APPENDIX R

Flood Hazard Assessment

FIBRECO

Fibreco Export Terminal Enhancement
Permit Application Document

APPENDIX R
Flood Hazard Assessment - Executive Summary

Purpose: To identify and assess the flood hazards that may affect the safe use of the Fibreco property.

Highlights of the plan 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

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nhc
northwest hydraulic consultants

NHC Project No: 3002083

2016 August 23

Fibreco Export Inc.
1209 McKeen Avenue
North Vancouver, BC
V7P 3H9

Attention: **Mr. Glenn Dempster**
Via Email: gdempster@fibreco.com

Subject: **Fibreco, 1209 McKeen Avenue, North Vancouver**
Flood Hazard Assessment

1 INTRODUCTION

This report summarizes the flood hazard assessment (FHA) conducted for Fibreco Export Inc. (Fibreco) facility located at 1209 McKeen Avenue within the District of North Vancouver (DNV). The property is located on the north shore of Burrard Inlet, between the first and second narrows, 500 m west of MacKay Creek.

The objective of this assessment is to identify and assess the flood hazards that may affect the safe use of this property. The northern most part of this property is within the DNV's Creek Hazard Development Permit Area (DPA) and the entire property is potentially at risk to coastal flooding. Consequently, the property requires a FHA prior to obtaining building permits. This assessment is based on the criteria specified by DNV's SPE 106 Creek Hazard Report and SPE 107 Flood Hazard Report Master Requirements as well as the *Professional Practice Guidelines - Legislated Flood Assessments in a Changing Climate in BC* prepared by the Association of Professional Engineers and Geoscientists of BC (APEGBC, 2012).

Hydrotechnical hazards are defined as flooding, erosion, deposition, scour and avulsion typically due to channelized flow or coastal water levels. This hydrotechnical hazard analysis concentrates on the hazards associated with Burrard Inlet and MacKay Creek. Additional flood hazard may arise from local surface water management and site drainage. Such hazard is not addressed by this study, but is to be addressed by the stormwater management plan.

2 SITE DESCRIPTION

The Fibreco site is located in the District of North Vancouver on the north shore of Burrard Inlet, 500 m west of MacKay Creek, roughly 2.2 km east of the Lions Gate Bridge (**Figure 1**). The site is relatively flat with slopes generally less than 0.6% and elevation of around 4 m (geodetic, above mean sea level). The north side of the site is bounded by McKeen Avenue and the railway line, of which a spur line also borders the west side of the site.

The east side is bordered by Pemberton Avenue along the north half of the site, while the southern half lies adjacent to an open channel.

Presently, exposed wood chips are stockpiled on ground both north and south halves of the site, covered storage is located in the middle of the site, and wood pellets storage silos are located on the east edge of the north half of the site. Office and security buildings are located at the northwest corner of the property. Facilities in 2013 provided loading for deep see vessels as well as loading and unloading of barges. As of 2016 the terminal only provides loading for deep-sea vessels.

Future site plans are expected to include the following:

- Repurposing portions of the property currently used to store uncovered piles of wood chips with the addition of storage silos for specialty grains.
- Electrical switch room at the northeast corner of the property.
- Modular lab building at the southwest corner of the property.
- Office and security buildings to remain at the northwest corner of the property.

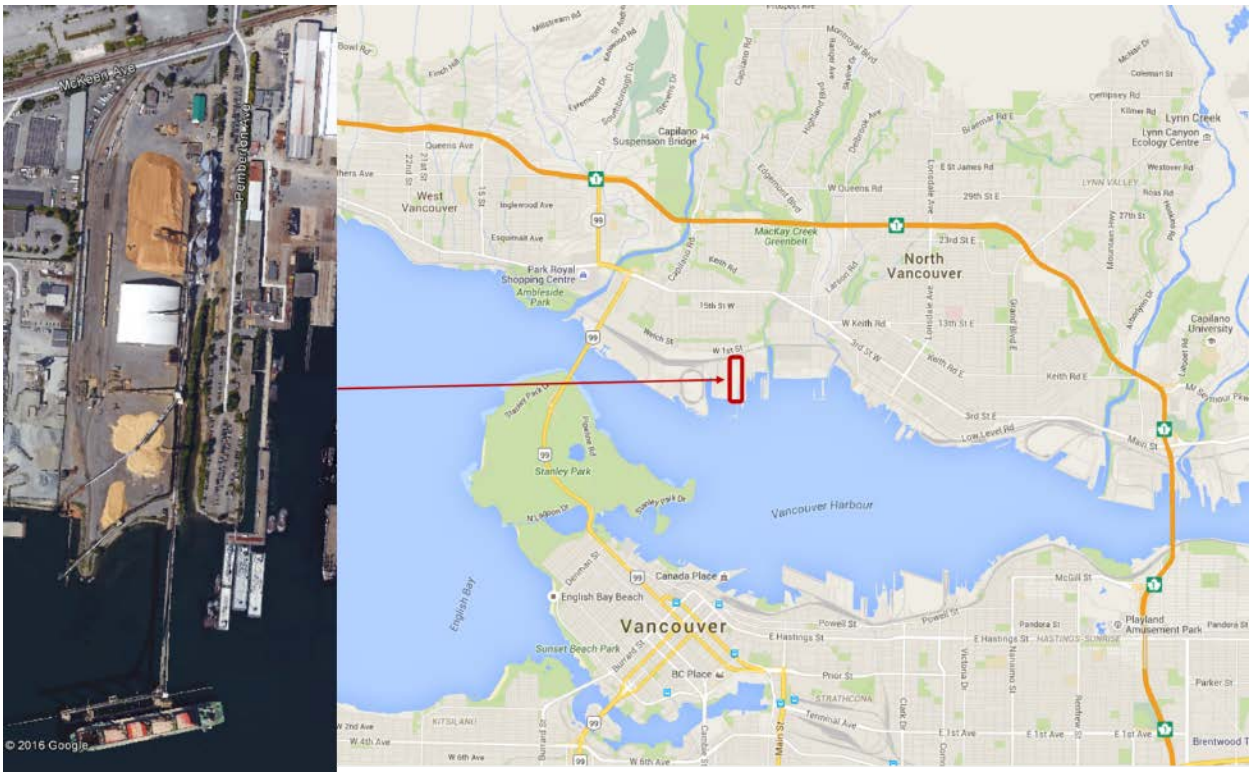

Figure 1. Project Location (Google Earth, 2015)

An inspection of the site and surround area was conducted by Dale Muir (NHC) on 2013 October 29 and 2016 August 02 to evaluate hazards at the site and from the surrounding area. In addition, a digital elevation data was

reviewed; this included 2014 'bare-earth' LiDAR data at 1 m resolution obtained from DNV 's Open Data GIS as well as 2016 LiDAR data provided by Fibreco.

No barriers exist between Burrard Inlet and the project site. The banks along Burrard Inlet and the blind channel east of the site are armoured with angular rock riprap. Large trees have established along the blind channel. The banks are generally overly steep and show signs of localized failure; this is especially true along Burrard Inlet (**Photo 1** and **Photo 2**).

MacKay Creek drains south to Burrard Inlet, with its outlet 420 m east of the project site. MacKay Creek crosses from Lower MacKay Creek Park to its outlet channel under two bridges; a single span crossing under West 1st Street and a multi-unit rectangular box culvert under the railway (**Photo 3** and **Photo 4**). These crossings are 430 m northeast of the site. Both of these crossing have little clearance between their low chord (i.e. obvert) and the creek's water level and are susceptible to blockage by locally sourced debris. The railway bridge may be more susceptible to blockage due to its multiple openings. However, overflow of this structure is expected to be primarily be redirected into the downstream channel as it passes over the railway embankment. Overflow of MacKay Creek may flow west following the slight slope of 1st Avenue and approach the project site.

Photo 1 **Burrard Inlet riprap south of site**

Photo 2 **Burrard Inlet riprap local failure**

Photo 3 **Downstream view towards 1St St bridge**

Photo 4 **Downstream view towards railway bridge**

3 BACKGROUND REVIEW

The following set of information has been reviewed as part of our investigation of the possible hydraulic hazards located near the property site:

- Flood Hazard Report – Section 219 Covenant, Master Requirement SPE 106 (DNV, 2011c)
- Creek Hazard Report – Section 219 Covenant, Master Requirement SPE 107 (DNV, 2011c)
- Creek Hazard Development Permit Area Map 2.2 (DNV, 2012b)
- Schedule B Development Permit Areas (DNV, 2012)
- Creek Hydrology, Floodplain Mapping and Bridge Hydraulic Assessment study, North Vancouver (KWL, 2014)

No provincial floodplain mappings exist for the area. The most recent flood study conducted for the DNV relevant to this project appears to be KWL's 2014 report.

4 FLOOD HAZARD ASSESSMENT

4.1 MacKay Creek Flood Hazard Assessment

MacKay Creek can impose hazard on adjacent properties though:

- High water level inundating property with flood water and debris,
- Erosion of river banks,
- Scouring of the river bed potentially undermining and failing adjacent banks,
- Deposition or blockage within the river directing flow towards or over bank and possibly leading to erosion (gradual lateral migration of the river) or avulsion (sudden relocation of the river)

DNV has adopted the 200-year flood levels presented by the 2014 KWL report for the 200-year flood expected under the flow and tidal conditions projected for the year-2100. Within areas deemed at risk to flood hazard the DNV consider mapped flood inundation and potential overflow.

Figure 3 provides an overview map of areas inundated through direct connection to MacKay Creek with a depth of inundation 0.1 m to 0.5 m. The figure shows that flooding is most extensive to the west of MacKay Creek. Overflow of MacKay Creek upstream of the 1st Street bridge is expected to flow west following the slight slope of 1st Street and approach the project site. Comparison of the year-2012 flood scenario suggests little difference in flood risk at the site from MacKay Creek with projected climate change.

The project FCL based on MacKay Creek flooding is El. 4.69 m (GD - *Canadian geodetic vertical datum*). This is limited to the north part of the site. Other areas of the site, not expected to be inundated in the 200-year flood, would have a DNV recommended FCL of El. 4.4 to 5.0 m based on 0.6 m above adjacent grade.

The project site is not expected to be subjected to erosion of the river banks, scouring of the bed, or deposition other than potentially contributing to blockage of the channel and overflow flooding.

It is our understanding that DNV has recently commissioned a lower MacKay dike flood mitigation study. The outcome of the study could result in future dike or bridge improvement and reduce the year-2100 flood level predicted from the KWL flood study.

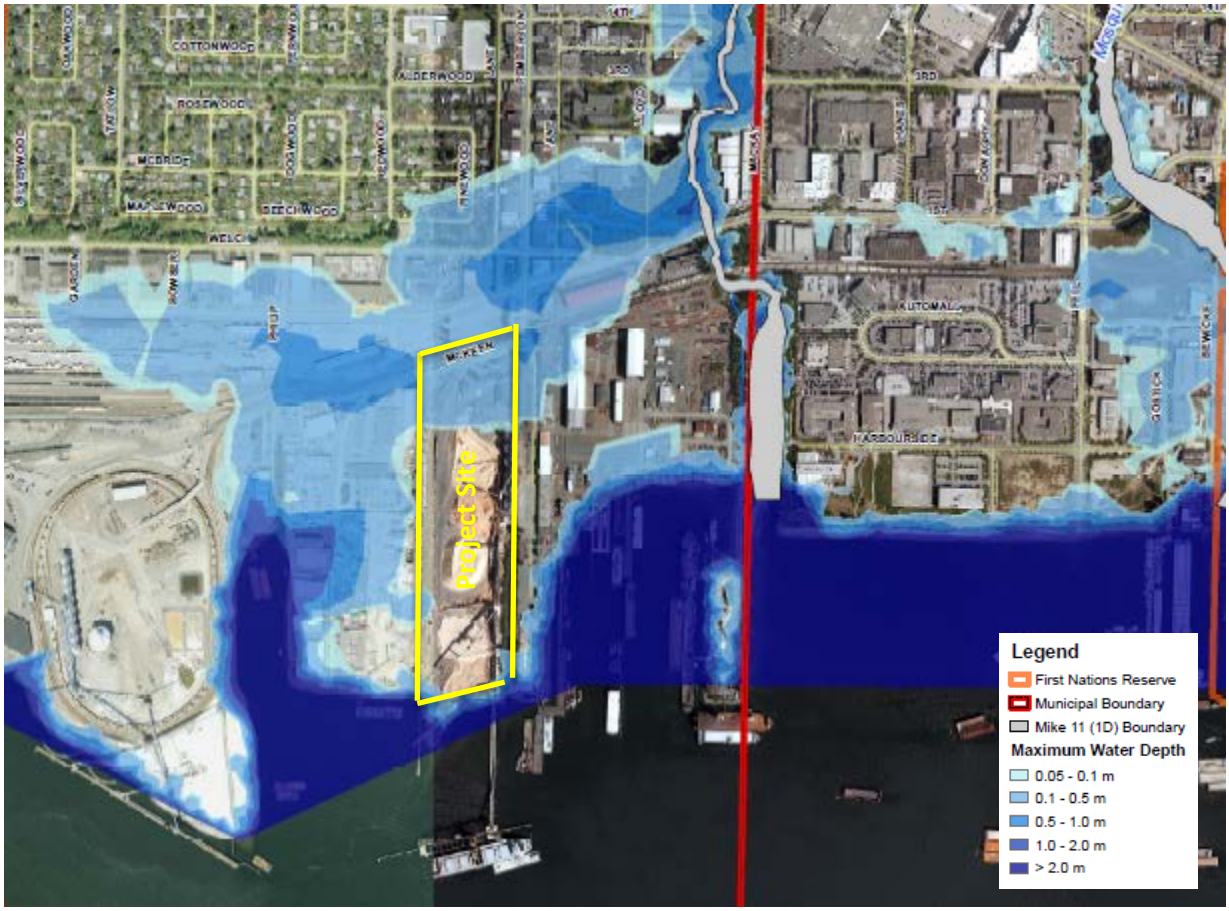

Figure 2. Modelled 2-D inundation for watercourses, 200-year flood based on year-2100 (KWL, 2014)

4.2 Coastal Flood Hazard Assessment

Coastal flood hazard at the study property is derived from high water at the adjacent shore of Burrard Inlet, incorporating the combined effects of tide, storm surge, wind setup, wave run-up, and sea level rise (SLR).

In January 2011, the BC Ministry of Environment (MOE) published Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use (MOE, 2011a). The guidelines present an approach for developing a flood construction level (FCL) calculated as the summation of:

FCL = Higher High Water Level Large Tide (HHWLT)
+ the 200-year storm surge
+ sea level rise (SLR)
+ local subsidence
+ wave effects from a 200-yr storm
+ 0.6 m freeboard

Referred to as Designated Flood Level (DFL)

Referred to as the Flood Construction Reference Plane (FCRP)

The FCL within this area[1] of the north shore of Burrard Inlet for the year 2012, 2100, and 2200 were calculated based on this guideline and presented in Appendix A of the KWL 2014 flood study. This information is summarized in **Table 1.**

Table 1. Flood Construction Levels

FCL Components	2012	2100	2200
200-year Water Level (m GD) – High tide and storm surge	3.2	3.2	3.2
Sea Level Rise (m)	0.12	1.0	2.0
Local subsidence (m)	0.0	- 0.12	- 0.24
Wave effect (m)	0.5	1.3	1.3
Freeboard (m)	+ 0.6	+ 0.6	+ 0.6
Flood Construction Level (m GD)	**4.4**	**6.0**	**6.9**

DNV provides a "Flood Construction Level" database, generated from the KWL flood study. Within this database DNV suggests an FCL of 4.68 m GD for much of the Fibreco site instead of 6.0 m GD. This is because the KWL flood study did not incorporate wave action in its extreme coastal event modeling analysis. The KWL report states:

> "Wave action was not included in the extreme coastal event modeling, as waves are transient and volume-limited. While very damaging at the shoreline, waves would not create the same effect further inland, and would likely be mitigated by sea dikes at the coastal margin. Therefore waves have not been included in these results, since it would be overly conservative for determining FCL values".

[1] Shoreline section referred to as "Seaspan and Harbourside" in the study.

Thus, the FCL of 4.68 m GD adopted for the local coastal region is 1.3 m lower than the FCL presented in **Table 1**. A map of KWL's year-2100 coastal flood inundation projection is shown in **Figure 4**. As expected, since the existing ground elevation of the project site is at around 4.0 m GD, the figure shows that much of project site would experience inundation between 0.5 and 1.0 m.

KWL flood study, however, also states:

> "For design of coastal flood protection measures (e.g., future sea dikes), and development and that might occur in the coastal margin (e.g., port facilities), detailed wave studies and mitigation measure would be used for design purposes."

Since the project site is located in the coastal margin and is potentially directly impacted by wave overtopping, it is recommended that FCL value of 6.0 m GD, derived based on the provincial guideline, be adopted for all new construction of habitable space, instead of 4.68 m GD.

The approach presented in the provincial guideline is based on co-occurrence of design coastal events (i.e. high tide with design storm surge and design wind storm) without specifically addressing probability of these events co-occurring. Further study can simultaneously simulate long-term conditions allowing statistical frequency analysis to be applied on the simulated water level record. Such as refinement may reduce the flood level and associated mitigative measures.

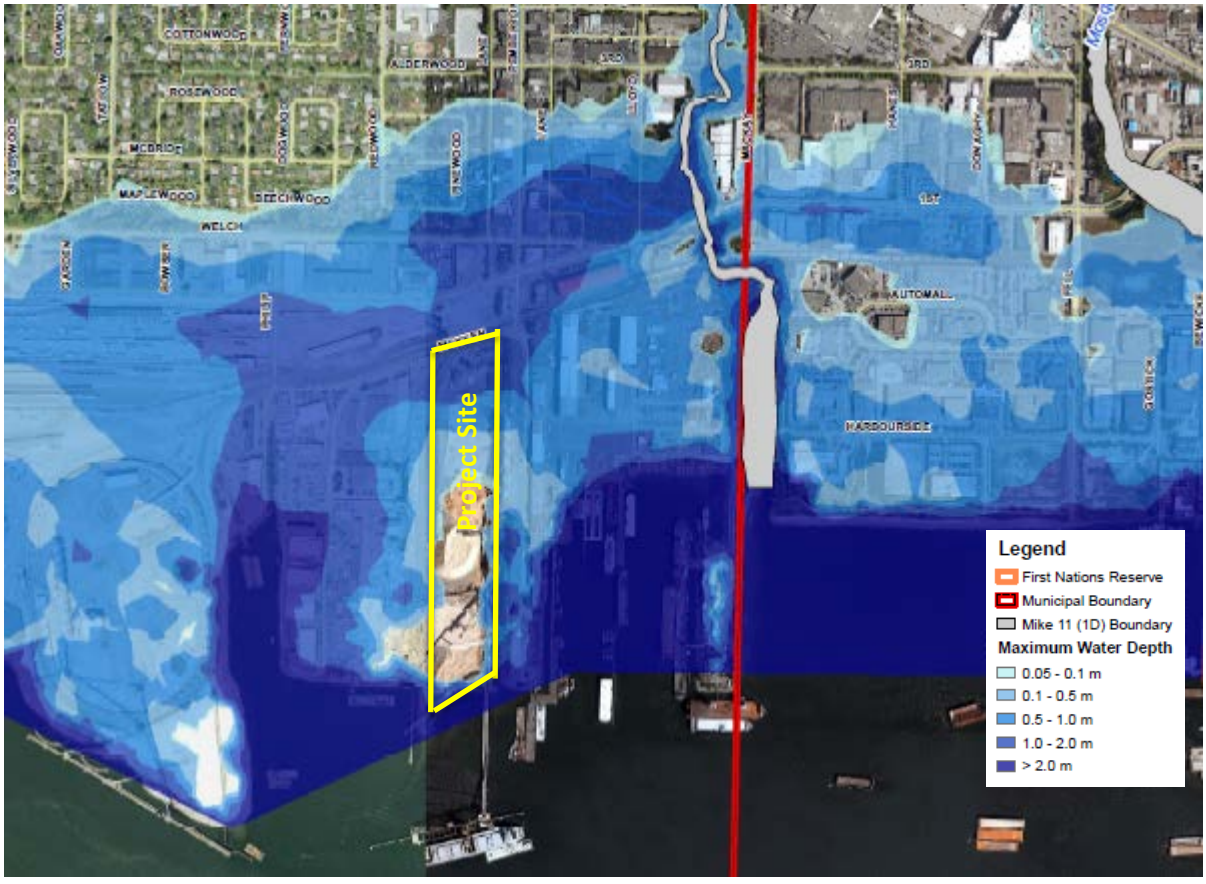

Figure 3. Burrard Inlet simulated flood depth, mean annual flood coinciding with year-2100 coastal design flood level (DFL) conditions (KWL, 2014)

5 MITIGATION MEASURES

5.1 Flood Construction Level

The factor that defines the potential flood level for this site to the year-2100 is the coastal flood risk. To mitigate this flood hazard it is recommended that a FCL be adopted for new construction of habitable space on the study site. Based on the previously estimated water level for coastal flood risk (KWL, 2014), the proposed FCL has been calculated as:

Water Level:	5.4 m
Freeboard:	0.6 m
Flood Construction Level:	6.0 m

Based on the current assessment, it is expected that the FCL is conservative and joint probability analysis of the coastal flood hazard could potentially reduce the suggested FCL.

The Fibreco site is in a transitionary period. The recommended FCL is based on the conditions for the year-2100. Temporary works with expected service life less than 30-years can be based on a flood scenario closer to that shown for the year-2012. Sea level rise resulting from global climate change is expected to gradually increase at the start of this century and increase more rapidly near the end of this century; however to remain conservative this is often approximated as a linear change (see **Figure 4**). Based on this approximation a coastal FCL for the year-2050 has been calculated as (remaining slightly greater than the FCL based on MacKay Creek):

Water Level:	4.5 m
Freeboard:	0.6 m
Flood Construction Level:	5.1 m

Industrial work areas and storage can be at an elevation equal or greater to the FCL minus the freeboard; that is El. 5.4 m for long-term work areas and El. 4.5 m for short-term work areas (less than 30-year expected service life).

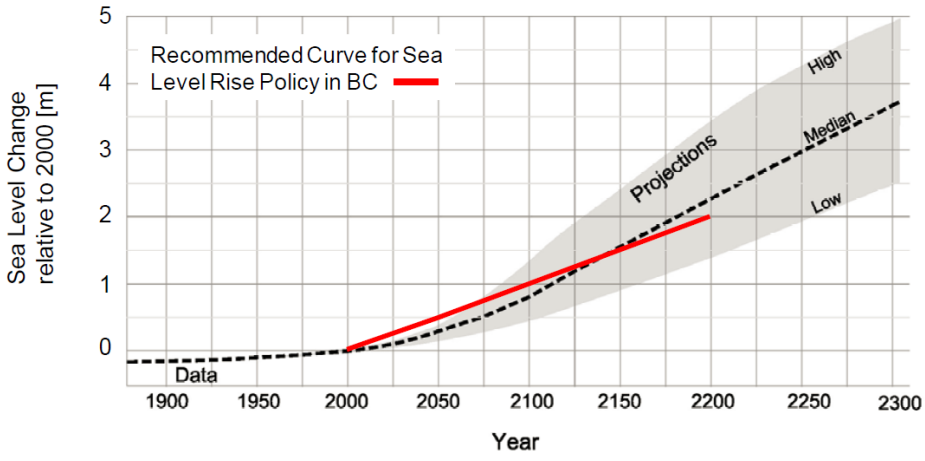

Figure 4. Projected sea level rise (BC Ministry of Environment, 2011)

5.2 Bank Armouring

The existing banks along Burrard Inlet are armoured and are expected to withstand the typical wave events that they are exposed to. However, it is recommended that the banks are visually inspected for erosion and failure annually and following any extreme wave events. Identification of any failures should trigger a more detailed inspection (such as by a professional engineer) and or maintenance repairs.

Locating commercial, residential, or valuable infrastructure within 20 m of the bank should be avoided or additional armouring is recommended to ensure future bank failures do not jeopardize this infrastructure. The setback can be reduced to as little as 7.5 m provided the bank armouring is improved following an appropriate design.

6 SUMMARY AND RECOMMENDATIONS

A hydrotechnical hazard assessment was conducted based on 200-year flood (0.5% annual exceedance probability) for up to the Year 2100 including climate change projections. From the study it is recommended that a Flood Construction Level of El. 6.0 m be adopted for the project site. This value was derived using additive approach is considered to be conservative. A joint probability analysis of the coastal flood hazard could potentially reduce the recommended FCL.

This flood hazard assessment was conducted following APEGBC 2012 Class 2 flood hazard assessment guidelines. A summary of the APEGBC criteria for such an assessment is presented in **Table 3**.

Table 3. Summary of APEGBC Typical Class 2 Flood Hazard Assessment Methods and Deliverables

APEGBC Flood Hazard Assessment Component	Notes
Typical hazard assessment methods and climate/environmental change considerations	
Site inspection and qualitative assessment of flood hazard	Completed by NHC
Identify any very low hazard surfaces in the consultation area (i.e., river terraces)	Completed by NHC
Estimate erosion rates along river banks	Project site set back from the active river channel - any erosion is expected to be mitigated well before reaching the project site
1-D or possibly 2-D modelling, modelling of fluvial regime and future trends in river bed changes, erosion hazard maps, possibly paleo flood analysis	Relying on previous model studies for the most part. River changes not likely to affect project site due to distance, topography, and land use.
Identify upstream or downstream mass movement processes that could change flood levels (e.g., landslides leading to partial channel blockages, diverting water into opposite banks)	Potential debris blockage is the design flood scenario. Sea level rise considered for coastal flooding.
Conduct simple time series analysis of runoff data, review climate change predictions for study region, include in assessment if considered appropriate	Relying on previous studies.
Quantify erosion rates by comparative air photograph analysis	N/A – erosion risk deemed low.

APEGBC Flood Hazard Assessment Component	Notes
Typical deliverables	
Letter report or memorandum with at least water levels and consideration of scour and bank erosion	Completed
Cross-sections with water levels, flow velocity and qualitative description of recorded historic events, estimation of scour and erosion rates where appropriate with maps showing erosion over time	Not Required
Maps with area inundated at different return period, flow velocity, flow depth, delineation of areas prone to erosion and river bed elevation changes, estimates of erosion rates	Not Required

7 SAFE CERTIFICATION

NHC has not assessed the property for hazards related to, fire, debris flow, debris flood, landslide, or any other hazards besides those resulting directly from flood and/or erosion emanating from MacKay Creek and from Burrard Inlet. With respect to flood and erosion hazard, for flood events less than or equal to the 200-year peak instantaneous flow of MacKay Creek and 200-year coastal flood event, NHC certifies that the subject property is considered safe for the use intended if the recommended flood construction levels presented in the following table are adhered to.

Table 2. Flood construction level (m GD) based on land use and expected service life

Land use	Short-term (<= 30 yrs)	Long-term (> 30 yrs)
Habitable and commercial space*	6.0	6.0
Mobile/temporary work space (i.e. modular/skid mounted lab)	5.1	6.0
Main electrical switchgear	6.0	6.0
Industrial work and storage facilities	4.5	5.4
Loading and unloading facilities associated with water-oriented industry may be below this level, but should be designed to withstand water levels and waves to this level (i.e. water damage, hydrostatic loading, wave loading).	5.1	6.0

*Renovations to existing buildings/structures maybe allowed at current building elevations, provided the increase in building/structure area is not more than 25%. However, where possible FCL should be met for safety regardless of rules and regulations.

In addition,

1. Buildings and other valuable infrastructures are setback 20 m from the top of bank along Burrard Inlet (this may be reduced with improved bank armouring).
2. Any below grade infrastructure should be designed with safe unobstructed egress up to the FCL to avoid potential entrapment.
3. Any erosion, scour, conveyance, or flood proofing works for flood protection are designed by a qualified registered professional. Short and long -term maintenance requirements for the flood protection works

are outlined by a qualified registered professional and these requirements are followed by the owner/operator of the property.

4. Any future flood works constructed by DNV or others between the project site and MacKay Creek does not concentrate or direct flow towards the project site.

8 CLOSURE

We hope this work and report meets your current needs. If you have any questions or would like to further discuss these findings, please contact Mr. Dale Muir or Mr. Edwin Wang at our North Vancouver office by email (dmuir@nhcweb.com | ewang@nhcweb.com) or by telephone (604) 980-6011.

Sincerely,

Northwest Hydraulic Consultants Ltd.

Prepared by:

Edwin Wang, PEng.
Project Engineer

Reviewed by:

Dale Muir, PEng.
Principal

DISCLAIMER

This document has been prepared by Northwest Hydraulic Consultants Ltd. in accordance with generally accepted engineering practices and is intended for the exclusive use and benefit of Fibreco Export Inc., and their authorized representatives for specific application to the 2016 flood hazard assessment for 1209 McKeen Avenue, North Vancouver, BC.

The contents of this document are not to be relied upon or used, in whole or in part, by or for the benefit of others without specific written authorization from Northwest Hydraulic Consultants Ltd. No other warranty, expressed or implied, is made. Northwest Hydraulic Consultants Inc. and its officers, directors, employees, and agents assume no responsibility for the reliance upon this document or any of its contents by any parties other than Fibreco Export Inc.

9 REFERENCES

APEGBC (2012). Professional Practice Guidelines - Legislated Flood Assessments in a Changing Climate in BC. Prepared by Association of Professional Engineers and Geoscientists of BC. 2012 June.

BC Ministry of Environment (2011). Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use. Sea Dike Guidelines. Prepared for BC Ministry of Environment (MOE), prepared by Ausenco Sandwell. Project 143111. 2011 January 27.

District of North Vancouver (2011). Flood Hazard Report – Section 219 Covenant, Master Requirement SPE 106

District of North Vancouver (2011). Creek Hazard Report – Section 219 Covenant, Master Requirement SPE 107

District of North Vancouver (2012). Official Community Plan – Schedule B Development Permit Areas. Bylaw 7900. Adopted July 2012.

District of North Vancouver (2012b). Creek Hazard Development Permit Area Map 2.2.

District of North Vancouver (DNV) (2016). GIS web site: www.geoweb.dnv.org accessed May 18, 2016.

KWL (2014). "Creek Hydrology, Floodplain Mapping and Bridge Hydraulic Assessment study, Final Report". Report prepared for City of North Vancouver by Kerr Wood Leidal Associated Ltd.

APPENDIX A
FLOOD HAZARD AND RISK ASSURANCE STATEMENT AND COVENANTS

APPENDIX J: *FLOOD HAZARD* AND *RISK* ASSURANCE STATEMENT

Note: This Statement is to be read and completed in conjunction with the "*APEGBC Professional Practice Guidelines - Legislated Flood Assessments in a Changing Climate*, March 2012 ("*APEGBC* Guidelines") and is to be provided for *flood assessments* for the purposes of the *Land Title Act*, Community Charter or the *Local Government Act*. Italicized words are defined in the *APEGBC* Guidelines.

To: The *Approving Authority* Date: 2016-Aug-23

Planning, Permits,and Properties, District of North Vancouver

31209 McKeen Avenue, North Vancouver, BC V7P 3H9

Jurisdiction and address

With reference to (check one):

- ☐ Land Title Act (Section 86) – Subdivision Approval
- ☐ Local Government Act (Sections 919.1 and 920) – Development Permit
- ☑ Community Charter (Section 56) – Building Permit
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Variance
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Exemption

For the Property:

905-959 Premier St., North Vancouver (Lot 1 (Formerly Lots A & B), District Lot 612, New Westminster District, LP 15642)

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist*.

I have signed, sealed and dated, and thereby certified, the attached flood assessment report on the Property in accordance with the APEGBC Guidelines. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- ☑ 1. Collected and reviewed appropriate background information
- ___ 2. Reviewed the proposed *residential development* on the Property
- ☑ 3. Conducted field work on and, if required, beyond the Property
- ☑ 4. Reported on the results of the field work on and, if required, beyond the Property
- ☑ 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *flood hazard* analysis or *flood risk* analysis I have:
  - ☑ 6.1 reviewed and characterized, if appropriate, floods that may affect the Property
  - ☑ 6.2 estimated the *flood hazard* or *flood risk* on the property
  - ☑ 6.3 included (if appropriate) the effects of climate change and land use change
  - ☑ 6.4 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
  - ☑ 6.5 estimated the potential *consequences* to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a specific level of *flood hazard* or *flood risk* tolerance or return period that is different from the standard 200-year return period design criteria[1], I have
  - ☑ 7.1 compared the level of *flood hazard* or *flood risk* tolerance adopted by the *Approving Authority* with the findings of my investigation
  - ☑ 7.2 made a finding on the level of *flood hazard* or *flood risk* tolerance on the Property based on the comparison
  - ___ 7.3 made recommendations to reduce the *flood hazard* or *flood risk* on the Property

[1] *Flood Hazard Area Land Use Management Guidelines* published by the BC Ministry of Forests, Lands , and Natural Resource Operations and the 2009 publication *Subdivision Preliminary Layout Review – Natural Hazard Risk* published by the Ministry of Transportation and Public Infrastructure. It should be noted that the 200-year return period is a standard used typically for rivers and purely fluvial processes. For small creeks subject to debris floods and debris flows return periods are commonly applied that exceed 200 years. For life-threatening events including debris flows, the Ministry of Transportation and Public Infrastructure stipulates in their 2009 publication *Subdivision Preliminary Layout Review – Natural Hazard Risk* that a 10,000-year return period needs to be considered.

8. Where the *Approving Authority* has **not** adopted a level of *flood risk* or *flood hazard* tolerance I have:

N/A 8.1 described the method of *flood hazard* analysis or *flood risk analysis* used

N/A 8.2 referred to an appropriate and identified provincial or national guideline for level of *flood hazard* or *flood risk*

N/A 8.3 compared this guideline with the findings of my investigation

N/A 8.4 made a finding on the level of *flood hazard* of *flood risk* tolerance on the Property based on the comparison

N/A 8.5 made recommendations to reduce *flood risks*

___ 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

☑ the findings from the investigation and the adopted level of *flood hazard* or *flood risk* tolerance (item 7.2 above)

☐ the appropriate and identified provincial or national guideline for level of *flood hazard* or *flood risk* tolerance (item 8.4 above)

I hereby give my assurance that, based on the conditions contained in the attached flood assessment report,

Check one

☐ for subdivision approval, as required by the *Land Title Act* (Section 86), "that the land may be used safely for the use intended".

Check one

☐ with one or more recommended registered *covenants*.

☐ without any registered *covenant*.

☐ for a development permit, as required by the *Local Government Act* (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

☑ for a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended".

Check one

☑ with one or more recommended registered *covenants*.

☐ without any registered *covenant*.

☐ for flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* associated with the *Local Government Act* (Section 910), "the development may occur safely".

☐ for flood plain bylaw exemption, as required by the *Local Government Act* (Section 910), "the land may be used safely for the use intended".

Dale Muir
Name (print)

2016-Aug-23
Date


Signature

30 Gostick Place, North Vancouver, BC, V7M 3G3
Address

604-980-6011
Telephone

(Affix Professional seal here)

If the *Qualified Professional* is a member of a firm, complete the following.

I am a member of the firm Northwest Hydraulic Consultants Ltd. (NHC)
and I sign this letter on behalf of the firm. (Print name of firm)