Fibreco Export Terminal Enhancement
Permit Application Project Overview (R3)

FIBRECO

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PROJECT OVERVIEW

1.1 Background

B.C. owned and operated, Fibreco Export Inc. (Fibreco) has successfully served the western Canadian forest industry by moving wood chips and wood pellets to customers throughout the world for 40 years. Located in the North Shore Trade Area, Fibreco is one of the largest wood pellet handling facility in the world and a vital component of the Asia-Pacific Gateway.

The Terminal Enhancement Project will allow diversification to include handling food ingredients and animal feed products for international agri-trade. Commodities to be handled include, but not limited to Wheat, Peas, Lentils, Barely, Canola and Canola Meal Pellets to name a few. Fibreco will increase its throughput by capturing existing underserved demand for agricultural export.

The proposed Project requires permit approvals from the Vancouver Fraser Port Authority and the District of North Vancouver.

1.2 Key Components

<u>Within VFPA Jurisdiction (see key map below)</u>

- Demolition:
    - Removal of 'woodchip only' handling equipment (1 reclaims, 1 conveyor)
    - Wood retaining walls and pilings
    - Removal of old shiploader and associated equipment
        - 1-2 months of time anticipated

- Treated wood timbers in both the DNV and VFPA jurisdiction have been identified and options for disposal include finding an opportunity to re-purpose the material or send to an appropriate facility for incineration.

- Untreated wood will ideally be re-purposed or chipped for fuel.

- Steel structures in the DNV and VFPA will be dismantled and ideally salvaged for re-use or disposed of by an accredited scrap recycling vendor.

- Concrete structures (reclaims) on DNV and VFPA will be disposed of in an appropriate landfill.

- The shiploader (in VFPA jurisdiction) demolition will involve removing all components by water based crane to a barge. The material will be transported off-site and sorted by nature of the material and disposed of in the appropriate manner. All steel components will be evaluated for salvage value or disposed of by an accredited scrap recycling vendor.

- Refit of existing conveyor to dock (Conveyor 3) (2000 tph capacity)
    - 1 month of time anticipated

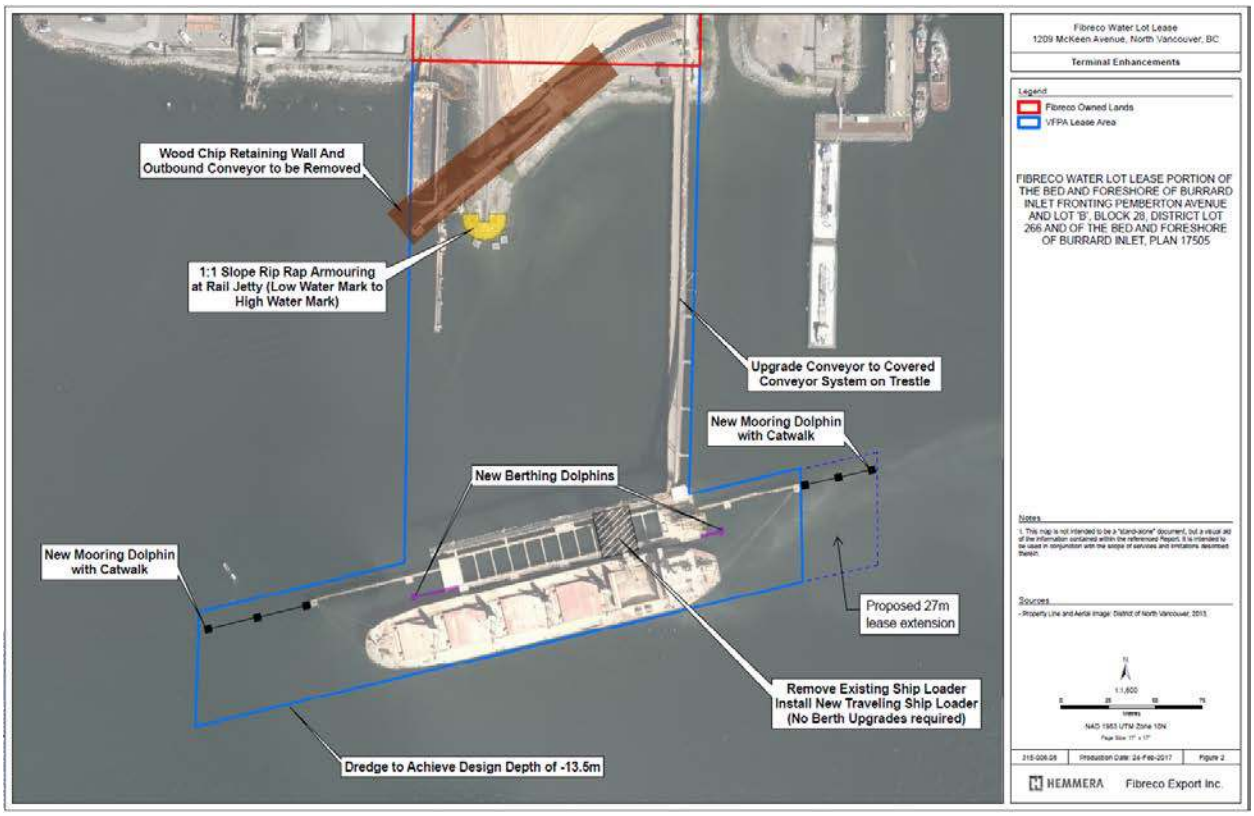
- Re-fit and cover existing dock feed conveyor (Conveyor 2) (2000 tph capacity)
    - 1 month of time anticipated

- Restore rip-rap on rail jetty to original slope (1:1)
    - 1 week of time anticipated

- Install 2 breasting dolphins and 2 berthing dolphins to accommodate Panamax vessels.
    - 2-4 weeks of time anticipated

- Shiploader:
    - Install new travelling shiploader to more efficiently load products, to accommodate Panamax vessels, and to minimize dust emissions.
    - Upgrade electrical system
        - 2 months of time anticipated

- Dredging in front of berth to design depth of 13.5m (4,050 m3 of material)
    - 1-2 weeks of time anticipated



Key Map – Planned works in VFPA Jurisdiction

Within District of North Vancouver Jurisdiction

- Demolition:
  - Removal of 'wood chip' handling equipment (3 reclaims, 2 conveyors)
  - Relocation of Longshore lunchroom, operators cab and Electrical room
  - Removal of wood retaining walls and pilings

- Rail Yard - Switch adjustments and track extensions allowing the receiving and unloading of a 112 car unit train. This will also facilitate better movement to and through the rail car dumper. Addition of extra track to allow for more on-site rail car storage.

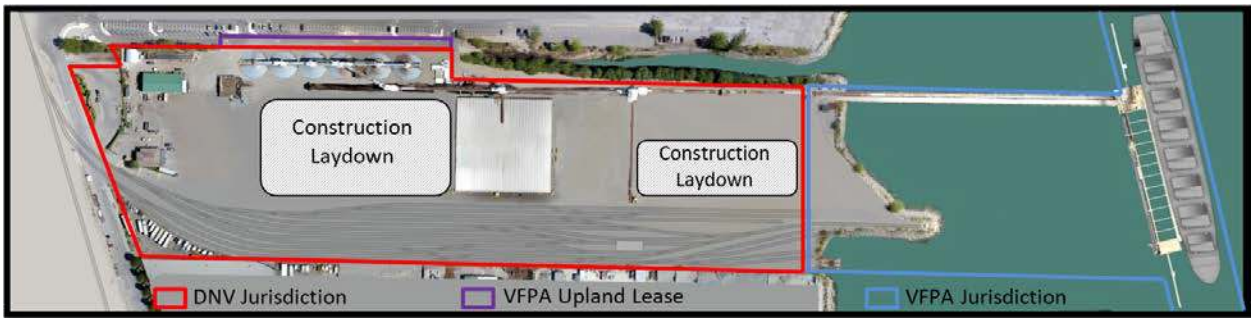
- Rail Car Dumper - Retrofit dumper with new gravity hopper. Install new enclosure with modern dust control and collection.

- Conveying Systems - Install covered conveying systems with modern dust control, with inbound to storage rates at 1,500 TPH and outbound rates at 2,000 TPH (includes outbound weighing).

- Storage - Construct 48 new 3400t silos and 8 - 1000t silos (all gravity drain), with a capacity of 171,200 tonnes of storage.

- Site Infrastructure - Upgrade electrical, water and storm systems.

Construction laydown and assembly areas will take place on the private lands (DNV jurisdiction) (See figure below)

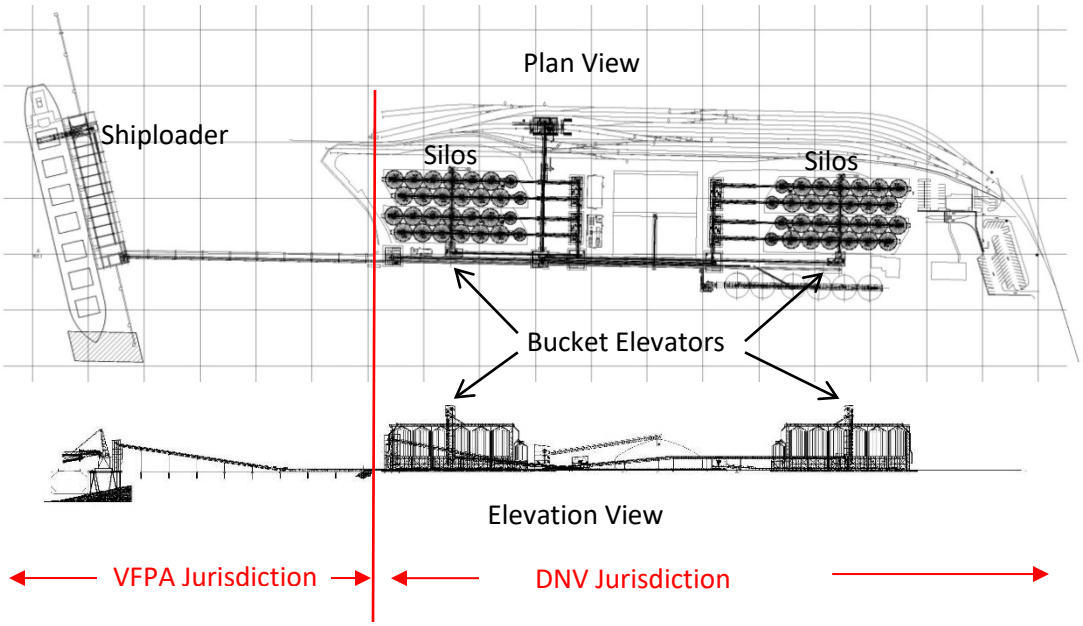


The Terminal Enhancement Project is estimated to cost in excess of $100 million. The project can be substantially delivered by Q4 2018.

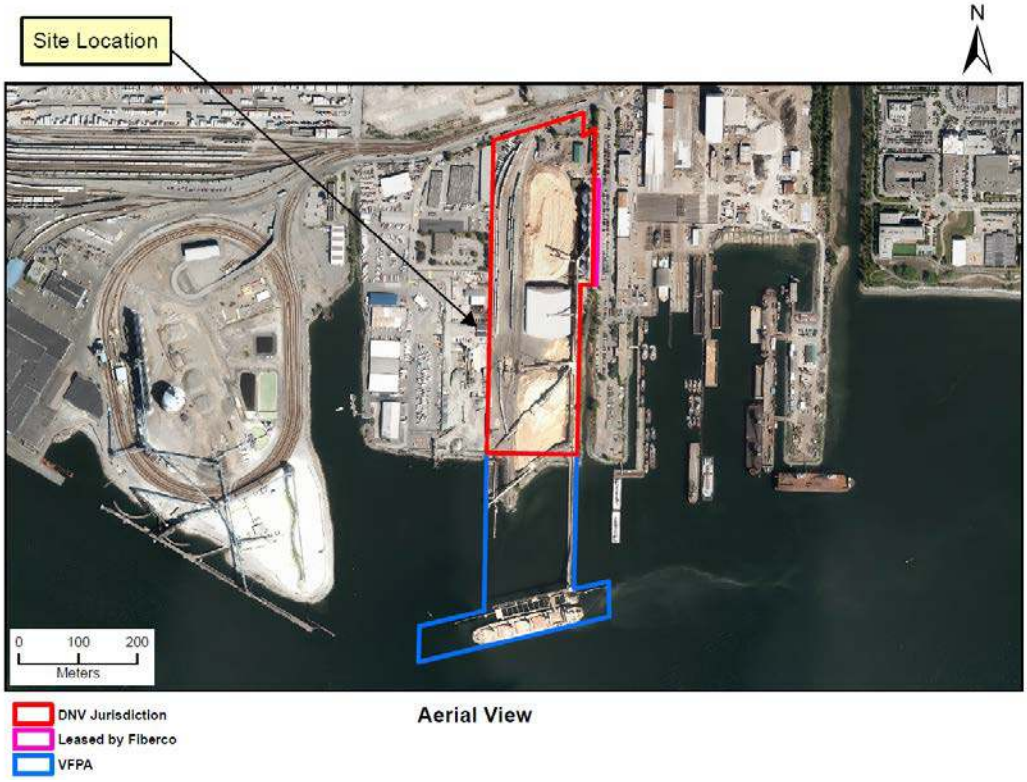
1.3 Key Anticipated Project Benefits

- Less dust and less noise from rail unloading and from other plant operations.
- Improved safety for workers and the community with modern handling equipment.
- Sustainability for a local business and job security for B.C. workers, through diversification and reduced reliance on wood products.
- Local economic benefits, with a $15 million direct injection to the local economy, and anticipated annual indirect contributions of $45 million annually.
- National agri-trade benefits, with improved customer service through better turnaround times and by providing relief to Canadian agricultural producers and railroads with an additional outlet to export agricultural and food ingredient products to emerging Asia-Pacific markets.
- More attractive site, with physical improvements, newer equipment and removal of open chip piles.
- Environmental benefits, including improved air quality and more efficient power usage.

1.4 General Arrangement

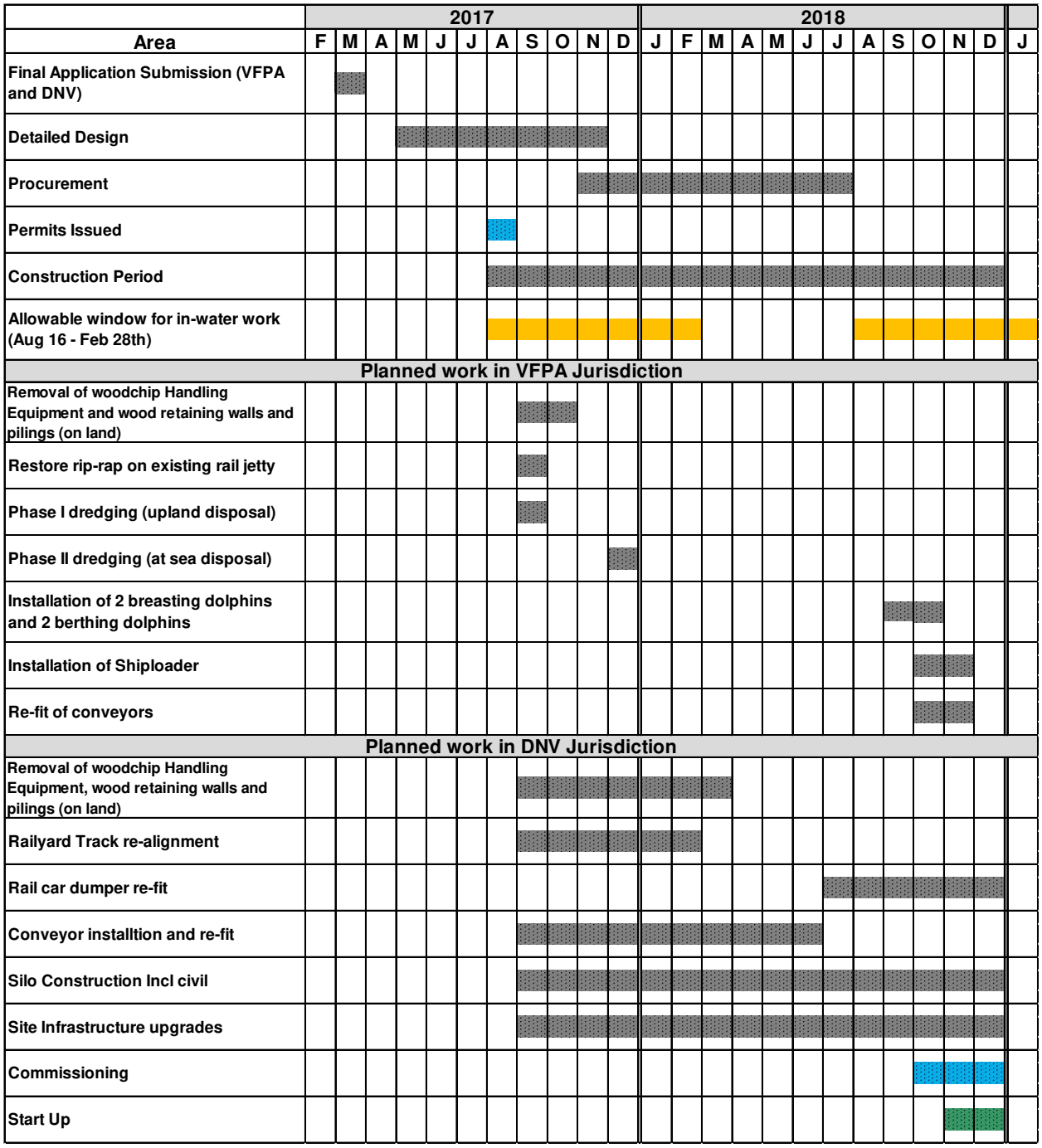


1.5 Perspective Views



Aerial View

1.6 Project Timeline



2.0 OPERATIONS

Currently Fibreco handles wood pellets and wood chips. The following tables summarize existing and future operations including the increase in yearly capacity of the terminal.

2.1 Existing Capacity

Fibreco typically received railcars by manifest. The size of trains varied, depending on supplier delivery needs and vessel requirements. Shifts worked were primarily 7 days per week, day and afternoon (8am - 1 am). A portion of the wood chips received at Fibreco came via barges until Q2 2016.

Historical Rail Traffic

Year	Rail Volume Handled (Chips) (mt)	Rail Volume Handled (Pellets) (mt)	Total Rail Volume (mt)	Chip Switches	Pellet Switches	Total Switches
2012	256,435	1,580,382	1,836,817	205	508	713
2013	264,145	1,539,395	1,803,540	129	405	534
2014	188,544	896,330	1,084,874	93	235	328
2015	202,728	843,966	1,046,694	102	222	324
2016	221,024	1,044,525	1,265,549	83	268	351

Historical vessel traffic consisted of Handymax size vessel. The table below illustrates the number of ships that called Fibreco in the last 5 years. With a decline in the woodchip demand and wood pellets moving to Prince Rupert, the activity at Fibreco has diminished.

Historical Vessel Traffic

Year	Chip tonnage	Pellet tonnage	Total tonnage	Chip Vessels	Pellet Vessels	Total Vessels
2012	375,000	1,562,812	1,937,812	17	51	68
2013	364,000	1,554,991	1,918,991	15	57	72
2014	310,500	887,455	1,197,955	16	45	61
2015	288,500	772,460	1,060,960	12	40	52
2016	252,000	963,000	1,215,000	14	42	56

2.2 Future Capacity

With the re-work in the rail yard and the addition of a car indexer and modern hopper door opener, Fibreco will be able to land, unload and release a 112 car unit train in 24 hours. The increase in productivity will lead to fewer trains needed for greater tonnes handled.

Predicted Rail Traffic

Year	Predicted Volume (Pellets) (mt)	Predicted Volume (Grain) (mt)	Total volume (predicted)	Grain Switches	Pellet Switches	Total Switches
Stub Year	1,000,000	500,000	1,500,000	50	234	284
Year 1	1,000,000	1,000,000	2,000,000	99	234	333
Year 2	1,000,000	1,200,000	2,200,000	119	234	353
Year 3	1,000,000	1,500,000	2,500,000	149	234	383
Year 4	1,000,000	2,000,000	3,000,000	198	234	432

With the introduction of agri products, the prediction is that the volumes will return to the 2012 levels (see table below). The addition of Panamax sized vessels and larger parcels due to customer needs, the overall efficiency at Fibreco will improve requiring fewer vessels per tonne handled. The average volume per vessel increases from approximately 22,000 mt to 46,000 mt.

Predicted Vessel Traffic

Year	Grain tonnage	Pellet tonnage	Total tonnage	Grain Vessels	Pellet Vessels	Total Vessels
Stub Year	500,000	1,000,000	1,500,000	13	40	53
Year 1	1,000,000	1,000,000	2,000,000	25	33	58
Year 2	1,200,000	1,000,000	2,200,000	27	33	60
Year 3	1,500,000	1,000,000	2,500,000	30	33	63
Year 4	2,000,000	1,000,000	3,000,000	36	33	65

2.3 Hours of Operation

Fibreco is available to work 24 hours per day 360 days per year. Shifts are determined by the demand. The average operating hours for the shiploader under this Project is 1000 hrs per year for wood pellets and 2000 hrs per year for grain. The current operating hours for the shiploader on the existing terminal is 1750 hrs per year for pellets and 950 hrs per year for wood chips.

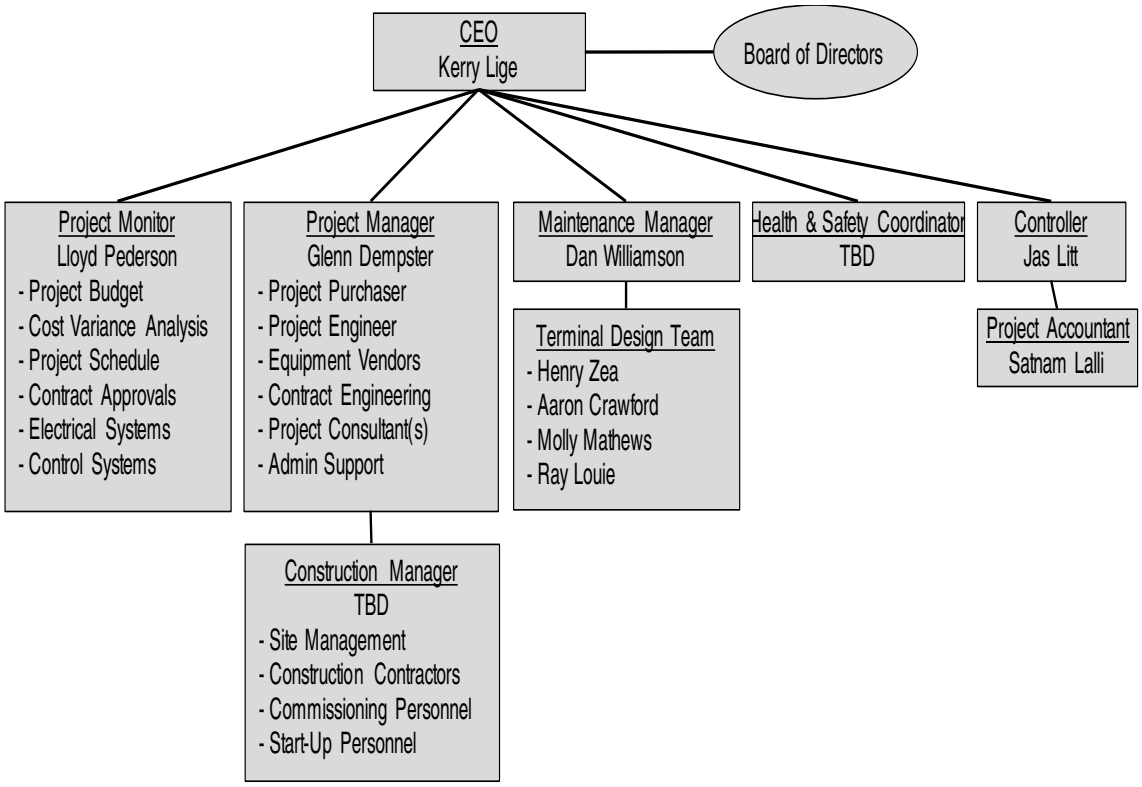
3.0 PROJECT ORGANIZATION

The Project Management Team will be primarily comprised of a selection of key individuals from Fibreco, project management / delivery specialists, and professional engineering personnel for design and field engineering. Other key consultants and contractors, such as a communications consultant, will be aligned with the Project Management Team on an as required basis.

The Project Management Team will work closely with Fibreco terminal operations and maintenance team to ensure smooth integration of this project into the existing facilities including coordination of shutdowns for major tie-in work. The Project Management Team will also significantly engage Fibreco's operating and maintenance staff for design input and reviews, and to participate in HAZOP and related workshops at important design milestones.

A Health & Safety and Environmental Manager will be retained to independently oversee, administrate, and audit these critical facets of responsibility. The Health & Safety and Environmental Manager will monitor the safety activities of the project and will work in coordination with an environmental consultant to monitor environmental aspects of the project including compliance with the permits and applicable regulations.

The Project Organization chart is provided below for reference.



4.0 PROJECT ELEMENTS

4.1 Community Engagement (VFPA and DNV Review)

Fibreco's vision is to be an innovative and safe, world-class facility, with value-added services for all customers and stakeholders. In support of this vision, the proposed communications and engagement goals are to:

- Obtain broad-based community, business and regulator support for the Project.
- Meet all federal, provincial, regional and municipal permitting requirements for public notification and engagement.

Proposed objectives are to:

- Foster open and meaningful dialogue with the community and other stakeholders.
- Provide relevant and timely information about Project-related activities so that interested parties can be informed about how to participate and provide feedback.
- Respond in a timely and meaningful way to questions about the Project and related changes to Fibreco's operations and the local landscape.
- Position Fibreco as a valued business within the local community and the Asia-Pacific Gateway supply chain, committed to sustainable growth in trade.

Stakeholders: As regulators, Vancouver Fraser Port Authority and the District of North Vancouver will define the extent of consultation required. Based on initial discussions with the Regulators, the proposed consultation and engagement plan includes the following:

- Notification (letters to nearby residents/businesses/key stakeholders, newspaper advertisement)
- Small group meetings with specific interested groups
- Online outreach including an opportunity for online feedback
- Public consultation materials (feedback form, display boards, project backgrounder)
- Public open house
- Consultation summary report
- Input consideration report showing how feedback has been considered

Anticipating the requirements, and considering Fibreco's history in the area, vision and values, and the interests of key stakeholders every effort will be made to include our stakeholders and neighbours in notification of project activities.

- Port Community Liaison Committees
- Construction Communications Plan

Letters with key information, public open house and website with key activities will be regular components of the communication plan before, during and after construction to ensure local and global concerns are being addressed.

The proposed Project may have an impact on the adjacent community during the construction period, and therefore the applicant is required to notify area residents and the municipality prior to construction and/or demolition.

- Brief description of the proposed Project, background, construction considerations and challenges, engagement objectives, key audiences and stakeholders, key messages, contact information and notification activities prior to construction and/or demolition.
- Submission of a final plan will be required at a later date determined by VFPA.

See: Appendix A - Community Engagement

4.2 Site Layout (VFPA and DNV Review)

For information purposes the following plans are included;

- Site Location Map
- Subdivision Plan 17505 – Site Boundary Definition
- Reference Plan 14131- Delineating Easement F88213
- VFPA Lease Boundary Dimensions
- Bathymetric Survey (water soundings)

See: Appendix B - Site Layout

4.3 Rail Operations Plan (VFPA and DNV Review)

The Fibreco Terminal Enhancement Project aims to transform an already successful dry bulk handling facility into a world class multi commodity terminal.

The current rail car dumper is a rotary style (for wood chips) with a retractable spout for receiving wood pellets. Wood chip cars are open top box car style with an approximate weight of 50t of product per car. Cars are delivered by CN rail in spots between 20 – 90 cars. Cars are marshalled in the Fibreco railyard and distributed on 10 tracks. Pellet cars are typically 60 foot bottom hopper cars (3 or 4 hopper) with cargo weight of approximately 95t per car. Trains are marshalled, weighed and dumped, then located in the yard for CN to remove.

The rail strategy will consist of thorough and frequent communication with Fibreco, customers and the railroad to determine supply chain and logistics schedule. Unit trains will be dispatched from destination and spot on arrival at Fibreco. Woodpellets will continue to be spotted in a manifest manner. Additional track storage is being recommended to manage

production shortfall and or railcar oversupply. A contingency for bad order cars is part of the design plan to avoid excess handling of partially loaded railcars. The terminal design also includes the ability to direct hit and recirculate cargo where necessary.

See: Appendix C - Rail Operations Plan

4.4 Transportation Plan (DNV Review)

The Fibreco Terminal Enhancement Project will result in a more efficient modern facility. While an overall increase in product volume per year will occur, it will translate into only marginally increases in vehicle traffic. Strategies will be developed as the project unfolds to create opportunities to limit construction traffic. Project goals include;

- Determine short term and long term site access needs and potential traffic mitigation
- Identify wider reaching effects of road and rail traffic with mitigation opportunities
- Ensure sufficient parking is provided to meet site generated demands and conform to municipal regulations

Primary truck delivery routes are identified and there is no expectation of any transportation of dangerous goods. Attempts will be made to ensure deliveries are made in standard highway trucks and trailers or flat-decks. Opportunities may exist where larger deliveries can arrive by water direct to Fibreco.

Based on predicted staffing levels, peak parking requirements are determined at eighty five (85) stalls required, the parking plan is designed at 90 stalls with considerations for disabled parking stalls, electric vehicle as well as covered bicycle and electric bicycle space available.

Access to the Fibreco site was designed to ensure that WB19 Trucks, Emergency Fire Truck and municipal Garbage Trucks can enter and exit without comprising public safety.

See: Appendix D - Transportation Plan

4.5 Marine Operations Plan (VFPA Review)

Berthing: A COWI led study was performed with assistance from the Navtec consulting and the Pacific Pilots Association (PPA) to ensure that Fibreco could receive and load Panamax vessels. The simulator at the PPA was used with assistance from local pilots. Real world tides and current data was collected an input into the simulator for best case results. Berthing scenarios as well as emergency situations were run, with the conclusion that Fibreco can currently accept Panamax vessels.

Operations: Fibreco will continue to operate much like it does today. Vessels will arrive at the berth under the direction of a member of the PPA (Pilot) and tug assist. The loading plans will be pre-determined with consultation of the operations manager, agent and ships master. The loader will travel along the berth on rails to load. The loader can reach about 3 ½ hatches

before the vessel needs to shift. The vessels will shift with the ships winches as it does today. New fenders (cone style) will be installed to allow for the larger berthing energy of the Panamax vessels.

See: Appendix E - Marine Operations Plan

4.6 Detailed Equipment Drawings and Specifications (VFPA and DNV Review)

Equipment drawings and specifications are based on the current design for the Terminal Enhancement project. As the final detailed design is completed the equipment design and type may vary to improve flow, efficiency or environmental improvements.

Drawing sets have been sorted by jurisdiction to include; both DNV and VFPA, DNV Only and VFPA only.

All engineering will duly consider the national Building Code (2015), Geotechnical Investigation Reports, District of North Vancouver requirements and the Port of Vancouver.

Drawing packages included:

- Engineering Letter of Compliance
- Flow Diagram
- General Arrangement and Section Drawings
- Civil / Structural Drawings
- Mechanical Drawings
- Conveyor Data Sheets
- Marine Structure Drawings

See: Appendix F - Detailed Equipment Drawings and Specifications

4.7 Site Servicing Plans (DNV Review)

Fibreco was constructed in 1978. Original site service connections will continue to serve the site well into the future. As-built drawings illustrate the services to the lot boundary.

- Stormwater Connection As-built (Paragon Engineering - 2103)
- Sanitary Connection As-built (District of North Vancouver, Municipal Engineering – 1978)
- Water Connection (H.A. Simons - 1979)

See: Appendix G - Site Servicing Plans

4.8 Lighting Plan (VFPA and DNV Review)

All of the lighting fixtures installed will be energy efficient LED fixtures. Adequate lighting to satisfy the requirements of Occupational Health and Safety Regulations will be installed. These fixtures will provide the lighting levels required for safe operation of the terminal while minimizing the effect of light broadcast to adjacent sites and views.

The design and installation of the lighting fixtures will focus on having light focused inward and downward into the Fibreco site. Although the exterior lighting will be visible from outside the terminal the design will minimize the external visibility.

See: Appendix H - Lighting Plan

4.9 Dredging Plan (VFPA Review)

Dredging in front of the berth is part of a regular maintenance program at Fibreco. In order to better service Panamax sized vessels, dredging is necessary.

Scope: Target dredge depth of 13.5m. 4,050 m3 of material to be dredged

- Phase I - 1,250 m3 is considered contaminated (upland disposal)
- Phase II - 2,800 m3 is considered suitable for disposal at sea

Characterization determination: Core samples taken in the dredge area and lab tested. Elevated levels of cadmium and copper found on top 0.3m.

- Occasional evidence of zinc, arsenic, PAH's and tri-butyl tin exceeding Disposal at Sea (DAS) criteria

Timing: Dredging will occur in the Fisheries and Oceans Canada (DFO) window between August 15 and February 28. Dredging of clean material (Phase II) to be completed during the following annual DFO Fisheries window depending on timing of obtaining the DAS Permit.

Mitigation: Subsequent to Phase 1 dredging and following confirmatory sediment sampling, a DAS Permit Application will be submitted to Environment and Climate Change Canada (EC) to allow for the remaining native dredged material, approximately 2,800 m^3, to be disposed at the Point Grey DAS site.

- Dredging will be completed using a cable clamshell dredger in conjunction with a barge or a barge-mounted modified excavator

Sediment Disposal: Apply for Waste Approval Application for upland material. Truck contaminated sediment to licensed facility. Apply for Disposal at Sea (DAS) permit. Clean native material to be disposed of at the Point Grey site.

See: Appendix I - Dredging Plan and Sediment Characterization

4.10 Landscape Plan (DNV Review)

The front entrance landscaping will be expanded as part of the Terminal Enhancement Project. Landscape Architects Enns Gauthier have been engaged to develop a landscape plan that will provide an attractive streetscape as well as shield the visibility of some of the industrial activity on the site.

See: Appendix J - Landscape Plan

4.11 Greenhouse Gas Emissions, Water Conservation and Waste Management (DNV Review)

Greenhouse Gas Emission Reduction Plan: Fibreco continually makes great effort to reduce the carbon footprint. Currently Fibreco has a number of policies in place that look to reduce the total carbon footprint for the site. The new build will further look to reduce overall output.

Water Conservation Plan: Effort to reduce water usage is an organizational goal for Fibreco. Site wide water use has been reduced by 30% since 2013 as part of the overall operating plan. Within the design criteria are a number of water reduction measures.

Waste Management: Fibreco currently has a waste management program in place. Several local waste disposal companies assist is the management of our waste and multitude of recycling efforts.

Future considerations include, collecting wood dust from bag houses for alternative disposal. Collecting agri dust from baghouses and spillage for the local feed market.

See: Appendix K – Greenhouse Gas Emissions, Water Conservation and Waste Management

4.12 Stormwater Management Plan (VFPA and DNV Review)

Fibreco is committed to ensuring the highest level of environmental protection is maintained. In order to keep our waterways clean, Fibreco will not allow any harmful water to escape from the site. The existing Stormwater Management Plan effectively removes solids, oil and grease and any other run off that may occur within the site boundaries.

The proposed land use changes do not alter the ground grades nor the impervious area. Thus, runoff quantities and patterns as well as catchment areas are expected to remain un-changed. Design flows were computed using the Rational Method to evaluate the pipe capacity of DNV storm mains.

The proposed site redevelopment which includes the removal of the woodchip pile and containment and coverage of the materials on the site is expected to lead to an improvement in the stormwater quality with respect to total suspended solid (TSS).

Best Management Practices (BMP) by several local agencies were reviewed and recommendations on stormwater management measures, maintenance and inspection, and water monitoring were made to improve stormwater management in the future.

The complete report details these findings, provides relevant drawings, and includes project-specific design information. Please refer to the complete report to fully understand the recommendations and appropriate context.

See: Appendix L - Stormwater Management Plan

4.13 Construction Environmental Management Plan (VFPA and DNV Review)

The Construction Environmental Management Plan lays out a road map to assist both contractors and Fibreco employees in preventing any harmful occurrences as well as responding to an incident, should one occur.

With the absence of wood chips being stored on-site, there is more then adequate space for laydown of construction material at Fibreco.

Highlights of the plan include, but are not limited to:

- Key Project Personnel and Responsibilities
- Establishing an Environmental Monitor (EM)
    - EM responsibilities
    - EM authority

- Project Mitigation Measures and Environmental Specifications
    - Site Access, Mobilization and Laydown areas
    - Air Quality, monitoring and abatement methods
    - Noise and vibration
    - Machinery and Equipment
    - Erosions and sediment control
    - Contaminated groundwater management
    - Vegetation and wildlife management
    - Concrete and grouting
    - Marine work and dredging
    - Archaeological resources
    - Sensitive habitat features and species

- Emergency Response
    - Communication and protocols
    - Emergency Plan
    - Spill Response Plan

- Waste Management

See: Appendix M - Construction Management Plan

4.1 Visual Impact and Shade Analysis (VFPA and DNV Review)

Visual Impact: A view impact analysis has been performed with recommendations from the District of North Vancouver and the Port of Vancouver. Key locations were selected to better understand how the visual appearance of the site will look upon project completion. Rendering models were created illustrating the change in landscape and are shown in the appendices. There does not appear to be a significant view impact from neighbouring properties. The properties directly adjacent have a clearer view of the silos, however with the silo installation the open chip piles are removed providing a cleaner look to the site.

The locations selected for rendering views are:

- Keith Road West (2 views)
- Norgate neighbourhood (2 views)
- Adjacent West property
- Adjacent East property
- Canada Place (Vancouver) (2 views)
- Stanley Park at Brockton Lighthouse (Vancouver)

Shadow Analysis: Illustrations were created detailing the four extreme cases during the year (spring equinox, summer solstice, fall equinox and winter solstice). The shadowing created by the project does not appear to have a significant shade effect on the surrounding properties.

See: Appendix N - Visual Impact Analysis

4.2 Air Quality Assessment (VFPA and DNV Review)

The Project air quality assessment was prepared according to Port of Metro Vancouver's Project & Environment Review (PER) Guidelines – Environmental Air Assessment (July 2015

As part of the expansion project, Fibreco is able to outfit many of the key particulate emission (PM) sources onsite with best achievable emissions control technology that significantly reduces PM emissions when the expansion is completed. Key upgrades that will reduce PM emissions with the expansion project completed are:

- Improved shiploader emissions controls for both pellet and grain handling – the current shiploader emissions represented the source with the largest impact on ambient

particulate matter concentrations at Fibreco and the expansion will allow for significant improvements in fugitive dust emissions from this source
- Better dust control measures implemented on the material handling transfers points throughout the facility, including at the railcar unloader, a key source of emissions at Fibreco
- The elimination of open stockpiles of wood chips.

The dispersion modelling assessment shows that combustion-related emissions levels from the project will result in ambient pollutant concentrations well below Metro Vancouver Ambient Air Quality Objectives (AAQOs), even when considering the maximum impacts throughout the year.

Through project design focused on addressing the particulate matter emissions from the facility, the overall emissions and impact to ambient concentrations of PM10 and PM2.5 is reduced significantly with the implementation of the project. Many of these improvements result in reduction of PM emissions from pellet handling as well as the additional grain products. The dispersion modelling assessment shows that with these emission controls PM emissions from the facility are predicted to comply with AAQOs.

Given the predicted reductions in PM emissions from the implementation of the expansion, it would be expected that air quality surrounding the Fibreco Terminal will improve with the installation of the additional emission controls associated with the expansion.

See: Appendix O - Air Quality Assessment

4.3 Noise Impact Assessment (VFPA and DNV Review)

BKL Consultants Ltd. (BKL) has conducted an environmental noise assessment for the proposed Fibreco Terminal Enhancement Project.

The Project will include the following key changes and improvements:

- Elimination of wood chip operations
- Elimination of barge import and export
- Modifications to rail yard and rail car unloading shed
- New dumper baghouse dust collector
- New railcar indexers
- New conveyor systems for grain operations and improved material handling
- New silo storage for grain products
- Modifications to existing wood pellet silo feed conveyor system
- Modifications to existing berth and ship-loader

This report documents existing community noise levels near the Project and the predicted noise climate following completion of the Project. The assessment was prepared in

accordance with the Environmental Noise Assessment Terms of Reference provided to VFPA on November 26, 2015.

The objectives of this study were to review existing conditions at nearby noise sensitive receptors, perform site measurements of significant Fibreco noise sources, construct a noise model to predict community noise levels in the existing noise environment and the future noise environment with the Project, and to provide mitigation options where applicable. This study does not address potential short-term construction noise effects. BKL assessed existing community noise levels using noise measurement data collected in 2012 by BKL in the Norgate residential community and by conducting noise measurements recently at Bodwell High School. Noise data was collected for a period of one week and was used to characterize the existing community noise environment and assist in establishing the existing noise levels at potentially affected receptors. BKL developed a Cadna/A computer noise model to assess existing and future noise levels at all nearby residences.

The model includes noise sources from Fibreco, local road traffic, and CN railway operations. The Project noise predictions were based on the following main assumptions:

- Wood chip operations will be completely eliminated
- Barge import and export will be completely eliminated
- Unloaded railcars will no longer roll freely down the slope and impact stationary cars
- CN service efficiency will improve since they will be able to deliver and retrieve more cars at a time, resulting in fewer shunting impacts per car serviced
- Shipboard generator noise emissions will increase in proportion to the proposed throughput increase

Based on these assumptions, BKL predicts a 0 to 2 dBA increase in Fibreco-generated noise throughout the surrounding community once the Project is at full capacity. However, future total noise levels with and without the Project are predicted to remain the same throughout the surrounding community, which shows that Fibreco is not the dominant source in the community. Total noise levels are predicted to remain unchanged in the future relative to existing noise levels, except for a slight decrease in one residential area due to train whistle cessation.

Although the Total Noise is not predicted to increase with the Project in 2020, noise mitigation could be considered to reduce the dominant Fibreco noise sources where practical. There are a number of noise mitigation strategies, such as fan silencers and noise barriers, which will be investigated to minimize Project noise levels using best available techniques not entailing excessive cost.

See: Appendix P - Noise Impact Assessment

4.4 Geotechnical Assessment (VFPA and DNV Review)

GeoPacific Consultants Ltd. Was retained to provide geotechnical input for the preliminary design of the referenced Grain and Wood Pellet Infrastructure Project at the Fibreco site. An investigation of the subsurface conditions was completed by GeoPacific from June 16 to 18, 2015. At that time, a total of 7 solid stem auger test holes and 7 electric Cone Penetration Test (CPT) soundings were completed to depths of up to 41 and 36 m below grade, respectively. Two seismic shear wave velocity profiles were completed on site to assist with the seismic evaluation.

Geotechnical test holes showed little if any topsoil and deleterious materials within the upper fills. Thus stripping should be minimal, though existing buried utilities and structures should be removed prior to undertaking any foundation preparation or densification works.

For seismic design, based on the results of the linear site specific dynamic analysis GeoPacific Consultants Ltd provided a "Recommended Design Spectra" to be employed in the structural design.

The liquefaction assessment indicates only marginal liquefaction at the site. Thus ground improvement is not considered necessary to achieve reasonable performance under a major earthquake such as the 1:2,475 design earthquake.

According to the geotechnical report, light structures, including grade supported and elevated conveyors could be supported conventionally using shallow foundations. For the elevated portion where overturning loads are likely to govern foundation design or where spatial constraints exist, pile foundations may be preferred. For these structures, small diameter pipe piles, H-piles, helical piles or drilled micropiles are all considered feasible.

The storage silos are expected to impose high localized stresses. To accommodate these stresses, some ground improvement is considered necessary. Full displacement stone columns are recommended to improve the ground condition sufficiently to support the silos on a mat foundation. Alternatively pile foundations can be used.
For a new rail car unloading pit, a tunnel would be constructed below grade and would need to be design for uplift pressures due to buoyancy as well as large lateral pressures due to soil, and where applicable water pressures.

See: Appendix Q - Geotechnical Assessment

4.5 Flood Hazard Assessment (DNV Review)

Highlights of the assessment include:

- Flood Risks
- McKay Creek
    - High water level and flooding potential

    - Water and debris inundation
    - Erosion and undermining of river banks
    - Lateral migration of river banks
- Burrard Inlet
    - Higher high water level
    - 200-year storm surge and wave effect
    - Sea level rise (SLR)
- Recommendations
    - Increase Flood Construction Level (FCL) from 4.68m to 6.0m for new construction of long term habitable spaces and main electrical switchgear
    - Increase FCL for mobile/temporary structures to 5.1m
    - Annually and post storm event, inspect and repair bank armouring
    - Limit construction of valuable infrastructure to 20m from of top of bank
    - Design below grade infrastructure with safe unobstructed egress to FCL to avoid entrapment in a flood event

See: Appendix R - Flood Hazard Assessment

4.6 Site Profile and Hazardous Materials Report (DNV Review)

A site profile was performed by Hemmera Envirochem Inc.to determine the historical use of the Fibreco lands. The site profile is intended to identify any potential concerns that could stem from former industrial use.

Astech Consulting did a thorough site survey of all equipment that is to removed or modified in order to determine the existence of hazardous materials such as asbestos, lead paint and PCB's.

Site Profile:

- Evidence of contaminated soil due to migration of historical operations on neighbouring property (asphalt tar manufacturing)
- Historical presence of underground and above ground fuel storage

Mitigation:

- Every effort will be made in the site design to avoid penetrating the contaminated layer
- Any evidence of contamination will result in a strict isolation and removal method

Hazardous Material Survey:

- Many samples taken and lab tested to determine presence of asbestos, lead paint and PCB's
- Areas with potential or known presence of asbestos are identified and removal and disposal methods are clearly defined

- Equipment intended for demolition containing lead paint has been identified with destructive samples and lab tests performed
- Removal will be according to Workers Compensation Board of BC standards. The highest level of worker safety will be maintained

- PCB's have been identified in certain light fixtures and electrical components.
- Remove will be in accordance to WBC Occupational Health and Safety Regulation and disposal in accordance with the BC Ministry of Environment Management Act
- Every care will be taken to avoid worker and environmental exposure

- Treated wood have been identified and options for disposal include finding an opportunity to re-purpose the material or send to an appropriate facility for incineration.

- Every effort will be made to re-purpose the timbers.

MSDS information is available on site.

See: Appendix S - Site Profile Hazardous Materials Report

4.7 Dock Condition Survey (VFPA Review)

Field inspection of the Fibreco Wharf was performed by Advisian (Worley Parsons) in June 2016. This inspection is part of the ongoing asset maintenance program at Fibreco Export Inc. Items identified as immediate are addressed in the 2016 capital plan, while secondary and greater will be in the 2017 plan.

See: Appendix T - Dock Condition Survey

4.8 Fire Safety Analysis (DNV Review)

Highlights of the plan include:

- Fire Prevention
    - Modern dust control at rail receiving, transfers, storage and shiploader
    - Full car hopper pit at trail dumper
    - Enclosed conveyors
    - Tramp metal magnets
    - Purpose built, enclosed transfers
    - Modern dust suppression shiploading spout
    - All new electrical systems to comply with local standards

- Early Detection:

- Bearing temperature monitoring on drives and key rollers
- Fire-fly spark detection at critical transfers
- Low temperature sprinkler systems on conveyors and critical areas
- Automatic sprinkler systems for new buildings
- Fire and smoke detection systems monitored 24/7

- Emergency Response
  - Fire water loop to include access to all areas of the site
  - Site enables emergency vehicle access
  - Local Fire Department involvement in system design and implementation

See: Appendix U - Fire Safety Analysis

4.9 Spill Prevention and Emergency Plan (VFPA and DNV Review)

Highlights of the plan include:

- Emergency Response
  - Emergency Contacts
  - Protocol procedures

- Environmental Spill Response
  - Emergency Spill Response
  - Incident Clean Up
  - Incident Investigation and Reporting

- Spill Prevention
  - Oil and Hazardous Material Storage
  - Best Management Practices for Spill Control and Reduction
  - Refueling
  - Spill Kits
  - Clean Up
  - Storage Area Inspection
  - Employee Training
  - Contractor evaluation

See: Appendix V - Spill Prevention and Emergency Plan

4.10 Energy Efficiency Study (VFPA and DNV Review)

A study by CWA Engineers was performed to baseline the electrical energy used by Fibreco as part of the BC Hydro Power Smart Program. Recommendations are put forward for consideration in the new build.

The Customer Site Investigation (CSI) identifies the major energy end users of a facility and provides an electrical energy cost baseline for the different processes. The CSI also identifies preliminary electricity cost saving opportunities and provides recommendations for further investigation and implementation.

A site visit in Q1 2016 was conducted to identify any operational conditions that could lead to energy inefficiencies. A lighting inventory was performed, as well as collecting electrical data on motors operating under load. Upon completion of the field investigation, the data and information was analyzed to identify opportunities to help improve Fibreco's energy efficiency.

The CSI identified a number of opportunities to improve energy efficiency of the Fibreco facility that can be implemented as part of the Terminal Enhancement Project. The conveyor system warrants further study which can be incorporated with redesign of the conveyors to handle grain. In addition, an upgrade of the electrical system can incorporate the design of a new power factor correction system and include an LED lighting retrofit.

See: Appendix W - Energy Efficiency Study

4.11 Archeological Potential (VFPA and DNV Review)

Archeological research was by Hemmera Envirochem Inc. in order to satisfy VFPA and District of North Vancouver Environmental Review requirements.

- The conclusion of the Archeological Potential - Preliminary Assessment is that, based on the preliminary assessment, the risk of disturbing intact archaeological deposits is low
- This conclusion is based on the proposed footprint and depth of ground alteration, the fill history on the site and potential effects to native soil, the distance of the proposed project to potable water, the location of proposed project in relation to the original shoreline (as well as streams), and information available on recorded archaeological sites and archaeological potential
- There are no recorded archaeological sites or areas of archaeological potential within 100 m of the Project site therefore a further archeological assessment is not recommended

See: Appendix X - Archeological Potential

4.12 Biophysical Survey (VFPA Review)

Terrestrial Habitat, Marine Habitat Biophysical field surveys and desktop analysis were performed for both upland and in-water by Hemmera Envirochem Inc. in order to satisfy VFPA and District of North Vancouver Environmental Review requirements. Field visits were conducted in the spring of 2016. The marine survey was completed on July 22, 2016, while the terrestrial survey was performed on June 30, 2016.

The conclusions of the biophysical surveys based on results of desktop and field assessments are:

Aquatic:

- The proposed Project is not expected to permanently affect marine habitats or species.
- Upgrades to the berthing dock include the addition of new dolphins and piles will provide additional structural habitat for fish and sessile invertebrates while the proposed maintenance dredging will remove wood waste and contaminated sediments that can negatively affect habitat physical structure, and result in acute or long term sediment toxicity.
- Avoidance of potential impacts to fish are to be provided through the application of well-established mitigation measures and the construction environmental management plan will include mitigation strategies, best management practices, and environmental monitoring expectations for the project work.

Upland VFPA Lease Area:

- The proposed Project will result in removal of some native and non-native vegetation associated with the jetty modification work, however, it is not expected to have an impact on wildlife or vegetation resources, including species at risk.
- The presence of a noxious plant species (Japanese knotweed) in the Project site will require mitigation to prevent spreading to other locations on and off site as outline in the letter report.
- If trees and the conveyor systems are to be removed during the breeding bird window, March 15 - August 15, a pre-construction nest clearing survey conducted by a Qualified Environmental Professional (QEP) should be undertaken to ensure no birds are nesting in the area. The proposed Project is not expected to permanently affect marine habitats or species.

See: Appendix Y - Biophysical Survey

4.13 Engineering Service Costs (DNV Review)

The existing site services infrastructure at Fibreco is expected to be adequate for the proposed project. With only a modest increase in personnel, there is not a need to expand the facilities significantly. There is not an expectation for Engineering Service costs.

See: Appendix Z - Engineering Service Costs