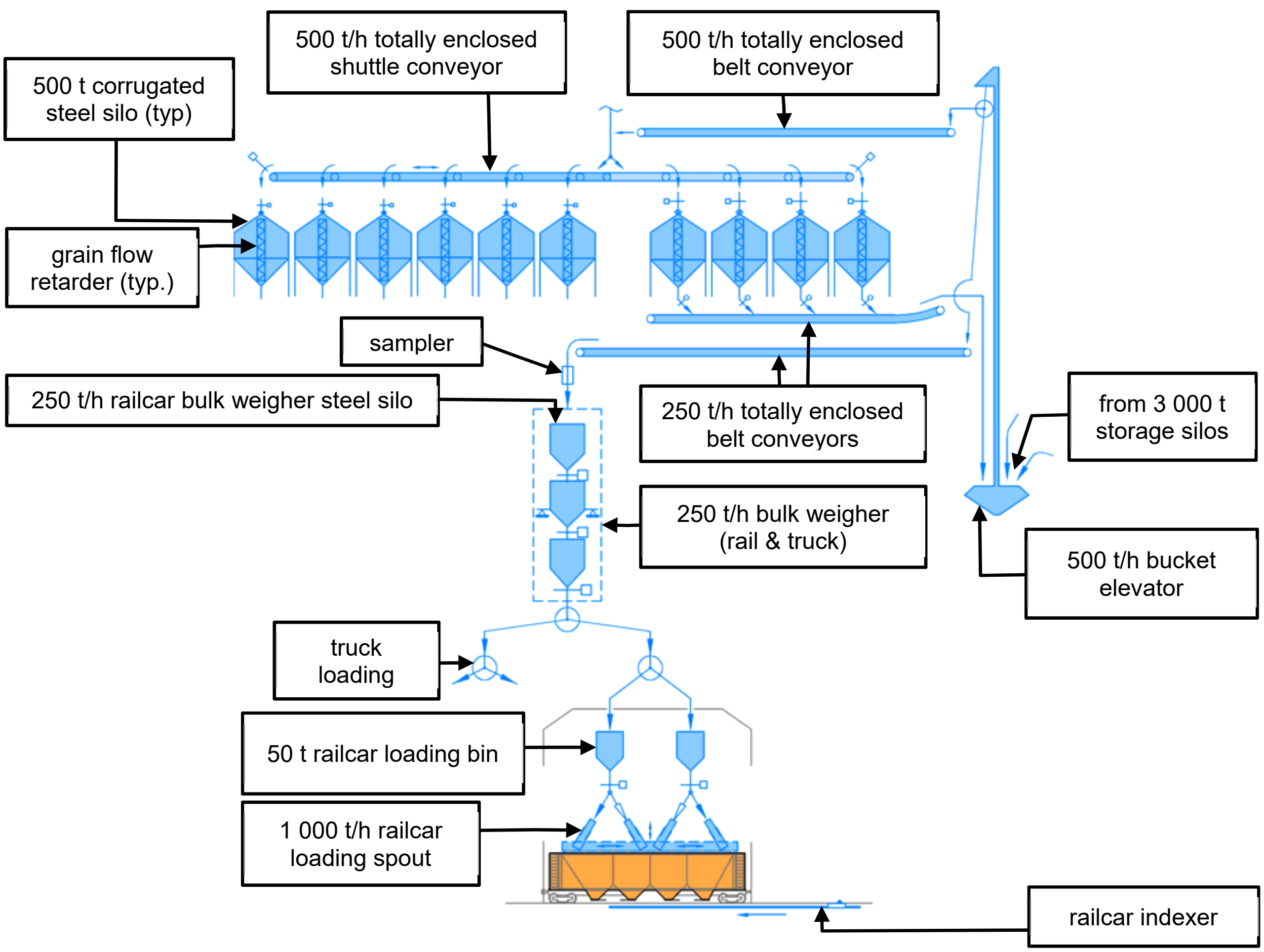
A small amount (approximately 200 000 t) of FGT's annual throughput is destined to local users such as feed millers and shipped by regular bulk railcars.

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 3 000 t silos and transferred to smaller 500 t steel silos.

When required for dispatch, grain is transferred by means of 250 t/h totally enclosed belt conveyors and bucket elevator to the 250 t/h rail/truck bulk weigher and from there to railcar loading bins. To reduce dust emission during loading of railcars, specially designed loading spouts will be used. This design has been used in several other installations in Canada, USA, and overseas, with considerable success.

Refer to Figure 2.2-6.

Figure 2.2-6
Grain Flow for Railcar Loading



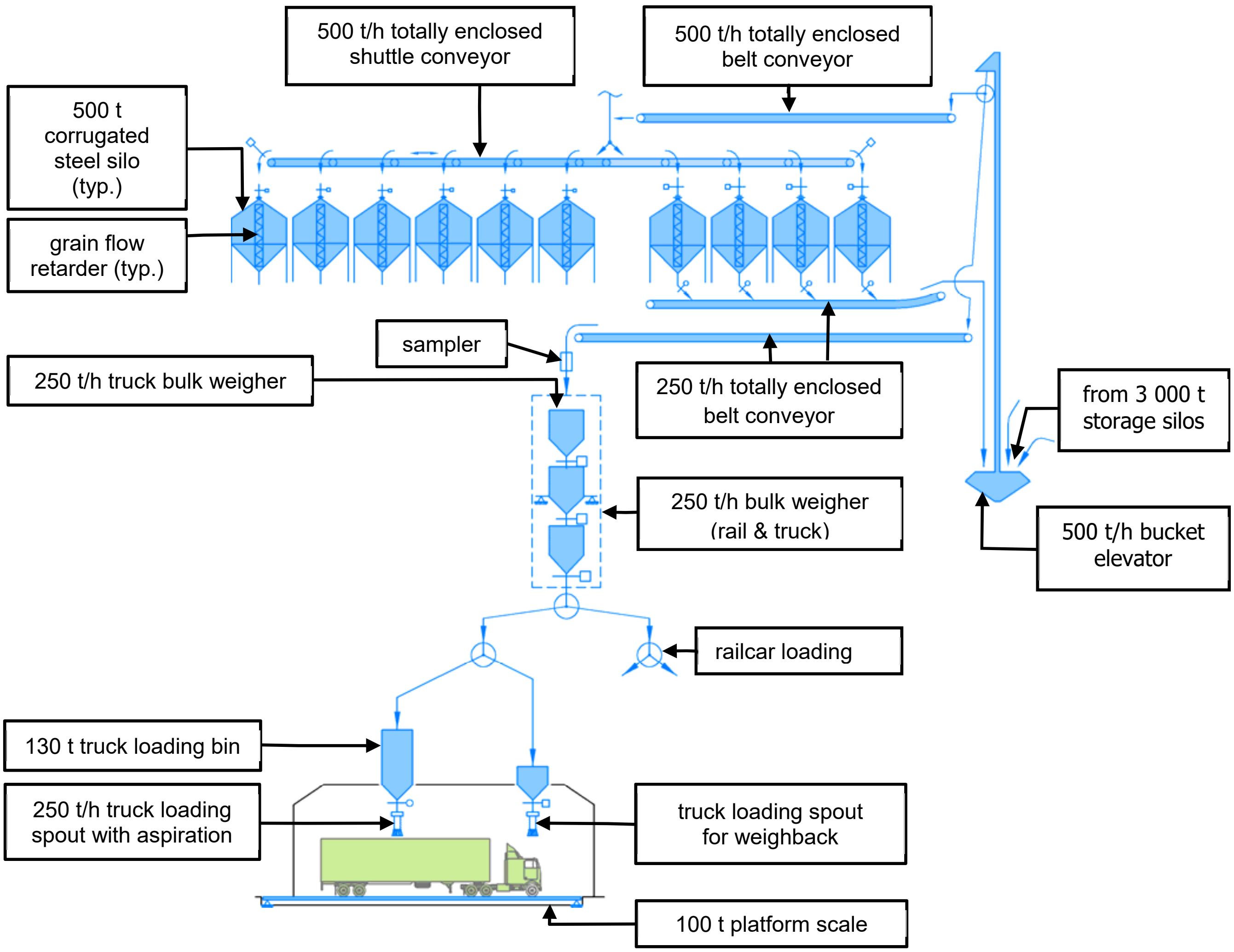
2.2.7.6 Grain Flow for Truck Loading

A further small amount (approximately 30 000 t) of FGT's annual throughput which is sold to local feed millers is shipped by 40 t bulk trucks.

The grain for this market is also received with railcars together with the other grain, but stored in 500 t steel silos.

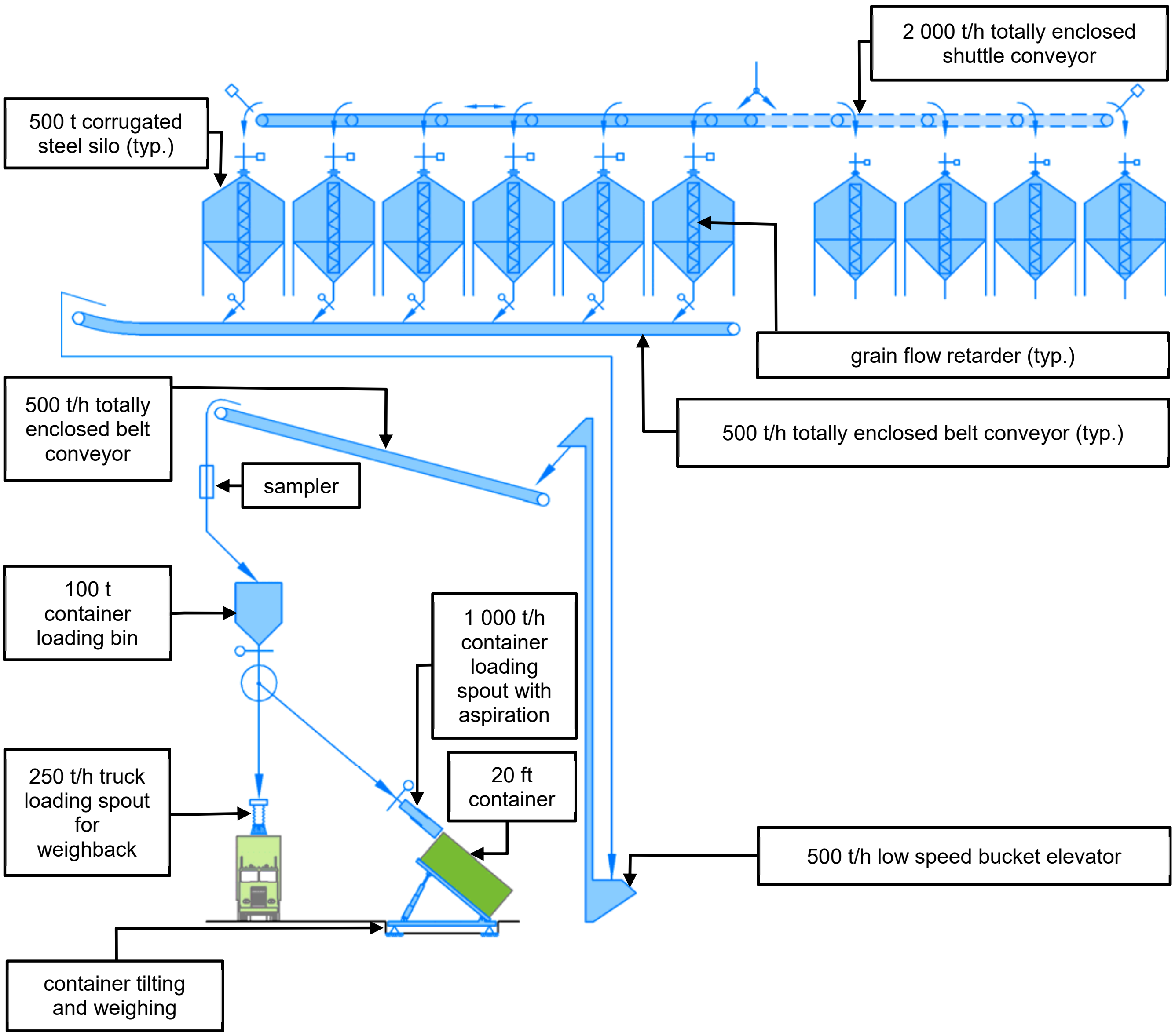
To load trucks, grain is withdrawn from the 500 t silos and transported by means of 250 t/h totally enclosed belt conveyors and bucket elevator to the 250 t/h rail/truck bulk weigher. From there the grain is deposited into a 150 t truck loading bin. The truck loading bin is provided with a special loading spout to reduce dust emission. Refer to Figure 2.2-7.

Figure 2.2-7
Grain Flow for Truck Loading



or loading containers, the grain is withdrawn from the 500 t steel silos and fed to a container loading bin. Refer to Figure 2.2-8.

Figure 2.2-8
Grain Flow for Container Loading



2.2.7.7 Grain Flow for Container Loading

Container stuffing business will be a small but significant part of FGT, about 600 000 t initially and projected to increase over time.

Containers will be filled with a variety of specialty products as indicated earlier in this report.

Containers will be received empty from various storage depots and dispatched full to the Delta Port destined to export markets. To load containers grain is received by railcars in unit trains and stored in 500 t steel silos.

For container loading, grain is withdrawn from the 500 t silos and transported by means of 500 t/h totally enclosed belt conveyor and bucket elevator to a 100 t container loading bin.

For loading, the container is lifted by a hydraulic platform to a 55º inclination. A special spout is inserted on the top section of the open door above the bulk head. The spout is designed to seal the entire door opening of the container and to aspirate the inside of the container while being filled.

2.2.7.8 General Considerations for Fire and Life Safety Design

2.2.7.8.1 <u>General Design Considerations</u>

FGT's design will utilize the best available technology in the area of material handling equipment for agricultural products and best engineering practice will be employed in areas where code requirements are either not specific or not applicable to this type of facilities.

In certain areas, new design concepts will be introduced to further enhance life safety, reliability, and product integrity.

2.2.7.8.2 <u>Building Structure</u>

The building structure will be designed to minimize enclosed area.

Except for the unloading building, which by necessity requires a below grade area for unloading railcars, all other structures have been placed above grade and are mostly open to avoid underground tunnels.

Only those structures requiring protection from inclement weather such as bulk weighers, railcar loading, railcar unloading, and truck loading bays, will be enclosed. All other structures will be of the open type.

All enclosed areas will either be provided with sufficient open area to vent to the outside such as loading and unloading structures or will be provided with explosion venting panels where practical.

However, due to physical limitations, the area below the unloading building, would have minimal explosion venting area.

2.2.7.8.3 Storage Silos

The corrugated steel storage silos will be designed so that in the event of internal explosion, the roof sheets will lift off keeping the integrity of the silo structure intact.

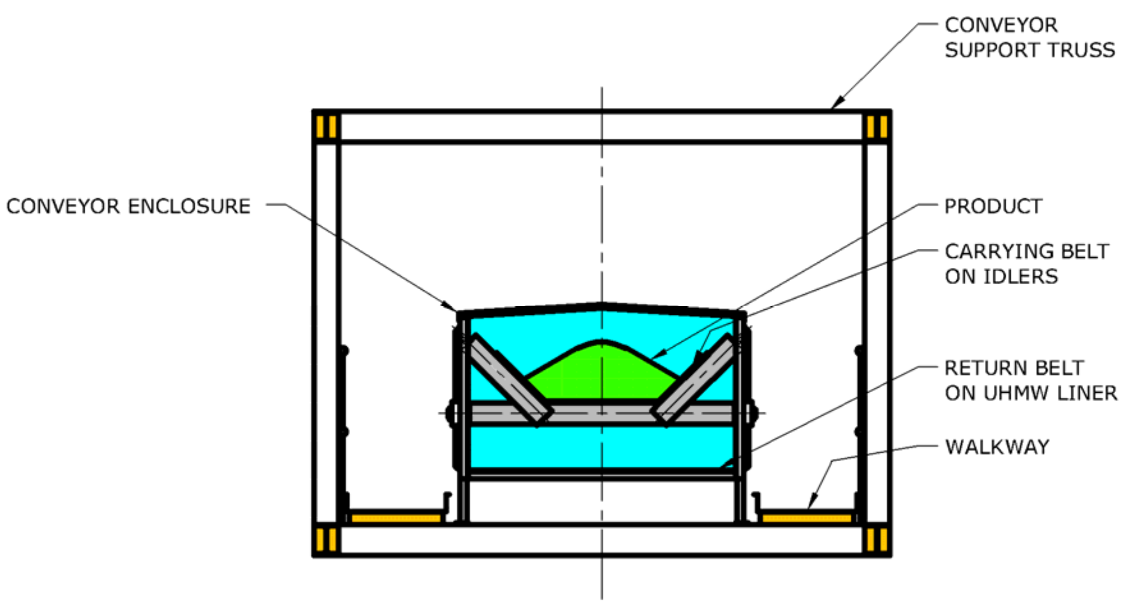
2.2.7.8.4 Material Handling Equipment

.1 Belt Conveyors

Belt conveyors would be totally enclosed of two different design concepts:

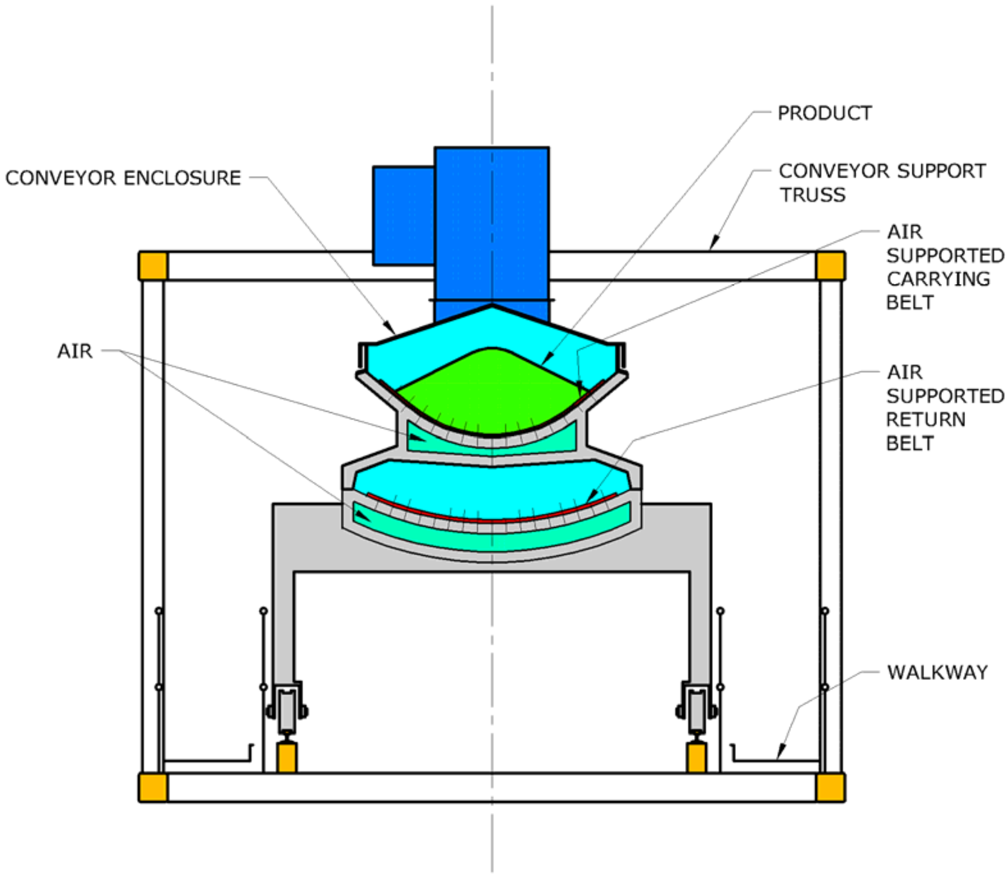
- Idler supported belt for both carrying a return belt used throughout. Refer to Figure 2.2-9.

Figure 2.2-9
Cross Section of Typical Idler Supported Enclosed Belt Conveyor



- Air support belt for carrying and slider type for return belt used for shuttle conveyors above silos, at shiploader and for shipping belts. Both types of belt will be low speed: Refer to Figure 2.2-10.

Figure 2.2-10
Cross Section of Typical Totally Air Supported Shuttle Conveyor



The belt design speed will be between 2.6 m/s and 2.8 m/s compared to industry standard of 3.5 m/s to 4.0 m/s.

The lower belt speed will:

- Reduce air turbulence at loading and unloading points
- Reduce turbulence and eliminate product to metal impact at transfer points

- Reduce dust being lifted off the moving product inside the belt enclosure caused by the well-known peeling effect of air against dusty products.

Each belt conveyor will be aspirated at the head end and if necessary at loading points to create negative pressure inside the conveyor enclosure. The aspiration will be in the form of a fan and a cartridge filter. Dust collected on the aspirated side of the filter will be reintroduced in the grain stream in the form of lumps. Refer to Figures 2.2-11 and 2.2-12.

Figure 2.2-11
Discharge Section of Typical Idler Supported Enclosed Belt Conveyor

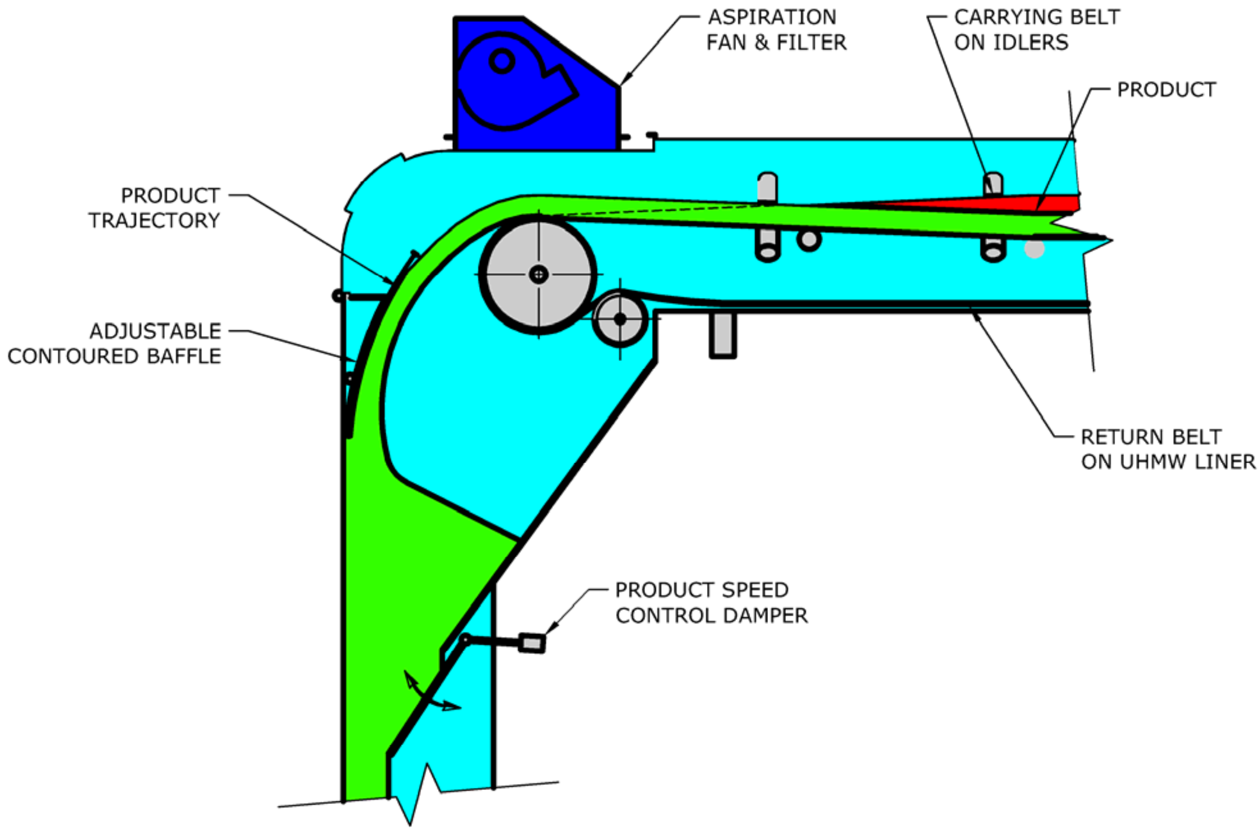
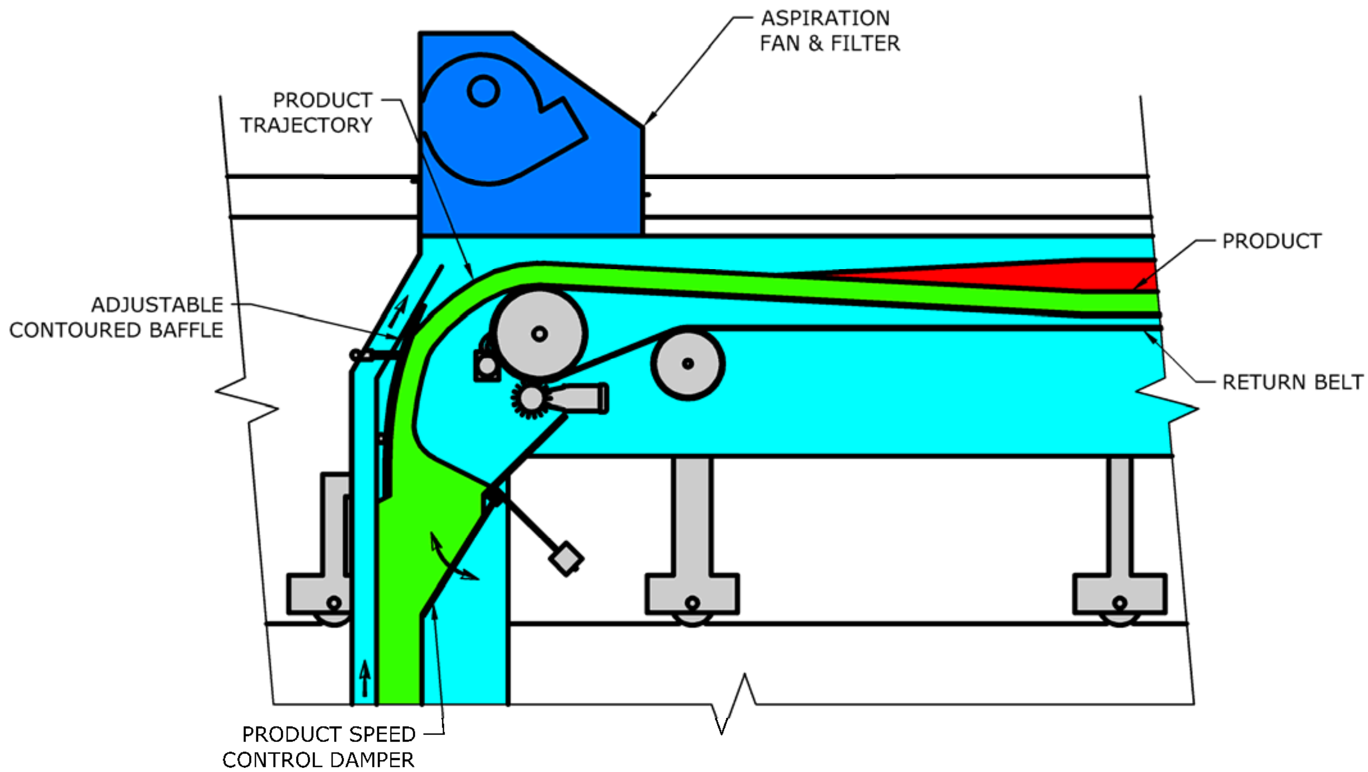


Figure 2.2-12
Discharge Section of Typical Air Supported Shuttle Conveyor



.2 Bucket Elevator

Bucket elevators will be totally enclosed and low speed centrifugal discharge type. The speed will be in the range of 2.5 m/s to 2.8 m/s compared to 3.5 m/s to 4.0 m/s. The head discharge chute will be designed to eliminate impact of product to metal. The carrying buckets will be plastic. Refer to Figures 2.2-13 and 2.2-14.

The low speed will:

- Reduce air turbulence at feed and discharge points
- Reduce impact of product on buckets and on discharge spout metal casing
- Reduce dust production.

The boot section and discharge plenum will be aspirated to create a negative pressure inside the casing to prevent dust leakage.

Figure 2.2-13
Discharge Section of Typical Bucket Elevator

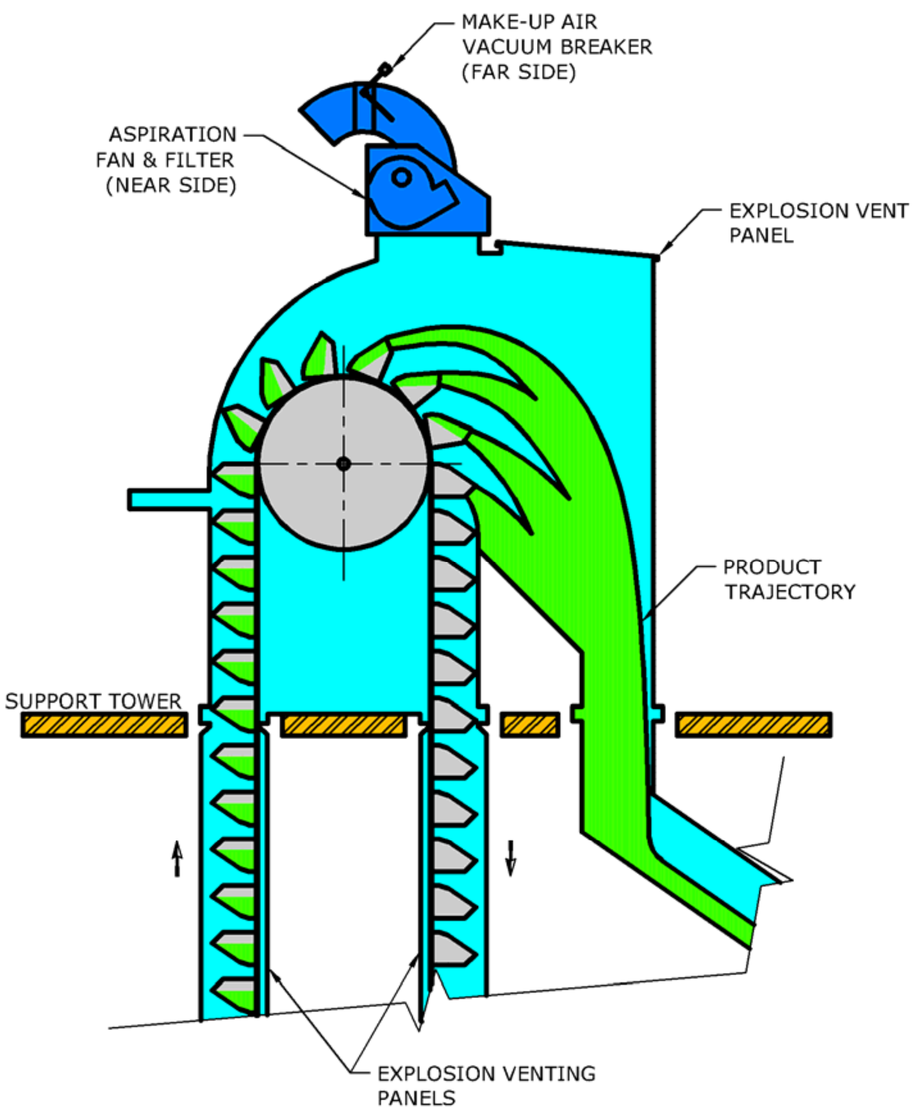
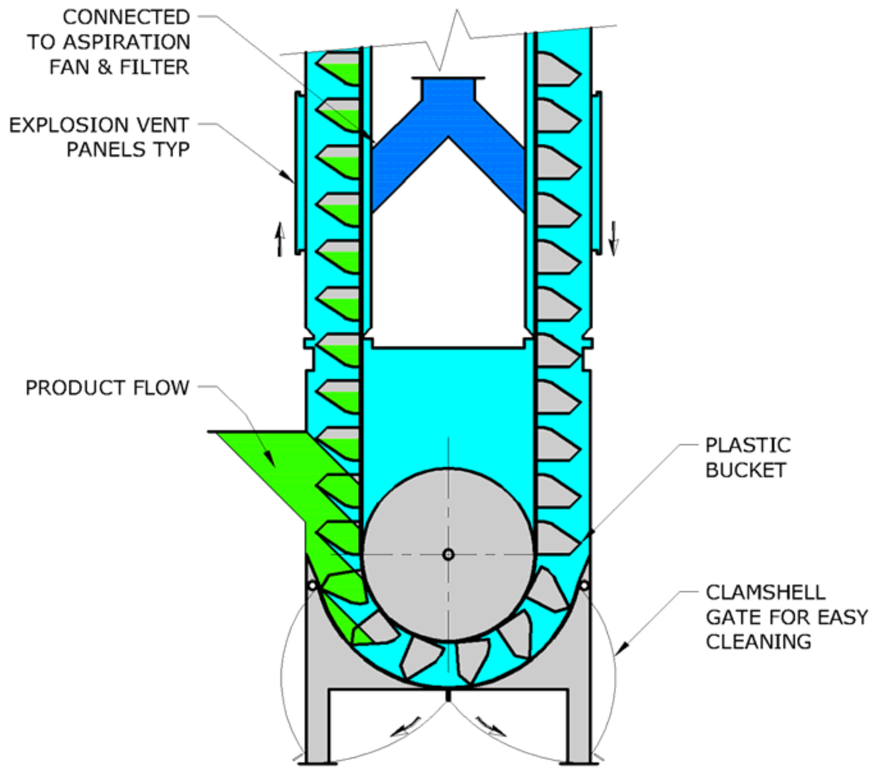


Figure 2.2-14
Boot Section of Typical Bucket Elevator Easy-cleaning



.3 Unloading Pit

The top of the unloading pit, where grain is discharged from railcar, will be provided with:

- Steel grating to prevent ingress of large foreign objects in the grain stream.
- Counterweighted baffles to prevent dust blow back when product is first dumped into pit.
- Combination air aspiration fan with cartridge filter to produce negative pressure inside the unloading hopper. The dust accumulated on aspirated side of the filter cartridge will be reintroduced in the grain stream in the form of dust lumps. Refer to Figures 2.2-15 and 2.2-16.

Figure 2.2-15
Cross Section of Unloading Pit

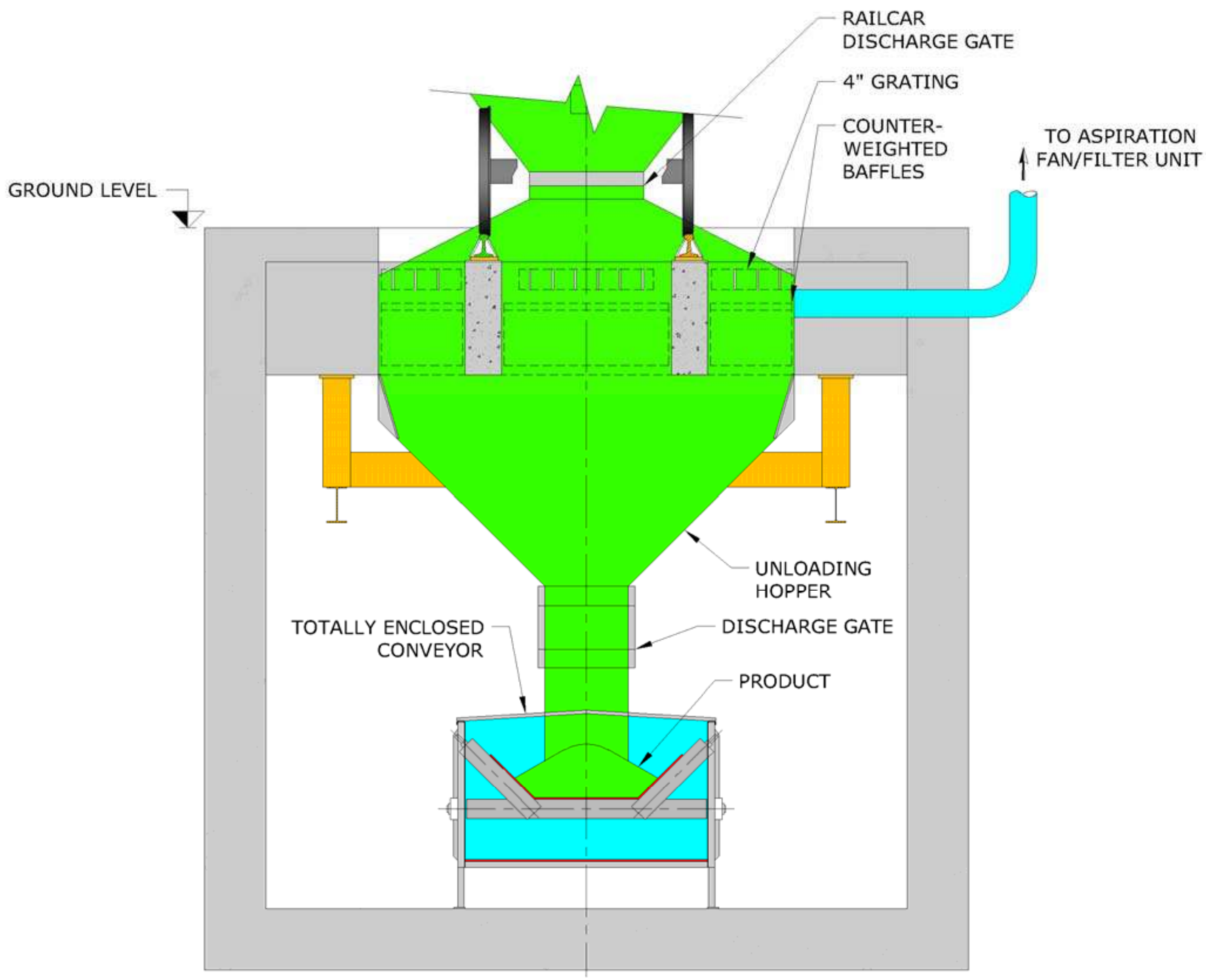
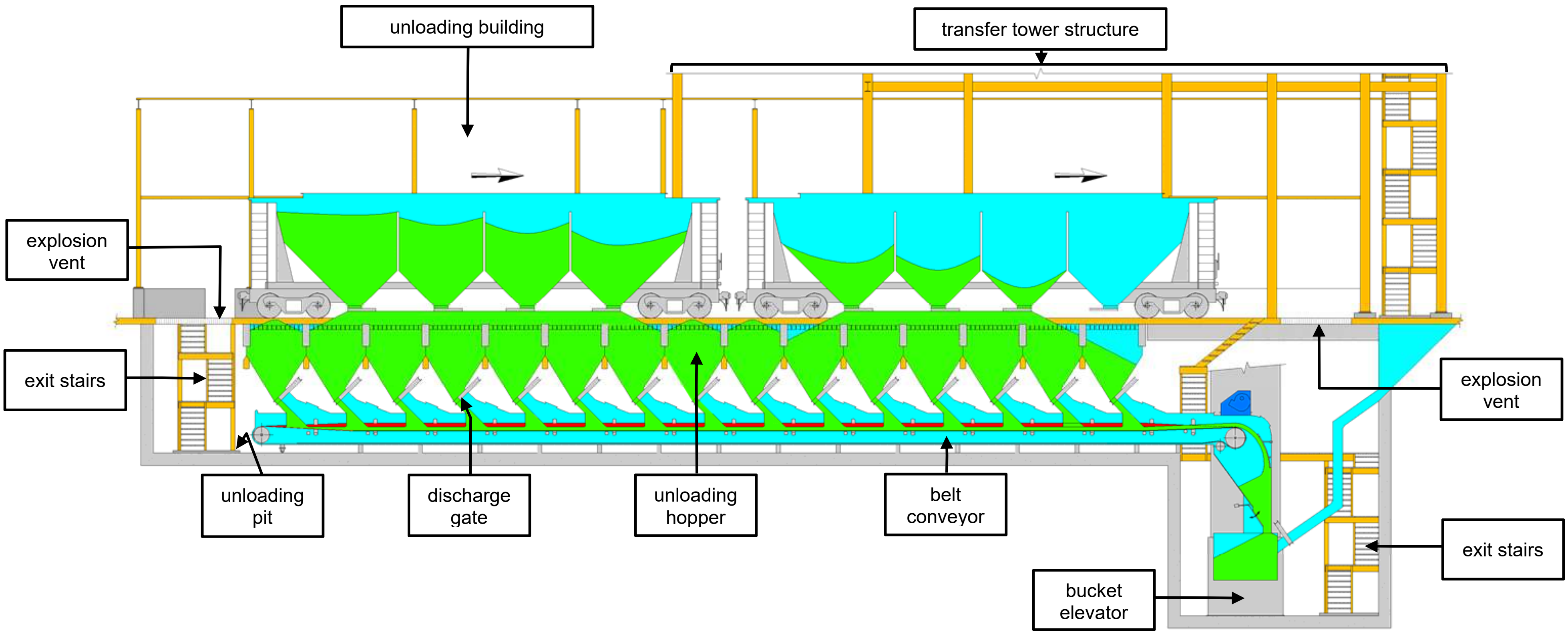


Figure 2.2-16
Unloading Pit Longitudinal Section



.4 Storage Silos

All storage silos will be provided with internal flow retarders (bean ladders) to:

- Keep the product stream compact inside the flow retarder tube to reduce air entrainment during the silo filling process
- Reduce product drop speed in certain silos to about 7 km/h, this reduces product breakage thus eliminating creation of additional dust inside the silo which is typical with standard silo filling techniques.

The silo will be aspirated during filling operation to remove air displaced by the product and to provide negative pressure to avoid dust escaping from the silo air vents.

.5 Bulk Weigher

Bulk weigher will be provided with interventing air ducts to facilitate movement of air between the upper garner, scale garner, and lower garner (or shipping bin).

The interventing duct will be open to atmosphere but aspirated at the same time to prevent any possible escape of dust due to occasional turbulence.

.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 loading spout will be designed to be lowered to the bottom of the truck and provide choke feed loading during the entire filling cycle to prevent dust from escaping and becoming airborne.
- The rail loading spout will be designed to completely enclose the loading slot of the railcar. While the product is flowing, the plenum of the railcar is aspirated by a combination fan and cartridge filter.
- The container loading spout will be retractable and will seal the entire 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.

2.3 PROPOSED CONSTRUCTION PERIOD

2.3.1 Construction Schedule

Refer to Figure 2.2-17.

Please see next page.

Figure 2.2-17
Construction Schedule (page 1 of 2)

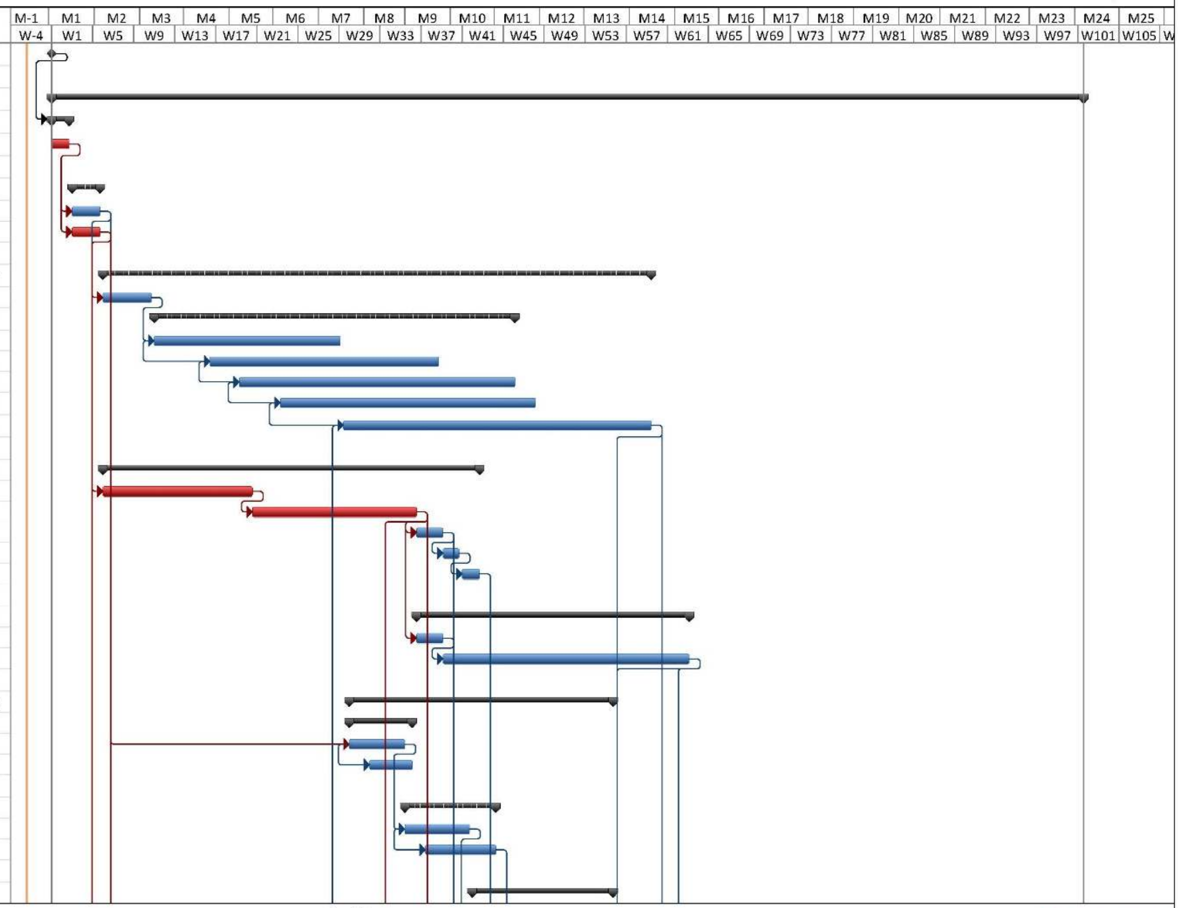
FGT
FRASER GRAIN TERMINAL

FRASER GRAIN TERMINAL

PROPOSED CONSTRUCTION SCHEDULE

Project 1419

ID	WBS	Task Name	Duration
1	1	Start of Project and dummy task	0 days
2			
3	**2**	**Construction**	**493 days**
4	**2.1**	**Site services**	**10 days**
5	2.1.1	Construction Services	10 days
6			
7	**2.2**	**Civil Services**	**15 days**
8	2.2.1	Water	15 days
9	2.2.2	Sewer System	15 days
10			
11	**2.3**	**Storage Area**	**257 days**
12	2.3.1	Preparation Works	25 days
13	**2.3.2**	**Concrete**	165 days
14	2.3.2.1	Raft Foundation	80 days
15	2.3.2.2	Silo Concrete Walls	101 days
16	2.3.2.3	Ring Beams	123 days
17	2.3.3	Cones and Silos	113 days
18	2.3.4	Galleries, Bents and Towers	150 days
19			
20	**2.4**	**Receiving Area**	174 days
21	2.4.1	Excavation	74 days
22	2.4.2	Concrete structure	69 days
23	2.4.3	Equipment	12 days
24	2.4.4	Rail Support Beams	9 days
25	2.4.5	Building	10 days
26			
27	**2.5**	**Main Transfer Tower**	132 days
28	2.5.1	Foundation	12 days
29	2.5.2	Steel Structure & Equipment	120 days
30			
31	**2.6**	**Shipping System**	**130 days**
32	**2.6.1**	**Transfer System**	31 days
33	2.6.1.1	Foundation	28 days
34	2.6.1.2	Bents, Tower and Galleries	21 days
35			
36	**2.6.2**	**Wharf Transfer Gallery**	**44 days**
37	2.6.2.1	Foundation	32 days
38	2.6.2.2	Bents, Tower and Galleries	34 days
39			
40	**2.6.3**	**Wharf**	**70 days**



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1 of 2

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Figure 2.2-17
Construction Schedule (page 2 of 2)

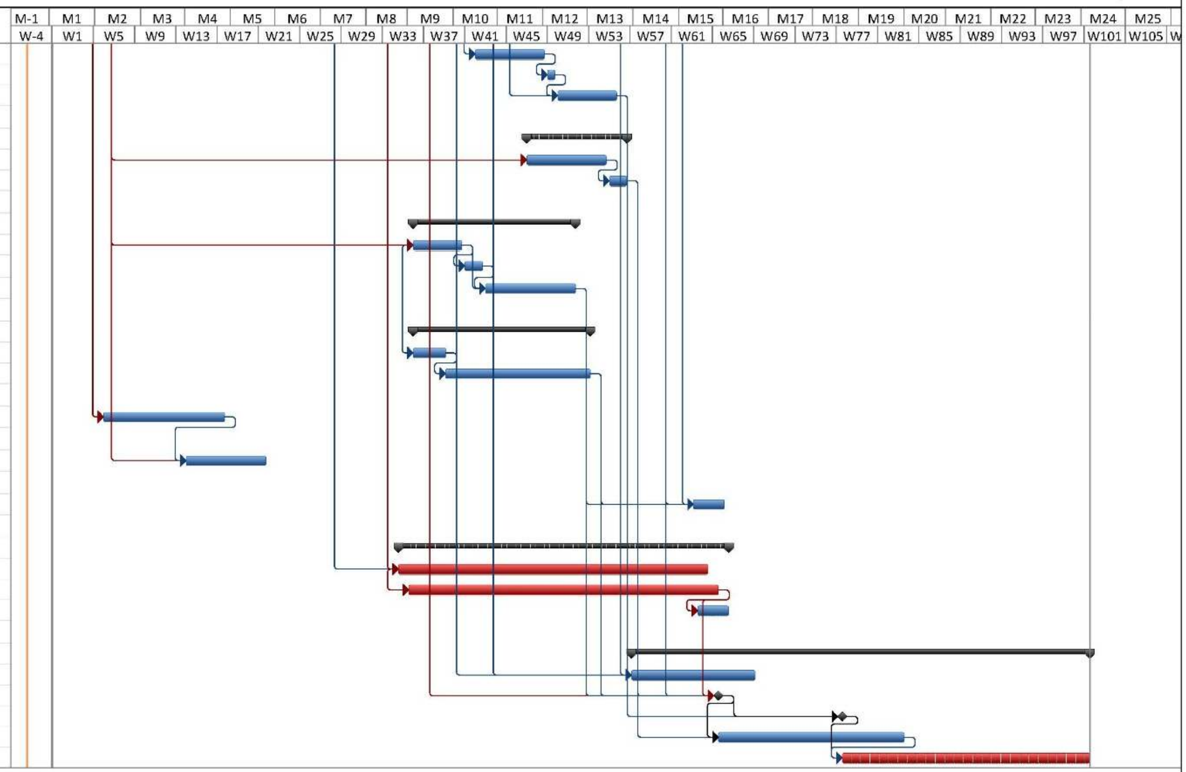
FGT
FRASER GRAIN TERMINAL

FRASER GRAIN TERMINAL

PROPOSED CONSTRUCTION SCHEDULE

Project 1419

ID	WBS	Task Name	Duration
41	2.6.3.1	Foundation	35 days
42	2.6.3.2	Rails	5 days
43	2.6.3.3	Shiploader	30 days
44			
45	**2.7**	**Rail**	**50 days**
46	2.7.1	FGT loop and PARY	40 days
47	2.7.2	Spur Line (Railcar Loading)	10 days
48			
49	**2.8**	**Container Loading**	**80 days**
50	2.8.1	Container area ground work	25 days
51	2.8.2	Foundation	10 days
52	2.8.3	Container Loading Bldg.	45 days
53			
54	**2.9**	**Railcar/Truck Loading Bldg.**	**86 days**
55	2.9.1	Foundation	16 days
56	2.9.2	Building & Equipment	70 days
57			
58	**2.10**	**Office Bldg.**	**60 days**
59			
60	**2.11**	**Maintenance Bldg.**	**40 days**
61			
62	**2.12**	**Roads**	**15 days**
63			
64	**2.13**	**Installation Services**	**160 days**
65	2.13.1	Mechanical installation	150 days
66	2.13.2	Electrical installation	150 days
67	2.13.3	Clean up activities	15 days
68			
69	**2.14**	**Start-up, Testing and Commissioning**	**223 days**
70	2.14.1	Start-up	60 days
71	2.14.2	First Railcar	0 days
72	2.14.3	First Vessel	0 days
73	2.14.4	Testing	90 days
74	2.14.5	Commissioning	120 days



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2.3.2 Description of Construction Staging Activities

The preliminary estimate of the major equipment to be utilized during construction is as follows.

Construction Services

- One rough terrain 30 T crane for 2 days
- One skid-steer loader for 2 days
- One forklift 3 T capacity
- Miscellaneous cars and trucks for personnel and deliveries

Civil Services (Water, Sewer System, Roads)

- Two 5 T trucks with integral folding boom crane for 10 days
- Two skid-steer loaders for 10 days
- Two 5 T excavators for 10 days
- Two compactors for 10 days
- Miscellaneous cars and trucks for personnel and deliveries

Storage Area Preparation

- One concrete saw for 10 days
- Miscellaneous cars and trucks for personnel and deliveries

Storage Area Concrete

- Two tower cranes for 160 days
- One rough terrain 30 T crane for 2 days
- One 5 T truck with integral folding boom crane to load/unload rebar for 50 days
- One 50 T crane for 10 days to assemble/dismantle tower cranes
- Two concrete pumps for 140 days
- Six ready-mix concrete trucks for 140 days
- Five concrete vibrators for 140 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools: hammers, impact wrenches, etc.

Storage Area Steel

- Six welders for 175 days
- Two rough terrain 30 T cranes for 90 days
- One 5 T truck with integral folding boom crane to load/unload plates for 50 days
- One 200 T crawler crane for 150 days
- One 200 T hydraulic crane for 30 days
- Two articulating boom lifts for 90 days
- Miscellaneous cars and trucks for personnel and deliveries

- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders

Receiving Area Excavation and Piling

- One sheet pile driving unit (vibrator type) for receiving area and reclaim trench for 35 days
- One pile driving unit (vibrator type) for main tower and trench pit for 10 days
- One tieback anchor drill unit for receiving area/deep pit for 15 days
- Two 5 T excavators for 70 days
- Four dump trucks to remove excavated materials for 40 days
- One rough terrain 30 T crane for 40 days
- Two welders for 20 days
- One concrete saw for 12 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders

Receiving Area Concrete

- One rough terrain 30 T crane for 40 days
- Two concrete pumps for 60 days
- Six ready-mix concrete trucks for 60 days
- Four concrete vibrators for 60 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
- One 5 T truck with integral folding boom crane for 30 days

Receiving Area Steel

- One rough terrain 30 T crane for 9 days
- Two welders for 9 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- One 5 T truck with integral folding boom crane for 5 days

Receiving Area Equipment

- Two welders for 5 days
- One rough terrain 30 T crane for 10 days
- One 5 T truck with integral folding boom crane for 5 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders

Receiving Area Building

- One rough terrain 30 T crane for 10 days
- One welder for 10 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 5 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- Two articulating boom lifts for 5 days
- One 3 T forklift for 3 days

Main Transfer Tower Concrete

- One rough terrain 30 T crane for 10 days
- Two concrete pumps for 4 days
- Six ready-mix concrete trucks for 4 days
- Four concrete vibrators for 4 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers

Main Transfer Tower Steel and Equipment

- One rough terrain 30 T crane for 120 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 70 days
- One 200 T crawler crane for 50 days
- Two welders for 120 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders

- Two articulating boom lifts for 50 days
- One 3 T forklift for 100 days

Transfer System Piling and Concrete

- One rough terrain 30 T crane for 25 days
- One 5 T truck with integral folding boom crane to load/unload rebar for 10 days
- Two concrete pumps for 20 days
- Six ready-mix concrete trucks for 20 days
- Four concrete vibrators for 20 days
- One 5 T excavator for 10 days
- Two dump trucks to remove excavated materials for 10 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
- One pile driving unit (vibrator type) for 15 days
- One concrete saw for 5 days

Transfer System Steel and Equipment

- One rough terrain 30 T crane for 20 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 10 days
- One 200 tonne crawler crane for 15 days
- Two welders for 15 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- One articulating boom lifts for 15 days
- One 3 T forklift for 10 days

Wharf Transfer Gallery; Piling and Concrete

- One rough terrain 30 T crane for 20 days
- One concrete pump for 25 days
- Three concrete ready-mix trucks for 25 days
- Two concrete vibrators for 25 days
- One 5 T excavator for 10 days
- Two dump trucks to remove excavated materials for 10 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
- One pile driving unit (vibrator type) for 15 days
- One concrete saw for 8 days

Wharf Transfer Gallery; Steel and Equipment

- One rough terrain 30 T crane for 30 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 10 days
- One 200 T crawler crane for 10 days
- Two welders for 20 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
    - Hammers
    - Impact wrenches
    - Grinders
- One articulating boom lifts for 15 days
- One 3 T forklift for 10 days

Wharf Area; Water Side Piling and Concrete Works

- One rough terrain 30 T crane for 30 days
- One concrete pump for 20 days
- Three concrete ready-mix trucks for 25 days
- Two concrete vibrators for 25 days
- Two dump trucks to remove excavated materials for 10 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
    - Hammers
- One pile driving unit (vibrator type) for 20 days
- One concrete saw for 20 days
- One jackhammer for concrete demolition for 20 days
- One air compressor for 20 days

Wharf Area; Rail and Steel Works

- One rough terrain 30 T crane for 5 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 3 days
- Two welders for 3 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
    - Hammers
    - Impact wrenches
    - Grinders
- One 3 T forklift for 10 days

Shiploader Erection

- One rough terrain 30 T crane for 30 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 10 days

- One 200 T crawler crane barge mounted for 20 days
- One service barge and tug for 2 days
- One welder for 20 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- One articulating boom lift for 20 days
- One 3 T forklift for 10 days

<u>Rail Works (FGT loop, PARY and spur Line)</u>

- One rough terrain 30 T crane for 50 days
- One 5 T truck with integral folding boom crane to load/unload steel parts for 50 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
- One rail laying machine for 30 days
- One 5 T excavator for 30 days
- Two dump trucks to remove excavated materials for 10 days
- One concrete saw for 15 days
- Two jackhammers for concrete/asphalt demolition for 20 days
- One air compressor for 20 days
- One skid-steer loader for 15 days
- One Spreader/grader for 15 days

<u>Container Storage Areas</u>

- One rough terrain 30 T crane for 25 days
- Miscellaneous cars and trucks for personnel and deliveries
- One spreader/grader for 25 days
- Three concrete ready-mix trucks for 15 days
- Two concrete vibrators for 15 days
- Two skid-steer loaders for 25 days

<u>Container Loading Structure</u>

- One rough terrain 30 T crane for 30 days
- One 5 T truck with integral folding boom crane for loading/unloading steel parts for 25 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers

- Impact wrenches
- Grinders
- Two welders for 20 days
- One concrete pump for 4 days
- Three concrete ready-mix trucks for 4 days
- Two concrete vibrators for 4 days
- One 5 T excavator for 5 days
- One articulating boom lift for 25 days
- One 3 T forklift for 10 days
- Two dump trucks to remove excavated materials for 5 days
- One concrete saw for 3 days

Railcar and Truck Loading Facility

- One rough terrain 30 T crane for 70 days
- One 5 T truck with integral folding boom crane for loading/unloading steel parts for 45 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- Two welders for 40 days
- One concrete pump for 6 days
- Three concrete ready-mix trucks for 6 days
- Two concrete vibrators for 6 days
- One 5 T excavator for 5 days
- One articulating boom lift for 65 days
- One 3 T forklift for 30 days
- Two dump trucks to remove excavated materials for 5 days
- One concrete saw for 3 days

Office Building

- One rough terrain 30 T crane for 25 days
- One 5 T truck with integral folding boom crane for loading/unloading 15 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- One welder for 10 days
- One concrete pump for 2 days
- Three concrete ready-mix trucks for 2 days
- Two concrete vibrators for 2 days

- One 5 T excavator for 1 day
- One dump truck to remove excavated materials for 1 day
- One articulating boom lift for 45 days
- One 3 T forklift for 50 days
- One concrete saw for 2 days

Maintenance Building

- One rough terrain 30 T crane for 10 days
- One 5 T truck with integral folding boom crane for loading/unloading 5 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools:
  - Hammers
  - Impact wrenches
  - Grinders
- One welder for 5 days
- One concrete pump for 1 day
- Three concrete ready-mix trucks for 1 day
- Two concrete vibrators for 1 day
- One 5 T excavator for 1 day
- One dump truck to remove excavated materials for 1 day
- One articulating boom lift for 25 days
- One 3 T forklift for 20 days
- One concrete saw for 1 day

Mechanical Equipment Installation

- All equipment installation already covered by other events

Electrical Equipment Installation

- All equipment installation already covered by other events

Clean Up

- One 5 T truck with integral folding boom crane for 10 days
- Miscellaneous cars and trucks for personnel and deliveries
- Miscellaneous hand tools
- Two skid-steer loaders for 15 days, one equipped with brush
- One dump truck to remove left over for 5 days

Notes:

1. Hours of work for all events: 07:00 – 17:00 Monday to Friday.
2. The cranage quantities are not necessarily additive; judicious planning of the lift activities will allow for a more continuous operation of a minimum number of units.

3. DRAWING REQUIREMENTS

3.1 SITE LOCATION

A surveyed site plan showing the relationship of the proposed Project to surrounding area at a 1:5000 scale is included in appendix – Building Structures Drawings as Drawing No. 1419-G-05-110.

3.2 SITE PLAN

The description of the land together with a description of the existing Bekaert Canada Limited lease with VFPA, the proposed land swap between FSD and P&H, the proposed new lease for the subject property between VFPA and P&H as well as right of ways between P&H and FSD and between P&H and VFPA is described in Section 2.1.4. The drawings showing the proposed site with existing and new proposed property lines are included in appendix, Drawing Nos. 1419-G-05-111 and 1419-G-05-200

3.3 BUILDINGS, STRUCTURES, AND EQUIPMENT

A description of the Project components installed on the Project site land leased from VFPA, and Project components installed on FSD land also leased from VFPA on which FGT would have a right of use is included in Section 2.1.3. The drawings showing these Project components are included in appendix. These drawings show dimensions, plans, and elevations of proposed new buildings. Only the existing electrical room will be retained for use. All other existing buildings will be demolished under a separate demolition contract.

The principal fixed building structures to be constructed in this Project consist of the following:

.1	Administration Building	Drawing No. 1419-G-05-280
.2	Maintenance Shop	Drawing No. 1419-G-05-281
.3	Storage Silos	Drawing No. 1419-G-05-250
.4	Unloading Building	Drawing No. 1419-G-05-230
.5	Railcar and Truck Loading Building	Drawing No. 1419-G-05-270
.6	Container Loading Building	Drawing No. 1419-G-05-260
.7	Process Tower	Drawing No. 1419-G-05-232
.8	Various valve rooms and electrical rooms distributed throughout the site	Drawing Nos. 1419-G-05-414, 1419-G-05-720, and 1419-G-05-721

All other structures consist of open type towers and bents to support conveyors and conveyor trusses.

Additional drawings of buildings, structures, and equipment containing floor plans, equipment layouts, roof plans, and excavation depths are included in appendix; General Arrangement Drawings.

3.4 MARINE STRUCTURE AND SHIPLOADER

The marine structure consists of steel bents and a steel tower supporting a shuttle conveyor to feed a travelling shiploader.

The bents and tower will be supported by steel piles so as not to impose additional loading on the existing dock.

The shiploader will travel on rails which placed on steel beams supported by piles.

The drawings showing the structure and the travelling shiploader are included in appendix as follows:

<u>Marine Structure</u>
Drawing Nos. 1419-G-05-610
1419-G-05-112
1419-G-05-220
1419-G-05-221

<u>Travelling Shiploader</u>
Drawing Nos. 1419-G-05-601
1419-G-05-602
1419-G-05-603
1419-G-05-604
1419-G-05-605

Additional drawings for the marine structure and shiploader are included in appendix.

3.5 LOT GRADING, DRAINAGE, STORM WATER MANAGEMENT, AND UTILITIES

The final grading for the site is shown on Drawing No. 1419-G-05-404. The site drainage and storm water management is shown on Drawing No. 1419-G-05-405 and 406.

The general arrangement of the services is shown on Drawing No. 1419-G-05-411

3.6 LIGHTING

The lighting for the site is shown on Drawing Nos. 1419-G-05-700 to 1419-G-05-710. Additional lighting details and information are included in appendix.

3.7 PARKING AND ACCESS

Parking and access to site is shown on General Arrangement of the Overall Site Layout Drawing No. 1419-G-05-200 and 1419-G-05-282.

3.8 RAIL SERVICE

The rail service to the site is described in Section 2.1.5 and shown on Drawings No. 1419-G-05-110 and 500.

Additional information concerning rail service is included in appendix in the Rail Operations Plan.

3.9 CONSTRUCTION LAYDOWN AREAS

Services during construction, including material laydown area is shown on Drawing No. 1419-G05-408.