TRANSMOUNTAIN

CELEBRATING 60 YEARS OF SERVICE 1953 to 2013

Trans Mountain Pipeline ULC

Trans Mountain Expansion Project

An Application Pursuant to Section 52 of the National Energy Board Act

December 2013

Volume 6d — Westridge Marine Terminal Environmental Protection Plan

KINDER MORGAN CANADA

NATIONAL ENERGY BOARD

IN THE MATTER OF

the *National Energy Board Act*,
R.S.C. 1985, c. N-7, as amended, ("*NEB Act*")
and the Regulations made thereunder;

AND IN THE MATTER OF

the *Canadian Environmental Assessment Act*, 2012,
S.C. 2012, c. 37, as amended,
and the Regulations made thereunder;

AND IN THE MATTER OF

an application by Trans Mountain Pipeline ULC
as General Partner of Trans Mountain Pipeline L.P.
(collectively "Trans Mountain")
for a Certificate of Public Convenience and Necessity and
other related approvals pursuant to Part III of the *NEB Act*

APPLICATION BY TRANS MOUNTAIN FOR APPROVAL OF THE TRANS MOUNTAIN EXPANSION PROJECT

December 2013

To: The Secretary
The National Energy Board
444 — 7th Avenue SW
Calgary, AB T2P 0X8

Trans Mountain Expansion Project
Application Pursuant to Section 52 of the *National Energy Board Act*

Guide to the Application

Application	
Transmittal - Letter to the National Energy Board	
Volume 1	Summary
Volume 2	Project Overview, Economics and General Information
Volume 3A	Public Consultation
Volume 3B	Aboriginal Engagement
Volume 3C	Landowner Relations
Volume 4A	Project Design and Execution – Engineering
Volume 4B	Project Design and Execution – Construction
Volume 4C	Project Design and Execution – Operations and Maintenance
Volume 5A	Environmental and Socio-Economic Assessment – Biophysical
Volume 5B	Environmental and Socio-Economic Assessment – Socio-Economic
Volume 5C	Environmental and Socio-Economic Assessment – Biophysical Technical Reports
Volume 5D	Environmental and Socio-Economic Assessment – Socio-Economic Technical Reports
Volume 6A	Environmental Compliance
Volume 6B	Pipeline Environmental Protection Plan
Volume 6C	Facilities Environmental Protection Plan
Volume 6D	**Westridge Marine Terminal Environmental Protection Plan**
Volume 6E	Environmental Alignment Sheets
Volume 7	Risk Assessment and Management of Pipeline and Facility Spills
Volume 8A	Marine Transportation
Volume 8B	Marine Environmental and Socio-Economic Technical Reports
Volume 8C	TERMPOL Reports

This volume contains:

Volume 6D	
Section 1.0	Introduction
Section 2.0	Environmental Protection Plan Organization
Section 3.0	Environmental Compliance
Section 4.0	Notification of Interested Parties
Section 5.0	Environmental Overview
Section 6.0	Pre-Construction Activities
Section 7.0	General Westridge Marine Terminal Construction Mitigation Measures
Section 8.0	Onshore and Marine Construction Mitigation
Section 9.0	References

Appendix A	Checklist
Appendix B	Contingency Plans
Appendix C	Management Plans
Appendix D	Contacts
Appendix E	Wildlife and Wildlife Habitat
Appendix F	Drawings
Appendix G	Details

NEB FILING MANUAL CHECKLIST

CHAPTER 3 – COMMON INFORMATION REQUIREMENTS

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
3.1 Action Sought by Applicant			
1.	Requirements of s.15 of the Rules.	Volume 1 Section 1.1	---
3.2 Application or Project Purpose			
1.	Purpose of the proposed project.	Volume 2 Section 1.1	---
3.4 Consultation		Volumes 3A, 3B, 3C; Volumes 5A, 5B Section 3; Volume 8A Section 3	--
3.4.1 Principles and Goals of Consultation			
1.	The corporate policy or vision.	Volume 3A Section 1.2.1 Volume 3B Section 1.2.1	--
2.	The principles and goals of consultation for the project.	Volume 3A Section 1.2.2 Volume 3B Section 1.2.2 Volume 5A Section 3.2.1 Volume 5B Section 3.2.1	--
3.	A copy of the Aboriginal protocol and copies of policies and principles for collecting traditional use information, if available.	Volume 3B Section 1.3.5	--
3.4.2 Design of Consultation Program			
1.	The design of the consultation program and the factors that influenced the design.	Volume 3A Section 1.3 Volume 3B Section 1.3 Volume 5A Section 3.1.1, 3.2.2 Volume 5B Section 3.1.1, 3.2.2	--
3.4.3 Implementing a Consultation Program			
1.	The outcomes of the consultation program for the project.	Volume 3A Section 1.7 Volume 3B Section 1.5 Table 1.5.1 Volume 5A Section 3.1.5, 3.2.4 Volume 5B Section 3.1.5, 3.2.4	--
3.4.4 Justification for Not Undertaking a Consultation Program			
2.	The application provides justification for why the applicant has determined that a consultation program is not required for the project.	N/A	N/A
3.5 Notification of Commercial Third Parties			
1.	Confirm that third parties were notified.	Volume 2 Section 3.2.2	--
2.	Details regarding the concerns of third parties.	Volume 2 Section 3.2.2	--
3.	List the self-identified interested third parties and confirm they have been notified.	N/A	N/A
4.	If notification of third parties is considered unnecessary, an explanation to this effect.	N/A	N/A

CHAPTER 4 – SECTIONS 4.1 AND 4.2: COMMON REQUIREMENTS FOR PHYSICAL PROJECTS

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
4.1 Description of the Project			--
1.	The project components, activities and related undertakings.	Volume 2 Section 2.0; Volume 4A	--
2.	The project location and criteria used to determine the route or site.	Volume 2 Section 4.0; Volume 4A	--
3.	How and when the project will be carried out.	Volume 2 Section 2.3; Volume 4B Section 2.0	--
4.	Description of any facilities, to be constructed by others, required to accommodate the proposed facilities.	N/A	N/A
5.	An estimate of the total capital costs and incremental operating costs, and changes to abandonment cost estimates.	Volume 2 Section 2.9	--
6.	The expected in-service date.	Volume 2 Section 1.1; Volume 4B Section 2.1	--
4.2 Economic Feasibility, Alternatives and Justification			
4.2.1 Economic Feasibility			
1.	Describe the economic feasibility of the project.	Volume 2 Section 3.5	--
4.2.2 Alternatives			
1.	Describe the need for the project, other economically-feasible alternatives to the project examined, along with the rationale for selecting the applied for project over these other possible options.	Volume 2 Section 3.0; Volume 8A Section 2.2	--
2.	Describe and justify the selection of the proposed route and site including a comparison of the options evaluated using appropriate selection criteria.	Volume 2 Section 4.0; Volume 8A Section 2.2	--
3.	Describe the rationale for the chosen design and construction methods. Where appropriate, describe any alternative designs and methods evaluated and explain why these other options were eliminated.	Volume 2 Section 4.0; Volume 8A Section 2.2	--
4.2.3 Justification			
1.	Provide a justification for the proposed project	Volume 2 Section 3.4	--

GUIDE A – A.1 ENGINEERING

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
A.1.1 Engineering Design Details			
1.	Fluid type and chemical composition.	Volume 4A Section 3.1.1	--
2.	Line pipe specifications.	Volume 4A Section 3.2.8	--
3.	Pigging facilities specifications.	Volume 4A Section 3.3.1, 3.3.2	--
4.	Compressor or pump facilities specifications.	Volume 4A Section 3.4	--
5.	Pressure regulating or metering facilities specifications.	Volume 4A Section 3.5	--
6.	Liquid tank specifications, or other commodity storage facilities.	Volume 4A Section 3.4	--
7.	New control system facilities specifications.	Volume 4A Section 3.3	--
8.	Gas processing, sulphur or LNG plant facilities specifications.	N/A	N/A
9.	Technical description of other facilities not mentioned above.	N/A	N/A
10.	Building dimensions and uses.	Volume 4A Section 3.3, 3.4, 3.5	--
11.	If project is a new system that is a critical source of energy supply, a description of the impact to the new system capabilities following loss of critical component.	N/A	N/A
A.1.2 Engineering Design Principles			
1.	Confirmation project activities will follow the requirements of the latest version of CSA Z662.	Volume 4A Section 2.2	--
2.	Provide a statement indicating which Annex is being used and for what purpose	Volume 4A Section 2.3	--
3.	Statement confirming compliance with OPR or PPR.	Volume 4A Section 2.1	--
4.	Listing of all primary codes and standards, including version and date of issue.	Volume 4A Section 2, Table 5.1.1	--
5.	Confirmation that the project will comply with company manuals and confirm manuals comply with OPR/PPR and codes and standards.	Volume 4A Section 2.6, Table 5.1.2	--
6.	Any portion of the project a non-hydrocarbon commodity pipeline system? Provide a QA program to ensure the materials are appropriate for their intended service.	N/A – all hydrocarbons	N/A
7.	If facility subject to conditions not addressed in CSA Z662: • Written statement by qualified professional engineer • Description of the designs and measures required to safeguard the pipeline	Volume 4A Section 2.9	--
8.	If directional drilling involved: • Preliminary feasibility report • Description of the contingency plan	Volume 4A Section 2.12	--
9.	If the proposed project involves the reuse of materials, provide an engineering assessment in accordance with CSA Z662 that indicates its suitability for the intended service.	Volume 4A, Section 2.7	--
10.	If new materials are involved, provide material supply chain information, in tabular format.	Volume 4A Section 2.7	
11.	If reuse of material is involved, provide an engineering assessment in accordance with CSA Z662 that indicates its suitability for the intended service.	Volume 4A, Section 2.7	--
A.1.3 Onshore Pipeline Regulations			
1.	Designs, specifications programs, manuals, procedures, measures or plans for which no standard is set out in the OPR or PPR.	--	Existing standards will be followed
2.	A quality assurance program if project non-routine or incorporates unique challenges due to geographical location.	--	No unique challenges
3.	If welding performed on a liquid-filled pipeline that has a carbon equivalent of 0.50% or greater and is a permanent installation: • Welding specifications and procedures • Results of procedure qualification tests	--	Welding on liquid filled pipe will not be conducted

GUIDE A – A.2 ENVIRONMENTAL AND SOCIO-ECONOMIC ASSESSMENT

The following table identifies where information requested in the National Energy Board (NEB) Filing Manual Guide A – A.2 Environmental and Socio-economic Assessment checklist may be found in the various volumes of the Application for the Trans Mountain Expansion Project.

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
A.2.5 Description of the Environmental and Socio-Economic Setting				
1.	Identify and describe the current biophysical and socio-economic setting of each element (*i.e.*, baseline information) in the area where the project is to be carried out.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
2.	Describe which biophysical or socio-economic elements in the study area are of ecological, economic, or human importance and require more detailed analysis taking into account the results of consultation (see Table A-1 for examples). Where circumstances require more detailed information in an ESA see: i. Table A-2 – Filing Requirements for Biophysical Elements; or ii. Table A-3 – Filing Requirements for Socio-economic Elements.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
3.	Provide supporting evidence (*e.g.*, references to scientific literature, field studies, local and traditional knowledge, previous environmental assessment and monitoring reports) for: • information and data collected; • analysis completed; • conclusions reached; and • the extent of professional judgment or experience relied upon in meeting these information requirements, and the rationale for that extent of reliance.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
4.	Describe and substantiate the methods used for any surveys, such as those pertaining to wildlife, fisheries, plants, species at risk or species of special status, soils, heritage resources or traditional land use, and for establishing the baseline setting for the atmospheric and acoustic environment.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
5.	Applicants must consult with other expert federal, provincial or territorial departments and other relevant authorities on requirements for baseline information and methods.	Volume 5A: ESA - Biophysical • Sections 3.0, 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 3.0, 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Sections 3.0 and 4.2 Volume 8B: Technical Reports	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
A.2.6 Effects Assessment				
Identification and Analysis of Effects				
1.	Describe the methods used to predict the effects of the project on the biophysical and socio-economic elements, and the effects of the environment on the project (*i.e.*, changes to the Project caused by the environment).	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Technical Reports	Volume 8A: Marine Transportation • Sections 4.3, 5.5 and 5.6	---
2.	Predict the effects associated with the proposed project, including those that could be caused by construction, operations, decommissioning or abandonment, as well as accidents and malfunctions. Also include effects the environment could have on the project. For those biophysical and socio-economic elements or their valued components that require further analysis (see Table A-1), provide the detailed information outlined in Tables A-2 and A-3.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Technical Reports	Volume 8A: Marine Transportation • Sections 4.3, 5.6 and 5.7 Volume 8B: Technical Reports	---
Mitigation Measures for Effects				
1.	Describe the standard and project specific mitigation measures and their adequacy for addressing the project effects, or clearly reference specific sections of company manuals that provide mitigation measures. Ensure that referenced manuals are current and filed with the NEB.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports Volume 6B: Pipeline Environmental Protection Plan (EPP) Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP Volume 6E: Environmental Alignment Sheets Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 2.0, 3.0, 4.0, 6.0, 7.0, and 8.0 • Technical Reports	Volume 8A: Marine Transportation • Sections 4.3, 5.1, 5.3, 5.6 and 5.7 Volume 8B: Technical Reports	---
2.	Ensure that commitments about mitigative measures will be communicated to field staff for implementation through an Environmental Protection Plan.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP Volume 6E: Environmental Alignment Sheets Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 2.0, 3.0, 4.0, 6.0, 7.0 and 8.0	Volume 8A: Marine Transportation • Sections 4.3, 5.1, 5.3, 5.6 and 5.7	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
3.	Describe plans and measures to address potential effects of accidents and malfunctions during construction and operation of the project.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 2.0, 4.0, 6.0, 7.0 and 8.0	Volume 8A: Marine Transportation • Sections 4.3, 5.1, 5.3, 5.6 and 5.7	---
Evaluation of Significance				
1.	After taking into account any appropriate mitigation measures, identify any remaining residual effects from the project.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
2.	Describe the methods and criteria used to determine the significance of remaining adverse effects, including defining the point at which any particular effect on a valued component is considered “significant”.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
3.	Evaluate significance of residual adverse environmental and socio-economic effects against the defined criteria.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
4.	Evaluate the likelihood of significant, residual adverse environmental and socio-economic effects occurring and substantiate the conclusions made.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
A.2.7 Cumulative Effects Assessment				
Scoping and Analysis of Cumulative Effects				
1.	Identify the valued components for which residual effects are predicted, and describe and justify the methods used to predict any residual results.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
2.	For each valued component where residual effects have been identified, describe and justify the spatial and temporal boundaries used to assess the potential cumulative effects.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
3.	Identify other physical works or activities that have been or will be carried out within the identified spatial and temporal boundaries for the cumulative effects assessment.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
4.	Identify whether the effects of those physical works or activities that have been or will be carried out would be likely to produce effects on the valued components within the identified spatial and temporal boundaries.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
5.	Where other physical works or activities may affect the valued components for which residual effects from the applicant's proposed project are predicted, continue the cumulative effects assessment, as follows: • consider the various components, phases and activities associated with the applicant's project that could interact with other physical work or activities; • provide a description of the extent of the cumulative effects on valued components; and • where professional knowledge or experience is cited, explain the extent to which professional knowledge or experience was relied upon and justify how the resulting conclusions or decisions were reached.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
Mitigation Measures for Cumulative Effects				
1.	Describe the general and specific mitigation measures, beyond project-specific mitigation already considered, that are technically and economically feasible to address any cumulative effects.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
Applicant's Evaluation of Significance of Cumulative Effects				
1.	After taking into account any appropriate mitigation measures for cumulative effects, identify any remaining residual cumulative effects.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
2.	Describe the methods and criteria used to determine the significance of remaining adverse cumulative effects, including defining the point at which each identified cumulative effect on a valued component is considered "significant".	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
3.	Evaluate the significance of adverse residual cumulative effects against the defined criteria.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
4.	Evaluate the likelihood of significant, residual adverse cumulative environmental and socio-economic effects occurring and substantiate the conclusions made.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
A.2.8 Inspection, Monitoring and Follow-up				
1.	Describe inspection plans to ensure compliance with biophysical and socio-economic commitments, consistent with Sections 48, 53 and 54 of the *NEB Onshore Pipeline Regulations (OPR)*.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP	Volume 8A: Marine Transportation • Section 4.3	---
2.	Describe the surveillance and monitoring program for the protection of the pipeline, the public and the environment, as required by Section 39 of the *NEB OPR*.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP	Volume 8A: Marine Transportation • Section 4.3	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
3.	Consider any particular elements in the Application that are of greater concern and evaluate the need for a more in-depth monitoring program for those elements.	Volume 5A: ESA - Biophysical • Sections 9.0 and 10.0 Volume 5B: ESA - Socio-Economic • Sections 9.0 and 10.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP (Socio-Economic Management Plan of Appendix C)	Volume 8A: Marine Transportation • Section 4.5	---
4.	For *Canadian Environmental Assessment (CEA) Act, 2012* designated projects, identify which elements and monitoring procedures would constitute follow-up under the *CEA Act, 2012*.	Volume 5A: ESA - Biophysical • Section 10.0 Volume 5B: ESA - Socio-economic • Section 10.0	N/A	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
Table A-1 Circumstances and Interactions Requiring Detailed Biophysical and Socio-Economic Information				
Physical and meteorological environment		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0 and 7.0	N/A	---
Soil and soil productivity		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Soil Assessment Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 5.3, 6.0 and 7.0	N/A	---
Water quality and quantity (onshore and marine)		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Groundwater Technical Report • Fisheries (Alberta) Technical Report • Fisheries (British Columbia) Technical Report • Wetland Evaluation Technical Report • Marine Sediment and Water Quality – Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 7.0 • Quality Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Ecological Risk Assessment of Marine Transportation Spills Technical Report	---
Air emissions (onshore and marine)		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Marine Air Quality and Greenhouse Gas – Marine Transportation Technical Report • Air Quality and Greenhouse Gas Emissions Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 7.0	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Air Quality and Greenhouse Gas Emissions	---
Greenhouse gas emissions (onshore and marine)		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0 and 7.0 Volume 5C: ESA - Biophysical Technical Reports • Air Quality and Greenhouse Gas Emissions Technical Report	Volume 8A: Marine Transportation • Sections 4.2 and 4.3 Volume 8B: Technical Reports • Marine Air Quality and Greenhouse Gas Emissions	---
Acoustic environment (onshore and marine)		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0, and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Acoustic Environment Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3 and 4.4 Volume 8B: Technical Reports • Marine Noise (Atmospheric)	---
Fish and fish habitat (onshore and marine), including any fish habitat compensation required		Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Fisheries (Alberta) Technical Report • Fisheries (British Columbia) Technical Report • Marine Resources - Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Resources – Marine Transportation Technical Report • Ecological Risk Assessment of Westridge Marine Terminal Spills	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
	Wetlands	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Wetland Evaluation Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	N/A	---
	Vegetation	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Vegetation Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	N/A	---
	Wildlife and wildlife habitat (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Wildlife and Wildlife Habitat Technical Report • Wildlife Modeling and Species Accounts Report • Marine Resources –Westridge Marine Terminal Technical Report • Marine Birds – Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2. 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Resources – Marine Transportation Technical Report • Marine Birds – Marine Transportation Technical Report • Ecological Risk Assessment of Westridge Marine Terminal Spills	---
	Species at Risk or Species of Special Status and related habitat (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Fisheries (Alberta) Technical Report • Fisheries (British Columbia) Technical Report • Vegetation Technical Report • Wildlife and Wildlife Habitat Technical Report • Wildlife Modeling and Species Accounts Report • Marine Resources –Westridge Marine Terminal Technical Report • Marine Birds – Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2. 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Resources – Marine Transportation Technical Report • Marine Birds – Marine Transportation Technical Report • Marine Transportation Spills Ecological Risk Assessment Technical Report	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
Human occupancy and resource use (onshore and marine)		Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report • Managed Forest Areas Technical Report • Agricultural Assessment Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Commercial, Recreational and Tourism Use – Marine Transportation Technical Report	---
Heritage resources		Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0 and 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 6.3.3	N/A	---
Navigation and navigation safety		Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0 and 7.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report	Volume 8A: Marine Transportation • Section 5.2	---
Traditional land and resource use		Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Traditional Land and Resource Use Report • Pipeline and Facilities Human Health Risk Assessment Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Traditional Marine Use Report for Marine Transportation • Marine Transportation Human Health Risk Assessment Technical Report	---
Social and cultural well-being		Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0	N/A	---
Human health and aesthetics		Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report • Community Health Technical Report • Viewshed Modelling Analysis Technical Report • Pipeline and Facilities Human Health Risk Assessment Technical Report Volume 7 Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Qualitative Human Health Risk Assessment of Westridge Marine Terminal Technical Report Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Transportation Human Health Risk Assessment Technical Report • Marine Transportation Spills Human Health Risk Assessment Technical Report	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
	Infrastructure and services	Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report • Community Health Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Commercial, Recreational and Tourism Use – Marine Transportation Technical Report	---
	Employment and economy	Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report • Worker Expenditures Analysis Technical Report	N/A	---

GUIDE A – A.3 ECONOMICS

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
A.3.1 Supply			
1.	A description of each commodity.	Volume 2 Section 3.1.1	--
2.	A discussion of all potential supply sources.	Volume 2 Section 3.3.2	--
3.	Forecast of productive capacity over the economic life of the facility.	Volume 2 Sections 3.3.1, 3.4.1	
4.	For pipelines with contracted capacity, a discussion of the contractual arrangements underpinning supply.	Volume 2 Section 3.3.2	--
A.3.2 Transportation Matters			
Pipeline Capacity			
1.	In the case of expansion provide: • Pipeline capacity before and after and size of increment • Justification that size of expansion is appropriate	Volume 2 Sections 1.1, 2.1, 3.5	--
2.	In case of new pipeline, justification that size of expansion is appropriate given available supply.	N/A – expansion	N/A
Throughput			
1.	For pipelines with contracted capacity, information on contractual arrangements.	Volume 2 Section 3.2.1	--
2.	For non-contract carrier pipelines, forecast of annual throughput volumes by commodity type, receipt location and delivery destination over facility life.	N/A	N/A
3.	If project results in an increase in throughput: • theoretical and sustainable capabilities of the existing and proposed facilities versus the forecasted requirements • flow formulae and flow calculations used to determine the capabilities of the proposed facilities and the underlying assumptions and parameters	Volume 2 Section 3.1	--
4.	If more than one type of commodity transported, a discussion pertaining to segregation of commodities including potential contamination issues or cost impacts.	N/A	N/A
A.3.3 Markets			
1.	Provide an analysis of the market in which each commodity is expected to be used or consumed.	Volume 2 Section 3.4.2	--
2.	Provide a discussion of the physical capability of upstream and downstream facilities to accept the incremental volumes that would be received and delivered.	Volume 2 Section 3.4.2	--
A.3.4 Financing			
1.	Evidence that the applicant has the ability to finance the proposed facilities.	Volume 2 Section 3.2.2	--
2.	Estimated toll impact for the first full year that facilities are expected to be in service.	Volume 2 Section 3.2.1	--
3.	Confirmation that shippers have been apprised of the project and toll impact, their concerns and plans to address them.	Volume 2 Section 3.2.1	--
4.	Additional toll details for applications with significant toll impacts.	Volume 2 Section 3.2.1	
A.3.5 Non-NEB Regulatory Approvals			
1.	Confirm that all non-NEB regulatory approvals required to allow the applicant to meet its construction schedule, planned in-service date and to allow the facilities to be used and useful are or will be in place.	Volume 2 Section 1.5	--
2.	If any of the approvals referred to in #1 may be delayed, describe the status of those approval(s) and provide an estimation of when the approval is anticipated.	Volume 2 Section 1.5	--

GUIDE A – A.4 LANDS INFORMATION

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
A.4.1 Land Areas			
1.	• Width of right-of-way and locations of any changes to width • Locations and dimensions of known temporary work space and drawings of typical dimensions • Locations and dimensions of any new lands for facilities	Volume 2 Section 5.2	--
A.4.2 Land Rights			
1.	The type of lands rights proposed to be acquired for the project.	Volume 2 Section 5.3	--
2.	The relative proportions of land ownership along the route of the project.	Volume 2 Section 5.3.2	--
3.	Any existing land rights that will be required for the project.	Volume 2 Section 5.4	--
A.4.3 Lands Acquisition Process			
1.	The process for acquiring lands.	Volume 2 Section 5.4.1, 5.4.2	--
2.	The timing of acquisition and current status.	Volume 2 Section 5.4.3	--
3.	The status of service of section 87(1) notices.	Volume 2 Section 5.4.4	--
A.4.4 Land Acquisition Agreements			
1.	A sample copy of each form of agreement proposed to be used pursuant to section 86(2) of the NEB Act.	Volume 2 Section 5.4.2	--
2.	A sample copy of any proposed fee simple, work space, access or other land agreement.	Volume 2 Section 5.5.2	--
A.4.5 Section 87 Notices			
1.	A sample copy of the notice proposed to be served on all landowners pursuant to section 87(1) of the NEB Act.	Volume 2 Section 5.4.4, Appendix D	--
2.	Confirmation that all notices include a copy of Pipeline Regulation in Canada: A Guide for Landowners and the Public.	Volume 2 Section 5.4.4	--
A.4.6 Section 58 Application to Address a Complaint			
1.	The details of the complaint and describe how the proposed work will address the complaint.	N/A	N/A

CONCORDANCE TABLE WITH THE *CEA ACT, 2012*

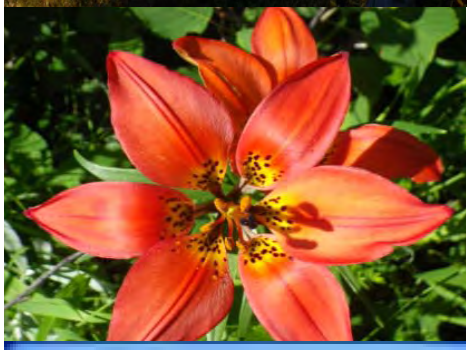
CEA Act, 2012 Requirement	Section in *CEA Act, 2012*	Application Volume and Section
The environmental effects of the designated project, including:		
the environmental effects of malfunctions or accidents that may occur in connection with the designated project;	s.19.1(a)	Volume 5A ESA - Biophysical: • Section 7.0 Volume 5B ESA - Socio-economic: • Section 7.0 Volume 7 Risk Assessment and Management of Pipeline and Facility Spills Volume 8A Marine Transportation: • Sections 4.3 and 5.0
any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;	s.19.1(a)	Volume 5A ESA - Biophysical: • Section 8.0 Volume 5B ESA - Socio-economic: • Section 8.0 Volume 8A Marine Transportation: • Section 4.4
the significance of the effects referred to in paragraph (a);	s.19.1(b)	Volume 5A ESA - Biophysical: • Sections 7.0 and 8.0 Volume 5B ESA - Socio-economic: • Sections 7.0 and 8.0 Volume 8A Marine Transportation: • Sections 4.3 and 4.4
comments from the public – or, with respect to a designated project that requires that a certificate be issued in accordance with an order made under section 54 of the *National Energy Board Act*, any interested party – that are received in accordance with this *act*;	s.19.1(c)	Volume 3A Public Consultation Volume 3B Aboriginal Engagement Volume 3C Landowner Relations Volume 5A ESA - Biophysical: • Section 3.0 Volume 5B ESA - Socio-economic: • Section 3.0 Volume 8A Marine Transportation: • Section 3.0
mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;	s.19.1(d)	Volume 5A ESA - Biophysical: • Sections 7.0 and 8.0 Volume 5B ESA - Socio-economic: • Sections 7.0 and 8.0 Volume 5C ESA – Biophysical Technical Reports Volume 5D ESA - Socio-economic Technical Reports Volume 6B Pipeline Environmental Protection Plan Volume 6C Facilities Environmental Protection Plan Volume 6D Westridge Marine Terminal Environmental Protection Plan Volume 6E Environmental Alignment Sheets Volume 8A Marine Transportation: • Sections 4.3, 4.4 and 5.0 Volume 8B Technical Reports
the requirements of the follow-up program in respect of the designated project;	s.19.1(e)	Volume 5A ESA - Biophysical: • Section 10.0 Volume 5B ESA - Socio-economic: • Section 10.0
the purpose of the designated project;	s.19.1(f)	Volume 5A ESA - Biophysical: • Section 2.0 Volume 5B ESA - Socio-economic: • Section 2.0 Volume 8A Marine Transportation: • Section 1.1

CONCORDANCE TABLE WITH THE *CEA ACT, 2012*

CEA Act, 2012 Requirement	Section in *CEA Act, 2012*	Application Volume and Section
alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alterative means;	s.19.1(g)	Volume 5A ESA - Biophysical: • Sections 2.0 and 4.0 Volume 5B ESA - Socio-economic: • Sections 2.0 and 4.0 Volume 8A Marine Transportation: • Section 2.2
any change to the designated project that may be caused by the environment;	s.19.1(h)	Volume 5A ESA - Biophysical: • Section 7.10 Volume 8A Marine Transportation: • Section 4.3
the results of any relevant study conducted by a committee established under section 73 or 74; and	s.19.1(i)	N/A
any other matter relevant to the environmental assessment that the responsible authority, or, – if the environmental assessment is referred to a review panel – the Minister, requires to be taken into account.	s.19.1(j)	Volume 8A Marine Transportation Volume 8B Technical Reports Volume 8C TERMPOL Reports These volumes take into consideration the *Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities, Trans Mountain Expansion Project* (September 10, 2013) (NEB 2013)
The environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge.	s 19.3	Volume 5A ESA - Biophysical: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C ESA - Biophysical Technical Reports Volume 5D ESA - Socio-economic Technical Reports Volume 8A Marine Transportation: • Sections 4.2, 4.3 and 4.4 Volume 8B Technical Reports
Subsection 5(1) of *CEA Act, 2012* defines environmental effects as a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:		
fish as defined in section 2 of the *Fisheries Act* and fish habitat as defined in subsection 34(1) of that *Act*;	s.5(1)(a)(i)	Volume 5A ESA - Biophysical: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C ESA - Biophysical Technical Reports Volume 8A Marine Transportation: • Sections 4.2, 4.3, 4.4 and 5.0 Volume 8B Technical Reports
aquatic species as defined in subsection 2(1) of the *Species at Risk Act;*	s.5(1)(a)(ii)	Volume 5A ESA - Biophysical: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C ESA - Biophysical Technical Reports Volume 8A Marine Transportation: • Sections 4.2, 4.3, 4.4 and 5.0 Volume 8B Technical Reports
migratory birds as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994*, and	s.5(1)(a)(iii)	Volume 5A ESA - Biophysical: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C ESA - Biophysical Technical Reports Volume 8A Marine Transportation: • Sections 4.2, 4.3, 4.4 and 5.0 Volume 8B Technical Reports
any other component of the environment that is set out in Schedule 2.	s.5(1)(a)(iv)	N/A
Subsection 5(1) of the *CEA Act, 2012* defines environmental effects as (b) a change that may be caused to the environment that would occur		
on federal lands,	s.5(1)(b)(i)	Volume 5A ESA - Biophysical: • Section 7.0 Volume 5B ESA - Socio-economic: • Section 7.0
in a province other than the one in which the *act* or thing is done or where the physical activity, the designated project or the project is being carried out, or	s.5(1)(b)(ii)	N/A No changes are anticipated in provinces other than Alberta and BC in relation to the ESA.
outside Canada.	s.5(1)(b)(iii)	Volume 8A Marine Transportation: • Sections 4.3, 4.4 and 5.0
Subsection 5(1) of the *CEA Act, 2012* defines environmental effects as (c) with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on:		

CONCORDANCE TABLE WITH THE *CEA ACT, 2012*

CEA Act, 2012 Requirement	Section in *CEA Act, 2012*	Application Volume and Section
health and socio-economic conditions;	s.5(1)(c)(i)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D ESA - Socio-economic Technical Reports Volume 8A Marine Transportation: • Sections 4.3 and 4.4 Volume 8B Technical Reports
physical and cultural heritage;	s.5(1)(c)(ii)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0 and 7.0
the current use of lands and resources for traditional purposes; or	s.5(1)(c)(iii)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D ESA - Socio-economic Technical Reports Volume 8A Marine Transportation: • Sections 4.3 and 4.4 Volume 8B Technical Reports
any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.	s.5(1)(c)(iv)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0 and 7.0



WESTRIDGE MARINE TERMINAL ENVIRONMENTAL PROTECTION PLAN FOR THE TRANS MOUNTAIN PIPELINE ULC TRANS MOUNTAIN EXPANSION PROJECT

December 2013

ESA-NEB-TERA-00006D

Prepared for:

TRANSMOUNTAIN

Trans Mountain Pipeline ULC

Kinder Morgan Canada Inc.
Suite 2700, 300 – 5th Avenue S.W.
Calgary, Alberta T2P 5J2
Ph: 403-514-6400

Prepared by:

tera ENVIRONMENTAL CONSULTANTS

TERA Environmental Consultants
Suite 1100, 815 - 8th Avenue S.W.
Calgary, Alberta T2P 3P2
Ph: 403-265-2885

BACKGROUND

Trans Mountain Pipeline ULC (Trans Mountain) is a Canadian corporation with its head office located in Calgary, Alberta. Trans Mountain is a general partner of Trans Mountain Pipeline L.P., which is operated by Kinder Morgan Canada Inc. (KMC), and is fully owned by Kinder Morgan Energy Partners, L.P. Trans Mountain is the holder of the National Energy Board (NEB) certificates for the Trans Mountain pipeline system (TMPL system).

The TMPL system commenced operations 60 years ago and now transports a range of crude oil and petroleum products from Western Canada to locations in central and southwestern British Columbia (BC), Washington State and offshore. The TMPL system currently supplies much of the crude oil and refined products used in BC. The TMPL system is operated and maintained by staff located at Trans Mountain's regional and local offices in Alberta (Edmonton, Edson, and Jasper) and BC (Clearwater, Kamloops, Hope, Abbotsford, and Burnaby).

The TMPL system has an operating capacity of approximately 47,690 m^3/d (300,000 bbl/d) using 23 active pump stations and 40 petroleum storage tanks. The expansion will increase the capacity to 141,500 m^3/d (890,000 bbl/d).

The proposed expansion will comprise the following:

- pipeline segments that complete a twinning (or "looping") of the pipeline in Alberta and BC with about 987 km of new buried pipeline;
- new and modified facilities, including pump stations and tanks: and
- three new berths at the Westridge Marine Terminal in Burnaby, BC, each capable of handling Aframax class vessels.

The expansion has been developed in response to requests for service from Western Canadian oil producers and West Coast refiners for increased pipeline capacity in support of growing oil production and access to growing West Coast and offshore markets. NEB decision RH-001-2012 reinforces market support for the expansion and provides Trans Mountain the necessary economic conditions to proceed with design, consultation, and regulatory applications.

Application is being made pursuant to Section 52 of the *National Energy Board Act* (*NEB Act*) for the proposed Trans Mountain Expansion Project (referred to as "TMEP" or "the Project"). The NEB will undertake a detailed review and hold a public hearing to determine if it is in the public interest to recommend a Certificate of Public Convenience and Necessity (CPCN) for construction and operation of the Project. Subject to the outcome of the NEB hearing process, Trans Mountain plans to begin construction in the fourth quarter (Q4) of 2015 and go into service in late 2017.

Trans Mountain has embarked on an extensive program to engage Aboriginal communities and to consult with landowners, regulatory authorities (*e.g.*, municipalities), stakeholders, and the general public. Information on the Project is also available at www.transmountain.com.

The scope of the Project will involve:

- using existing active 610 mm (NPS 24) and 762 mm (NPS 30) OD buried pipeline segments;
- constructing three new 914 mm (NPS 36) OD buried pipeline segments totalling approximately 987 km:
  - Edmonton to Hinton – 339.4 km;
  - Hargreaves to Darfield – 279.4 km; and
  - Black Pines to Burnaby – 367.9 km.

- reactivating two 610 mm (NPS 24) OD buried pipeline segments that have been maintained in a deactivated state:
  - Hinton to Hargreaves – 150 km; and
  - Darfield to Black Pines – 43 km.
- constructing two, 3.6 km long 762 mm (NPS 30) OD buried delivery lines from Burnaby Terminal to Westridge Marine Terminal (the Westridge delivery lines);
- installing 23 new sending or receiving traps (16 on the Edmonton-Burnaby mainlines), for in-line inspection tools, at nine existing sites and one new site;
- adding 35 new pumping units at 12 locations (*i.e.,* 11 existing and one new pump station site);
- reactivating the existing Niton Pump Station that has been maintained in a deactivated state;
- constructing 20 new tanks located at the Edmonton (5), Sumas (1) and Burnaby (14) Terminals, preceded by demolition of 2 existing tanks at Edmonton (1) and Burnaby (1), for a net total of 18 tanks to be added to the system; and
- constructing one new dock complex, with a total of three Aframax-capable berths, as well as a utility dock (for tugs, boom deployment vessels, and emergency response vessels and equipment) at Westridge Marine Terminal, followed by the deactivation and demolition of the existing berth.

Figure B-1 illustrates the regional location of the TMEP and the existing TMPL system in Alberta and BC.

TRANS MOUNTAIN

FIGURE B-1

PROJECT OVERVIEW
ALBERTA AND BRITISH COLUMBIA

TRANS MOUNTAIN
EXPANSION PROJECT

- Kilometre Post (KP)
- Reference Kilometre Post (RK)
- Trans Mountain Pipeline (TMPL)
- Trans Mountain Expansion Project Proposed Pipeline Corridor
- Terminal
- Pump Station (Pump Additions, Station Modifications and/or Scraper Facilities)
- New Pump Station (Proposed)
- Pump Station (Reactivated)
- Existing Pump Station
- Highway
- Railway
- City / Town / District Municipality
- Indian Reserve / Métis Settlement
- National Park
- Provincial Park
- Protected Area / Natural Area / Provincial Recreation Area / Wilderness Provincial Park / Conservancy Area
- Provincial Boundary
- International Boundary

Projection: LCC Modified. Routing: Baseline TMPL & Facilities: provided by KMC, 2012; Proposed Pipeline Corridor V6: provided by UPI, Aug. 23, 2013; Transportation: IHS Inc., 2013, BC Forests, Lands and Natural Resource Operations, 2012 & Natural Resources Canada, 2012; Geopolitical Boundaries: Natural Resources Canada, 2003, AltaLIS, 2013, IHS Inc., 2011, BC FLNRO, 2007 & ESRI, 2005; First Nation Lands: Government of Canada, 2013, AltaLIS, 2010 & IHS Inc., 2011; Hydrology: Natural Resources Canada, 2007 & BC Crown Registry and Geographic Base Branch, 2008; Parks and Protected Areas: Natural Resources Canada, 2012, AltaLIS, 2012 & BC FLNRO, 2008; ATS Grid: AltaLIS, 2009; Edmonton TUC: Alberta Infrstructure, 2011; Canadian Hillshade: TERA Environmental Consultants, 2008; US Hillshade: Copyright:© 2013 Esri

tera ENVIRONMENTAL CONSULTANTS

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

MAP NUMBER	201312_MAP_TERA_ESA_00503_REV0		PAGE SHEET 1 OF 1
DATE	December 2013	TERA REF. 7894	REVISION 0
SCALE	1:2,250,000	PAGE SIZE 11x17	DISCIPLINE ESA
DRAWN	AJS	CHECKED TGG	DESIGN TGG

0 25 50 75 100 km

ALL LOCATIONS APPROXIMATE

201312_MAP_TERA_ESA_00503_RevO.mxd

Westridge Marine Terminal

The Westridge Marine Terminal is located on the south shore of Burrard Inlet, east of the Second Narrows at RK 3.6 (d-047-D/092-G-07) of the Westridge delivery lines. Design of the additional facilities at the Westridge Marine Terminal is currently underway. These plans include constructing the following dock facilities:

- one dock with three operational berths for Aframax tankers, with one of the three new berths equipped to accommodate oil and jet fuel barges; and
- one small utility dock with multiple berths for pilot launches, tugs, spill response vessels and equipment.

The proposed configuration of the new docks is provided in Volume 4A. Some near shore dredging might be necessary to accommodate construction of the new docks.

Each of the three tanker berths consists of a number of individual elements or structures arranged in accordance with the accepted industry practice. Typical elements include:

- fender and mooring structures;
- containment boom;
- vessel access towers;
- delivery and receipt pipeline systems, including loading arms;
- pedestrian catwalks connecting the dolphin structures to the central platform; and
- vapour recovery systems and fire-suppression systems.

The existing water lease will need to be expanded to accommodate the new docks. Foreshore lands will also be expanded along the lateral footprint to provide the necessary space for land based infrastructure. The outer face of the fill will be protected with rip rap (stone armour) to prevent erosion.

New scraper receiving facilities will be installed for the two new Westridge delivery lines between the Burnaby Terminal and the Westridge Marine Terminal. The new scraper receiving facilities will be installed within the existing fence line of the Westridge Marine Terminal on previously disturbed lands owned by Trans Mountain.

The existing electrical substation and electricity supply line within the Westridge Marine Terminal will be upgraded as required. Electrical upgrades will be determined through a study to be conducted by BC Hydro. At this time, it is anticipated that an additional 3 MW of power will be required at this facility. No new roads will be required to access the terminal. However, an improved site access road and an expanded parking area for staff and Contractors will be required. No new access will be constructed across the existing Canadian Pacific Railway line that bisects the facility.

The nearest residence is located approximately 75 m south of the Westridge Marine Terminal property boundaries.

ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Full Name
bbls	barrels
bbl/d	barrels per day
BC	British Columbia
BC MFLNRO	British Columbia Ministry of Forests, Lands and Natural Resource Operations
BC MOE	British Columbia Ministry of Environment
BC MWLAP	British Columbia Ministry of Water, Land and Air Protection
CCME	Canadian Council of Ministers of the Environment
DFO	Fisheries and Oceans Canada
DO	Dissolved oxygen
DWT	deadweight tonnes
EHS	KMC's Environmental, Health, and Safety Management System, as adopted by Trans Mountain for the TMEP
EPP	Environmental Protection Plan
ESA	Environmental and Socio-Economic Assessment
GHG	greenhouse gas
ha	hectare
km	kilometre
KMC	Kinder Morgan Canada Inc.
m	metre
m^3	cubic metres
m^3/d	cubic metres per day
mm	Millimetres
NEB	National Energy Board
NEB *Act*	*National Energy Board Act*
NPS	Nominal Pipe Size
NTU	Nephelometric Turbidity Unit
OD	outside diameter
PAH	polycyclic aromatic hydrocarbon
PMV	Port Metro Vancouver
Project	Trans Mountain Expansion Project
RK	Reference Kilometre Post
SARA	*Species at Risk Act*
TBD	to be determined
TERA	TERA Environmental Consultants
TMEP	Trans Mountain Expansion Project
Trans Mountain	Trans Mountain Pipeline ULC
TSS	total suspended solids
WHMIS	Workplace Hazardous Materials Information System

GLOSSARY

Term	Definition
air quality	A measure of the chemical pollutant loading in the atmosphere. As a measure or metric, it is generally related to human health endpoints, odour thresholds or environmental effects that are developed and regulated by municipal, provincial or federal regulatory authorities. Ambient air quality objectives or standards have been developed to reflect the more stringent effect and measured or predicted levels are commonly compared to these values as a gauge of compliance as well as the degree of quality of the air.
borrow material	Imported, non-native soil, aggregate or consolidated materials that are used during pipeline construction.
development zone	The non-vegetated, gravel padded or paved area located within the boundaries of a facility footprint.
Environmental Alignment Sheets	A series of maps noting the locations of select environmental features that are encountered by the proposed corridor, associated potential issues and recommended mitigation measures.
Environment, Health and Safety Policy	KMC's EHS Management System which has been adopted by Trans Mountain. This is the formalization of Trans Mountain's commitment to conduct business in a safe and environmentally responsible manner supported through a series of commitments.
Environmental/Community Relations Education Program	A training system that identifies regulations, legislation and valuable environmental components that might be encountered throughout TMEP activities. The recommendations of the valuable environmental components are discussed, as well as public relations and communication with regards to TMEP activities and the surrounding environment.
feasible	Capable of being reasonably accomplished or brought about given environmental and economic considerations.
Health, Safety and Environment Policy	The formalization of Trans Mountain's commitment to conduct business in a safe and environmentally responsible manner supported through a series of commitments
high tide	The state of the tide at its highest level.
hydrostatic testing	The use of water for pressure testing a pipeline to a pressure of at least 25% greater than the planned operating pressure in order to expose potential defects or leaks and ensure integrity.
Kinder Morgan Canada	Kinder Morgan Canada inc. (KMC) is a corporation owned by Kinder Morgan Energy Partners. KMC operates Trans Mountain Pipeline L.P., a general partner of Trans Mountain Pipeline ULC (Trans Mountain)
low tide	The state of the tide at its lowest level (0 m chart datum).
Lower Mainland Region	Geographic area located approximately west of Hope, BC to Vancouver, BC
merchantable timber	Timber that will be sold to a timber processor.
Mitigation measures	mean measures for the elimination, reduction or control of a project's adverse environmental effects, including restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.
National Energy Board	An independent federal agency established in 1959 by the Parliament of Canada to regulate international and interprovincial pipelines and associated facilities.
Noxious weeds	A plant designated in accordance with the regulations as a noxious weed and includes the plant's seeds; a person shall control a noxious weed that is on land the person owns or occupies (*Weed Control Act*).
onshore	Area of land extending back from the high tide mark.
offshore	Area of water extending from continental shelf to the nearshore boundary.
Port Metro Vancouver	A non-shareholder, financially self-sufficient corporation established by the Government of Canada, and accountable to the federal Minister of Transport, responsible for the operation and development of the assets and jurisdictions of over 600 km of shoreline, extending from Point Roberts at the Canada/US border through Burrard Inlet to Port Moody and Indian Arm, and from the mouth of the Fraser River, eastward to the Fraser Valley.
practical	Capable of or suitable to being put into effect, given environmental and economic considerations.
Prime Contractor	Main company contracted for the coordination, supervision and completion of the Trans Mountain Expansion Project.
root zone material	L-H and Ae horizon material and includes Bm and Bf horizons in British Columbia (the upper 15-20 cm of material)
shoreline	The line along which a large body of water meets the land.
topsoil	Ah, Ahe or Ap horizons and in some cases when the B is cultivated, a Bp horizon.
warranted	Justify or necessitate a course of action.
Westridge Delivery Line	A single 609.6 mm (24 inch) OD delivery line measuring 4 km in length that runs from the Burnaby Terminal to the Westridge Marine Terminal. The Project consists of two (2) additional lines, each 762 mm (30 inch) OD, and approximately 4 km in length.
Westridge Marine Terminal	Trans Mountain owned marine loading facility located within Port Metro Vancouver that can accommodate ships up to 120,000 DWT and barges. The Westridge Marine Terminal has been in operation since 1957.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF DRAWINGS

LIST OF DETAILS

1.0 INTRODUCTION

Trans Mountain Pipeline ULC (Trans Mountain) is a Canadian corporation with its head office located in Calgary, Alberta. Trans Mountain is a general partner of Trans Mountain Pipeline L.P., which is operated by Kinder Morgan Canada Inc. (KMC), and is fully owned by Kinder Morgan Energy Partners, L.P. Trans Mountain is the holder of the National Energy Board (NEB) certificates for the Trans Mountain pipeline system (TMPL system).

The TMPL system commenced operations 60 years ago and now transports a range of crude oil and petroleum products from Western Canada to locations in central and southwestern British Columbia (BC), Washington State and offshore. The TMPL system currently supplies much of the crude oil and refined products used in BC. The TMPL system is operated and maintained by staff located at Trans Mountain's regional and local offices in Alberta (Edmonton, Edson, and Jasper) and BC (Clearwater, Kamloops, Hope, Abbotsford, and Burnaby).

The TMPL system has an operating capacity of approximately 47,690 m^3/d (300,000 bbl/d) using 23 active pump stations and 40 petroleum storage tanks. The expansion will increase the capacity to 141,500 m^3/d (890,000 bbl/d).

The proposed expansion will comprise the following:

- pipeline segments that complete a twinning (or "looping") of the pipeline in Alberta and BC with about 987 km of new buried pipeline;
- new and modified facilities, including pump stations and tanks; and
- three new berths at the Westridge Marine Terminal in Burnaby, BC, each capable of handling Aframax and Panamax class vessels.

The expansion has been developed in response to requests for service from Western Canadian oil producers and West Coast refiners for increased pipeline capacity in support of growing oil production and access to growing West Coast and offshore markets. NEB decision RH-001-2012 reinforces market support for the expansion and provides Trans Mountain the necessary economic conditions to proceed with design, consultation, and regulatory applications.

Application is being made pursuant to Section 52 of the *National Energy Board Act* (*NEB Act*) for the proposed Trans Mountain Expansion Project (referred to as "TMEP" or "the Project"). The NEB will undertake a detailed review and hold a public hearing to determine if it is in the public interest to recommend a Certificate of Public Convenience and Necessity (CPCN) for construction and operation of the Project. Subject to the outcome of the NEB hearing process, Trans Mountain plans to begin construction in the fourth quarter (Q4) of 2015 and go into service in late 2017.

Trans Mountain has embarked on an extensive program to engage Aboriginal communities and to consult with landowners, regulatory authorities (*e.g.*, municipalities), stakeholders, and the general public. Information on the Project is also available at www.transmountain.com.

The scope of the Project will involve:

- using existing active 610 mm (NPS 24) and 762 mm (NPS 30) OD buried pipeline segments;
- constructing three new 914 mm (NPS 36) OD buried pipeline segments totalling approximately 987 km:
  - Edmonton to Hinton – 339.4 km;
  - Hargreaves to Darfield – 279.4 km; and
  - Black Pines to Burnaby – 367.9 km.

- reactivating two 610 mm (NPS 24) OD buried pipeline segments that have been maintained in a deactivated state:
  - Hinton to Hargreaves – 150 km; and
  - Darfield to Black Pines – 43 km.
- constructing two, 3.6 km long 762 mm (NPS 30) OD buried delivery lines from Burnaby Terminal to Westridge Marine Terminal (the Westridge delivery lines); and
- constructing one new dock complex, with a total of three Aframax-capable berths, as well as a utility dock (for tugs, boom deployment vessels, and emergency response vessels and equipment) at Westridge Marine Terminal, followed by the deactivation and demolition of the existing berth.

The Westridge Marine Terminal EPP is based on:

- KMC's Environment, Health, and Safety (EHS) Management System, as adopted by Trans Mountain (KMC 2012a);
- the Environmental and Socio-Economic Assessment (ESA) – ESA Volumes 5A and 5B of the Project;
- results of the biophysical and engineering field programs completed to date;
- feedback obtained through engagement;
- Trans Mountain's commitments made in the ESA, to regulatory authorities and to the public;
- industry standard/best management documents (*e.g.*, *Standards and Best Practices for Instream Works* [BC Ministry of Water, Land and Air Protection {MWLAP 2004}, *Best Management Practices for Pile Driving and Related Operations* [BC Marine and Pile Driving Contractors Association 2003], etc.); and
- professional experience based upon over 30 years of pipeline planning in western Canada.

Trans Mountain expects that a decision to proceed with construction will lead to the development of detailed engineering plans (to be submitted for approval of the National Energy Board [NEB]) and pre-construction activities, including clearing and infrastructure development up to one year in advance. The construction period is expected to commence during the first quarter of 2016 with the first berth completed at the end of the first quarter in 2017. At this time, the existing dock would be removed from service. Construction of the second and third berths would be targeted for completion by the end of 2017. A summary of the Westridge Marine Terminal season of construction and construction details is provided in Table 1.0-1 (see bottom row of table).

TABLE 1.0-1

PROPOSED FACILITIES CONSTRUCTION SCHEDULE

Facility[1]	2015	2016				2017			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Edmonton Terminal									
Edmonton Pump Station									
Gainford Pump Station									
Wolf Pump Station									
Edson Pump Station									
Hinton Pump Station									
Jasper Pump Station									
Rearguard Pump Station									
Blue River Pump Station									
Blackpool Pump Station									
Black Pines Pump Station									
Kamloops Pump Station									
Kingsvale Pump Station									
Sumas Pump Station									
Sumas Terminal									
Burnaby Terminal									
Westridge Marine Terminal									

1.1 Purpose

The purpose of the Westridge Marine Terminal EPP is to communicate Trans Mountain's environmental procedures and mitigation measures to field personnel to be implemented during the construction of the Westridge Marine Terminal in a clear, concise and user friendly format, to avoid or reduce potential adverse environmental effects.

Specifically, the Westridge Marine Terminal EPP:

- identifies mitigation measures to be implemented during Project activities;
- provides instructions for carrying out construction activities in a manner that will avoid or reduce adverse environmental effects; and
- serves as reference information for the environmental inspection staff to support decision-making process and provides direction to more detailed information (*i.e.,* resource-specific mitigation, management and contingency plans, etc.).

1.2 Roles and Responsibilities for Environmental Compliance

The construction and commissioning of the Project is the responsibility of Trans Mountain's Major Projects Group. The Major Projects Group has been assembled to oversee the design and execution of large expansion projects. The roles and responsibilities of the relevant personnel related to environmental compliance are provided below. These roles and responsibilities will be updated once construction plans are further developed.

An organization chart for environmental compliance is provided in Figure 1.2-1 while Table 1.2-1 provides a description of environmental roles and responsibilities.

Figure 1.2-1
Preliminary Environmental Compliance Organizational Chart for the Westridge Marine Terminal Facility

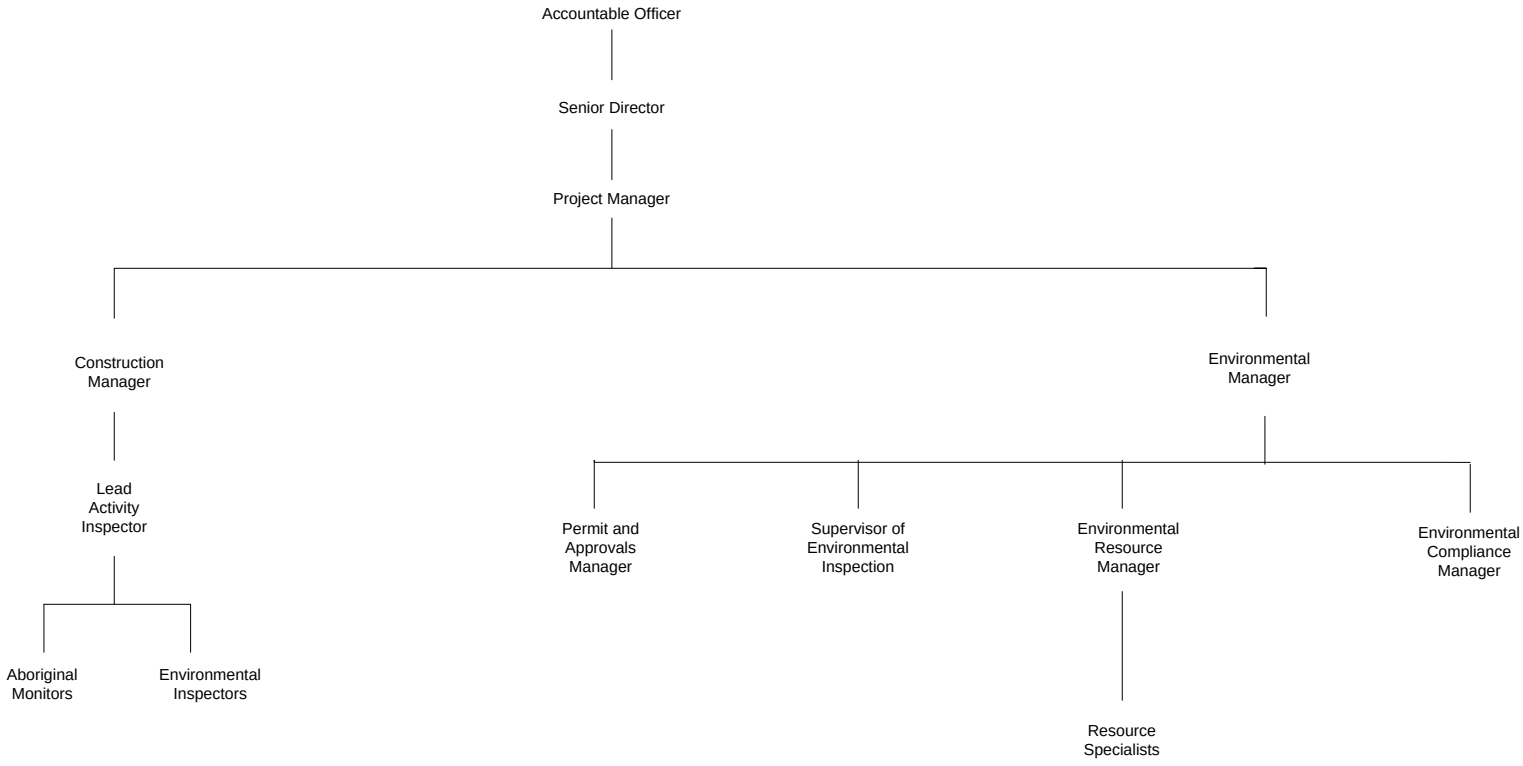


TABLE 1.2-1

ROLES AND RESPONSIBILITIES

Role	Responsibilities
Accountable Officer	• Ensure Trans Mountain has documented polices and goals and continues to be committed to ongoing use of the EHS Management System. • Demonstrate leadership and direction to the environmental program. • Ensure all Trans Mountain and Contractor staff are aware of the Environmental Inspectors' environmental responsibilities and receive training appropriate to their roles on the Project. • In coordination with legal services, responsible for the NEB application for 'Leave to Open' prior to putting the TMEP pipeline and facilities into service. • Responsible for ensuring applicable conditions of the NEB CPCN are signed-off.
Senior Director	• Provide leadership and direction to the environmental programs for the Major Projects Group. • Assume ultimate authority for environmental performance for the Major Projects Group. • Ensure there are sufficient, qualified and trained personnel to conduct the Project in an environmentally responsible manner to ensure environmental compliance. • Ensure that NEB CPCN conditions have been met and appropriate environmental authorizations are in place. • Responsible for ensuring suitable environmental programs (Inspection and Compliance) are in place to ensure commitments are met. • Ensure that EPPs, Environmental Facility Drawings of Westridge Marine Terminal and permits are included in contract bid documents. • Ensure that Contractors have an opportunity to tour environmentally sensitive areas during the bid process. • Ensure environmental compliance audits are implemented and action items for the Project are followed through. • Report on environmental performance to Executives and the Director of EHS. • Ensure Management of Change (MOC) procedures are in place and followed.
Project Manager	• Ensure Contractors understand the EPPs and environmental sensitivities of the Project during contracting process. • Resolve conflicts between construction management and environmental considerations. • Review environmental compliance reports including incident reports and follow-up actions. • Ensure environmental performance and compliance of the Contractors is a topic of discussion at their regularly scheduled meetings. • Ensure environmental responsibilities are integrated in all levels of the Project organization.
Environmental Manager	• Report to the Project Manager on environmental compliance. • Work closely with the Environmental Compliance Manager in implementing the Environmental Compliance Program and Environmental Compliance Plan to ensure environmental approvals and permits for construction are acquired and environmental commitments are met. • Provide overall environmental coordination and communication for the Project. • Work with Senior Directors and Project Manager to ensure sufficient, qualified and trained personnel are in place to implement the Environmental Compliance Program and Environmental Compliance Plan. • Ensure KMC policies and Environmental Manual that have been adopted by Trans Mountain are available and adhered to. • Review Environmental Inspection reports from the Supervisor of Environmental Inspection to evaluate Project resource needs and compliance issues. • Develop and oversee environmental education program for the Project. • Conduct on-going consultation with regulatory authorities. • Oversee the work of the Environmental Compliance Manager, Permit and Approvals Manager, and Environmental Resource Manager. • Work closely with the Environmental Compliance Manager to evaluate processes to ensure they are working effectively to ensure compliance. • Help to resolve conflicts between construction activities and environmental considerations. • Conduct site visits to ensure inspection and compliance programs are effective. • Assist with training of the Environmental Inspector on communications, reporting requirements and permit conditions. • Review weekly compliance report from the Environmental Compliance Manager.

TABLE 1.2-1 Cont'd

Role	Responsibilities
Environmental Compliance Manager	• Report to the Environmental Manager regarding environmental compliance issues. • Develop, maintain and ensure understanding and implementing the Environmental Compliance Plan. • Coordinate and facilitate environmental compliance audits. • Develop and maintain the environmental commitment tracking table that will be used to develop an issue tracking list that will be used in the environmental as-built report. • Accompany regulatory authority representatives on field reviews/inspections, where warranted. • Provide advice on interpreting environmental compliance requirements and ensuring compliance with Project specifications and environmental permits. • Use the MOC procedures to approve or deny requests for environmental changes generated by the field. • Receive environmental non-compliance reports and relay information and response actions to internal parties. • Work with KMC's Emergency Response Line (ERL) to ensure agency notifications are made in cases of reportable incidents (*e.g.*, releases). • Ensure spill reports are completed. • Communicate and address environmental issues raised by regulatory authorities. • Prepare the weekly compliance report for the Environmental Manager and Supervisor of Environmental Inspection. • Report non-compliances and spills to regulatory authorities.
Permit and Approvals Manager	• Oversee all elements of environment permit acquisition and compliance. • Confirm understanding of permit requirements with regulatory authorities and handle any permit-related issues. • Obtain regulatory approval for substantial changes to mitigation measures. • Work with construction and engineering teams to obtain information necessary to resolve environmental issues and acquire new permits or permit revisions. • Ensure permit binders are kept up-to-date in field offices.
Environmental Resource Manager	• Coordinate the work of the Resource Specialists to handle specific environmental sensitivities. • Plan environmental specialist participation in the construction program. • Ensure schedule windows for fish and wildlife are met. • Ensure appropriate equipment and materials are onsite to assess compliance with commitments.
Supervisor of Environmental Inspection	• Work with Construction manager to resolve onsite conflicts that may occur from time to time between Contractors, technical Inspectors and Environmental Inspection on environmental issues. • Communicate clearly and on a timely basis with the Environmental Manager and Environmental Compliance Manager regarding major environmental issues including serious non-compliance events. • Coordinate with the Environmental Manager to ensure appropriate environmental resources are onsite. • Provide a daily summary report to the Project Manager, Environmental Manager and Environmental Compliance Manager on Contractor compliance with Project mitigation requirements, permit conditions and environmental specifications on a daily basis.
Lead Activity Inspector	• Ensure the construction right-of-way is marked and flagged, as required, prior to construction progressing through sensitive areas. • Liaise with regulatory authorities to address concerns, maintain positive and effective communications with agency representatives and facilitate agreement in the field. • Communicate clearly and on a timely basis with the Supervisor of Environmental Inspection regarding major environmental issues and non-compliance events. • Have the authority, in consultation with the Environmental Inspector, to halt construction during specific non-compliance activities that have potential to have adverse effects on the environment. • Communicate with the Environmental Resource Manager on Resource Specialists, as required, for specific activities and environmentally sensitive areas. • Coordinate with the Environmental Compliance Manager, as needed, on interpretation of permits and compliance issues throughout the Project. • Inspect and document Contractor compliance with project mitigation requirements, permit conditions and environmental specifications on a daily basis. • Oversee environmental training activities for the construction spread. At the daily construction meeting, discuss issues or trends noted in the weekly Environmental Compliance Report prepared by the Environmental Compliance Manager.

TABLE 1.2-1 Cont'd

Role	Responsibilities
Environmental Inspector	• Document environmental compliance and environmental activities on a daily basis and maintain a photographic record. • Responsible for environmental issues resolution, field decision making and reporting. • Coordination with the Construction Manager, Lead Activity Inspectors, construction Contractor representatives and Environmental Inspector. • Ensure the Project is constructed in compliance with environmental conditions and requirements contained with the Project Application, environmental specifications, standards and permits through inspection and documentation/photographs. • Have the authority, in consultation with the Lead Activity Inspectors, to halt construction during specific non-compliance activities that have potential to have adverse effects on the environment. • Inform Lead Activity Inspectors daily of the environmental issues in their area. • Work closely with construction Contractor representatives to discuss environmental sensitivities and commitments that must be met. • Assess work areas ahead of construction noting concerns and site-specific issues, site conditions and provide advance notice to the Construction Manager and Lead Activity Inspectors to allow proactive planning of the work to avoid major effects. • Enforce compliance with environmental legislation, commitments, approvals and permits. • Keep track of issues not immediately resolved by entering them into the Issues Tracking List. • Provide listed issues to the Contractors to resolve in an agreed timeline before they escalate into a non-compliance.
Aboriginal Monitor	• Work with the Environmental Inspector to provide traditional knowledge to the construction program to ensure protection of the environment. • Discuss upcoming traditional and western science elements with the Environmental Inspector to ensure protection and monitoring. • Monitor mitigation success in protecting the environment.
Environment, Health and Safety Department	• Review environment performance. • Ensure maintenance and implementation of the Trans Mountain Environmental Management System. • Participate in monthly safety and environmental stewardship meetings to facilitate timely discussion of joint environmental issues and expectations. • The KMC Legal Department will commission environmental compliance audits, which will be coordinated by the EHS Department using the services of a third-party consulting firm to provide the Lead Auditor. Ancillary auditors will be provided by KMC.
Construction Manager	• Ensure compliance with company specifications, permit conditions, construction contracts and applicable codes. • Notify Project Manager and Environmental Manager of changes to Project work schedule as defined in the application or permit using the MOC process. • Actively participate with the Environmental Manager and Environmental Compliance Manager to evaluate and improve environmental compliance. • Coordinate with Lead Activity Inspectors on work schedules, environmental sensitivities, environmental resource needs and permit conditions. • Conduct on-going consultation with regulatory authorities. • Read and understand the Environmental Compliance Plan and provide written acknowledgement. • Conduct Project construction meetings to ensure environmental compliance requirements are coordinated in daily activities.
Technical Inspectors	• Understand the environmental commitments associated with construction operations they are tasked with supervising. • Provide support in inspecting for and ensuring compliance with the environmental requirements of their construction activity. • Verify that environmental requirements and requests from the Environmental Inspector are carried out by their assigned crews. • Read and understand the Environmental Compliance Plan and provide written acknowledgement.
Engineering Manager	• Ensure construction plans and modifications to Project activities, schedules and issues are communicated in a timely manner to the appropriate personnel within the environment team by using the project MOC process. • Ensure compliance with specifications, permit conditions and construction contracts and applicable codes.
Contractor Supervisors and Foreman	• Review and understand the environmental requirements prior to establishment of contracts and during all phases of construction. • Responsible for conducting the Project in an environmentally responsible manner and incorporating all Project environmental requirements into daily construction activities. • Verify all construction personnel attend environmental orientation prior to work on the construction right-of-way. • Attend environmental education sessions designed for onsite supervisors. • Implement EPP mitigation measures during construction. • Respond to Environmental and Lead Activity Inspector requests during construction to ensure compliance with Project environmental requirements. • Ensure work is performed in compliance with company specifications, contract documents, environmental permit/approval conditions, landowner line lists and applicable codes. • Read and understand the Environmental Compliance Plan and provide written acknowledgement.

TABLE 1.2-1 Cont'd

Role	Responsibilities
Resource Specialist	• Confirm if mitigation objectives have been met and provide feedback to Supervisor of Environmental Inspection and Construction Manager. • Provide input to work plans of specific activities such as watercourse crossings, deterring wildlife from work area and soil handling (handling of specific environmental sensitivities). • Provide input in the event of an unanticipated discovery of valued resources such as a cultural resource site that was not previously mapped. • Assist the Environmental Inspector as needed.

1.2.1 Accountability

The Construction Manager – will be required to have experience in marine terminal planning and construction. The Construction Manager will have an understanding of issues which may be encountered during construction and take a preventative approach rather than a reactive approach to environmental issues. The Construction Manager must have a demonstrated commitment toward environmental protection a track record of successful environmental issue resolution.

The Environmental Manager – is responsible for directing the development and implementation of the environmental components of the Project including the reinforcement of KMC's EHS Management System as adopted by Trans Mountain, Trans Mountain's environmental management objectives, as well as ensuring that environmental commitments are integrated into contract documents and enforced during all phases of construction. The Environmental Manager will: oversee Trans Mountain's commitment to attain high standards of environmental compliance; maintain regulatory authority contacts; lead periodic audits and inspections; and direct environmental inspection services. Incidents including spills, permit infractions and corrective actions that have been taken will also be monitored by the Environmental Manager.

The Environmental Compliance Manager – will be accountable for ensuring environmental compliance during construction of the Project. All incidents that qualify as being in non-compliance of applicable laws, commitments made by Trans Mountain and/or specific approval conditions by regulatory authorities, will be reported to the Environmental Compliance Manager. The Environmental Compliance Manager will take necessary steps to rectify the situation through appropriate notification of regulatory authorities, implementation of suitable mitigation measures and record keeping of the circumstances that resulted in the non-compliance, remedial measures taken and recommendations for future monitoring.

The Permit and Approvals Manager - will oversee the acquisition and compliance of necessary environmental permits during all phases of construction. The Permit and Approvals Manager will report to the Environmental Manager, and work with the construction and engineering teams to obtain regulatory approval, new permits, and/or permit revisions in order to resolve environmental issues, or accommodate substantial changes to the mitigation measure.

The Environmental Inspector – is accountable for inspection and monitoring duties that ensure compliance with local, provincial and federal environmental legislation and regulations, and compliance with permit/approval conditions and the Westridge Marine Terminal EPP. The Environmental Inspector will have the authority to halt construction activities during specific non-compliance activities that have the potential to have adverse effects on the environment. However, the Environmental Inspector will establish a cooperative working relationship with the Construction Manager and provide support in the decision to suspend work in conjunction with the Construction Manager. Regular liaison with appropriate regulatory authorities during construction will be the responsibility of the Environmental Inspector.

Responsibilities of the Environmental Inspector will be to ensure that construction activities are conducted in a manner consistent with the Westridge Marine Terminal EPP, environmental commitments and applicable legislation during all phases of construction. The Environmental Inspector will communicate environmental requirements to field construction management regarding how to comply with the commitments and legislation within the context of construction activities and environmental conditions.

The Environmental Inspector will monitor construction activities, record the implementation of mitigation measures and advise the Lead Activity Inspector of the measures the Contractor is to implement to limit environmental disturbance. The Environmental Inspector will remain apprised of construction activities, including sensitive sites with the Lead Activity Inspector, to ensure that all resource-specific environmental features are clearly marked and construction inspection personnel are aware of all onsite issues (*e.g.*, soil conditions, drainages, weeds, etc.). In addition, the Environmental Inspector will, visit sensitive sites with the Lead Activity Inspector, Contractor personnel and Resource Specialists to plan construction activities at these sites. The Environmental Inspector will ensure Resource Specialists are present, where and when warranted, and to monitor activities during key construction events/environmental sensitive periods. All of the Environmental Inspectors will have the authority, in consultation with the Lead Activity Inspector, to halt construction activities during specific non-compliance activities that have the potential to have adverse effects on the environment.

To document the environmental inspection process, the Environmental Inspector will generate a daily report that provides a synopsis of the day's activities. The daily reports will record where environmental mitigation measures were successful, recommendations and actions taken on major decisions such as wet condition shut-down, procedures implemented in the case of unforeseen environmental issues or discoveries, non-compliance and conflicting permit/approval requirements. Unresolved issues or items identified for future follow-up will be documented/recorded. The daily reports will allow pertinent environmental information from the field to be provided to the Project management team at the corporate level to allow for prompt responses by Trans Mountain when warranted (*e.g.*, non-compliance issues). At the completion of the Project, the Environmental Inspector will be responsible for contributing to the completion of an as-built Report.

The Lead Activity Inspector – is in charge of all Activity Inspectors and providing them direction and supervision throughout the pipeline construction work. The duties and responsibilities of the Lead Activity Inspector require knowledge and experience in all phases of pipeline inspection. The Lead Activity Inspector acts as a client representative to monitor compliance with all provisions of various permits from regulatory authorities, including personal contact with designated officials from the appropriate regulatory authority. The Lead Activity Inspector will supervise all phases of the field quality control and technical staff assigned to the project to observe adherence to client company's construction contract drawings and specifications. Furthermore, the Lead Activity Inspector will delegate responsibilities and defines limits of authority to each Activity Inspector. The Lead Activity Inspector will ensure all members of the inspection team know their respective duties.

The Resource Specialists – are responsible to ensure that the mitigation objectives are met. The Resource Specialist will report to the Supervisor of Environmental Inspection, and assist the Environmental Inspector(s) as requested. The Resource Specialist will provide input to activity work plans that may affect specific resources, or in the event of an unanticipated discovery of a valued resource.

1.2.2 Decision-Making Process

The Environmental Inspector will work with others to collectively consider the following criteria when deciding which protection measures and/or procedures to implement during construction at the Westridge Marine Terminal and, where warranted, implement the MOC process (see Section 3.0):

- site conditions at the time of construction (*e.g.*, slope gradient and aspect, soil texture, marine riparian vegetation, marine bird habitat, fish or fish habitat, marine mammal, bird breeding and nesting periods, fish spawning and migration periods, etc.);
- weather (*e.g.*, wind, precipitation forecast, air temperature, etc.) and oceanic conditions (*e.g.*, tidal conditions, current patterns, etc.) at the time of construction;
- permit/approval conditions;
- equipment and/or materials availability at the time of construction;
- consultation with geotechnical engineer;

- Contractor experience with conducting specific construction techniques;
- inspection staff experience with implementing applicable protection measures and/or procedures; and
- applicable EHS Management System.

1.2.3 Emergency Response Plans

To comply with the systematic Safety Management Program approach as from section 47 of the *National Energy Board Onshore Pipeline Regulations*, an Emergency Response Plan (ERP) will be developed and implemented for TMEP construction. The TMEP ERP for construction will be separate from, and complementary to, the Trans Mountain operations ERP, and will lay out the guidelines for the development of the Prime Contractors' detailed, Site Specific ERPs. The TMEP ERP for construction will address legislative requirements and be based on recognized industry standards of practice.

The Site-Specific ERPs will address potential construction emergency situations requiring response by TMEP construction resources (as supplied by the Prime Contractors), Trans Mountain operations resources, or external resources, in keeping with the philosophy of using the most immediately available resources. It is expected that the Site Specific ERPs will address personal injury or health incidents, environmental damage, fires, floods, earthquakes, rock slides, avalanches, sabotage, trespass and other emergency situations that may arise in the context of construction. The Site Specific ERPs will consider the Contractors' risk assessments (Section 5.1.2 of Volume 4B) completed as part of an employer's duty to ensure that the health and safety of every employee is protected required by section 124 of the *Canada Labour Code.* The Site Specific ERPs will identify emergency response roles and responsibilities and the detailed procedures, including notifications, to be followed in the event of various types of emergencies.

Regular audits will be conducted on the Site Specific ERPs to provide assurance that they will function effectively in case of emergencies.

2.0 ENVIRONMENTAL PROTECTION PLAN ORGANIZATION

This section provides an overview of the organization and scope of the Westridge Marine Terminal EPP.

2.1 Organization

The Westridge Marine Terminal EPP identifies the potential mitigation and reclamation measures that may be implemented during detailed design, pre-construction, construction and post-construction activities at the Westridge Marine Terminal and contingency and management plans to address potential effects, events or conditions that may arise during construction. In addition, the Westridge Marine Terminal EPP outlines environmental inspection and construction inspection roles and responsibilities during and following construction.

The Westridge Marine Terminal EPP applies to the Westridge Marine Terminal which includes terrestrial and marine infrastructure and staging areas.

Potential environmental mitigation measures are identified under the heading "Potential Mitigation Measures" by "Activity/Concern" in accordance with the progression of construction activities, and are intended to be read in conjunction with the Environmental Facility Drawings of Westridge Marine Terminal. The Environmental Facility Drawings of Westridge Marine Terminal and the resource-specific mitigation table for wildlife environmental resources and issues, identify specific locations where mitigation measures are to be implemented at the Westridge Marine Terminal.

The Westridge Marine Terminal EPP provides Trans Mountain, its Contractors and personnel with an understanding of the general environmental and socio-economic background of the facility site, the extent and limitations of the EPP, information to identify specific or unique mitigation measures to be implemented to address environmental and socio-economic issues associated with the Westridge Marine Terminal, and general mitigation measures or industry-accepted standards and procedures that are typically applied during marine terminal construction. These measures are generally provided in accordance with the sequence of construction of a marine terminal.

Section 1.0 Introduction outlines the purpose of the Westridge Marine Terminal EPP and provides an overview of roles and responsibilities.

Section 2.0 Environmental Protection Plan Organization provides details regarding the layout and general scope of the Westridge Marine Terminal EPP.

Section 3.0 Environmental Compliance provides information pertaining to the tools, processes and documentation to facilitate compliance with all the legislation, regulatory approvals, permits, commitments and the specific requirements set forth in the Westridge Marine Terminal EPP.

Section 4.0 Notification of Interested Parties provides details regarding specific activities to be followed to ensure all appropriate regulatory authorities, Aboriginal communities and applicable interested parties are properly notified prior to commencing construction activities at the Westridge Marine Terminal or, as warranted, during the construction period.

Section 5.0 Environmental Overview provides a brief overview of the environmental issues and features associated with the construction of the Westridge Marine Terminal.

Section 6.0 Pre-Construction Activities outlines the potential mitigation measures that may be implemented prior to initiation of construction activities. These measures include: delineation of the Westridge Marine Terminal facility site; access; identification and marking of environmental resources, underground utilities; and vegetation/weed management.

Section 7.0 General Construction Mitigation Measures provides an overview of the general measures that may be implemented during the construction phase at the Westridge Marine Terminal in onshore (non-marine) and offshore/in-water (marine) work areas.

Section 8.0 Onshore and Marine Construction Mitigation outlines the potential mitigation measures that may be implemented during construction in onshore and marine areas of the Westridge Marine

Terminal. This section includes: specific onshore construction mitigation; clearing and disposal; topsoil handling and grading; specific marine construction activities; air and hydrostatic testing; and onshore and marine construction, clean-up and reclamation.

Section 9.0 References lists the sources and reference material used to create the mitigation measures and strategies in the Westridge Marine Terminal EPP.

Appendices to the Westridge Marine Terminal EPP include:

- Checklist (Appendix A) tracks commitments and approval conditions within the Westridge Marine Terminal EPP for construction;
- Contingency Plans (Appendix B) provides measures to mitigate potential environmental effects that are not anticipated to occur during construction activities;
- Management Plans (Appendix C) provides additional description to measures outlined in the EPP that are anticipated to occur during construction activities;
- Contacts and Approvals (Appendix D) provides the contact information of the appropriate regulatory authorities that will be consulted during planning and construction of the Westridge Marine Terminal;
- A mitigation table provides specific management measures for:
  - Wildlife and Wildlife Habitat (Appendix E);
- Drawings (Appendix F) illustrates and describes general mitigation outlined in the EPP; and
- Details (Appendix G) describes site-specific mitigation to be implemented during Facility construction – to be developed prior to construction.

Information provided in these appendices is designed to support the specific mitigation measures identified in the Westridge Marine Terminal EPP and provide guidance to decision-making processes, should conditions arise that warrant implementation of remedial or contingency measures. Note the resource-specific mitigation provided in these appendices will be outlined in the technical reports by the respective Resource Specialists.

2.2 Limitations of the Westridge Marine Terminal Environmental Protection Plan

The Westridge Marine Terminal EPP has been prepared to address construction activities during non-frozen ground conditions. There may also be a need to revise specific measures as a result of ongoing regulatory or Aboriginal engagement, revisions to the scope of the Westridge Marine Terminal component of the TMEP, as determined through detailed engineering, or to address unforeseen resource-specific conditions that may arise during construction. If this were to occur, Trans Mountain will resolve the issue with the Construction Manager and the Environmental Inspector in consultation with the appropriate regulatory authorities and resource specialists (*e.g.,* wildlife biologist) in accordance with the MOC process outlined in Section 3.0. The resolution and/or revision will be documented and communicated to the appropriate parties.

3.0 ENVIRONMENTAL COMPLIANCE

Introduction

Environmental compliance is facilitated through sharing of information, providing orientation and training, hiring qualified staff, and providing onsite inspection of activities through a proactive and adaptive inspection program. The following measures will be implemented to ensure environmental compliance during construction at the Westridge Marine Terminal.

Objective

The objective of environmental compliance management is to ensure that:

- plans, programs, procedures and appropriately trained personnel are in place to facilitate construction at the Westridge Marine Terminal and associated facilities by implementing industry-accepted standards and procedures suitable for the conditions and in accordance with applicable laws and approval/permit conditions;
- systems and processes are in place that allow Trans Mountain and its Contractors to access Project environmental information to aid in decision-making at the field level; and
- the Environmental Inspector and Resource Specialists hired for the TMEP are qualified and properly trained.

Company Measures

The following measures are the responsibility of Trans Mountain.

Activity/Concern		Preparation Measures
EPP and Contract	1.	The Westridge Marine Terminal EPP will form part of the contract documents. Should any conflict in contract and EPP requirements arise, the more stringent conditions will apply.
EPP and Distribution	2.	Controlled copies of the Westridge Marine Terminal EPP and associated environmental documents will be required to be reviewed by key construction and Contractor personnel prior to construction and will be available to all key facilities construction and Contractor staff members during construction.
	3.	The Westridge Marine Terminal EPP will be a controlled document in accordance with the document control procedures. Trans Mountain will create a master document register for the EPP will be created that identifies the controlled copy number, ownership of the document and the current version number. Revisions, if warranted, will be sent to the controlled copy holders (*e.g.*, regulatory authorities) with instructions on replacement and destruction of previous versions. The EPP will be controlled by section, which will facilitate the insertion and replacement of updated materials.
	4.	The Westridge Marine Terminal EPP will serve as the construction guide for environmental issues and commitments, and includes all pertinent environmental information.
Environmental Facility Drawings of Westridge Marine Terminal	5.	The Environmental Facility Drawings, which will be appended to updated versions of the Westridge Marine Terminal EPP, will provide additional background information regarding environmental requirements and will be used in conjunction with the Construction Facility Drawings.

Activity/Concern	Preparation Measures
Communication	6. The Environmental Inspector will facilitate the transfer of environmental information and information updates to all identified Trans Mountain field staff and the Contractor in a timely manner. 7. Communication with environmental regulatory representatives will be the responsibility of the Environmental Inspector and the Construction Manager or the Environmental Manager, should any issues arise. 8. Assign an individual to prepare and deliver environmental orientation presentations to the appropriate regulatory authorities and Contractor staff, as directed by the Construction Manager and the Environmental Manager. 9. Facilitate the immediate transfer of environmental information and information updates (*e.g.,* construction schedule changes), as warranted, to Aboriginal communities and stakeholder groups.
Consequence of Worker Non-Compliance	10. Those who show careless or wanton neglect of the environment or disregard the mitigation measures outlined in the Westridge Marine Terminal EPP will be subjected to appropriate disciplinary measures including, if appropriate, removal from the work site and/or dismissal.
Approvals, Licenses and Permits	11. Trans Mountain will work with regulatory authorities to determine the necessary approvals, licences and permits needed for Westridge Marine Terminal construction or associated components prior to commencement of construction. The Contractor, subcontractors and the Environmental Inspector will be provided copies of all approvals, licenses and permits including the most recent updates and revisions, and will comply with all conditions presented to Trans Mountain. Any inconsistencies between approval/permit conditions and contract documents will be resolved prior to the commencement of construction. Copies of Fisheries and Oceans Canada (DFO) authorizations and DaS documents, if required, will be maintained on rigs (floating equipment) during piling, marine drilling operations, etc.
Listed or Sensitive Species	12. Implement the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B) if listed or sensitive species are discovered during future non-marine or marine wildlife studies, or during construction of the Westridge Marine Terminal. 13. Report sightings of sensitive species or species at risk to the Environmental Inspector and Construction Manager. Implement specific protection measures and report sightings in daily reports.
Pre-Job Meeting	14. Prior to the commencement of construction at the Westridge Marine Terminal, a pre-job meeting will be held with Trans Mountain's engineering and environmental staff, the Environmental Inspector and the Westridge Marine Terminal Contractor. Key regulatory authority and Aboriginal community representatives will be invited to the pre-job meeting as required. The objectives of the pre-job meeting are to: • review environmental and socio-economic issues at the site and surrounding area; • review key mitigation measures and contingency plans (see Appendix B); • review Trans Mountain's commitments; • review approvals, licenses and permits; • review rules, regulations and Project policies; and • address any outstanding concerns.

Activity/Concern	Preparation Measures
Environmental Inspector Qualifications	15. Trans Mountain will hire an Environmental Inspector with experience in construction of marine terminals and environmental inspection. The Environmental Inspector will have an understanding of marine terminal construction techniques and take a preventative approach rather than a reactive approach to environmental issues. The Environmental Inspector must have demonstrated a commitment toward environmental protection and a track record of successful environmental issue resolution. In addition, the Environmental Inspector will be supported by appropriate Resource Specialists who will have expertise in a particular resource feature associated with the Project (*e.g.,* geotechnical engineer, marine biologist, botanist, wildlife biologist, reclamation specialist) and be available onsite or via consultation, when warranted.
Environmental Inspector Responsibilities	16. The Environmental Inspector's main responsibility is to ensure that all environmental and socio-economic commitments, undertakings and conditions of approvals/permits are met and that work is completed in compliance with applicable environmental legislation, Trans Mountain's policies, procedures, industry-accepted standards, procedures and specifications in the most efficient and effective manner feasible. 17. The Environmental Inspector will liaise with appropriate regulatory authorities and Aboriginal representatives in co-operation with the Construction Manager, and the Environmental Manager. 18. The Environmental Inspector will provide advice on decisions such as marine sedimentation prevention, or courses of action to deal with unexpected environmental matters. 19. The Environmental Inspector will follow the Marine Spill Contingency Plan (see Appendix B) in accordance with federal and provincial regulations, in the event of a spill which will, or has the potential to, affect the marine environment. The Environmental Inspector will advise the Environmental Compliance Manager on the clean-up and disposal of the material and any affected soils or vegetation, if required. 20. The Environmental Inspector will prepare, collect, organize and disseminate all environmentally-related information and documentation that arises during construction and will be responsible for the preparation of daily reports. 21. The Environmental Inspector will supervise environmental resource staff that may be required to support the Project. 22. The Environmental Inspector will organize onsite meetings as requested by the Construction Manager and as the need arises, to address resource-specific issues as well as review construction methodologies with the Construction Manager.
Construction Manager Qualifications	23. Trans Mountain will hire a Construction Manager with experience in the construction of permanent above ground oil and marine terminal sites. The Construction Manager will have an understanding of issues which may be encountered during construction and take a preventative approach rather than a reactive approach to environmental issues. The Construction Manager will have a demonstrated commitment toward environmental protection and a track record of successful environmental issue resolution.

Activity/Concern	Preparation Measures
Environmental Training and Orientation Program	24. An Environmental Education Program (Level II and III training) will be developed and implemented by the Trans Mountain Environmental Team to ensure that all Trans Mountain staff and Contractors will be informed of the environmental and socio-economic requirements and sensitivities around the Westridge Marine Terminal prior to arrival onsite. Environmental training will include, at a minimum, the following: • the identification of sensitive features and valuable environmental components; • the processes to follow should an environmental feature be located and/or disturbed during construction; • initial response should a spill of any controlled substance occur; • the expectation that speed limits and signage, flagging and/or fences delineating the environmental features shall be respected at all times; and • the established protocol for wildlife encounters. 25. An Environmental Orientation will be developed and presented and ensure compliance with Trans Mountain requirements to ensure that all Trans Mountain staff, Contractors and visitors working at or visiting the site will be informed of environmental, socio-economic and community-relation requirements and sensitivities regarding the Project prior to arrival onsite. 26. This Environmental Orientation will be integrated with other Project policies/measures designed to manage potential Project-related socio-economic effects, particularly those related to worker interactions at the community level (*i.e.,* code of conduct and expected behavior). 27. The Project Environmental Manager will ensure the Environmental Education Program/Project Orientation presentations are consistent in all areas with respect to policies, agreements, and applicable legislation and regulations. 28. Prior to the commencement of construction, environmental sessions (as part of the Environmental Education Program) will be held to address various environmental conditions to be dealt with during construction (*e.g.,* soil erosion). 29. Multiple environmental training sessions may be required as different Contractor personnel arrive on the Project site (*e.g.*, earth works, piping, dock installation, testing). 30. The Environmental Inspector will be hired prior to commencement of construction with sufficient lead time to enable training and participation in the orientation of other construction staff and in time to allow full review and understanding of the Westridge Marine Terminal EPP. 31. The Environmental Inspector will complete a Level II and Level III of the Environmental Education Program. 32. During Level III training, the Environmental Inspector will be briefed by the Project Environmental Manager and/or the Environmental Compliance Manager, as well as environmental consultants, on the environmental processes, decisions and agreements that have taken place to date. 33. The Environmental Inspector will review all Project-related environmental information. 34. Additional training and tailgate meetings will be held on an ongoing basis.

Activity/Concern	Preparation Measures
Contractor and Inspection Orientation	35. An Environmental/Community Relations Education Program will be provided to the Contractor by the Environmental Inspection Team prior to construction.
Contractor Supervisory Staff Orientation	36. An Environmental/Community Relations Education Program will be provided to the senior supervisory staff by the Environmental Inspection Team prior to construction.
Contractor General Staff Orientation	37. The Contractor will deliver an environmental/community relations orientation presentation to all Contractor general staff. These orientations will be delivered at the work site. The Environmental Inspector may audit these orientations to ensure compliance with Trans Mountain requirements.
Regulatory and Aboriginal Community Representatives	38. Regulatory representatives and Aboriginal community representatives may attend the Contractor environmental orientation presentations or, if necessary, separate presentations will be provided.
Resource Specialists	39. The Resource Specialists will provide advice on mitigation measures for field issues and environmental resource features based on their specific areas of expertise. These areas of expertise include, but are not limited to: geohazards, soils, marine sediment, marine mammals, marine fish, marine birds, archaeology, palaeontology, weeds, reclamation and terrestrial wildlife.
Non-Compliances and Resolution	40. The Environmental Inspector will be notified by the Lead Activity Inspector or equivalent responsible person onsite when a non-compliance is identified and will contact Environmental Compliance Manager who will contact the appropriate regulatory authority. If the Construction Manager is not available during a non-compliance situation, the Environmental Inspector will investigate the non-compliance, provide corrective direction or, where warranted, initiate work stoppage. 41. The Construction Manager will make a determination to either modify the work practice or shut the activity down until corrective actions are determined and implemented. The Environmental Inspector will assist in this decision-making process. 42. If the work is shut-down, it will resume only when corrective actions have been developed and approved by Trans Mountain. Once approved by Trans Mountain, the Contractor will inform the work crew and work will proceed following the corrective action plan. 43. All non-compliances will be documented on the appropriate non-compliance forms and, if appropriate, the report will be supplemented with photographs. The Environmental Inspector will be responsible for documenting all environmental non-compliances and reporting to the Environmental Manager within 24 hours.

Activity/Concern	Preparation Measures
Decision-Making Criteria	44. The Lead Activity Inspector and Environmental Inspector will consider the following conditions when deciding which protection measure(s) and/or procedure(s) to implement during the construction of the Westridge Marine Terminal and associated components: • site conditions at the time of construction (*e.g.,* slope gradient and soil texture, wet soils, etc.); • sensitive species migration, spawning and rearing activity (*e.g.,* juvenile salmon); • weather conditions (*e.g.,* wind, precipitation forecast, air temperature, etc.) and tidal/current activity at the time of construction; • equipment and/or materials availability at the time of construction; • Contractor experience with conducting specific construction techniques; and • inspection staff experience with implementing applicable protection measures and/or procedures. 45. In the event that an unforeseen environmental issue arises during construction for which no mitigation measures have been approved, the Construction Manager or designate, the Environmental Manager, Lead Activity Inspector and the Environmental Inspector will formulate a plan of action in consultation with the appropriate regulatory authorities.

Management of Change

During the course of construction, it may be necessary to modify or create new procedures to address site conditions not previously identified in the Westridge Marine Terminal EPP. The following measures outline the process for the development or modification of procedures.

Activity	Preparation Measures
Change Management	46. The Lead Activity Inspector, the Environmental Inspector and the Construction Manager will be contacted if site conditions warrant a change in procedure that may have environmental implications. 47. Modification to the procedure(s) will be developed in co-operation with the Construction Manager and Trans Mountain's Project management team including engineering, Resource Specialists, and/or other expertise, as appropriate. 48. The modification to the procedure(s) may include one or more of the following: • change to specific procedure (*e.g.,* dredging of the marine environment from onshore and/or the marine environment and pile installation, etc.); • location (*e.g.*, site description); • rationale for change; • environmental criteria reviewed as part of modification request; • consideration of environmental objectives; • equivalent or approved standard of mitigation; • additional environmental mitigation measures required; • contract extra cost as a result of procedure change; • site sketch; and • approval by the Construction Manager and Trans Mountain Project management team representative.

Activity	Preparation Measures
Change Management (cont'd)	49. Changes to an existing procedure will be discussed with the appropriate regulatory authorities, stakeholders and Aboriginal community representatives and the appropriate authorization will be acquired, should the revised procedures require further regulatory approval. 50. Document and communicate the resolution and/or revision to the appropriate parties.
Post-Construction Documentation	51. Collect environmental information throughout construction for post-construction documentation (*e.g.,* erosion concerns) and assessment of the effectiveness of the procedures/measures used which can aid or inform the decision-making process.

4.0 NOTIFICATION OF INTERESTED PARTIES

Introduction

Notification of the construction schedule and timing of specific construction activities will facilitate awareness of upcoming activities, and allow the appropriate regulatory authorities, Aboriginal communities and other applicable interested parties to plan, as appropriate, for construction activities in the area of interest. The following measures will be implemented to ensure notification of interested parties in advance of, and during construction at the Westridge Marine Terminal.

Objective

The objective of notification of interested parties is to ensure:

- interruptions to other marine activities (*i.e.*, recreational operators, commercial activity, etc.) are limited during construction of the Westridge Marine Terminal;
- applicable interested parties are aware of construction activities at Westridge Marine Terminal; and
- appropriate regulatory authority representatives are kept informed throughout construction at the Westridge Marine Terminal.

Company Measures

The following measures are the responsibility of Trans Mountain.

Contacts		Notification Measures
Municipal Authorities	1.	Notify the City of Burnaby prior to the anticipated construction schedule a minimum of five working days prior to construction (see Appendix D). Contact will be maintained until Project completion.
	2.	Notify the City of Burnaby by road use agreements prior to construction, if required.
	3.	Inform all appropriate municipal authorities of the Project developments, as warranted.
	4.	Work with Municipal authorities to develop strategies to most effectively communicated the proposed construction schedule and work areas to its residents.
Provincial Authorities	5.	Notify the appropriate provincial regulatory authority prior to the anticipated construction schedule a minimum of five working days prior to construction (see Appendix D). Contact will be maintained until Project completion.
	6.	Notify BC Ministry of Transportation by road use agreement(s) conditions, if required.
	7.	Inform all appropriate provincial authorities of the Project developments, as warranted.
Federal Authorities	8.	Notify the NEB prior to the anticipated construction schedule a minimum of five working days prior to construction (see Appendix D). Contact will be maintained until Project completion.
	9.	Notify Port Metro Vancouver (PMV) prior to the anticipated construction schedule a minimum of five working days prior to construction (see Appendix D). Contact will be maintained until Project completion.
	10.	Notify the DFO Impact Assessment Biologist prior to the commencement of marine works. Refer to the Authorization, if applicable, to determine the advance notice required by DFO.

Contacts	Notification Measures
Federal Authorities (*cont'd*)	11. Notify the Canadian Wildlife Service if clearing is scheduled to occur during the migratory bird nesting period, if applicable (March 15 to August 15 in BC [Wilson pers. comm.]). 12. Inform all appropriate federal authorities (*i.e.*, Health Canada, Industry Canada, Environment Canada, etc.) of the Project developments, as warranted (see Appendix D).
Regulatory Authority Liaison	13. Ensure regular liaison with regulatory authority field representatives during construction which will be the responsibility of the Environmental Inspector in co-operation with the Construction Manager and Environmental Manager.
Aboriginal Communities	14. Provide Aboriginal communities with the anticipated construction schedule, a minimum of two weeks prior to the commencement of construction. 15. Install signage (*e.g.,* Warning – Construction in the Vicinity) off-shore and onshore, notifying of construction activities in the area. 16. Work with Aboriginal communities to develop strategies to most effectively communicate the construction schedule and work areas to its members.
Project Notice	17. Contact stakeholders, including marine commercial and recreational and tourism use organizations, prior to construction activities. Provide maps and schedules of the construction activities. Ensure any changes in the construction schedule are communicated, as warranted. 18. Place an announcement in local papers notifying the public of the location and timing of construction activities at least 14 days prior to activities. 19. Provide notification to residents of construction within urban areas through newspapers, newsletters, radio advertisements, on-line method, and/or other methods determined in collaboration with municipal authorities.
Resource Companies	20. Notify applicable companies for road, railway and power line crossings, if required, by crossing and transportation corridor use agreements. Notify pipeline and utility companies with lines that are located within the vicinity of the Westridge Marine Terminal site prior to construction and/or commencing facility piping pressure testing.
Navigable Waters	21. Notify marine commercial and recreational operators of the hazards associated with construction in accordance with NEB guidelines or approval conditions for navigable waters. Place warning signs (*e.g.,* Warning - Construction in the Vicinity) offshore and onshore, near construction activities. The signs are to be legible at a distance of 50 m. Follow conditions of permit approval(s) granted by the NEB.
Marine Operators	22. Notify appropriate regulatory authorities and licensees and/or distribute a notification to the shipping industry in order to advise commercial and recreational marine operators of the Project schedule and construction activities at the Westridge Marine Terminal.

Note: - See Appendix D for a contact list.

5.0 ENVIRONMENTAL OVERVIEW

Introduction

Environmental features and resources encountered during environmental surveys conducted at the Westridge Marine Terminal require mitigation measures to address both routine marine terminal construction activities and to identify and address environmental issues or features that may not be routinely encountered.

Objective

The purpose of this section is to provide the Contractor with a brief overview of the environmental issues and features associated with the construction of the Westridge Marine Terminal.

This environmental overview includes:

- the general environmental setting of the Westridge Marine Terminal;
- a listing of potential permits and authorizations required for construction at the Westridge Marine Terminal; and
- special environmental concerns that require specific mitigation measures during terrestrial and marine construction.

5.1 Environmental Setting

The Project will consist of approximately 977 km of new 914.4 mm (NPS 36) OD crude oil pipeline, which will commence at the Edmonton Terminal, a tank terminal located near Edmonton, Alberta and will terminate at the Burnaby Terminal (Burnaby Tank Farm); and two 762 mm (NPS 30) OD pipelines will connect the Burnaby Terminal to the Westridge Marine Terminal.

A brief summary of the environmental setting of the Westridge Marine Terminal portion of the Project is provided below:

- the Westridge Marine Terminal is located within the City of Burnaby, with extensive urban development within the vicinity of the Westridge Marine Terminal;
- the Westridge Marine Terminal is located within the Coastal Western Hemlock Biogeoclimatic Zone in BC;
- the Westridge Marine Terminal is located within marine mammal habitat;
- areas in the vicinity of the Westridge Marine Terminal supports numerous breeding, staging migrating and resident marine and non-marine birds. It is located within the designated English Bay and Burrard Inlet Important Bird Area which includes Burrard Inlet, Indian Arm, Port Moody Arm and associated sensitive bird colonies;
- the Westridge Marine Terminal is located within a Rockfish Conservation Area and DFO Important Areas for Dungeness crab and Pacific salmon;
- the Westridge Marine Terminal may be located within potential archaeological sites; and
- the expansion and construction of the Westridge Marine Terminal will be located at the existing Westridge Marine Terminal location within pre-disturbed areas, where practical.

5.2 Permits, Approvals and Authorizations

Trans Mountain will work with the appropriate regulatory authority to determine which environmental permits, approvals and authorizations are necessary and required, prior to the commencement of activities at the Westridge Marine Terminal. Lists of the potential environmental permits, approvals and

authorizations are provided in Tables 5.2-1 and 5.2-2. While these tables are comprehensive, they are not exhaustive and additional permits may be required.

TABLE 5.2-1

POTENTIAL FEDERAL ENVIRONMENTAL PERMITS/APPROVALS/AUTHORIZATIONS

Regulatory Authority	Legislation	Permit, Approval, Authorization and/or Notification	Activity/Trigger
Canadian Transportation Agency	*Railway Relocation and Crossing Act*	Crossing Permit	Approval to cross railways with access roads and power lines.
Environment Canada	*Canadian Environmental Protection Act, 1999;* Disposal at Sea Regulations; Regulations Respecting Applications for Permits for Disposal at Sea	Section 127: Disposal at Sea Permit (previously called Ocean Dumping Permit)	Approval to dispose of materials at sea (*e.g.,* dredge spoil from the Westridge Marine Terminal.
	Species at Risk Act (*SARA*)	Permit pursuant to Section 73 of *SARA* - Species at Risk Permit	Activities that affect a listed species, its critical habitat or residence.
Fisheries and Oceans Canada	*Fisheries Act. Section 32*(*2*)	Case-specific request for review	Authorization required if fish will be destroyed during construction.
	Fisheries Act. Section 35(*2*)	Case-specific request for review	Authorization required if construction will create serious harm to fish or any permanent alteration to, or destruction of, fish habitat.
	Operational Statements	Notification as per the applicable Operational Statements	As required, notifications for watercourse crossings that comply with DFO Operational Statements. Marine Communications and Traffic Services (MCTS) oversight of marine traffic within Canadian jurisdiction.
	Section 52 of *Fishery* (*General*) *Regulation*	Authorization of Fish Collection for Scientific, Experimental, Educational or Public Display Purposes	Approval to collect salmon or *SARA* listed species during scientific studies.
	SARA	Permit pursuant to Schedule 1 Aquatic Species of *SARA* - Species at Risk Permit	Activities that may affect a listed fish species, its critical habitat or residence.
Industry Canada	*Radiocommunication Act*	Radio Licence	Radio communication.
Natural Resources Canada	*Explosives Act*	Ammonium Nitrate Fuel Oil (ANFO) Permit	Blending of ammonium nitrate and fuel oil.
		Sections 6 and 7: Explosives Transportation Permit	Approval to transport explosives.
		Temporary Magazine Licence	Approval for any storage place of explosives in amounts that exceed the regulations. If a factory is required to make explosives near the site, additional permits may be required. Additional permits may also be required, depending on the type of explosives (*e.g.,* an Ammonium Nitrate Fuel Oil Permission) and whether they are blended.
		Temporary Blaster's License or Blaster's Permit	Approval for the use of explosives.
Port Metro Vancouver (PMV)	*Canada Marine Act*	Project Permit Building Permit Water Lease Expansion	Approval for new structures on water or land including modifications to existing structures.
Transport Canada	*Canada Shipping Act*	An act respecting shipping and navigation	Ensure compliance of vessels with relevant marine regulations.

Note: 1 As a result of the passage of the *Jobs, Growth and Long-term Prosperity Act* (Bill C-38), regulation requirements of some federal legislation are evolving and actual triggers and permitting requirements will be confirmed over the next year.

TABLE 5.2-2

POTENTIAL PROVINCIAL ENVIRONMENTAL PERMITS/APPROVALS/AUTHORIZATIONS

Regulatory Authority	Permit, Approval, Authorization and/or Notification
BC Oil and Gas Commission	• NEB Pipeline Provincial Authorization Application for: - temporary occupation of Crown land for the pipeline right-of-way and for ancillary land uses (camps, access, workspaces, etc.); - authorizations under Section 9 of the *Water Act* (changes in and about a stream) for stream or water body crossings; - cutting permits under Section 47.4 of the *Forest Act* to harvest Crown timber; and - road use permits under Section 117 of the *Forest Act*; and - Agricultural Land Reserve (ALR) authorizations for constructing a pipeline or facility, and for importing/removing soil from ALR lands. • Road permits under Section 14 of the *Land Act.* • Temporary Crown land access approval under Section 14 of the *Land Act.* • Section 8 *Water Act* Approval for short-term diversion or use of water. • Aggregate Operations and Borrow Pit Permit.
BC Parks	• Park Use Permit.
BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO)	• Authorization under Section 40 of the BC *Wildlife Act* (temporary closure to hunting, trapping and guide outfitting if necessary during a construction activity). • General wildlife permit(s) under the *Wildlife Act* and Approval or Notification for Changes In and About a Stream under Section 9 of the *Water Act* and Section 40 of the *Water Regulation* for beaver dam removal. • Scientific Fish Collection Permit. • *Heritage Conservation Act* Permit. • Road use permits. • Special Use Permit. • Burning Permit.
BC Ministry of Transportation and Infrastructure	• Road Use and Highway Crossing Permit. • Several other items (overweight, highway access, land closure request).
BC Ministry of Environment	• Section 44 Notification under the BC *Water Regulation* (minor work near a stream). • Section 14 Permit under the BC *Environmental Management Act* for the introduction of waste into the environment. • Section 7 Waste Discharge Permit under the *Oil and Gas Waste Regulation* for testing and disposing of test water with additives.

Trans Mountain will work with municipal authorities to determine which permits and approvals are necessary and required to carry out TMEP activities.

6.0 PRE-CONSTRUCTION ACTIVITIES

Introduction

This section describes the potential mitigation measures that may be implemented at the Westridge Marine Terminal prior to construction to ensure protection of environmental resource features, delineation of the Westridge Marine Terminal onshore and marine boundaries, as well as marking buried and overhead utilities. The following mitigation measures will be implemented, as warranted, by Trans Mountain, its Contractors and subcontractors prior to commencement of construction activities.

Objectives

The objectives of these mitigation measures are to ensure:

- all identified environmental resources occurring on the Westridge Marine Terminal footprint are properly identified and marked in the field prior to construction to avoid or reduce potential Project-related adverse environmental effects; and
- that the Westridge Marine Terminal site, marine development zone area is properly delineated/marked to prevent inadvertent marine traffic trespassing.

Company Measures

The following measures are the responsibility of Trans Mountain.

Activity/Concern		Potential Mitigation Measures
Workspace	1.	Identify the need for extra workspace prior to clearing and construction. Take extra workspace at locations that include sidehills and on rugged terrain to ensure sufficient temporary storage space for graded material, etc.
Construction Documentation	2.	Provide the Contractor and the Environmental Inspector with copies of the Westridge Marine Terminal EPP, the Environmental Facility Drawings of Westridge Marine Terminal and copies of all environmental approvals and permits, including the most recent updates and revisions. A complete set of construction documents including the Westridge Marine Terminal EPP, Environmental Facility Drawings of Westridge Marine Terminal and copies of environmental approvals and permits will be kept at the construction field office.
Approvals, Licences, Permits	3.	Obtain all necessary approvals, licences and permits required for the Westridge Marine Terminal prior to the commencement of the applicable activity or construction (see Section 5.0). Any inconsistencies between conditions of different permits will be rectified prior to construction.
Pre-Job Meeting	4.	Hold a pre-job meeting prior to the commencement of construction at the Westridge Marine Terminal with Trans Mountain's engineering and environmental staff, the Environmental Inspector and the Contractor. Key regulatory authority and Aboriginal community representatives will be invited to the pre-job meeting as required. This meeting is designed to make supervisory construction personnel aware of the key environmental and socio-economic issues, key mitigation and contingency plans (see Appendix B), Trans Mountain's commitments, approvals, licenses and permits, legislation and any outstanding concerns applicable to the construction area of the Westridge Marine Terminal.

Activity/Concern	Potential Mitigation Measures
Environmental Inspection	5. The Environmental Inspector will ensure the implementation of the Westridge Marine Terminal EPP during all phases of construction (*i.e.*, flagging/staking, clearing, topsoil/root zone material salvage, replacement and revegetation, erosion/sedimentation control, turbidity control, dredging of the marine environment from onshore and/or the marine environment pile installation, etc.). 6. Prior to the commencement of construction, the Environmental Inspector will review the Contractor's preliminary Execution Plan to ensure environmental resources (*e.g.*, archaeological sites, marine mammals, marine birds, marine fish, etc.) will not be compromised as a result of Westridge Marine Terminal pre-construction activities.
Pre-Construction Surveys	7. Complete all environmental surveys that are required prior to the commencement of construction of the Westridge Marine Terminal and provide the key results of the surveys and any associated mitigation to Project inspection personnel and the Contractor. Provide the above personnel with the updated resource-specific mitigation table and, if warranted, updated Environmental Facility Drawings of Westridge Marine Terminal. Identify any resource-specific locations where mitigation is necessary in the field and mark the locations accordingly (see Appendices E through F.
Hydrogeology	8. During Project field studies the Hydrogeological Resource Specialist, in consultation with landowners and the appropriate regulatory authorities, will determine if springs and wells used for domestic purposes located within 50 m of the Westridge Marine Terminal will be sampled for water quality and flow rate prior to the commencement of construction.
Monitoring	9. Initiate pre-construction monitoring, where warranted, prior to the commencement of construction or, if appropriate, prior to the commencement of a specific activity (*e.g.*, pile installation). Monitoring may be necessary prior to, during and following construction or a specific construction activity in the vicinity of water wells or springs. At some locations, monitoring will be necessary to assess the effects on specific environmental features (*e.g.*, marine mammals, archaeological sites, nesting birds, etc.). If required, ensure that applicable permits/approvals/ authorizations are in place to allow monitoring to be conducted.
Staking/Flagging/ Fencing	10. Stake all boundaries of the Westridge Marine Terminal non-marine footprint and any additional work areas (*e.g.,* cut areas, staging and storage areas). Clearly flag or stake the changes to boundaries of any changes to existing access roads. 11. Flag or fence-off specific non-marine resource features (*e.g.,* archaeological site, wildlife/marine habitat features, and sensitivities, etc.) prior to commencing construction in the vicinity of the resource feature. Clearly mark all sensitive environmental resources identified on the Environmental Facility Drawings of Westridge Marine Terminal and the wildlife resource-specific mitigation table within the immediate vicinity prior to construction clearing. Posts and rope or safety fencing may be necessary to delineate sensitive environmental resources within the Westridge Marine Terminal. 12. Flag areas identified as having Noxious weed infestations prior to the commencement of construction. 13. Confirm the accuracy of all environmentally sensitive resource locations and ensure flagging is maintained during construction.

Activity/Concern	Potential Mitigation Measures
Staking/Flagging/ Fencing (cont'd)	14. Delay final staking until after clearing and immediately prior to the commencement of construction activities.
Signage	15. Post signs in the vicinity of sensitive environmental features and use site identification numbers to ensure confidentiality and protection of resources, where warranted, and to alert workers of their presence and ensure their protection. Alert the Contractors that work will take place near sensitive features.
Environmental Resource Delineation	16. Resource-specific mitigation measures will be listed on the Environmental Facility Drawings of Westridge Marine Terminal and in the Wildlife and Wildlife Habitat Specific Protection and Management Measures table (see Appendix E) prior to construction. The tables will be used to track mitigation measures implemented for environmental resource features and will become part of the Westridge Marine Terminal environmental as-built report.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Potential Mitigation Measures
Construction Documentation	17. Maintain the Westridge Marine Terminal EPP, the Environmental Facility Drawings of Westridge Marine Terminal and copies of environmental permits, approvals and authorizations at the Contractor's construction field office.
Approvals, Licenses Permits	18. Ensure that all required approvals, licenses and permits are in place prior to the commencement of construction activities.
Workspace	19. Obtain approval from the Construction Manger and appropriate regulatory authority prior to taking additional workspace in the field.
Scheduling	20. Delay final staking of sensitive resources until immediately prior to the commencement of clearing and construction.
Weeds	21. Refer to the Weed and Vegetation Management Plan in Appendix C to reduce the potential for weed infestations following construction.

7.0 GENERAL WESTRIDGE MARINE TERMINAL CONSTRUCTION MITIGATION MEASURES

Introduction

The potential mitigation measures provided in this section may be applicable throughout all phases of the Westridge Marine Terminal construction and operations. These general measures will be implemented, as warranted, by Trans Mountain, its Contractors and subcontractors prior to the commencement of construction activities and will be followed by detailed specifications for each construction and operations phase of the Westridge Marine Terminal.

Objective

The objective of the following potential mitigation measures is to avoid or reduce potential adverse environmental effects associated with general marine and onshore construction activities at the Westridge Marine Terminal including: clearing; topsoil/root zone material salvage; grading; and dock, access road and power lines construction. Construction will be completed in a manner that avoids or reduces adverse effects on residents in the area, marine users and socio-economic and environmental resources.

Company Measures

The following measures are the responsibility of Trans Mountain.

Activity/Concern		Potential Mitigation Measures
Discipline	1.	Those who show careless or wanton neglect of the environment or disregard the Westridge Marine Terminal EPP or any Project policies will be removed from the work site.
Modifications of the EPP Measures	2.	Develop new or alternative mitigation measures if the measures identified in the Westridge Marine Terminal EPP prove to be ineffective at avoiding or reducing environmental effects. Develop alternative or new measures in co-operation with the Environmental Inspector, Environmental Compliance Manager, Environmental Manager the NEB and, if warranted, the applicable Resource Specialist(s). Use the MOC process to obtain necessary approvals outlined in Section 3.0.
	3.	Discuss the planned changes in mitigation to be implemented with the appropriate regulatory authority and, if required, obtain the appropriate approval prior to implementing the new measures. If the planned change in mitigation meets the environmental objectives and there is no specific regulatory approval required for the change, no additional discussions with regulatory authorities are necessary.
	4.	Document the change in mitigation and communicate the change to applicable construction personnel, including the Construction Manager. If warranted, monitor the effectiveness of the new/alternative mitigation.
Review Mitigation Measures for Sensitive Features	5.	Review with the Contractor the mitigation to be implemented to avoid or reduce effects on marine mammals, marine birds, marine fish and fish habitat, wildlife species of concern, and any other sensitive environmental or cultural features on or in proximity to the Westridge Marine Terminal. Conduct this review in advance of construction at known locations where any of the above features are known to be present to ensure that the Contractor has a full understanding of the procedures to be implemented (see Appendix E and the Environmental Facility Drawings of Westridge Marine Terminal).

Activity/Concern	Potential Mitigation Measures
Review Mitigation Measures for Sensitive Features (*cont'd*)	6. Refer to the Wildlife and Wildlife Habitat Specific Protection and Management Measures table provided in Appendix E and as shown on the Environmental Facility Drawings of Westridge Marine Terminal.
Surface Erosion and Sedimentation	7. Trans Mountain will implement a monitoring program to determine the effectiveness of the erosion and sediment control mitigation measures during construction in preventing terrestrial sediment loading into the marine environment.
Archaeological/ Palaeontological Heritage Resources	8. Ensure the Contractor is aware of any recommendations identified in the Archaeological Impact Assessment (see Section 3.0).
Dust Control	9. Ensure that dump truck loads are covered prior to travelling on public roads and gate seals are kept tight on dump trucks for dust control management.
Scheduling	10. Ensure all construction activities are completed prior to the expiration of applicable permits approvals and authorizations. In the event that a permit or approval is likely to expire prior to the completion of the applicable construction activities, take steps well in advance of the expiration date to obtain renewal or extension of the permit/approval.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Potential Mitigation Measures
Scheduling	11. Complete all construction activities prior to the expiration of applicable permits, approvals and authorizations. In the event that a permit or approval is likely to expire prior to the completion of the applicable construction activities, take steps to notify the Permit and Approval Manager well in advance of the expiration date to obtain renewal or extension of the permit/approval. 12. Schedule construction activities to be conducted within 300 m of residences, during the period from 07:00 to 20:00, during weekdays, and 09:00 to 20:00, during weekends.
Modifications to the EPP Measures	13. Notify the Environmental Inspector in the event that mitigation measures identified in the Westridge Marine Terminal EPP are ineffective at avoiding or reducing environmental effects or if alternative measures to address environmental issues are warranted due to site or weather conditions.
Contingency Plans and Emergency Contact List	14. Ensure all key personnel working on the construction site review the contingency plans, management plans and the emergency contacts list prior to commencement of Westridge Marine Terminal construction (see Appendices B, C and D, respectively).
Extreme Weather/ Poor Oceanographic Conditions	15. Monitor weather patterns and oceanographic conditions daily to allow for schedule changes and contingency planning (see Appendix B). 16. Implement the Soil Erosion and Sediment Control Contingency Plan (see Appendix B) for installation of additional erosion and sediment control measures prior to or during wet conditions and extreme weather events, to ensure the protection of the marine environment.

Activity/Concern	Potential Mitigation Measures
Extreme Weather/ Poor Oceanographic Conditions (*cont'd*)	17. Suspend work if an extreme weather event and/or poor oceanographic conditions occur onsite that may pose risks to the environment or environmental protection measures. 18. Implement emergency response procedures as outlined in the Trans Mountain Emergency Response Plan prepared for the Project, as required.
Seismic Events	19. Suspend work immediately in the event of a seismic event. 20. Implement emergency response procedures, as required, as outlined in the Trans Mountain ERP prepared for the Project
Roads and Access	21. Confine construction activities to the allotted Westridge Marine Terminal footprint (including the marine construction area). Restrict construction traffic to existing roads and permanent Westridge Marine Terminal access.
Construction Traffic	22. Mark shoreline access points clearly on all construction drawings. 23. Enforce construction traffic speed limits during travel to and from the construction site. 24. Report all wildlife collisions to the Environmental Inspector. The Environmental Inspector will notify the appropriate regulatory authorities and the police, if required.
Public Marine Access	25. Discourage unauthorized marine vessel access at the Westridge Marine Terminal through use of signs, markers and/or buoys.
Fishing	26. Prohibit recreational fishing by Project personnel on or in the vicinity of the Westridge Marine Terminal.
Onshore or Marine Wildlife	27. Discuss onshore and marine wildlife issues that are identified during construction with the Environmental Inspector, Wildlife Resource Specialists and the appropriate regulatory representatives, as necessary or as directed in the Wildlife Encounter Contingency Plan and the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B). 28. Refer to the Wildlife and Wildlife Habitat Specific Protection and Management Measures table provided in Appendix E and as shown on the Environmental Facility Drawings of Westridge Marine Terminal.
Archaeological/ Palaeontological Heritage Resources	29. Follow any recommendations identified in the Archaeological Impact Assessment. Obtain the approval of the BC MFLNRO prior to commencing any construction activity within 30 m of a monument, or archaeological site. 30. Suspend work in proximity (*i.e.*, within 30 m) to archaeological, palaeontological or historical sites (*e.g.*, modified bone, pottery fragments, fossils) discovered during construction. No work at that particular location shall continue until permission is granted by the BC MFLNRO [Section 8.0]. Follow the contingency measures identified in the Heritage Resources Discovery Contingency Plan (see Appendix B). 31. Arrange for an archaeological excavation of previously unidentified sites encountered by construction wherever such sites warrant attention and can be excavated without interfering with the construction schedule. When for practical reasons, the sites cannot be immediately investigated, map and suitably flag these sites for later investigation. 32. Prohibit the collection of any historical, archaeological or palaeontological resources by Project personnel.

Activity/Concern	Potential Mitigation Measures
Archaeological/ Palaeontological Heritage Resources (*cont'd*)	33. Avoid disturbance of geodetic or legal survey monuments, to the extent feasible. Where a geodetic monument is disturbed during construction, the Construction Manager will immediately report such disturbance to the appropriate regulatory authority. The Contractor will re-establish the monument, where feasible, in accordance with the instructions of the Dominion Geodesist.
Lighting	34. Design lighting requirements at the Westridge Marine Terminal to meet the *Canada Occupational Health and Safety Regulations* and the *International Ship and Port Facility Security Code* (for compliance), for worker safety and terminal security during construction, while minimizing environmental and socio-economic effects. 35. Prevent sky-lighting which may lead to bird disorientation/collisions, where feasible, by: using low level and low intensity lighting; using no lighting in areas where no work is planned; using downturned shaded fixtures in light standards; and using a higher lumen/watt (light out to power in) ratio, such as metal halide lighting. 36. During migratory bird periods and/or during extreme weather events, bird strike warnings will be issued to berthed vessels with a request to reduce deck lighting. 37. Report all bird collisions with lighting structures to the Lead Activity Inspector and the Environmental Inspector. 38. Direct the lighting for all construction activities downward and, where feasible, positioned to avoid or reduce effects to nearby residents. 39. Use lighting in the yellow spectrum, where possible, to reduce disruption to nocturnal fish activities and bird strikes.
Air Quality/Odour/ GHG Emissions	40. Trans Mountain will consult with and inform the City of Burnaby and neighbouring landowners of the existing Westridge Marine Terminal with the potential to be affected by emissions from construction activities, prior to the commencement of these activities. 41. Trans Mountain will reduce the duration that vehicles and equipment are allowed to sit and idle to less than one hour unless air temperatures are less than 0°C. 42. Ensure equipment is well-maintained during construction to reduce air and noise emissions. 43. Use multi-passenger vehicles for the transportation of crews to and from the Westridge Marine Terminal, as much as possible. 44. Control emissions to ambient air from new construction at the Westridge Marine Terminal so that concentrations of pollutants do not exceed Metro Vancouver Ambient Air Quality Objectives.
Noise	45. Adhere to all federal (*i.e., Environment Canada, Motor Vehicle Safety Act, Oil and Gas Occupational Safety and Health Regulations,* etc.), provincial (*BC Noise Control Best Practices Guidelines [BC OGC 2009], Worker's Compensation Act*, *Occupational Health and Safety Regulations,* etc.) and municipal guidelines and regulations for noise management.

Activity/Concern	Potential Mitigation Measures
Noise (cont'd)	46. Ensure that Westridge Marine Terminal construction activities adhere to the City of Burnaby Noise and Sound Abatement Bylaw (Number 7332), including approved hours of work, unless otherwise approved by municipal authorities. Schedule construction activities during the period from 07:00 to 20:00, during weekdays, and 09:00 to 20:00, during weekends, if feasible. 47. Implement mitigation measures where night-time activity (*e.g.*, HDD) on the facility site is located within 500 m of residences as outlined in the Noise Management Plan (see Appendix C). 48. Ensure construction activities located within onshore or marine wildlife setback distances will be scheduled to occur within least risk windows or proceed with the approval of the appropriate regulatory authority. 49. Maintain noise suppression equipment (*e.g.*, silencers) on all construction machinery and vehicles. 50. Noise abatement and construction scheduling will be considered during noise-sensitive periods, to limit disruption to sensitive receptors (*i.e.*, neighbouring landowners, wildlife migratory periods, nesting birds etc.). 51. Implement mitigation measures where residences are located within 300 m of the Westridge Marine Terminal as, where feasible, outlined in the Noise Management Plan (see Appendix C). 52. Enforce vehicle speed limits and inform Contractor truck drivers and mobile equipment operators that engine retarder braking in urban areas is prohibited. 53. Consider the placement and orientation of equipment to be used at the Westridge Marine Terminal prior to construction in order to reduce the noise disturbance of residents and sensitive wildlife in the vicinity of the Westridge Marine Terminal. 54. Enclose noisy equipment and use baffles such as material storage and subsoil piles, where and when feasible, to limit the transmission of noise beyond the construction site. 55. Use only the size and power of tools necessary to limit noise from power tool operations. 56. Locate stationary equipment, such as compressors and generators, away from sensitive wildlife, to the extent feasible, and follow the applicable municipal, provincial and federal guidelines. 57. Maintain noise suppression equipment on all construction machinery and vehicles in good order. 58. Use vibratory methods of pile installation, to the extent feasible. Limit impact piling to daytime only, if feasible.
Waste Disposal	59. Do not discharge solid materials, including construction materials, into the marine environment at any time. 60. Collect all construction debris (*e.g.*, welding rods, oil cans, ropes, bands, caps, etc.), waste materials generated during equipment maintenance activities (*e.g.*, oily rags, oils) and other waste materials on a regular basis and dispose of at an approved facility and in accordance with the Waste Management Standard (see Appendix C). Ensure wastes are recycled where practical. 61. Store all garbage in wildlife-proof containers.

Activity/Concern	Potential Mitigation Measures
Waste and Hazardous Material Storage	62. Follow measures outlined in the Waste Management Standard (see Appendix C) for storage of waste or hazardous materials on the work site. 63. All personnel will understand their responsibilities for proper handling, identification, documentation and storage of hazardous materials and wastes. 64. Personnel who will be handling hazardous materials and wastes will possess valid Workplace Hazardous Materials Information System (WHMIS) training. 65. An appropriate number of portable toilets will be made available to ensure that Westridge Marine Terminal construction crews have ready access to washroom facilities. The facilities will be serviced and cleaned regularly and will be adequately secured. All site personnel are to use portable toilets as provided. 66. Storage areas for hazardous materials and wastes at the Westridge Marine Terminal will be selected and designed to: • prevent access by wildlife, and reduce the attractiveness of such sites to wildlife; • provide safe storage areas, including secondary containment, for all liquid hazardous materials and wastes; and • prevent vehicular incidents by providing unobstructed access (*e.g.*, for delivery vehicles, emergency vehicles). 67. Storage of hazardous materials in quantities generated or required for the daily construction activities will be onsite and then transferred to other designated areas and removed during final clean up. Fuel, oil or hazardous materials required to be stored onsite will be stored within secondary containment. 68. Store bulk tanks containing hazardous materials (*e.g.*, fuel for construction equipment) in a bermed area lined with an impervious polyethylene liner. Containment berms will be large enough to contain 110% of the largest tank plus 10% of the aggregate tank volume within the containment area or as otherwise specified by regulatory requirements. Note that secondary containment for fuel storage tanks is required as noted above for volumes exceeding 1,000 L. Design and size secondary containment for hydrocarbons will be designed and sized in accordance with applicable provincial and federal requirements. Remove any rainwater which accumulates within the containment structure if authorized by the Environmental Inspector. If there is a visible hydrocarbon sheen, the water in the containment structure will be collected for proper storage and disposed of at an approved facility. 69. Visually inspect aboveground tanks on a regular basis as well as when the tank is refilled. Maintain inspection records for each tank. Take remedial action immediately following the detection of a leak. 70. Maintain documentation on all wastes being stored at the Westridge Marine Terminal. 71. Inspect waste storage areas on a routine basis in accordance with applicable regulation. Correct identified problems or deficiencies in a timely manner. 72. Remove all secondary containment structures that are not required during the operations phase of the Project.

Activity/Concern	Potential Mitigation Measures
Waste and Hazardous Material Storage (*cont'd*)	73. Clearly identify and secure industrial waste storage areas. Clearly label controlled products stowed in any containers to comply with WHMIS protocols (Health Canada 2010). 74. Transport, handle, use and dispose of hazardous materials in accordance with provincial and federal regulatory requirements and as identified in the Waste Management Standard (see Appendix C).
Contaminated Soils	75. Implement the Contamination Discovery Contingency Plan (see Appendix B) and applicable measures for the Waste Management Standard (see Appendix C) in the event contaminated soils and/or groundwater are encountered during construction.
Spill Prevention	76. Maintain all appropriate spill response equipment at all work sites. Assess the risk of resource-specific spills to determine the appropriate type and quantity of spill response equipment and materials to be stored onsite and a suitable location for storage (see Emergency Response Plan in Volume 4C). 77. Store all hazardous substances and fuels in proper containment systems to prevent release to the environment. Handle all hazardous materials in accordance with applicable WHMIS protocols. 78. Ensure that during construction no fuel, lubricating fluids, hydraulic fluids, methanol, antifreeze, herbicides, biocides, or other chemicals are released into the ground or the marine environment. In the event of a spill onshore that does not have the potential to migrate into the marine environment implement the Spill Contingency Plan (see Appendix B). In the event of a spill in the marine environment, or onshore with the potential to migrate into the marine environment implement the Marine Spill Contingency Plan (see Appendix B). 79. Post specific instructions at the field construction office and in construction environmental training handbooks regarding applicable contacts and appropriate response actions to be taken in the event of a spill onshore and offshore including the measures provided in the Spill Contingency Plan and Marine Spill Contingency Plan (see Appendix B) and contacts for spill reporting as provided in Appendix D.
Equipment Refuelling and Servicing	80. Report spills immediately to the Environmental Inspector who will notify the Environmental Compliance Manager for reporting to the appropriate regulatory authorities, as required. For a list of who to contact see the Marine Spill Contingency Plan (see Appendix B). 81. Ensure that operators and onsite construction foremen are trained to contain spills or leakage from equipment. 82. Place an impervious tarp or drip tray underneath equipment/vehicles while servicing equipment/vehicles when there exists the potential for accidental spills (*e.g.*, oil changes, servicing of hydraulic systems, etc.). 83. Ensure that bulk fuel trucks, service vehicles, marine vessels, barges and pick-up trucks equipped with additional fuel tanks carry spill prevention, containment and clean-up materials that are suitable for the volume of fuels or oils carried. Carry spill response contingency supplies on bulk fuel and service vehicles that are suitable for use on land and water (*i.e.,* sorbent pads, sorbent boom and rope).

Activity/Concern	Potential Mitigation Measures
Equipment Refuelling and Servicing (cont'd)	84. Employ the following measures to limit the risk of fuel spills in water. Where equipment refuelling is necessary within 100 m of the marine environment, ensure that: • all containers, hoses, nozzles are free of leaks; • all fuel nozzles are equipped with automatic shut-offs; • operators are stationed at both ends of the hose during fuelling unless the ends are visible and readily accessible by one operator; and • fuel remaining in the hose is returned to the storage facility. 85. Do not wash equipment or machinery in or near the marine environment. Control wastewater from construction activities, such as equipment washing or cement mixing, to avoid discharge into the marine environment. 86. Inspect marine vessels regularly and ensure all refueling and hydraulic hoses are in good repair. 87. Construction vessels will not be refuelled at the Westridge Marine Terminal. Appropriate fueling locations will be explored and determined prior to construction.

8.0 ONSHORE AND MARINE CONSTRUCTION MITIGATION

Introduction

The potential mitigation measures provided in this section may be applicable during the construction of onshore and marine components of the Westridge Marine Terminal throughout all phases of construction. The following potential mitigation measures may be implemented, as warranted, by Trans Mountain's Contractors and subcontractors during construction activities.

Objective

The objective of the following potential mitigation measures is to ensure that the Westridge Marine Terminal construction is conducted in a manner that reduces adverse effects on residents in the area, nearby land users and socio-economic and environmental resources.

8.1 Specific Onshore Construction Mitigation

Introduction

The following potential mitigation measures will be implemented as necessary by Trans Mountain, its Contractors and subcontractors during the onshore construction of the Westridge Marine Terminal.

Objective

The objective of these potential mitigation measures is to:

- avoid or reduce potential adverse environmental effects associated with the onshore component of the Westridge Marine Terminal construction activities including: clearing, cement pouring and facility construction.

Specific Onshore Measures

Specific onshore environmental protection specifications are to be implemented, as necessary, in concert with the general construction measures (onshore and marine) outlined in Section 7.0. These are followed by detailed specifications for each phase of onshore Westridge Marine Terminal construction.

Company Measures

Refer to Section 7.0 (General Westridge Marine Terminal Construction Mitigation Measures) for measures that are the responsibility of Trans Mountain.

Contractor Measures

The following activity measures are to be implemented by the contractor.

Activity/Concern	Potential Mitigation Measures
Drainage	1. Ensure the potential for soil erosion by water is reduced during construction activities by avoiding ponding of water or the unintentional channelization of surface water flow.
	2. Maintain existing surface drainage across the Westridge Marine Terminal.
	3. Implement the Soil Erosion and Sediment Control Contingency Plan, if necessary (see Appendix B).

Activity/Concern	Potential Mitigation Measures
Wet Soil Conditions	4. Adhere to the measures outlined in the Wet Soils Contingency Plan (see Appendix B) during earthworks on non-gravel padded areas during wet soil conditions. 5. In consultation with the Environmental Inspector, postpone construction, suspend equipment travel or utilize construction alternatives in the event of wet soils located outside of the development zone in order to reduce terrain disturbance and soil structure damage or areas within the development zone prior to gravel padding to prevent excessive sediment production. 6. Initiate contingency measures once one of the following indicators occurs: excessive rutting; wheelslip; build-up of mud on tires and cleats; formation of puddles; and/or tracking of mud down the road as vehicles leave the Westridge Marine Terminal. 7. Factors influencing a decision to postpone start-up or shut-down work include: the weather forecast; construction schedule; and the availability of non-problem areas (*i.e.*, well-drained soils). 8. The wet soil conditions shut-down decision will be made by the Construction Manger in consultation with the Lead Activity Inspector and the Environmental Inspector.
Water Wells	9. Ensure that measures are taken to reduce the amount of water discharged into a well to the subsurface. 10. Ensure that the amount of pumping of groundwater from a well is kept to a minimum to avoid ingress of seawater into water supply wells.
Surface Erosion and Sedimentation	11. Avoid or reduce construction on erosion-sensitive terrain during periods when erosion is most likely to occur. 12. Install temporary erosion and sediment control measures in areas of exposed soils or soil piles (see Drawing [Sediment Fence] provided in Appendix F). 13. Install erosion and sediment control structures and materials (*e.g.*, sediment fencing) and implement as warranted, erosion control measures outlined in the Soil Erosion and Sediment Control Contingency Plan (see Appendix B), as soon as practical following a heavy rain event, to ensure that sediments in water flowing from the Westridge Marine Terminal do not adversely affect the marine environment and the surrounding terrain. 14. Properly key-in sediment fencing to ensure no additional erosion or sedimentation occurs, where feasible (see Drawing [Sediment Fence] provided in Appendix F). Maintain existing vegetation between construction areas and the marine environment, where feasible. 15. All surface water runoff generated during construction will be redirected and stored in a settling pond or will be suitably filtered. Surface water runoff will be tested and treated, if necessary, and discharged into vegetated areas or into the marine environment, where practical. Follow the water quality guidelines outlined in Section 8.2 below, prior to discharge. 16. Ensure all personnel and equipment that are onsite are made available to control erosion, when warranted. 17. Remove drainage and erosion control devices and materials at all sites when the area is stabilized and no longer in use including infrastructure pads, permanent access, TWS (required for railway boring) and stockpile sites.

Activity/Concern	Potential Mitigation Measures
Surface Erosion and Sedimentation (*cont'd*)	18. Monitor erosion and sediment control measures throughout the duration of construction for excessive sediment accumulation and integrity. When necessary, remove accumulated sediment to ensure prolonged success and effectiveness of installed measures.
Retention/Settling Ponds	19. Create retention ponds where warranted, using the *BC Dam Safety Review Guidelines*, *Canadian Dam Safety Guidelines* and the Aggregate Operators Best Management Practices Handbook for BC (BC Ministry of Energy and Mines 2002) as a guide to hold sediment-laden stormwater runoff until the sediment has settled. 20. Size settling ponds created appropriately. 21. Remove sediment from all settling ponds, when required, to maintain effectiveness. 22. Test all waters to be released onto land or into water prior to release. The need and type of testing of water to be released onto land or into water will be in accordance with approval/permit/notification conditions. 23. Ensure an oily water/sediment separator system is in place prior to discharge. 24. Preferentially select discharge locations to dewater onto stable terrain areas where the water will be filtered through vegetation and soils, where feasible, prior to returning to the marine environment, rather than directly into the marine environment. 25. Monitor discharge locations to ensure that no erosion or flooding occurs. 26. Dissipate water energy through the use of a dissipater and protective rock rip-rap, sheeting, tarpaulins or other equivalent materials to reduce or avoid the potential for erosion of soils during water discharge activities.
Weeds	27. Ensure equipment arrives at the Westridge Marine Terminal clean and free of soil or vegetative debris. Inspect and identify equipment deemed to be acceptable with a suitable marker, such as a sticker. Do not allow any equipment arriving in a dirty condition onsite until it has been cleaned. 28. Clean equipment (*i.e.*, steam-clean or compressed air) involved in topsoil/root zone material handling at weed-infested sites prior to leaving the location. 29. Refer to the Project specific Weed and Vegetation Management Plan (see Appendix C) for appropriate weed management measures to be implemented during construction at Westridge Marine Terminal.
Use of Herbicides	30. Restrict the application of herbicides to licensed applicators. 31. Prohibit the use of herbicides within 30 m of the marine environment unless otherwise approved by the appropriate regulatory authority. 32. Refer to the Project specific Weed and Vegetation Management Plan (see Appendix C) for the use and application of Herbicides at the Westridge Marine Terminal.
Invasive Marine Species	33. Ensure all Project-related vessels follow the requirements for ballast water management as outlined in the *Canadian Shipping Act* (c.26) and the *Canadian Ballast Water Control and Management Regulations* (SOR/2011-237) in order to reduce the risk of importing invasive marine species into the Westridge Marine Terminal area.

Activity/Concern	Potential Mitigation Measures
Species at Risk/Sensitive Species	34. Ensure that any mitigation measures associated with onshore and marine wildlife species at risk are communicated to the Contractor and enforced by the Lead Activity Inspector and the Environmental Inspector. 35. Refer to the Wildlife and Wildlife Habitat Specific Protection and Management Measures table provided in Appendix E and as shown on the Environmental Facility Drawings of Westridge Marine Terminal. Report sightings of sensitive species or species at risk immediately to the Environmental Inspector. Implement the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B) as appropriate. Record the location in the daily reports and locate and mark on the Westridge Marine Terminal environmental as-built drawings.
Wildlife	36. Implement specific management measures (see Appendix E) for marine mammals, marine birds and wildlife and wildlife habitat, and as shown on the Environmental Facility Drawings for Westridge Marine Terminal. 37. Adhere to applicable setback distances (see Appendix E) and associated timing constraints, to the extent feasible, during Westridge Marine Terminal construction activities (*e.g.*, topsoil salvage, fill and gravel hauling/placement) to avoid noise-related disturbances during sensitive wildlife periods (*e.g.,* bird nesting) unless otherwise approved by the appropriate regulatory authority. 38. Consider the timing of work windows to least-risk periods for marine birds, in consultation with the appropriate regulatory authorities, to avoid sensitive seasonal periods (e.g., migration, nesting and rearing). 39. Apply species-specific buffers, provided by wildlife resource specialists, at all active bird nest sites. 40. Construct the Westridge Marine Terminal in a well-organized and efficient manner to limit the duration of sensory disturbance to wildlife. 41. Implement the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B) in the event that potentially rare and endangered wildlife species and/or their required habitats are discovered during construction. 42. Deploy bubble curtains during pile installation to reduce underwater noise levels where an impact hammer is required for pile installation. 43. Use a vibratory method of pile installation instead of an impact hammer, where possible. 44. Implement the Wildlife Encounter Contingency Plan (see Appendix B) in the event of an encounter with wildlife during construction, either at the site or on the commute to or from the construction site. 45. Ensure that there is no harassment or feeding of any wildlife. Always defer to wildlife to allow them safe movement through the site. 46. Prohibit the recreational use of watercraft by construction personnel on and adjacent to the Westridge Marine Terminal. 47. Store lunches in air-tight containers in vehicles, equipment or the construction office to avoid attracting wildlife.

Activity/Concern	Potential Mitigation Measures
Archaeological/ Palaeontological Heritage Resources	48. Suspend work in proximity (*i.e.*, within 30 m) to archaeological, palaeontological or historical sites (*e.g.*, modified bone, pottery fragments and fossils) discovered during construction. No work at that particular location shall continue until permission is granted by the BC MLNRO. Follow the contingency measures identified in the Heritage Resources Discovery Contingency Plan (see Appendix B). 49. Prohibit the collection of any historical, archaeological or palaeontological resources by Project personnel.
Work Around the Marine Environment	50. Ensure approvals are in place prior to work on the upland area but adjacent to the marine environment. 51. Ensure all equipment is clean prior to arrival on site. 52. Install sediment fences at the base of cut/fill areas to reduce sediment discharge into the marine environment, where warranted (see Drawing [Sediment Fence] provided in Appendix F). 53. Maintain sediment fences in place at the base of cut/fill areas, where warranted, until revegetation is stable (see Drawing [Sediment Fence] provided in Appendix F).
Contaminated Soils and/or Sediment	54. Implement appropriate measures provided in the Contamination Discovery Contingency Plan (see Appendix B) in the event contaminated soils and/or sediment are encountered during construction.
Welding Shavings	55. Use a tarp and/or magnets to collect bevel shavings on a daily basis to prevent ingestion by wildlife.
Fire Prevention	56. Ensure that all personnel are made aware of proper disposal methods for welding rods, cigarette butts and other hot or burning material. 57. Do not smoke in the open when the fire hazard is high. 58. Ensure that fire suppression equipment, such as shovels and fire extinguishers, are available.
Dust Control	59. Apply water or approved tackifier to exposed topsoil piles if wind erosion occurs. 60. Apply water or approved tackifier to disturbed areas if traffic and wind conditions result in excessive dust. The frequency of dust abatement measures will be increased during periods of high wind. 61. Control dust emissions by applying dust suppressants, if warranted. Ensure the Environmental Inspector approves the dust suppressants prior to use. 62. Additional dust abatement measures (*e.g.*, covering topsoil piles, installing wind fences, applying a tackifier) will be implemented, when warranted, during topsoil/root zone salvage and construction activities. 63. Ensure that watering of roads and work surfaces does not generate excessive formation of surface water accumulation (*i.e.*, puddles or excessive mud generation), or result in overland water flow or sedimentation of the marine environment. 64. Reduce or avoid the potential for dust generation during earthworks (by limiting the drop height from a backhoe bucket into a dump truck). The extent of the disturbed footprint outside of the development zone will be limited and promptly reclaimed following construction to stabilize the disturbed surface soils to limit the potential for dust generation.

8.1.1 Clearing and Disposal

Introduction

The following mitigation measures will be implemented by Trans Mountain, its Contractors and subcontractors during the clearing of vegetation at the Westridge Marine Terminal construction site.

Objectives

The objectives of these mitigation measures are to:

- reduce or avoid adverse effects to the terrestrial footprint; and
- limit disturbance of vegetation, to the extent practical.

Company Measures

The following measures are the responsibility of Trans Mountain.

Activity/Concern		Potential Mitigation Measures
Clearing	1.	Clear shrubs with limited habitat potential within the appropriate timing windows for breeding birds to discourage nesting on the Westridge Marine Terminal prior to construction, if construction is scheduled to occur during the spring/summer period (see Appendix E).
Workspace	2.	Obtain approval from the Construction Manager prior to taking additional workspace in the field.
Schedule	3.	Direct that a breeding bird nest survey be conducted by a qualified marine avian biologist at least seven days prior to initiating activities in areas where clearing activities have not been completed prior to the start of the bird nesting period. In the event that a nest is discovered, or found incidentally during other Project-related activities, an appropriate mitigation strategy will be established by Trans Mountain's Environmental Inspector or Wildlife Resources Specialists as described in the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B).
	4.	The Environmental Inspector will ensure the brushing Contractor clears shrubby vegetation from the Westridge Marine Terminal prior to the onset of the bird nesting season. See the Environmental Facility Drawings of Westridge Marine Terminal for locations to be pre-cleared. Any clearing within the migratory RAP will only be allowed if a nest survey has been conducted within seven days of the commencement of clearing and no nesting activity was observed.
Hotline Exposure/ Hydrovac	5.	Ensure hydrovac slurry suspected of contamination receives special handling and storage.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern		Potential Mitigation Measures
Workspace	6.	Ensure that no clearing or grading take place beyond the existing boundaries of the Westridge Marine Terminal. Clear vegetation only from those areas essential for construction.

Activity/Concern	Potential Mitigation Measures
Schedule	7. Conduct clearing of shrubby vegetation where directed by the Lead Activity Inspector and the Environmental Inspector, identified within the resource-specific mitigation tables or as shown on the Environmental Facility Drawings of Westridge Marine Terminal prior to the onset of the bird nesting season in the spring (typically March 15).
Bar Ditch and Foreign Line Ramps	8. To facilitate access across the railway, construct foreign line ramps with borrow material (not topsoil) unless otherwise determined by the Lead Activity Inspector and the Environmental Inspector, or the owner. 9. Install culverts in bar ditches when ramped to maintain drainage. Culvert specifications will be determined by the Environmental Inspector.
Hotline Exposure/ Hydrovac	10. The hydrovac Contractor will ensure that all tanks are clean and free of contaminants prior to arriving onsite. 11. Salvage topsoil/root zone material prior to exposing hotlines unless it has been previously salvaged as part of the Westridge Marine Terminal preparation activities. 12. Prior to initiating the hydrovac operation, the hydrovac Contractor will ensure that the Lead Activity Inspector and the Environmental Inspector have reviewed and approved a disposal site. 13. If temporary onsite storage is constructed (*e.g.*, sump or bermed area) topsoil/root zone material, if present, will be salvaged from the area to be used for storage and the storage area will be sized to contain the slurry by preventing off-site migration of the stored slurry. If a dike is necessary for containment, the dike will be composed of impermeable subsoil or geotextile. The hydrovac Contractor will ensure that at no time during the hydrovac slurry disposal will the slurry be allowed to be pumped into or flow into the marine environment. 14. Empty the hydrovac truck onto subsoil at approved sites. Ensure that hydrovac material is contained within the designated release area (*i.e.*, will not migrate to the marine environment or onto topsoil/root zone material). 15. Implement the appropriate measure(s) provided in the Contamination Discovery Contingency Plan (see Appendix B) if contaminated or potentially contaminated soils are discovered during hydrovac activities. 16. Ensure hydrovac slurry suspected of contamination receives appropriate handling storage and disposal. 17. Follow the mitigation measures related to hydrovac hotline exposure provided in the Hydrovac Cutting and Handling Disposal Management Plan (see Appendix C) during hotline exposure, if applicable. 18. Temporarily store hydrovac slurries in clean oilfield storage tanks if other more practical storage options (*i.e.*, temporary pits) are not feasible for the site. 19. Backfill and compact all hydrovac holes during rough clean-up with mineral soil to ensure settling of material does not pose a hazard for wildlife, or to construction personnel in the development zone. If hydrovac slurry necessitates off-site disposal, clean replacement backfill will be sourced.

Activity/Concern	Potential Mitigation Measures
Clearing	20. Install erosion and sediment control measures (*i.e.*, sediment fences) as soon as practical following clearing if it is determined by the Environmental Inspector that the sediment filtering properties of the cleared vegetation have been affected (see Drawing [Sediment Fence] provided in Appendix F). 21. Use hand clearing or other methods that leave the vegetation layer (deciduous woody root layer) intact during clearing activities in sensitive wildlife areas, if approved by the Environmental Inspector.
Clearing Limits	22. Confine all clearing and associated activities within the staked/flagged Westridge Marine Terminal construction boundaries. Adhere to clearing restrictions associated with special environmental features (*i.e.*, nesting birds) as outlined in the Wildlife and Wildlife Habitat Specific Protection and Management Measures table (see Appendix E).
Sensitive Terrain	23. Use hand clearing methods where directed by the Environmental Inspector to avoid or reduce disturbance to the ground surface on sensitive terrain.
Non-Merchantable Timber/Shrubby Vegetation	24. Use brushcutters, brushhogs or other equipment that will avoid or reduce terrain disturbance to clear shrubby vegetation to assist in maintaining an intact ground surface in areas where grading is not warranted.
Grubbing	25. Avoid grubbing of areas within the Westridge Marine Terminal until just prior to construction if high seasonal rainfall is anticipated between clearing and marine terminal construction. 26. Use a stump mulcher to clear shrubby vegetation (*i.e.*, shrubs, small trees, etc.) to ground level rather than grubbing, to encourage more rapid regeneration of vegetation.
Shrubby Vegetation Disposal	27. Pre-clear and chip shrubby vegetation or mulch (mulch not to exceed a depth of 5 cm) where grading will not be required and a smooth work surface is required. Dispose of excess chips at an approved location outside of the Westridge Marine Terminal site. 28. Ensure there is no burning of shrubby vegetation.
Gates	29. Install construction fencing around new areas not previously fenced with locked gates at access points to block unauthorized travel onto the Westridge Marine Terminal site following clearing. Keep gates locked and assign security personnel, to block access, if warranted.

8.1.2 Topsoil/Root Zone Material Handling and Grading

Introduction

The following potential mitigation measures will be implemented by Trans Mountain, its Contractors and subcontractors during onshore construction at the Westridge Marine Terminal site.

Objective

The objective of these potential mitigation measures is to avoid or reduce effects on topsoil productivity, surface drainage patterns and to conserve surface material in order to facilitate reclamation of disturbed areas.

Company Measures

The following measures are the responsibility of Trans Mountain.

Activity/Concern		Potential Mitigation Measures
Approvals, Licenses Permits	1.	Ensure that all required approvals, licenses and permits are in place prior to commencing construction activities.
Resource-Specific Environmental Features	2.	Confirm that flagging/staking, fencing or signage installed during survey activities (see Section 6.0) are in place to identify resource-specific mitigation features (*e.g.*, Noxious weed infestations, archaeological sites, bird ground nests, etc.) and are maintained throughout topsoil salvage and grading activities.
Monitoring of Soil Piles	3.	Monitor topsoil piles for erosion and weed growth until the soils are replaced or stored in berms. Direct the Contractor to initiate erosion control (*e.g.,* watering down, tackifier application, etc.) (see Soil Erosion and Sediment Control Contingency Plan in Appendix B) or weed control measures (*e.g.*, spraying, hand pulling) as outlined in the Weed and Vegetation Management Plan (see Appendix C), if warranted.

Contractor Measures

The following activity specific measures are to be implemented by the Contractor.

Activity/Concern		Potential Mitigation Measures
Workspace	4.	Obtain approval from the Construction Manager and the appropriate regulatory authority prior to taking additional workspace in the field.
Timing	5.	Ensure that there is low enough soil moisture to allow construction without causing excessive rutting or soil compaction.
Known Archaeological Sites	6.	Do not permit grading in proximity to known archaeological sites unless mitigation measures have been implemented, or otherwise approved by the appropriate regulatory authority.
Topsoil/Root Zone Material Salvage	7.	Salvage topsoil from locations in the Westridge Marine Terminal site where grading and/or padding is necessary.
	8.	Locate topsoil piles outside of the construction area where topsoil will be replaced following earthworks. Locate topsoil storage piles on the upslope side of the site to avoid contamination from accidental spills and away from natural drainage patterns.

Activity/Concern	Potential Mitigation Measures
Topsoil/Root Zone Material Salvage Depth	9. Salvage all available topsoil (min. 15-20 cm or 50% organic material and 50% mineral soil), unless the material is unsuitable (*e.g.,* bedrock, gravel, rock) using the Environmental Facility Drawings of Westridge Marine Terminal as a guide. Where soils are not readily distinguishable by colour, the Lead Activity Inspector and the Environmental Inspector will provide direction based on an evaluation of soil texture and structure.
Monitor Topsoil/Root Zone Material Windrow	10. Monitor topsoil piles during the growing season for wind and water erosion, and weed growth until the soils are replaced or stored in berms. Implement remedial measures to control erosion (see Soil Erosion and Sediment Control Contingency Plan in Appendix B) and weed growth (see Weed and Vegetation Management Plan in Appendix C), when warranted.
Grading	11. Salvage topsoil from areas to be graded and store topsoil piles in a location away from construction or in a permanent location if topsoil will not be replaced. Avoid overstripping. The area of topsoil salvage is to correspond with the area to be disturbed. 12. Grade the work site to the specifications of the geotechnical or civil engineer. 13. Ensure graded material does not spread off-site.
Topsoil/Root Zone Material/Subsoil Separation	14. Keep subsoil piles separate from topsoil/root zone material piles. Maintain a minimum separation distance of 1 m between topsoil/root zone material and subsoil piles.
Contaminated Soils	15. Implement the Contamination Discovery Contingency Plan (see Appendix B) and applicable measures from the Waste Management Standard (see Appendix C) in the event contaminated soils are encountered during soil handling procedures.

8.2 Specific Marine Construction Mitigation

Introduction

The following potential mitigation measures are applicable to the construction of marine components of the Westridge Marine Terminal throughout all phases of construction by Trans Mountain, its Contractor and subcontractors.

Objective

The objective of the following potential mitigation measures is to avoid or reduce potential adverse environmental effects associated with the marine component of the Westridge Marine Terminal construction activities including: dredging of the marine environment from onshore and/or the marine environment; pile installation; cement pouring; and dock construction.

General Marine Measures

General marine environmental protection specifications are to be implemented in concert with the general marine construction measures outlined in Section 7.0.

Company Measures

The following activity specific measures are the responsibility of Trans Mountain.

Activity/Concern		Potential Mitigation Measures
Permits and Approvals	1.	Ensure all conditions outlined in authorizations and/or permits and approvals are met prior to the commencement of marine construction.
Marine Dredging	2.	Following dredging of the marine environment operations that are utilizing a Disposal at Sea Permit, a written report will be provided to Environment Canada Disposal at Sea Program within 30 days of Project completion. This report will include the dates of disposal activities, the names of the loading and disposal sites and the quantity of disposed matter.

Contractor Measures

The following activity specific measures are to be implemented by the Contractor.

Activity/Concern		Potential Mitigation Measures
Permit Conditions	3.	Ensure all equipment to be used for marine construction activities is in accordance with the *NEB Act* approval for navigable waters and DFO Authorization.
Schedule	4.	Conduct marine work (below high water) requiring the use of heavy equipment that cannot be completed from a barge, during low tide.
	5.	Schedule work for daylight hours, where feasible.
	6.	Construct only within designated seasonal work windows, unless otherwise approved by applicable regulatory authorities.
Access	7.	Access to marine construction activities shall be through the Contractors registered marine vessels. These vessels will be approved for the Project, inspected and certified fit for use by the Contractor or their designate.
	8.	Access to marine construction activities from designated staging and/or laydown areas as specified by the Contractor.
	9.	Maintain a list of personnel and vessels eligible to access the marine construction.

Activity/Concern	Potential Mitigation Measures
Access (*cont'd*)	10. Ensure barges used for heavy equipment access are placed (anchored or spudded down) in appropriate areas with minimal effects to intertidal and subtidal marine habitats. The location for barges will be approved by appropriate regulatory authorities prior to placement. Avoid eelgrass beds and other sensitive marine habitats, where feasible. 11. Access to the Westridge Marine Terminal development zone will be along existing roads. If additional temporary access roads are required at or near the shoreline, they will be constructed of granular fill over a geotextile and removed after construction is completed.
Fishing	12. Prohibit recreational fishing by Project personnel on or in the vicinity of the Westridge Marine Terminal.
Construction Traffic/Heavy Equipment	13. Ensure all project vessels are equipped with a very high frequency radio with appropriate channels to monitor vessel traffic in the Project area. 14. Ensure that construction vessel traffic is confined to the general work site, where feasible, and that vessel anchoring or other disturbance only occurs in Trans Mountain approved locations, unless required in an emergency situation. 15. If practical, ensure equipment utilize vegetable-based hydraulic fluids and lubricants during this work.
Collisions	16. Inform all operators of Project-related vessels of the hazards regarding bird strikes occurring at night because of deck lighting or inclement weather, bird collisions with Westridge Marine Terminal structures and vessel collisions with marine mammals. Report all bird, mammal and structure strikes/collisions immediately to the Lead Activity Inspector and the Environmental Inspector. 17. Operate Project-related vessels at slow speeds during construction in order to decrease the likelihood of striking marine mammals, infrastructure or other vessels.
Noise	18. Operate all Project-related vessels at slow speeds during marine construction in order to limit the intensity of acoustic emissions. 19. Vessel operators will avoid rapid acceleration to control noise. 20. Propellers of all Project-related vessels will be well-maintained in order to reduce underwater noise.
Marine Sedimentation	21. Implement appropriate marine sediment/turbidity control measures within the surrounding area, prior to marine construction activities, to contain sedimentation to the marine work area (*e.g.,* turbidity curtains).

Activity/Concern	Potential Mitigation Measures
Marine Sedimentation (*cont'd*)	22. Implement a water quality monitoring program during marine construction activities (*i.e.,* dredging of the marine environment from onshore and/or the marine environment, marine drilling, pile installation, infilling, etc.) in order to assess the effectiveness of mitigation measures in place to reduce potential effects to water quality and sediment quality during construction. The monitoring program will assess total suspended solids (TSS) and turbidity within sediment plumes created as a result of marine construction. TSS and turbidity levels will be monitored to ensure these concentrations remain within the Canadian Council of Ministers of the Environment's (CCME) *Canadian Environmental Quality Guidelines* (CCME 2007). In the event that TSS concentrations exceed allowable limits outside of the construction area, water samples will be collected and tested for polycyclic aromatic hydrocarbons (PAHs) in order to assess the risk of spread of these contaminants. The distance required for monitoring will be determined based on consultation with DFO (see Water Quality Monitoring Management Plan in Appendix C). 23. Monitor pH levels to ensure acceptable levels are maintained where there is a possibility of cement spills in the marine environment. 24. Adhere to all water quality guidelines outlined below.
Water Quality Criteria	25. Implement the following water quality criteria for TSS when commencing or completing marine construction, as per the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 2007), which apply to continuous exposure (from 24 hours to 30 days): • 5 mg/L above background when the background is equal to or less than 250 mg/L; or • 10% above background when the background is more than 250mg/L. 26. Ensure the short-term exposure level of TSS does not exceed 25 mg/L over a 24-hour period (CCME 2007). 27. Ensure the following water quality criteria for turbidity (to an accuracy of within +/- 2 NTU) will be implemented when commencing or completing marine construction as per the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 2007): • turbidity will be less than 2 NTU above background when between 8 and 80 NTU; or • turbidity will be within 10% of background levels when background exceeds 80 NTU. 28. Implement the following water quality criterion for pH (tested to an accuracy of within +/- 0.2 pH units), if deemed necessary during construction, when commencing or completing marine construction, as per the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 2007): • pH will be between 7.0 and 8.7. 29. Implement water quality criteria for dissolved oxygen (DO) when commencing or completing marine construction, as per the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 2007): • the minimum concentration of DO in a marine environment is 8.0 mg/L; • when the natural DO level (measured pre-construction) is less than 8.0 mg/L, the minimum concentration of DO in that marine environment will be the pre-construction measured DO level;

Activity/Concern	Potential Mitigation Measures
Water Quality Criteria (*cont'd*)	30. when the natural DO concentrations are greater than 8.0 mg/L, DO levels must not drop below 10% of the pre-construction measured DO level. 31. Ensure water quality criteria for PAHs will follow the guidelines outlined in the *Canadian Water Quality Guidelines for the Protection of Aquatic Life*: Polycyclic aromatic hydrocarbons (CCME 2007). 32. Ensure the concentration of hydrocarbon oil and grease within the marine environment will be 0 mg/L at all times and that any potential offsite sources are identified. In the event that the concentration of hydrocarbon oil or grease exceeds 0 mg/L, this will be considered a spill and the Marine Spill Contingency Plan (see Appendix B) will be implemented. 33. Ensure all recommendations for determining background concentration levels are determined in accordance with the criteria outlined in the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 2007).
Cement and Concrete Fines Management	34. Isolate all cement work from the marine environment. 35. Wash all tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh cement in designated areas, away from the marine environment. Wash water runoff and excess cement will be routed, contained in a closed system settling basin and disposed of at a designated site, or treated to meet the water quality guidelines outlined below and disposed of in accordance with applicable permit. 36. Collect stormwater, surface water runoff and wash water generated from construction activities that contains or may contain suspended cement materials/particles in approved settling ponds. Monitor pH as per the *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. If the pH of the water is above acceptable levels, it may be adjusted using carbon dioxide bubblers at the settling ponds. All captured water will be treated and tested prior to release. 37. Avoid depositing, directly or indirectly, any concrete, cement, mortars or other lime-containing construction materials into or near the marine environment. All forms, if applicable, shall be examined by qualified Inspector(s) prior to pour to ensure they are tight. 38. Ensure proper sealed chutes are present to avoid spillage, if cement is discharged or placed directly into the formwork. If the cement is being placed in the formwork with a cement pump, properly seal and lock all hose and pipe connections to ensure the lines will not leak or uncouple. Do not overfill cement forms. 39. Monitor pH in the marine environment adjacent to the isolated work site until completion of the cement work if cement spills into the marine environment. Maintain a record where pH changes more than 1.0 pH unit, measured to an accuracy of +/- 0.2 pH units, from the background level or if pH is recorded to be below 7.0 or above 8.7. 40. Maintain complete isolation of cast-in-place cement and grouting from the marine environment for a minimum of 48 hours if the ambient air temperature is above 0°C and for a minimum of 72 hours if the ambient air temperature is below 0°C.

Activity/Concern	Potential Mitigation Measures
Cement and Concrete Fines Management (*cont'd*)	41. Monitor all generated water created during concrete curing (*i.e.,* runoff, surface water, wash water, etc.) for parameters related to cement additives used in concrete production (*i.e.,* hydrocarbons, pH, TSS) to acceptable levels (see Water Quality Criteria in Section 8.0 for water quality guidelines). Treat generated water until discharge criteria are met, if water does not meet the applicable water quality criteria. 42. Ensure dust and fines generated during grinding of cured concrete that enter the water column, does not exceed the allowable limits for suspended solids (see above for water quality guidelines). Ensure that pH ranges are monitored and maintained when dust or fines from grinding incompletely cured concrete enters the water column (see Water Quality Criteria in Section 8.0). In the event that levels are outside the acceptable ranges, introduce preventative measures (*i.e.,* implementation of turbidity curtains to contain the solids and prevent marine mammals or fish from entering the contaminated area (see Drawing [Turbidity Curtain Installation – Tidal Conditions] provided in Appendix F). Contain contaminated surface water in settling ponds and ensure water is neutralized prior to disposal. 43. Contain all wash water containing cement or concrete fines to prevent them from entering the marine environment. Isolate water for a minimum of 72 hours and ensure pH levels reach the water quality guidelines outlined above. 44. Conduct routine testing for turbidity and TSS during marine work activities and when surface water is being generated onshore (*i.e.,* generation of wash-water (see the Water Quality Monitoring Management Plan in Appendix C). Additional testing for other parameters, including pH, may be conducted at the direction of the Environmental Inspector, in the event of a concrete, cement or aggregate spill. 45. In the event the testing results exceed the criteria outlined in the water quality guidelines, consider the environmental effects (*i.e.,* proximity to the source, fish presence in the area, etc.) and implement appropriate mitigation measures. Continue with testing until the problem is rectified. 46. Ensure all cement work is completed during dry conditions, and properly contained within formwork, such that no cement products enter surrounding marine environment, where possible. Cement formulations must meet DFO specifications for setting. Concrete must be set before a change in tidal conditions results in coverage. 47. Clean all settling ponds to maintain effectiveness. 48. Utilize accepted industry construction practices for placing concrete over water and take all reasonable precautions to contain and neutralize spills in the event that concrete or cement material is released into the marine environment. Use anti-washout admixtures in any concrete or cement grout that must be placed underwater. Report the spill to the Environmental Compliance Manager who will report to the appropriate regulatory authorities. Ongoing monitoring of pH and turbidity will occur during and following clean-up of the spill to ensure proper pH and concentration levels are reached and maintained (see Water Quality Criteria in Section 8.0). 49. Implement the Marine Spill Contingency Plan (see Appendix B), in the event of a cement or concrete fines spill or material release. 50. Remove all cement and affiliated equipment or materials upon completion of cement works.

Activity/Concern	Potential Mitigation Measures
Waste Disposal	51. Manage all marine related soil and liquid waste in accordance with the *Canadian Shipping Act.* 52. Do not discharge ballast water at the Westridge Marine Terminal site, except from a local or mid-ocean source. 53. Ensure solid materials, including construction materials, will not be discharged into the marine environment at any time. 54. Ensure site clean-up (*i.e.,* shovelling or sweeping docks) will occur at the end of each day to prevent accumulation of waste materials. 55. Keep dock surfaces free of construction materials (*e.g.,* cement or concrete fines) to prevent their entry into the marine environment.
Marine Mammals	56. Discuss marine mammal issues that are identified during construction, with the Environmental Inspector, Marine Mammal Resource Specialists and the appropriate regulatory authorities. 57. Complete a marine mammal survey prior to any marine activities (*i.e.,* dredging of the marine environment from onshore and/or the marine environment, drilling, pile installation, infilling, etc.), by trained personnel to determine the presence of marine mammals within the area. If any cetaceans or species at risk are observed in or within close proximity to the predetermined exclusion zone, all marine operations will be temporarily suspended (or rescheduled if deemed necessary) until the marine mammal(s) has left the exclusion zone and does not reappear within 30 minutes. 58. Sound levels will be monitored by qualified personnel both onshore and in-water, during loud underwater construction activities (*e.g.*, pile installation activities) in order to allow for adjustments to the radius of the exclusion zone based on changes in field conditions. The number of personnel required for monitoring will depend on the size and extent of the pre-determined exclusion zone. Monitoring will take place for 30 minutes prior to and during marine construction activities. In the event that cetaceans or species at risk are observed within or near the exclusion zone, temporarily suspend or reschedule all construction activity if deemed necessary. Resume activities once the observed marine mammal(s) has left the exclusion zone and does not reappear within 30 minutes. 59. Use a vibratory method of pile installation, where possible. 60. Deploy bubble curtains during pile installation to reduce underwater noise levels where an impact hammer is required for pile installation. 61. Implement the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B), in the event of encountering a marine mammal species of concern. 62. Refer to the Wildlife and Wildlife Habitat Specific Protection and Management Measures table provided in Appendix E and as shown on the Environmental Facility Drawings of Westridge Marine Terminal.

Activity/Concern	Potential Mitigation Measures
Species at Risk/ Sensitive Species	63. Report sightings of sensitive species or species at risk immediately to the Environmental Inspector. Implement the Onshore or Marine Wildlife Species of Concern Discovery Contingency Plan (see Appendix B), as appropriate. The Environmental Inspector will record the location in the daily reports and map on the Westridge Marine Terminal Environmental As-Built Drawing(s). 64. Refer to the Wildlife and Wildlife Habitat Specific Protection and Management Measures table provided in Appendix E and as shown on the Environmental Facility Drawings of Westridge Marine Terminal.
Marine Fish and Fish Habitat	65. Determine appropriate timing windows for marine construction activities (*i.e.,* dredging of the marine environment from onshore and/or the marine environment, marine drilling, pile installation, infilling, etc.) in consultation with DFO. Avoid sensitive species and life stages (*e.g.*, juvenile salmon) during marine activities, where feasible. 66. Conduct all dredging and infilling works within the DFO least-risk timing window for Burrard Inlet, which is from August 16 to February 28. If this becomes impractical, timing will be determined in consultation with DFO. 67. Position equipment associated with marine activities (e.g., pile installation) to prevent damage to sensitive fish habitat, to the extent feasible. In the event that sensitive fish habitat cannot be avoided, alternative methods may be considered for equipment placement to help reduce the effects to established fish habitat. 68. Reduce the risk of sedimentation into areas of fish habitat by properly installing appropriate terrestrial erosion and sediment control measures (see Surface Erosion and Sedimentation Measures above) and marine sediment/turbidity control measures, as required (see Drawing [Turbidity Curtain Installation - Tidal Conditions] provided in Appendix F). 69. Prior to the commencement of infilling and dredging, implement a crab salvage program to trap and relocate Dungeness crabs away from in-water construction areas. 70. Environmental Inspector will report immediately to DFO on behalf of the Contractor, if the extent or nature of permanent alteration or destruction of fish habitat during any marine construction phase is outside the scope defined in permits and approvals.
Marine Dredging	71. Develop all marine construction activities in consultation with DFO and Environment Canada. 72. Adhere to measures related to marine mammals and marine fish and fish habitat outlined above. 73. Use sediment disposal methods appropriate to sediment quality (*i.e.,* to-sea if screening criteria are met or to be disposed of at a designated facility if sediment does not meet disposal at sea screening criteria). 74. Follow applicable work windows within the marine environment as outlined in the authorization provided by DFO. 75. Ensure all appropriate regulatory authorities are notified (*i.e.,* Canadian Coast Guard, DFO, Transport Canada, PMV) prior to commencement of dredging of the marine environment from onshore or the marine environment associated with construction at the Westridge Marine Terminal.

Activity/Concern	Potential Mitigation Measures
Marine Dredging (*cont'd*)	76. Environment Canada will issue a Letter of Approval for the disposal of dredged materials from the specific site and sediment depths stating the specific Disposal at Sea Permit No. XXXX-X-XXXXX (to be provide prior to construction). 77. Conduct dredging of the marine environment from the marine environment according to the Disposal at Sea Permit No. XXX-X-XXXXX (to be provided prior to construction) and necessary approvals. 78. Ensure all permits are posted and visible on all operating construction vessels. 79. Limit dredging to the extent feasible, for Westridge Marine Terminal construction. 80. Implement the least invasive method of dredging the marine environment (*i.e.,* Clamshell dredging), if feasible, in order to reduce sedimentation. 81. Control activities associated with dredging of the marine environment (from onshore or from the marine environment) to ensure that mobile marine species can escape. 82. Install sedimentation/turbidity control methods (e.g., turbidity curtains) during activities associated with dredging of the marine environment (from onshore or from the marine environment) in order to limit the dispersion and effects of sedimentation on sensitive species (see Drawing [Turbidity Curtain Installation - Tidal Conditions] provided in Appendix F). Turbidity curtains will be attached to a floatation boom and will extend from the sea surface to 1-2 m from the sea bottom, if feasible, or as per engineered design. 83. Remove seabed sediment during activities associated with dredging of the marine environment from onshore or from the marine environment, and place all excavated material on a barge deck located inside the turbidity curtain and remove for disposal on sea (if approved by appropriate regulatory authorities) or at an approved location on land (if material does not meet disposal at sea screening criteria). 84. Adhere to measures outlined in Section 7.0 and the Heritage Resources Discovery Contingency Plan (see Appendix C) of this EPP for historical, archaeological and palaeontological resources if historical artifacts or remains are discovered during activities associated with dredging of the marine environment. 85. Implement the Marine Spill Contingency Plan (see Appendix B) in the event of a hydrocarbon or hazardous material release during dredging of the marine environment.
Marine Drilling	86. Prior to the start of any marine drilling work, complete a "Notice of Project" to DFO that outlines the approximate durations and/or contact information, for adjacent residents and other stakeholders. Determine appropriate timing windows for marine drilling in consultation with DFO. 87. Implement drilling activities according to all applicable permits and/or approvals. 88. Adhere to all measures related to air quality/GHG emissions and noise outlined in Section 7.0 of this EPP.

Activity/Concern	Potential Mitigation Measures
Marine Drilling (*Cont'd*)	89. Install sedimentation/turbidity control methods (e.g., turbidity curtains) during activities associated with marine drilling in order to limit the dispersion and effects of sedimentation on sensitive species (see Drawing [Turbidity Curtain Installation - Tidal Conditions] provided in Appendix F). Turbidity curtains will be attached to a floatation boom and will extend from the sea surface to 1-2 m from the sea bottom, if feasible, or as per engineered design. 90. Ensure all equipment and equipment attachments are in good working condition and are well-maintained. 91. Ensure that spill kits and containment booms are maintained onsite at all times. 92. Contain marine drill cuttings on the sea bed adjacent to the drilling operation where subsurface sediment samples and analysis has determined that appropriate soil conditions are present and the potential for turbidity is low, where feasible. 93. Transport drill cuttings to the surface for appropriate onshore storage and disposal in the event that they are not suitable for return into the marine environment. 94. Test all additives to be used for marine drilling for toxicity prior to use and pre-approved by Trans Mountain.
Pile Installation	95. Implement pile installation activities according to all applicable permits and/or approvals. 96. Complete and submit a "Notice of Project" to DFO that outlines the approximate durations and/or contact information for adjacent residents and other stakeholders, prior to the commencement of pile installation work. 97. Employ an effective method of mitigating shock waves/noise deflectors (e.g., bubble curtain) when required (see Drawing [Air/Bubble Curtain Installation - Pile Installation] provided in Appendix F). Conduct an acoustic survey in order to establish the effectiveness of the bubble curtain, prior to the commencement of the pile installation activity. Take appropriate measures to reduce the level of shock waves if measured sound pressures exceed 30 kPa. 98. Determine appropriate timing windows for pile installation activities in consultation with DFO. 99. Use a vibratory method of pile installation instead of an impact hammer, if feasible.
Cleaning Out Pipe Piles	100. If steel pipe piles that are driven open ended are to be cleaned out after driving, recover and test all sediment for contamination and dispose in accordance with appropriate regulations (*e.g.*, treat and dispose at an appropriate landfill site, if sediment does not meet acceptable sediment quality criteria for disposal at sea). 101. Ensure that toxic sediment is not redistributed in the area unless otherwise approved by DFO. 102. Redistribute non-toxic sediment, in the area if approved by DFO, if sensitive fish habitat is not present in the immediate vicinity, using one of the following two methods:

Activity/Concern	Potential Mitigation Measures
Cleaning Out Pipe Piles (*cont'd*)	• return the sediment to the sea bed near or adjacent to the terminal site through an appropriate sized discharge tube and allow the sediment to settle in the immediate area with the support of a turbidity curtain to contain any turbidity that forms as a result of discharge activities; or • return the sediment to the base of the pile (where cement and rebar are not used within the pile) through use of an appropriate sized discharge tube and additional hosing in order to direct placement of sediment.
Scour Protection	103. Following installation of pipe piles, install rock armouring at the base of the pile to provide resistance against potential scour developed during storm events. 104. Install appropriate scour protection (*e.g.*, rock armouring, collars, etc.) around pipe piles, if appropriate, to dissipate current/tidal effects and provide scour protection.
Marine Infilling	105. Ensure all conditions outlined in authorizations, approvals and/or permits are met during marine infilling. 106. Review and abide by all specifications for infilling activities as defined in Trans Mountain's Infill Design (Volume 4A Section 3.4.4), and as directed by a qualified engineer. 107. Acquire appropriate material to be used for infilling. Infilling material will be clean, non-toxic material sourced from a nearby, existing quarry or other appropriate and approved source. Material will not be sourced from a new quarry. 108. Implement appropriate marine sediment/turbidity control measures (e.g., turbidity curtains) prior to infilling activities, within the marine work area to contain sedimentation and contamination from the surrounding areas (see Drawing [Turbidity Curtain Installation - Tidal Conditions] provided in Appendix F). 109. Implement a crab salvage program to trap and relocate Dungeness crabs away from infill areas prior to commencement of infilling activities. 110. Place rock armouring progressively, where required, to reduce erosion and prevent the loss of infill material (see Drawing [Infilling – Rock Armouring] provided in Appendix F. 111. Avoid creating surface depressions during the fill process which might trap fish through the tidal cycle. 112. Backfill any disturbance along the shoreline with clean, native material within one tidal cycle in order to limit turbidity levels near the shoreline area. No earthworks will be allowed within the right-of-way allowance of the rail line. 113. Ensure that any potential mitigation measures concerning marine wildlife species at risk are communicated to the Contractor and enforced by the Lead Activity Inspector and the Environmental Inspector.
Marine Noise	114. During marine activities, adhere to appropriate protection measures and timing restraints related to marine mammals and marine fish outlined in the EPP. 115. Consider the use of bubble curtains/air blankets to help reduce the effects of noise from construction activities to marine mammals and marine fish (see Drawing [Air/Bubble Curtain Installation - Pile Installation] provided in Appendix F).

8.3 Westridge Marine Terminal Facility Testing

8.3.1 Low Pressure Air and Hydrostatic Testing

Introduction

Prior to the operation of the Westridge Marine Terminal expansion, systems will require a low pressure air test, followed by a hydrostatic test, which is then followed by dry (no oil present) and wet (oil present) commissioning to facilitate final testing and calibration of facility components. The following mitigation measures are to be adhered to, as applicable, during air and hydrostatic testing where low pressure air will be used during an initial leak test and water will be used to pressure test sections of piping and other facility components. Water will be obtained from the City of Burnaby. The following potential mitigation measures will be implemented, as warranted, by Trans Mountain, its Contractor and subcontractors prior to hydrostatic testing activities.

Objective

The objective of these potential mitigation measures is to:

- ensure low pressure air and hydrostatic pressure testing activities are conducted in accordance with all approval conditions and permits; and
- reduce or avoid effects on the marine environment waterbodies used during hydrostatic testing of Westridge Marine Terminal piping and facility components.

Company Measures

The following activity specific measures will be the responsibility of Trans Mountain.

Activity/Concern		Potential Mitigation Measures
Approvals, Licenses Permits	1.	Ensure that all required approvals, licenses and permits are in place prior to commencing testing activities.
Federal/Provincial/ Municipal Approvals	2.	Obtain all appropriate regulatory authority approvals for water use and discharge to allow for hydrostatic testing of the Westridge Marine Terminal piping and ensure conditions of approvals are satisfied during water use for hydrostatic testing.
	3.	Follow all conditions of federal/provincial permits/approvals during low pressure air and hydrostatic testing.
Provincial Regulations	4.	Conduct appropriate testing and treatment measures in accordance with Section 7(2)(e) and 7(3) of the *Oil and Gas Waste Regulation*, guidelines outlined in CAPP (1996) and/or BC MOE (2013b) *Water Quality Guidelines*.
Notifications	5.	Refer to notification requirements related to pressure testing in Section 4.0.
Water Additives	6.	Review potential issues associated with the testing program including water quality and, if appropriate, identify any chemical additives to be used during the testing program. Obtain approval, if required, for the use of the additives. Provide direction to the testing Contractor related to the handling, storage, use and disposal of the testing additives including water sampling, if warranted, and disposal of test water containing additives.
Pressure Testing	7.	Pressure testing will be completed by the manufacturer on all pressure containing equipment and Quality Assurance documentation will be provided at delivery with the equipment to the installation site and to the Project Management Office for verification to required standards. Any equipment not accompanied by the proper documentation will be quarantined until appropriate documentation is provided.

Activity/Concern	Potential Mitigation Measures
Discharge	8. Ensure that the appropriate testing and treatment measures are implemented in accordance with Section 7(2)(a) and 7(3) of the *BC Oil and Gas Waste Regulation*.
Sampling	9. Conduct sampling and testing of potential test water sources and soils at discharge sites, if warranted, to abide by requirements related to test water withdrawal/discharge and any other application/approval requirements.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Potential Mitigation Measures
Guidelines for Facility Component Testing and Commissioning	10. Ensure to hydrostatic test all prefabricated pipe spools as per KMC's Station Hydrostatic Test Standard MP4111, which has been adopted by Trans Mountain. 11. Ensure to hydrostatic test all valves as per KMC's Valve Pressure Test Procedure MP4301, which has been adopted by Trans Mountain. 12. Ensure to hydrostatic test pump casings, strainers, sending and receiving traps, and meters as per KMC's Fabricated Assembly Test Standard MP4401, which has been adopted by Trans Mountain. 13. Conduct a short duration low pressure air test to ensure all plugs are in place and all small valves are closed prior to hydrostatic testing.
Regulatory Approvals	14. Follow all conditions of federal, provincial and municipal permits/approvals, as applicable, during hydrostatic testing. 15. Confirm that approvals/permits and notifications are in place for the intended test water source(s). 16. Maintain copies of all applicable pressure testing approvals/permits and notifications onsite during pressure testing.
Notification of Inspectors	17. Notify the Construction Manager and the Lead Activity Inspector in advance of receiving domestic water for hydrostatic testing and a minimum of 24 hours prior to test water discharge activities or as indicated in permits.
Withdrawal	18. Follow the mitigation measures related to the water use provided in the Water Discharge Procedures Management Plan (see Appendix C) during hydrostatic testing. 19. Water to be used at the Westridge Marine Terminal will be sourced through the City of Burnaby water supply.
Equipment and Workers	20. Ensure sufficient workers and equipment are available onsite to repair any rupture, leak or erosion problem that might arise during testing.
Water Trucks	21. Ensure water hauling trucks for test water are clean and inspected prior to use.

Activity/Concern	Potential Mitigation Measures
Dewatering	22. Follow all measures outlined in the Water Discharge Procedures Management Plan and in the Water Discharge Form (see Appendix C) related to dewatering. 23. Ensure that the appropriate testing and treatment measures are implemented in accordance with Sections 7(2) and 7(3) of the *BC Oil and Gas Waste Regulation*. 24. Avoid discharging hydrostatic test water directly into any surface waterbody and/or the marine environment in accordance with the *BC Oil and Gas Waste Regulation*. 25. Monitor discharge locations to ensure that no erosion, flooding or icing occurs. If conditions become saturated to the extent that adequate natural filtration is no longer occurring, suspend dewatering and move the discharge to another approved location (confirm that appropriate approvals and, if warranted, soil testing have been completed) or construct a holding pond for the water and release the water when natural filtration is feasible. 26. Ensure the areas that are to receive discharged water are approved by the Lead Activity Inspector and Environmental Inspector in accordance with the applicable regulatory guidance. 27. Dewater onto approved areas where water will be filtered through vegetation and soils before returning to a waterbody. Provide scour protection (*e.g.,* use of rock aprons, plastic sheeting, plywood, straw bales, etc.) or an energy diffuser (*e.g.,* cone with baffles, frog's foot) at the discharge site as directed by Environmental Inspector. The rate of discharge will be reduced if these measures are ineffective. 28. Preserve water quality, to the extent feasible, including preventing the introduction of foreign material (*e.g.*, debris, sediment) into the receiving waterbody.
Sample Collection	29. Collect samples of source water, hydrostatic test water and soil of the receiving environment and analyze according to the parameters listed in the Water Discharge Procedures Management Plan (see Appendix C).
Pigging Debris	30. Collect pigging debris and dispose of at an acceptable location (*e.g.,* landfill as approved by the applicable regulatory authority).

8.4 Onshore and Marine Construction Clean-Up and Reclamation

Introduction

Clean-up and reclamation are important steps in returning construction sites to a condition similar to pre-construction. Construction clean-up will focus on the construction disturbances in onshore areas within the development zone and marine areas, and reclamation will focus on onshore areas that will be revegetated to a suitable vegetation cover following construction. The following mitigation measures will be implemented, as warranted, by Trans Mountain, its Contractor and/or subcontractors during construction clean-up and reclamation activities.

The objective of these mitigation measures is to:

- remove construction debris and materials;
- re-establish the facility footprint to a stable condition acceptable for operational requirements;
- effectively use reclamation techniques that prevent surface material loss due to wind and water erosion;
- establish a vegetative cover (where required) compatible with surrounding vegetation and land uses, and to deter the proliferation of weeds; and
- maintain equivalent land productivity, ensuring the ability of the land to support various land uses similar to the uses that existed prior to construction.

8.4.1 General Measures

The following potential mitigation measures are applicable to clean-up and reclamation activities where required in onshore and marine construction areas. Further detail is provided for mitigation measures related to clean-up and reclamation in the subsections that follow.

Objective

The objective of these mitigation measures is to:

- remove construction debris and materials;
- re-establish the Westridge Marine Terminal to a stable condition acceptable for operational requirements;
- effectively use reclamation techniques that prevent surface material loss due to erosion by wind and water; and
- stabilize the Westridge Marine Terminal to reduce the potential for sediment production and sedimentation of the marine environment.

Company Measures

The following activity specific measures are to be implemented by Trans Mountain.

Activity/Concern	Potential Mitigation Measures
Approvals, Licenses Permits	1. Ensure that all required approvals, licenses and permits are in place prior to commencing applicable reclamation activities.
Resource-Specific Environmental Features	2. Confirm that flagging, staking and/or fencing installed during survey activities (see Section 6.0) to identify resource-specific features (*e.g.*, Noxious weed infestations and archaeological sites) are in place and are maintained throughout clean-up and reclamation.

Activity/Concern	Potential Mitigation Measures
Assess Erosion Hazard	3. Assess the erosion hazard prior to the commencement of rough and final clean-up. This assessment, to be conducted by the Environmental Inspector in consultation with the Construction Manager, will consider topography, degree of disturbance, soil erodibility and likely schedule for rough clean-up, final clean-up and seeding. Request assistance in conducting the assessment, if warranted, from the Geotechnical, Soil or Reclamation Resource Specialists. 4. Direct the Contractor to implement appropriate erosion control measures that may be in addition to those identified on the Environmental Facility Drawings of Westridge Marine Terminal or noted elsewhere in this EPP.
Seeding	5. Review and retain seed Certificates of Analysis for each species in the various seed mixes. 6. Review and, if appropriate, approve of the Contractor's planned seeding procedures including the seeding equipment to be used at the Westridge Marine Terminal, calibration procedures for broadcast seeders and the schedule for seeding.
Municipality Requests	7. Review the commitments made to the City of Burnaby to ensure that any special requests related to clean-up and reclamation are implemented.

Contractor Measures

The following activity-specific measures are to be implemented by the Contractor.

Activity/Concern	Potential Mitigation Measures
Scheduling	8. Commence construction clean-up immediately following construction activity. 9. Postpone clean-up work on excessively wet soils until conditions are suitable. 10. Review timing constraints applicable to construction related activities prior to scheduling clean-up activities (see Wildlife and Wildlife Habitat Specific Protection and Management Measures table for wildlife timing restrictions provided in Appendix E). 11. Revegetate as soon as feasible following construction to reduce or avoid soil erosion and establish long-term cover. 12. Reclaim all disturbances within one growing season. If feasible, seed and plant seedlings in early spring to take advantage of the spring precipitation.
Seed Species Selection	13. Seed disturbed lands with native and non-native seed mixes developed for the Project that are based on vegetation field survey data, consultation with landowners/lessees or applicable regulatory authorities.
Seed Mix Requirements	14. Seed disturbed soils at: • level and gently sloping terrain (shrub/treed land); and • road ditches. 15. Seed mixes and application rates will be determined prior to construction.

8.4.2 Onshore Clean-Up and Reclamation

Introduction

Onshore construction clean-up will focus on the construction disturbances within the development zone (*i.e.*, padded area) and reclamation will focus on areas that will be revegetated to a suitable vegetation cover following construction. The following mitigation measures will be implemented, as warranted, by Trans Mountain, its Contractor and/or subcontractors during onshore clean-up and reclamation activities.

Objective

The objective of these potential mitigation measures is to:

- remove construction debris and materials from the onshore environment;
- re-establish the onshore environment of Westridge Marine Terminal to a stable condition acceptable for operational requirements;
- effectively use reclamation techniques that prevent surface material loss due to erosion by wind and water; and
- stabilize the Westridge Marine Terminal site to reduce the potential for sediment production and sedimentation of the marine environment.

Company Measures

Refer to Section 8.4.1 General Measures for measures that are the responsibility of Trans Mountain

Contractor Measures

The following mitigation measures are to be implemented by the Contractor following construction.

Activity/Concern	Potential Mitigation Measures
Scheduling	1. Commence clean-up immediately following construction activity.
Debris	2. Remove all remaining garbage and debris from the Westridge Marine Terminal site.
Topsoil Piles	3. Walk down the topsoil windrow/storage berm and consider tackifying or watering down the topsoil windrow/storage berms to reduce the risk of wind and water erosion.
Topsoil/Root Zone Material Replacement	4. Replace topsoil/root zone material evenly over all portions of the Westridge Marine Terminal site, outside of the development zone, that have been stripped. 5. Postpone replacement during wet conditions or high winds to prevent damage to soil structure or erosion of topsoil/root zone material.
Topsoil/Root Zone Material Storage Berms	6. Establish long-term topsoil/root zone material storage berms at locations away from regular Westridge Marine Terminal operational activity and areas with potential for overland water flow and storage berm erosion.
Weed Control	7. Refer to the Weed and Vegetation Management Plan (see Appendix C) for appropriate weed control measures to implement, as warranted, during onshore clean-up and reclamation.

8.4.3 Marine Clean-Up

Introduction

Marine construction clean-up will focus on the construction disturbances within the development zone (*i.e.*, below the high tide mark). The following mitigation measures will be implemented, as warranted, by Trans Mountain, its Contractor and subcontractors during marine clean-up and reclamation activities.

Objective

The objective of these potential mitigation measures is to remove construction debris, equipment and materials not needed during operations from the marine environment.

Company Measures

Refer to Section 8.4.1 General Measures for measures that are the responsibility of Trans Mountain.

Contractor Measures

The following mitigation measures will be implemented by the Contractor following marine construction activities.

Activity/Concern		Potential Mitigation Measures
Scheduling	1.	Commence clean-up immediately following construction activity.
Debris	2.	Remove all remaining garbage and debris from marine areas at the Westridge Marine Terminal site.
	3.	Conduct an underwater survey to identify the presence of construction debris. Immediately remove underwater debris if present.
Equipment	4.	Remove all Project equipment and materials from marine areas that will not be utilized during operations of the Westridge Marine Terminal.

9.0 REFERENCES

9.1 Personal Communication

TERA wishes to acknowledge those people identified in the Personal Communications for their assistance in supplying information and comments incorporated into this report.

Wilson, J. Special Projects Officer, Canadian Wildlife Service, Environment Canada. Delta, BC.

9.2 Literature Cited

British Columbia Marine and Pile Driving Contractors Association. 2003. Best Management Practices for Pile Driving and Related Operations. Vancouver, BC. 9 pp.

British Columbia Ministry of Energy and Mines. 2002. Aggregate Operators Best Management Practices Handbook for British Columbia. Website: http://www.em.gov.bc.ca/Mining/MineralStatistics/MineralSectors/ConstructionAggregates/ReportsandPublications/Pages/AggregateOperators.aspx#1. Accessed: September 2013.

British Columbia Ministry of Environment. 2012. Develop with Care – Environmental Guidelines for Urban and Rural Land Development in British Columbia. Section 4 – Environmentally Valuable Resources.

British Columbia Ministry of Environment. 2013a. Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (2013). A companion document to Develop with Care 2012.

British Columbia Ministry of Environment. 2013b. Water Quality Guidelines (Criteria) Reports. Website: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html#approved. Accessed: September 2013.

British Columbia Ministry of Water, Land and Air Protection. 2004. Standards and Best Practices for Instream Works. Website: http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf. Accessed: November 2013.

British Columbia Ministry of Water, Land and Air Protection. 2005. Handbook for Pesticide Applicators and Dispensers. Website: http://books.google.ca/books/about/Handbook_for_Pesticide_Applicators_and_D.html?id=WjJzAAAACAAJ&redir_esc=y. Accessed: September 2013.

Canadian Association of Petroleum Producers. 1996. Hydrostatic Test Water Management. Website: http://www.capp.ca/getdoc.aspx?DocId=179764&DT=NTV. Accessed: September 2013.

Canadian Council of Ministers of the Environment. 2007. *Canadian Water Quality Guidelines for the Protection of Aquatic Life*: Summary Table. Updated in December 2007. from the Canadian Environmental Quality Guidelines, 1999. Canadian Council of Ministers of the Environment. Winnipeg, MB.

Health Canada. 2010. Workplace Hazardous Materials Information System. Website: http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php. Accessed: September 2013.

Kinder Morgan Canada Inc. 2011. Integrated Vegetation Management Plan. Calgary, AB. 81 pp.

Kinder Morgan Canada Inc. 2012a. Environment, Health and Safety Policy. Calgary, AB. 1 pp.

Kinder Morgan Canada, Inc. 2012b. Emergency Response Plan – E.R.P.Trans Mountain Pipeline. Calgary, AB. 9 pp.

National Energy Board. 2013. NEB Filing Manual. Inclusive of Release 2013-03 (August 2013). Calgary, AB.

National Energy Board. 2011. Remediation Process Guide. Website: http://www.neb-one.gc.ca/clf-nsi/rsftyndthnvrnmnt/nvrnmnt/rmdtnprcssgd/rmdtnprcssgd-eng.pdf. Accessed: September 2013.

WorkSafe BC. 2009. Standard Practices for Pesticide Applicators. Website: http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/bk35.pdf. Accessed: October 2013.

APPENDIX A

CHECKLIST

(PLACE HOLDER – to be developed prior to construction)

APPENDIX B

CONTINGENCY PLANS

TABLE OF CONTENTS

LIST OF TABLES

1.0 CONTAMINATION DISCOVERY CONTINGENCY PLAN

Recognition and Response

Identification of Contamination

Soil, surface water and groundwater contamination can be recognized by one or more of the following:

- hydrocarbon odor;
- visible sheen;
- visible free product (oil or other product); and
- visible staining.

Stop work in the immediate area where contamination is identified, during the construction phase of the Project, to allow an assessment to be undertaken of the contaminated area.

Notification Framework

Upon the identification of contamination, work in the immediate area will cease immediately and the onsite supervisor, the Lead Environmental Inspector and the Environmental Inspector will be notified, if feasible. The Lead Environmental Inspector will notify the Environmental Compliance Manager, without delay, of the discovery. The Environmental Compliance Manager will ensure the timely notification to the appropriate provincial/federal regulatory authorities and the NEB.

Health and Safety

Upon discovery of previously unknown contamination, the health and safety of personnel and the public is the first priority. Contractors and personnel onsite will suspend all work in the immediate area, shut equipment down and immediately notify the onsite supervisor and the Environmental Inspector. Appropriate personal protective equipment that is stored on site, including respiratory protection, will be worn and all reasonable measures will be taken to ensure that health and safety of anyone in the immediate area is preserved. Personnel and Contractors will employ all measures and requirements outlined in the KMC Environment, Health and Safety (EHS) Policy as well as any measures or requirements (KMC 2012a).

Interim Mitigation

The Lead Environmental Inspector must be consulted when determining what mitigation measures are required and employed. In all instances, the migration of the contamination must be reduced. Mitigation measures may include:

- segregating contaminated soil for later sampling/analysis and disposal;
- placing any contaminated soil onto an impermeable surface;
- in cases where precipitation may cause runoff, contaminated soil will be covered with an impermeable cover, if practical;
- construct berms to control runoff, in cases where runoff is imminent;
- stopping contaminated water discharge; and
- storing contaminated water in tanks for later sampling/analysis and disposal.

Contamination Management Requirements

Excavations in which contaminated soil or groundwater has been discovered must not be backfilled until authorization has been given by the Construction Manager and the Environmental Inspector.

Contaminated soil and water must not be transported off-site or disposed of until analytical results have been received as per federal and provincial legislation and regulations. The Construction Manager and the Lead Environmental Inspector will provide notification as to when excavations can be backfilled.

2.0 FIRE CONTINGENCY PLAN

Fire Prevention Measures

The Contractor will develop a Fire Contingency Plan (Volume 4C, Section 5.2.6) and a Fire Prevention Plan (Volume 4C, Section 5.2.7) with minimum guidelines in the TEMP Health and Safety Management Plan. This plan will be used in conjunction with the Fire Contingency Plan and the Fire Prevention Plan during all phases of construction.

The following standard measures will be adhered to during new construction of the Westridge Marine Terminal and associated components (*e.g.,* access roads) of the Project.

- Prior to the commencement of construction, the Contractor will designate one of his staff as Fire Boss. The Fire Boss will be familiar with fire suppression techniques, equipment and procedures.
- The Lead Activity Inspectors and Contractors' vehicles will carry firefighting equipment such as shovels, backpack pumps or components of a water delivery system (pump and hose) in sufficient quantities so that each worker has access to at minimum, one hand tool with which to carry out fire suppression work. In addition, all motorized equipment must carry a fully charged fire extinguisher. The Fire Boss will ensure that fire extinguishers are present and fully charged.
- The Fire Boss will ensure that equipment is cleaned periodically to reduce the build-up of debris in areas which could pose a fire hazard such as the belly pans of crawler tractors.

In the Event of a Fire

The following response measures will be implemented in the event of a fire.

- Commence fire suppression measures immediately upon detection of a fire provided that current fire behaviour allows personnel to safely proceed.
- Report the location of fire as well as size, wind direction, fuels burning and immediate values at risk to the Fire Boss.
- The Fire Boss will report all wildfires immediately and relay general fire information to the appropriate provincial, municipal or federal responding authority.
- All equipment and personnel shall be made available to control the fire. Suppression efforts will take into consideration fire behaviour, safety, training, and fitness of personnel as well as equipment availability.
- The Fire Boss will inspect the fire as soon as possible and take charge of directing suppression measures until relieved by a responding authority official.
- Moveable material, particularly explosive or flammable materials, vehicles, etc. will be promptly moved to a safe location whenever there is a possibility of being endangered by fire.
- Fire suppression efforts shall continue until the fire is extinguished or until otherwise notified by the appropriate jurisdictional authority (*e.g.*, British Columbia Forest Service [BCFS], etc.).
- The Fire Boss will ensure that all burning embers are extinguished and will monitor the burn area for smouldering material. If available, employ infrared scanning equipment to detect any residual hot spots.

To Report a Wildfire:

911 or British Columbia 800-663-5555 (or *5555 on most cellular networks)

General Fire Information

When a fire is encountered adjacent to or within the vicinity of the facility footprint, make note of the following fire and site conditions prior to reporting the fire:

- Crew contact information
- Location of the fire
- Product or object that the fire is burning (trees, grass, oil, etc.)
- Approximate size of the fire
- How quickly the fire is spreading
- Colour of the smoke
- Values at risk (lives, structures, etc.)

3.0 HERITAGE RESOURCES DISCOVERY CONTINGENCY PLAN

Note: Personnel are NOT permitted to collect and/or keep any artifacts. All heritage resources identified must be catalogued, collected by Trans Mountain and submitted to the appropriate regulatory authority.*

The following procedures provide contingency measures for the discovery of terrestrial heritage resources or marine heritage resources prior to and during construction of the Westridge Marine Terminal and its associated components (*e.g.,* infrastructure excavation).

Heritage Resources Discovery Prior to Construction

In the event that archaeological, historical or palaeontological resources are discovered during the Archeological Impact Assessment (AIA) the following measures will be implemented.

- Carry out an assessment to determine the effects of the operation or activity on the identified heritage resources.
- Prepare and submit a report containing the assessment of the effects of the operation or activity described above to the applicable Minister, the NEB and/or the appropriate regulatory authority in accordance with the permit.

Conduct all salvage, preservation or mitigation measures or any other action deemed appropriate by the applicable Minister, the NEB and/or appropriate regulatory authority.

Prior to construction of the Project, the AIA will specify mitigation measures to be implemented at each heritage resource site identified. Mitigation measures to be implemented will be provided on the Environmental Facility Drawing or will otherwise be communicated to the Contractor to ensure their implementation.

The mitigation measures that may be implemented include the following.

- Avoid the site by amending the development footprint. Clearly mark these sites using fencing or flagging.
- Mitigate the site by the collection of artifacts, maps, photographic documentation and completion of an Archaeological Site Inventory Form.
- Have a qualified Heritage Resource Specialist (archaeologist or palaeontologist) present to monitor topsoil/root zone material salvage and grading operations.
- Install geotextile or matting (*i.e.*, swamp mat[s]) to protect the site if on extra temporary workspace or an access road.
- Conduct an excavation to retrieve scientific information and establish an adequate record of the site according to applicable heritage resources guidelines.

Heritage Resource Discovery During Construction

In the event that heritage resource sites are discovered during construction, implement the measures listed below.

- Suspend work immediately in the vicinity (*i.e.*, within 30 m) of any newly identified archaeological, palaeontological or historical resource sites (*e.g.*, modified bone, pottery fragments, fossils, wrecks of vessels or aircrafts). Work at that location may not resume until the measures below are implemented. Clearly mark the site using fencing and flagging when in a non-marine area.
- Notify the Environmental Inspector, who will notify the Construction Manager, the Lead Activity Inspector and a qualified Heritage Resource Specialist and, if warranted, the appropriate regulatory authority.

- A qualified Heritage Resource Specialist will develop, if warranted, an appropriate mitigation plan in consultation with the Environmental Inspector, the Lead Activity Inspector and the Construction Manager, and/or the appropriate regulatory authority, as well as the applicable Aboriginal communities. The mitigation measures available may include those listed below:

  - site avoidance - may include amending the development footprint or temporarily covering the site using geotextile pads, matting or subsoil ramps when in a non-marine area;

  - systematic data recovery - scope of work may range from artifact collection (if feasible), mapping and site documentation or salvage excavations; and

  - surveillance/monitoring - assign a qualified Heritage Resource Specialist to monitor the remainder of the terrestrial and marine operations in the vicinity of the discovery.

Human Remains Discovered During Construction

In the event that human remains are discovered during construction, implement the following measures listed below.

- Suspend work immediately in the vicinity of any newly identified human remains. Work at that location may not resume until the measures below are implemented.

- Notify the Environmental Inspector, who will notify the Construction Manager and Environmental Manager and a qualified Heritage Resource Specialist and, the local police and BC MFLNRO.

- If there is potential for disturbance to the site due to trafficability or high public visibility, assign employees to stand watch until a qualified Heritage Resource Specialist arrives.

- Stake, flag or otherwise mark off the location to prevent further disturbance.

- Cover any exposed bones with clean plastic sheeting, tarpaulin, blanket or other appropriate covering until a qualified Heritage Resource Specialist is present.

- Do not backfill or dispose of material, if excavated fill/material has been loaded into a truck, empty the excavated fill at a nearby secure location for a qualified Heritage Resource Specialist to inspect.

- The Contractor will only resume work in that area once the archaeological and forensic studies are complete, clearance has been granted by the BC MFLNRO, and Trans Mountain has been advised that work can continue.

4.0 MARINE SPILL CONTINGENCY PLAN

4.1 Introduction

The Marine Spill Contingency Plan has been prepared for construction activities being completed at the Westridge Marine Terminal. This plan demonstrates that Trans Mountain has appropriate response capabilities and measures in place to effectively address potential releases during construction at the Westridge Marine Terminal.

Purpose and Scope

Spill reporting procedures are applicable to all Trans Mountain construction activities. These procedures are specific to the Westridge Marine Terminal and will be followed in the event of a spill or release, within this facility or contamination of coastal waters during construction activities associated with the Project.

The purpose of this plan is to provide direction on how to quickly, safely and effectively respond to a construction phase marine spill at the Westridge Marine Terminal to ensure the protection of the public, employees and Contractors, the environment and company property. In addition, this plan will ensure that all releases of hazardous materials are reported to the appropriate authority, as required. As a federally regulated company, Trans Mountain is responsible for reporting any volume of spill at the Westridge Marine Terminal to the NEB.

This Marine Spill Contingency Plan identifies the lines of authority and responsibility, establishes proper reporting and communication procedures and outlines an action plan, to be implemented in the event of a marine spill. This Marine Spill Contingency Plan applies to fuel, hydrocarbons, chemicals and other potentially harmful substance released at the Westridge Marine Terminal.

It should be noted that the Westridge Marine Terminal is currently operational and has an existing operational-phase Emergency Response Plan (ERP), which already addresses most potential spills that could occur during future construction activities. However, a few construction-specific activities may result in spills, such as:

- spills from on-land construction vehicles/equipment that drain into the ocean;
- spills from vessels engaged in construction activities (*e.g.*, tugs, workboats); and
- spills from construction equipment on barges (*e.g.*, drill rigs, pile drivers, dredgers, front-end loaders, etc.).

4.2 Response Organization

All spills into or threatening a body of water are considered reportable to the Trans Mountain Control Centre (KMC 2012b). The Environmental Compliance Manager must report any incident of a spill or release at the Westridge Marine Terminal directly to the NEB, as soon as practical and take appropriate measures to remediate the contamination. The NEB also requires notification of the contamination, in writing, to the Secretary of the Board (NEB 2011). Details regarding the reporting and notification requirements are contained in Section 8.5 below.

Emergency spill response equipment is located in the Westridge Marine Terminal Oil Spill Containment and Recovery (OSCAR) trailer. The location and contents of this trailer will be discussed during daily safety meetings and are indicated on the Environmental Facility Drawing for the Westridge Marine Terminal. Further information regarding this equipment can be obtained from the Westridge Marine Terminal Supervisor or the Westridge Marine Terminal ERP (KMC 2012).

Immediate notification of a spill to the Westridge Marine Terminal Supervisor is crucial. Immediately contact local emergency response in the event of a spill involving danger to human life.

Westridge Marine Terminal Contractor Responsibilities

Westridge Marine Terminal Contractors will be responsible for prevention, preparedness, response and reporting on their worksites during the construction phase of the Project. Westridge Marine Terminal

Contractors must maintain an up-to-date inventory and location knowledge of response materials at the worksite. Trans Mountain will provide training, prior to work and implement regular emergency response exercises to enable employees and Contractors to perform their designated emergency responsibilities. It will be the Contractor's responsibility to immediately inform the Westridge Marine Terminal Supervisor and the Environmental Compliance Manager in the event of a spill or release.

Equipment

Emergency response equipment and materials will be provided to Westridge Marine Terminal Contractors to be stored onsite, as close to the area of work as possible. These materials will include, but are not be limited to: booms, skimmers and other collection devices, sea-water pumps, hoses, sorbents, fire nozzles, containment vessels, spill kits and personal protective equipment. Any concerns regarding additional response equipment should be directed to the Westridge Marine Terminal Supervisor, who will be able to source supplementary equipment through local service providers in the area.

Initial Assessment

In the event of any incident, the location and circumstances will be assessed to determine the safety hazards, human and environmental resources at risk of adverse effect and potential of the incident escalating into a greater incident. This assessment will be conducted by the Environmental Inspector or the Westridge Marine Terminal Supervisor, depending on the circumstances. The priorities of the Environmental Inspector in the event of a release incident are to:

- protect people and environment;
- stop the source, if safe to do so; and
- contain the release.

Recovery

After the initial assessment is complete, recovery of free product or materials with high concentrations of spilled product should be performed as soon as possible to reduce the extent of effects to the shoreline, sediment and water.

Detailed Assessment

After the initial assessment and recovery activities are complete, a detailed assessment of effects resulting from the spill is required. This assessment will investigate the effects to the shoreline, sediment and water in detail, will provide comparisons of concentrations of parameters of concern with applicable guideline concentrations and provide recommendations for remedial activities, if warranted.

Remediation

Remedial activities recommended in the detailed assessment should be implemented as soon as possible following the spill to bring sediment and water conditions into compliance with regulations. Long-term monitoring may be required as a result of certain spills. A remediation report is required to be submitted to the appropriate bodies.

Closure

Once the site has been brought back into compliance with applicable regulations and monitoring activities are complete, a closure report is required to be submitted to the appropriate bodies.

5.0 ONSHORE OR MARINE WILDLIFE SPECIES OF CONCERN DISCOVERY CONTINGENCY PLAN

The following procedures provide contingency measures for the discovery of onshore or marine wildlife species of concern prior to and during construction of the Westridge Marine Terminal and associated components (*e.g.,* access roads). Onshore and marine wildlife species of concern include provincial or federally-listed species.

Onshore or Marine Wildlife Species of Concern Discovery Prior to Construction

The discovery of onshore or marine wildlife species of concern or their site-specific habitat during wildlife or other studies at the Westridge Marine Terminal or other associated components (*e.g.,* access roads) will be assessed and appropriate mitigation measures will be determined by a qualified Wildlife Resource Specialist/Marine Wildlife Resource Specialist and as identified in Appendix G. The wildlife or habitat will be assessed based on the following criteria:

- the location of the onshore or marine wildlife or habitat feature with respect to the proposed area of development;
- the presence of the topographic environment feature or terrestrial/marine riparian vegetation to effectively screen the wildlife or habitat from construction activities;
- the timing of construction versus the critical timing constraints for the identified species; and
- the potential for an alteration of construction activities to reduce or avoid sensory disturbance.

The mitigation measures to be implemented will be determined by a qualified Wildlife Resource Specialist/Marine Wildlife Resource Specialist and may include the following:

- abide by seasonal timing constraints and the recommended setback distances;
- abide by daily timing restrictions on construction activities;
- reduce the proposed area of disturbance and protect the site using fencing or clearly mark the site using flagging when located in the non-marine environment;
- alter or delay construction activities to avoid/reduce sensory disturbance;
- inform all users of access restrictions in the vicinity of marked, flagged or fenced sites;
- shift the development within the staked boundaries, to avoid the site when located in the non-marine environment;
- install nest boxes or platforms or otherwise replace or enhance habitat during reclamation; and
- with the appropriate permit and/or regulatory consent, relocate individuals (*i.e.*, amphibians) or features (*i.e.*, unoccupied stick nests), if practical, and monitor the post-construction response.

The locations of important onshore and marine wildlife and wildlife habitat encountered within the Westridge Marine Terminal and appropriate mitigation to be implemented at each known site that have been identified in the Environmental Facility Drawing of Westridge Marine Terminal. The Westridge Marine Terminal EPP and the Environmental Facility Drawing of Westridge Marine Terminal will be amended to reflect important onshore and marine wildlife environmental features on or in the vicinity of the Westridge Marine Terminal or construction site and will incorporate any new discoveries prior to construction.

Onshore and Marine Wildlife Species of Concern Discovery during Construction

In the event that onshore or marine wildlife species of concern or their site-specific habitat is discovered during construction of the Westridge Marine Terminal, the discovery will be assessed and appropriate mitigation measures from the list above will be implemented as warranted.

Onshore or marine wildlife species of concern and their habitat characteristics that have the potential to occur within the Project area will be identified through the Environmental Education Program. The Environmental Inspector will be provided with detailed information regarding the identification of onshore or marine wildlife species of concern and their site-specific habitat.

Follow the measures outlined below in the event that onshore or marine wildlife species of concern or their site-specific habitat are discovered during construction of the Westridge Marine Terminal.

- Suspend work immediately in the vicinity of any newly discovered onshore or marine wildlife species of concern. Do not resume work at that location until the measures below have been implemented.
- Notify the Environmental Inspector who will notify the Construction Manager and Environmental Manager.
- The Environmental Inspector will assess the discovery and either allow construction to resume or, in the event of a confirmed or potential discovery, proceed by notifying:
  - the appropriate regulatory authority; and
  - a qualified Wildlife Resource Specialist/Marine Wildlife Resource Specialist.

A qualified Wildlife Resource Specialist/Marine Wildlife Resource Specialist will assess the discovery and determine the appropriate mitigation measures to be implemented in consultation with the Environmental Manager and the appropriate regulatory authority. The Wildlife Resource Specialist/Marine Wildlife Resource Specialist will visit the site, if warranted.

6.0 SOIL EROSION AND SEDIMENT CONTROL CONTINGENCY PLAN

Where soil erosion by wind or water is evident during the construction phase of the Westridge Marine Terminal and associated components (*e.g.*, access roads), all necessary Contractor equipment and personnel will be made available to control the erosion. During the construction phase, the Environmental Inspector in consultation with the Construction Manager and, if required, the NEB, will determine appropriate procedures to be implemented to control soil erosion and other soil handling problems encountered. The Environmental Inspector will notify the Environmental Manager and the NEB as soon as practical that contingency measures have been implemented. A record will be made of the location, timing, reason for implementation and measures implemented.

Water Erosion

One or more of the following water/wind erosion control options listed below may be implemented, if warranted, where soil erosion is observed (see Section 8.0 of the WMT EPP for additional mitigation measures):

- shut-down construction until the risk of erosion has been reduced or conditions improve;
- install sediment fences near the base of slopes;
- construct/install temporary berms of subsoil, coir logs, or sandbags during construction activities;
- salvage topsoil/root zone material and store away from the marine environment, if required;
- replace salvaged topsoil/root zone material, if practical; and
- Implement one or a combination of the following long-term mitigation techniques in onshore areas, as warranted:
  - apply mulch or tackifier to hold soil;
  - reseed and hand rake an annual cover crop, or apply seed; and
  - transplant native shrubs, plant willow stakes or use other bioengineering techniques, where appropriate.

Wind Erosion

One or more of the following water/wind erosion control options listed below may be implemented, if warranted, where soil erosion is observed (see Section 8.0 of the WMT EPP for additional mitigation measures).

Topsoil/Root Zone Material

- shut-down construction activities until winds dissipate and conditions improve;
- consider using the following techniques, if wind erosion of the topsoil/root zone material windrow is of concern:
  - apply water to the topsoil/root zone material windrow;
  - tackify (at rate recommended by the distributor) the topsoil/root zone material windrow; or
  - pack the topsoil/root zone material windrow with suitable equipment;
- consider using the following techniques, if wind erosion is of concern after topsoil/root zone material replacement:
  - seed with cereal or short-lived perennial grass cover crop species;

- apply hydromulch or tackifier; and
- install wind fences.

Soil Erosion/Sedimentation of Marine Riparian Areas

One or more of the following water/wind erosion control options listed below may be implemented, if warranted, where soil erosion is observed (see Section 8.0 of the WMT EPP for additional mitigation measures).

- Implement one or a combination of the following mitigation techniques in marine riparian areas:
  - plant rooted stock plants in the spring;
  - transplant dormant shrubs and trees from areas adjacent to or within the vicinity of the Westridge Marine Terminal;
  - seed the disturbed area with the appropriate approved native or non-native perennial grass seed mix and cover with erosion control blanket, where warranted; and
  - reinforce sloping terrain/shoreline with rock riprap arming or rock gabions.

In the Event of Potential Sedimentation

The Environmental Inspector will notify the Environmental Manager that contingency measures have been initiated and will maintain a record of the location, timing and reason for implementation of the contingency plan, if warranted. The Environmental Inspector will notify the NEB that contingency measures have been implemented during the construction of the Westridge Marine Terminal, as soon as practical. In the event that unacceptable levels of sedimentation of the marine environment occur during construction of the Westridge Marine Terminal, suspend construction activities and review the measures presented in the Water Quality Monitoring Management Plan (see Appendix C).

The procedures outlined below will be implemented progressively or individually as warranted, should an extreme precipitation event threaten the sediment control measures, or other circumstances occur that may render the existing sediment control measures inadequate:

- prohibit the operation of construction equipment close to the shoreline where there is a risk of sloughing, flooding of the work area or damage to sensitive aquatic species and/or habitat;
- install additional sediment fencing to prevent sediment-laden water from entering the marine environment;
- construct berms of sandbags, rock or coir logs on approach slopes to divert runoff from the development zone and onto well-vegetated lands or sediment retention ponds. The location and the composition of the sediment control structures will be determined by the Environmental Inspector;
- implement one or a combination of the following mitigation techniques for long-term protection measures:
  - plant rooted stock plants in the spring;
  - transplant dormant shrubs and trees from areas adjacent to or within the vicinity of the construction area; or
  - reinforce the shoreline with rock riprap/cobble armouring or rock gabions.

7.0 SPILL CONTINGENCY PLAN

The Construction Manager or designate, and the Lead Environmental Inspector and Environmental Inspector will immediately notify Trans Mountain via the 24-hour Emergency Line, which is operated by Kinder Morgan Canada Inc, and the Environmental Compliance Manager will notify the appropriate provincial/federal regulatory authority as required by law when a reportable event occurs during the construction of any component of the TMEP. If this is not possible, notification will be made as soon as practical.

Spills may need to be reported to provincial authorities, when applicable. The timeline in which the reporting is to take place is dependent on the size of the spill. An immediately reportable spill (major spill) is defined as a release of a substance that is likely to be an imminent environmental or human health hazard and/or meets or exceeds reportable volumes. Major spills will be immediately reported to the appropriate federal/provincial regulatory authority by the Environmental Compliance Manager. Any spills with volumes that are not immediately reportable (minor spills) are not required to be immediately reported to the applicable federal/provincial regulatory authority. Rather, these spills will be tracked and documented by the Environmental Inspectors and submitted to Trans Mountain for inclusion in their spill-tracking databases.

If there is any doubt that the quantity spilled exceeds reportable levels, the spill will be reported to Trans Mountain via the 24-hour Control Centre Emergency Line who will determine if the spill should be reported to the appropriate provincial/federal regulatory authority. Crucial information that will be provided to the 24-hour Control Centre Emergency Line, if feasible, includes: name and telephone number of the caller, date and time of the call, material(s) spilled, location of the spill, estimated quantity spilled, cause of spill, actions taken to-date, assistance required, injuries, and weather conditions (KMC 2012a,b).

In BC, a reportable spill is defined by the British Columbia *Environmental Management Act* as:

- A release of 100 L or more (BC MOE) (see Attachment B3).

Any sites contaminated by a spill will be assessed, remediation will be designed and disposal sites will be identified in accordance with the NEB Remediation Process Guide (NEB 2011). This document will be provided to the Construction Manager or designate, and the Lead Environmental Inspector and the Environmental Inspector as part of the Environmental Education Program. Emergency contacts are presented in Appendix D.

7.1 Introduction

Guidelines for the safe handling, storage, use and disposal of potentially hazardous materials as well as spill prevention measures and guidelines for the refuelling and servicing of equipment are provided in Trans Mountain's Waste Management Standard provided in Appendix C.

7.2 General Measures

The following are general measures to be adhered to during construction of the TMEP.

- Appropriate spill equipment will be maintained at all work sites. The risk potential for site-specific spills will be used to determine the appropriate type of response equipment to be stored onsite and suitable location for storage.

- Specific instructions regarding applicable contacts and appropriate response actions to be taken in the event of a spill will be posted in the field construction offices.

7.3 Initial Response

The following actions will be taken upon detection of a spill.

- Ensure personal safety and the safety of others onsite and don appropriate personal protective equipment. In the event of a spill of a hazardous material, the first person on the scene will execute the actions presented in the Spill Scene Checklist (Attachment B4).

- When notified of a spill, the Construction Manager, or designate, or the Environmental Inspector will immediately ensure that:
  - action is taken to control danger to human life;
  - an onsite Emergency Response Coordinator is designated;
  - the appropriate provincial disaster services, local police and/or RCMP, and emergency services have been notified through KMC's call down system;
  - the necessary equipment and personnel are mobilized, and measures are being implemented to stop the source of the spill, if safe to do so, and commence clean-up; and
  - Trans Mountain is immediately notified of the spill via the 24-hour Control Centre Emergency Line; and the Environmental Compliance Manager will immediately notify applicable provincial and federal regulatory authority, and the NEB of the spill.
- The Contractor will make all resources available to contain and clean-up the spill.
- Once the emergency contacts are made and the initial efforts to contain and clean-up the spill are underway, Trans Mountain will notify the Project's Environment Compliance Manager.

7.4 General Spill Containment Procedures

The successful containment of a spill on land or water depends on a variety of factors including: ground cover and topography; hydrogeology; solubility of the material; viscosity of the liquid; water currents; soil permeability; and climatic conditions.

The following general guidelines will be followed for containment of spills for hazardous materials.

- Ensure personal safety and safety of others onsite. The first person on the scene will execute the actions listed in the Spill Scene Checklist.
- Assess the safety hazards of the situation and don appropriate personal protective equipment.
- Remove sources of ignition, if safe to do so.
- Identify the product, stop source and physically contain spill as soon as safe to do so.
- Avoid use of water or fire extinguishing chemicals on non-petroleum product spills since many chemicals react violently with water and chemical extinguishing agents may release toxic fumes. In addition, chemicals may be soluble in water and dispersal makes containment and clean-up more difficult.
- Reduce traffic on contaminated soils.
- Use natural depressions or berms constructed with materials and equipment in proximity to the site to physically contain a spill on land. Deployment of booms will be necessary on water.
- Clean-up will not be attempted without advice from the Environment Manager.

7.4.1 Spills Occurring During Transportation

The general guidelines listed below will be followed for the containment of materials spilled during transportation.

- Contain spilled product.
- Pump tanker truck or transportation vessel dry (into appropriate containers).
- Remove tanker truck or transportation vessel from site.

- Recover spilled product.
- Clean up contaminated area.
- Dispose of sorbent pads, heavily contaminated soil and vegetation at an approved facility. On lightly contaminated soil areas where remediation is feasible, add amendments, repeat as required, sample soil and seed as appropriate. Repeat as required.

7.4.2 Spills Adjacent to or into a Watercourse or Wetland

The general guidelines listed below will be followed for spills adjacent to or into a watercourse or wetland.

- Construct berms and/or trenches to contain spilled product prior to entry into a watercourse or wetland.
- Deploy booms, skimmers, sorbents, etc., if feasible, to contain and recover spilled material from a watercourse or wetland.
- Pick up spilled product.
- Clean up contaminated area including downstream shorelines.
- Dispose of heavily contaminated soil and vegetation at an approved facility. On lightly contaminated soil areas consider in situ restoration where feasible; fertilize and then cultivate beyond depth of contamination. Repeat as required.

7.4.3 Spot Spills

Effects from small spot spills can generally be reduced and will not result in the suspension of activities if appropriate actions are implemented, All small spills of fuels or hazardous materials must be reported immediately to an Environmental Inspector.

- An Environmental Inspector, in consultation with the Environment Lead, will determine appropriate methods to remove or reclaim contaminated soils. Soil and vegetation heavily contaminated with petroleum products will be disposed of at an approved facility.
- Locations where spot spills occur are to be recorded to ensure that post-construction environmental monitoring of the site can be conducted, if warranted.
- In lightly contaminated soil areas where in situ restoration is feasible; soil will be fertilized, incorporated by hand or cultivated to a depth below the depth of contamination, then repeated as required.

8.0 WET SOILS CONTINGENCY PLAN

Trans Mountain will assign an Environmental Inspector with sufficient training and soils-related experience to identify soils that are too wet for a particular activity and identify when the soils are sufficiently dry to allow the activity to resume. The decision to continue or suspend particular construction activities on excessively wet soils will be made by the Construction Manager in consultation with the Environmental Inspector. A record of the location, timing and reason for implementation of the Wet Soils Contingency Plan will be maintained by the Environmental Inspector. In the event that activities are suspended the NEB will be notified by the Environmental Inspector, as soon as practical.

The Environmental Inspector will be responsible for monitoring and ensuring that all procedures are implemented and will liaise with the NEB to obtain input. Trans Mountain believes that effective communication between the Contractor and the NEB is critical when addressing wet soils. Therefore, if necessary, a meeting will be held in the field to ensure that all parties involved mutually understand the concerns.

Soils are considered to be excessively wet when the planned activity could cause: damage to soils either due to rutting by traffic through the surface material into the subsoil; soil structure damage during soil handling; or compaction and associated pulverization of surface material due to heavy traffic.

Contingency measures will be implemented, when warranted, if one or more of the following indicators occur:

- rutting of topsoil/root zone material to the extent in which admixing may occur;
- excessive wheelslip;
- excessive build-up of mud on tires and cleats;
- formation of puddles; and/or
- tracking of mud as vehicles leave the Westridge Marine Terminal.

Where construction activities have the potential to, or are causing the aforementioned issues, the Environmental Inspector, in consultation with the Construction Manager, will suspend that phase of the construction activity until soil conditions dry out or effective mitigation procedures have been implemented.

In the event of an excessively wet surface construction alternatives will be employed, when warranted, in order to avoid terrain disturbance and soil structure damage through rutting or compaction due to wet soil conditions. The contingency measures listed below will be implemented individually or in combination, as necessary, based on site conditions:

- Delay construction until soils dry out.
- Back-blade the facility site outside of the development zone at the end of the day in wooded areas. Back-blading fills in ruts, thereby assisting in the prevention of water erosion and re-establishing a firm work surface.
- Restrict construction traffic, where feasible, to equipment with low-ground-pressure tires or wide pad tracks.
- Postpone work in highly sensitive areas and shift effort to low sensitivity areas.
- Restrict work to non-problem areas, such as well-drained soils, until conditions improve.
- Salvage topsoil/root zone material in potential problem areas. Note that topsoil/root zone material salvage will not be permitted during wet soil conditions.

- Install geotextiles or matting in problem areas. Record the locations of all geotextiles or mats that will be removed immediately to ensure proper removal and clean-up following construction.

- Suspend construction activities and traffic in areas with wet soil conditions until the soils dry out. Suspension of construction activities outside of the development zone, will be based on discussions between the Construction Manager and the Environmental Inspector, and the Contractor. Recommencement of work must be authorised by the Construction Manager, in consultation with the Environmental Inspector, once soils dry out.

Partial Suspension of Construction Activities and Traffic

The primary concern during wet soil conditions is the potential for rutting, compaction and loss of soil structure in the topsoil/root zone material. Criteria to be used in determining whether activities will be suspended during wet soil conditions at Westridge Marine Terminal are provided in Table B.8-1.

TABLE B.8-1

CRITERIA FOR THE SUSPENSION OF ACTIVITIES DUE TO EXCESSIVELY WET SOIL CONDITIONS OUTSIDE OF THE DEVELOPMENT ZONE

Land Use	Topsoil/Root Zone Material Salvage Status	Construction Activity	Suspend Activity for Environmental Issue?
Bush-Wooded	No salvage conducted	Soils handling (topsoil/root zone material - salvage/replacement)	Yes
	Topsoil/Root Zone Material salvage in all areas outside of the development zone that will require grading	Materials storage and staging area	No
	Topsoil/Root Zone Material replacement	Clean-up	Yes, heavy traffic not permitted; No, quad traffic likely acceptable

9.0 WILDLIFE ENCOUNTER CONTINGENCY PLAN

Follow the measures provided below in the event of an encounter with wildlife during the construction of the Westridge Marine Terminal, including associated components (*e.g.,* access roads) either at the construction site or on the commute to and from the construction site.

- Report any incidents (*e.g.*, aggressive behaviour, nuisance behaviour, obtained food or garbage) with wildlife to the Environmental Inspector who will immediately notify the appropriate regulatory authority and, if warranted the local police detachment.
- Report any trapped, injured, or dead animals onsite to the Environmental Inspector who will notify the appropriate regulatory authority to consult on appropriate action.
- Report the location and details of collisions with wildlife to the Environmental Inspector, who will notify the appropriate regulatory authority and, if warranted, the local police detachment.
- Once the preceding contacts have been made, the Environmental Inspector will also contact Lead Activity Inspector, who will in turn communicate the information to the Construction Manager.
- The Environmental Inspector will document all wildlife encounters during construction in a detailed record. Wildlife encounter records will be kept on file by Trans Mountain and provided to the appropriate regulatory authority and Aboriginal communities upon request. This record will include, at a minimum:
  - date;
  - weather conditions;
  - location;
  - wildlife species encountered;
  - the type of encounter (*e.g.*, passive, aggressive, etc.); and
  - if applicable, any actions taken by Project staff to address the situation.

APPENDIX C

MANAGEMENT PLANS

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

1.0 HYDROVAC CUTTING AND HANDLING DISPOSAL MANAGEMENT PLAN

Background

Hydrovac excavation will be used prior to construction where soil excavation activities will occur onsite, as described in Section 8.1.1 of the Westridge Marine Terminal EPP. This method of excavation will be used prior to ground disturbance activities to expose hotlines and underground utilities and to prevent potential line strikes. The process of hydrovac excavation uses pressurized water to expose underground infrastructure, while a vacuum system simultaneously extracts the resulting hydrovac slurry and stores it in an onboard tank. This method of excavation produces a waste liquid which is a combination of water and spoil (*i.e.,* hydrovac slurry or hydrovac tailings) that must be properly contained and disposed.

Objectives

The objective of the Hydrovac Cutting and Handling Disposal Management Plan is to avoid or reduce potential adverse environmental effects due to the handling, storage or disposal of hydrovac slurry in accordance with applicable provincial and federal legislation, regulations and guidelines and KMC's policy and reclamation objectives for the Project.

Management Approach

Prior to initiating the hydrovac operation, the Hydrovac Contractor will ensure that the Environmental Inspector has reviewed and approved a disposal site. If the disposal site is determined to be off-site, the maximum weight of the loaded hydrovac truck will be determined to ensure compliance with applicable road weight restrictions. The Hydrovac Contractor will also provide copies of their operating procedures and emergency response plans for approval to the Environmental Inspector prior to initiation of hydrovac operations. The Hydrovac Contractor will ensure that all tanks are clean and free of contaminants prior to arriving onsite.

Refer to Water Discharge Procedures Management Plan provided in Appendix C for water discharge procedures to be employed during hydrovac activities

Hydrovac Operations

Topsoil/root zone material, if present, will be salvaged prior to hydrovac use. However, for holes less than 1 m in diameter, topsoil salvage is not necessary if the area to be exposed will be subsequently subject to topsoil salvage as part of Westridge Marine Terminal construction preparation activities.

Non-Contaminated Hydrovac Slurry Disposal

Non-contaminated tailings will be released into the hydrovac excavation if future subsidence of the site is not a concern and the area will be fenced until the tailings are dry. Onsite disposal is the preferred method for hydrovac slurry from new disturbances as it is not likely to be contaminated and is generally of mineral soil content. The disposal location will be in an area where topsoil/strippings salvage has occurred. If a dike is warranted to contain the hydrovac slurry, the dike material will be composed of subsoil material and able to prevent any surface water runoff from contacting the hydrovac slurry. The Hydrovac Contractor will ensure that at no time will the hydrovac slurry be allowed to be pumped into or flow into a waterbody, during hydrovac slurry disposal.

If temporary onsite storage is constructed (*e.g.*, sump or bermed area), topsoil/root zone material will be salvaged from the area to be used for storage and the storage area will be sized to be able to contain the hydrovac slurry by preventing off-site migration of the stored hydrovac slurry. If a dike is necessary for containment, it will be composed of impermeable clay. Salvaged topsoil/root zone material will stored on one or two sides of the stripped sump/dike area to provide access for equipment and potential sump/dike expansion, where warranted.

Hydrovac slurries may be temporarily stored on the Westridge Marine Terminal footprint in the hydrovac truck, in clean oilfield storage tanks, at a site designed to safely store hydrovac slurry, or in a metal slop bin if other more practical storage options (*i.e*., temporary pits) are not feasible for the site.

Wet hydrovac slurry may also be disposed of at an approved licensed treatment plant or disposal facility, if necessary. Appropriate documentation will be provided to Trans Mountain to confirm the hydrovac slurry was disposed of in accordance with regulatory requirements and to the satisfaction of Trans Mountain.

Contaminated Hydrovac Slurry Disposal

Trans Mountain will ensure hydrovac slurry suspected of contamination receives special handling storage and disposal. The Hydrovac Contractor will ensure contaminated hydrovac slurry will not be allowed to mix with non-contaminated hydrovac slurry. If contaminants are suspected, hydrovac slurry will not be removed from the site. Instead, arrangements will be made to temporarily store the hydrovac slurry onsite until analysis is complete and appropriate disposal requirements are made. Potential indicators of contamination include soils with a sudden change to a darker or blacker appearance in colouration and/or have a hydrocarbon odour. See the Contamination Discovery Contingency Plan (see Appendix B) for additional information.

Trans Mountain will require the Hydrovac Contractor to follow the guidelines set out in the Waste Management Standard (see Appendix C) as well as to provide appropriate documentation to verify the contaminated hydrovac slurry disposal is in accordance with regulatory requirements and to the satisfaction of Trans Mountain.

Ultimately, all hydrovac holes will be backfilled with mineral soil and compacted to ensure settling of material does not pose a hazard for wildlife or onsite personnel. If hydrovac slurry necessitates off-site disposal, clean replacement backfill will be sourced.

2.0 NOISE MANAGEMENT PLAN

(PLACE HOLDER – To be developed prior to construction)

3.0 TRAFFIC AND ACCESS CONTROL MANAGEMENT PLAN

The Traffic and Access Control Management Plan addresses the management of Westridge Marine Terminal construction traffic and access within the Westridge Marine Terminal. This plan addresses activities during pre-construction, construction and post-construction phases of the Project and provides guidelines for vehicular use during the construction of Westridge Marine Terminal, as well as blocking and controlling access (using existing access control measures) to Westridge Marine Terminal following construction and throughout the operation phase of the Project. The intent of the mitigation is to reduce disturbances caused by access, construction equipment and vehicle traffic during and following construction and, in particular, on areas with wildlife species or habitats, riparian areas and in areas of high soil erosion hazard. All vehicle and equipment operators will adhere to the contingency measures for wet conditions outlined in the Wet Soils Contingency Plan (see Appendix B).

The Traffic and Access Control Management Plan is a supplement to, and not a replacement for, the Traffic Control Plan to be prepared by the Prime Contractor.

The objectives of the Traffic and Access Control Management Plan will be accomplished by minimizing the development of access routes, controlling public access within Westridge Marine Terminal, selecting applicable access routes that cause the least disturbance to wildlife and/or marine mammal habitat, managing traffic on these routes, and determining appropriate construction reclamation. Trans Mountain will work with applicable resource managers and other affected stakeholders (*e.g.*, nearby residents, etc.) to define locations where access control is necessary, and what type(s) of access control will be implemented.

3.1 Pre-Construction

Westridge Marine Terminal pre-construction activities will be scheduled for dry conditions, where feasible.

The applicable regulatory authority will be notified of all access road upgrading requirements and Trans Mountain will accommodate continued existing access during Westridge Marine Terminal construction, whenever feasible.

The Project will implement and adhere to the following guidelines and mitigation measures.

- Once approval for the Project has been granted, all necessary permits will be obtained prior to the commencement of pre-construction work.

- Trans Mountain will work with applicable regulatory authorities and other potentially affected stakeholders when completing the final design for managing access within the Westridge Marine Terminal. Final access management measures to be implemented at any given location within Westridge Marine Terminal will be determined during the detailed design phase of the Project prior to construction. The applicable measure(s) to be implemented during construction will be mapped on the Environmental Facility Drawings for Westridge Marine Terminal which will be revised and issued prior to construction.

- Soil testing activities in areas where soil testing with a truck mounted auger is required will only take place under dry ground conditions so that surface disturbance is reduced.

- Prior to the commencement of construction activities, site-specific features of concern (*e.g.,* weeds or heritage resource sites) identified during biophysical surveys will be sufficiently flagged (if approved by Trans Mountain) so that subsequent traffic can avoid these areas.

3.2 Construction

During construction, the Project may implement and adhere to the following guidelines and mitigation measures.

- All Project personnel and other visitors to the Westridge Marine Terminal will receive a pre-job orientation which will include a discussion of the purpose and requirements of the Traffic and Access Control Management Plan. All project roads and access points to the Westridge Marine Terminal will be controlled using signage, gates, barricades or security personnel, where/as necessary, to prohibit unauthorized public use. Trans Mountain and their Contractor will develop a communication protocol prior to construction.

- Existing access roads will be utilized as access wherever possible. Existing access will not be upgraded or widened unless approved by the City of Burnaby.

- All vehicular traffic will be restricted to the approved and staked workspace and access roads. Any newly required access must be approved by Trans Mountain prior to development.

- Fences and signs will be erected to protect features of concern, as specified in Section 6.0 of the Westridge Marine Terminal EPP.

- Construction and inspection personnel and visitors to the Westridge Marine Terminal and other work sites will receive instruction regarding locations suitable for parking vehicles and equipment.

- Trans Mountain, the Contractor and all subcontractor personnel will avoid areas that are fenced or staked and abide by any restrictions on in/out privileges that are implemented in areas requiring special protection.

- Trans Mountain, the Contractor and all subcontractor personnel will limit travel within the Westridge Marine Terminal during the course of the work.

- Construction personnel will be transported between the hotel accommodations and muster areas by multi-passenger vehicles to the extent practical, in order to reduce vehicle traffic between lodging, staging and work site locations.

- The posted speed limit within Westridge Marine Terminal will be adhered to at all times during construction and may be lower under specific conditions such as areas of high erosion hazard, low visibility, steep terrain or areas where specific wildlife or vegetation concerns have been identified (speed limits will be posted within Westridge Marine Terminal).

- All Project-related vehicles will follow applicable traffic, road-use and safety laws.

- Speed limits will be obeyed in order to reduce the potential for collisions and for public safety.

- All personnel will avoid unnecessary wheel spin.

- Surface grading will be reduced on native vegetation (*i.e.,* rough micro-topography tolerated) unless a safety concern is identified.

- Use of cellular telephones and other hand-held communication devices by Trans Mountain staff, Contractor and subcontractors is prohibited while operating a motor vehicle. Drivers must pull over, when safe to do so and in a safe location, prior to using all hand-held communication devices.

- Vehicles will be limited to travel on the access roads within Westridge Marine Terminal for which they are designed.

3.3 Construction Clean-Up and Reclamation

- All temporary construction access roads will be reclaimed after construction is complete. Newly created access points will be blocked unless otherwise directed by Trans Mountain or the landowner/occupant or stakeholder. Reclamation efforts will be initiated and traffic will adhere to the following principles to ensure there is as little disturbance as practical:

- Existing access control (secured, locked gate) at Westridge Marine Terminal will remain in place following completion of construction and into operations, if required.

- Foot traffic will be reduced on newly seeded areas until grass establishment has taken place. Vehicle traffic will be avoided on seeded areas until the sod is re-established.

- All temporary construction access roads will be deactivated. Newly created access points will be blocked unless otherwise directed by Trans Mountain or the appropriate regulatory authority. Temporary construction gates removed during construction will be replaced with permanent fences.

- Routine access to the Westridge Marine Terminal for operations, maintenance and monitoring activities will be by way of pre-existing roads. Where travel within Westridge Marine Terminal in the vicinity of sensitive vegetation is required (*e.g.*, during reclamation monitoring), foot travel will be used whenever feasible.

- Trans Mountain's Emergency Preparedness and Response Program will include instructions regarding preferred access routes to the Westridge Marine Terminal in areas of sensitive vegetation or habitats. These instructions will be followed during both emergency response training exercises and real emergencies providing that response times and safety are not compromised.

4.0 WASTE MANAGEMENT STANDARD

The Waste Management Standard has been prepared to provide guidelines for dealing with the generation of Project waste. This plan is submitted in accordance with the filing requirements outlined in the NEB *Filing Manual* (NEB 2013).

The Waste Management Standard outlines specific measures to be followed by all Trans Mountain employees and contractors involved with the construction of the Project. The plan is designed to ensure wastes generated by the Project are handled, stored and disposed of in an environmentally responsible manner, thereby maintaining ecological and cultural integrity. The Waste Management Standard will reduce the likelihood of an accidental release of potentially hazardous waste products into the environment during Westridge Marine Terminal construction.

The Waste Management Standard applies to all employees, contractors and consultants who conduct work on behalf of Trans Mountain during construction of the Project. All employees, contractors and consultants will abide by all federal, provincial and municipal requirements for the storage, handling, transport, disposal and spill reporting requirements of all waste materials that are potentially hazardous to the environment.

The Environmental Inspector is responsible for ensuring compliance with KMC's *Environmental Guidelines* or the most recent KMC environmental manual or environmental management plans available at the time of construction for waste management. Where a discrepancy occurs, the most stringent requirements will apply. In the event of a spill, the Marine Spill Contingency Plan or the Spill Contingency Plan (see Appendix B) will be implemented. The Marine Spill Contingency Plan and the Spill Contingency Plan set forth the lines of communication and procedures to follow in order to facilitate containment and clean-up, should a spill occur.

Trans Mountain's Waste Management Standard will be provided in the Contractor's Construction Field Office.

1.0 INTRODUCTION

1.1 Scope

1.1.1 This Environmental Standard establishes the requirements that must be met while performing all work activities at Kinder Morgan Canada (KMC) in accordance with the Waste Management Program. This includes the requirements for handling, labelling, storing, and transporting wastes generated by work on or at KMC operated systems and facilities.

1.1.2 Any deviation from this Standard requires approval through the Facilities Modification Request (FMR) process.

1.2 Applicability

1.2.1 This document is applicable to all KMC employees and contractors with respect to any activity associated with waste management on the following (checked) KMC operated systems and facilities:

- ☑ Trans Mountain System
- ☑ Puget Sound System
- ☑ Jet Fuel System
- ☑ North 40 Terminal

1.3 Definitions

None

1.4 Background

1.4.1 Protection of the environment is a key priority of the public, industry, and government. One of the initiatives that KMC has implemented to accomplish this expectation is the environmentally responsible management of all waste generated by the company.

1.4.2 All types of waste, no matter how benign, can impact the environment and require responsible management to minimize and mitigate this impact. The Waste Management Program provides all employees and contractors with the tools to incorporate responsible waste management practices into their daily work routine and to

ensure that wastes are managed in accordance with applicable laws and regulations.

1.4.3 KMC operates facilities located in Canada and the United States. There are notable differences in how states and provinces regulate waste disposal. All employees involved in disposal activities must ensure that any waste intended for disposal or recycling is done so in accordance with the appropriate regulations for the province or state in which the waste is generated.

1.4.4 Both employees and contractors are responsible for preventing pollution by incorporating responsible waste management practices into work-related tasks on a daily basis. The results will lead to a cleaner environment, more efficient operations, and a safer workplace.

1.4.5 The Waste Management Program has been implemented to ensure compliance with regulatory requirements, protect human health and the environment, minimize costs and liabilities associated with managing wastes, and improve resource use and recovery in a managed and responsible manner.

1.4.6 This Standard is part of the Waste Management Program and states the requirements that must be met during all work activities.

2.0 ROLES AND RESPONSIBILITIES

2.1 Waste Program Coordinator

- Coordinates program management with third-party waste contractor
- Manages and coordinates third-party revisions to Waste Management Program
- Develops and implements waste training programs
- Participates in audits (as necessary) and corrective actions associated with waste documentation and processes
- Manages waste contractor selection for external auditing
- Acquires provincial waste generation numbers

2.2 Third-Party Waste Contractor

- Provides bin rental and pickup services
- Transports and disposes of routine and non-routine operational and project waste
- Provides technical waste support for field personnel
- Issues quarterly and annual waste tracking summaries to KMC for internal and external reporting
- Screens regulations/legislative requirements and provides updates to Waste Program Coordinator
- Reviews and updates KMC waste management documents as necessary
- Provides emergency waste services for petroleum releases i.e. onsite manifest completion, waste disposal coordination, etc.

2.3 Environment Manager

- Responsible for the overall Waste Management Program.
- Ensures the Environment Department has personnel and services in place to support the program.
- Designates a Waste Program Coordinator who will coordinate waste management activities associated with company facilities and operations.

2.4 EHS Coordinators

- Ensures applicable regulatory commitments are satisfied, including the acquisition of required permits and completion of government requested reports.
- Provides support and guidance to Operations and other departments on waste management issues.
- Assists in the acquisition of any required approvals for regional and project waste disposals.
- Responsible for record keeping and maintaining waste tracking documentation.
- Responsible for audit participation and corrective actions associated with facility audits.

2.5 Operations

- Coordinates day to day waste activities for their particular region, facility or activity.
- Ensures that only company approved waste contractors are used for generated waste transport and disposal.
- Ensures that all applicable waste training is received before conducting tasks associated with waste management.
- Responsible for completing station inspections which include Waste Storage Building Inspections.

2.6 Engineering

- Coordinates waste services for company projects.
- Ensures that only company approved waste contractors are used for generated waste transport and disposal.

2.7 Procurement Department

- Issues Master Service Agreement contracts with approved waste contractors.
- Provides support when surplus or used pipe, valves or fittings are sold or donated.

3.0 REQUIREMENTS

3.1 Waste Characterization and Classification

3.1.1 All wastes produced at KMC facilities and job sites shall be characterized and classified before long-term storage and disposal.

3.1.2  Characterization and classification shall be done by following Procedure *3.2.6.1 Classifying and Characterizing Waste*.

3.2 Waste Handling

3.2.1 All KMC employees who manage or handle waste must:

- Review and understand the applicable sections of the Waste Management Program.

- Be properly trained in the waste practices and procedures relevant to their work duties and have taken the KMC Waste Management Awareness training course.
- Ensure that all wastes are identified, handled, stored, transported, documented and disposed of or recycled in an environmentally acceptable manner and in compliance with federal, provincial/state, and municipal regulations.
- Report all spills or incidents in a timely manner according to KMC's incident reporting procedure (entry into STARS, emergency response line (ERL) notification, etc.).
- In Canada, review and understand Workplace Hazardous Materials Information System (WHMIS) and Transportation of Dangerous Goods (TDG) requirements before handling and disposing of wastes.
- In the United States, review and understand Hazardous Communication (HAZCOM), Department of Transportation (DOT) requirements for shipping dangerous goods, and Environmental Protection Agency (EPA) and state requirements for waste management.

3.3 Transportation of Wastes

3.3.1 All wastes produced at KMC facilities and job sites shall be transported in accordance with the applicable federal transportation requirements.

3.3.2 Transportation requirements are dependant on the properties of a substance, not whether it is waste or non-waste (unused); therefore, wastes must be transported with the same caution and compliance with transportation regulations as non-waste substances.

3.3.3  Transporting wastes shall be performed by following Procedure *3.2.7.3 Transporting Regulated Wastes – Documentation Guide*.

4.0 INSPECTIONS AND AUDITING

4.1 Inspections

4.1.1 All waste storage areas, including hazardous waste storage areas, shall be routinely inspected at least once every three months or as specified by the applicable regulations.

4.1.2 The inspections must document evidence of spills and leaks, corroded or damaged drums or tanks, missing labels, inadequate spill containment or weather protection, and current contents of wastes stored. A checklist shall be used for conducting routine inspections.

4.1.3  Inspections shall be carried out by following Procedure *3.2.6.2 Waste Storage and Inspections*.

4.2 Auditing

4.2.1 KMC shall undertake regular audits of waste contractors and internal operations where wastes are generated, handled, stored, transported, and disposed of or recycled.

4.2.2 Detailed information on waste auditing protocols and audit systems and schedules are developed and implemented by the Waste Program Coordinator.

4.2.3  Selecting waste contractors for waste disposal and ensuring they are approved for use by KMC shall be done by following Procedure *3.2.7.1 Selecting and Using Waste Contractors*.

5.0 QUALIFICATION AND TRAINING

5.1 KMC Employees who Manage or Handle Waste

5.1.1 All employees who handle, store, transport and dispose of waste must be qualified and have received waste management training. Waste training for KMC Technicians is a component of, and administered within, the KEEP Canada Program.

5.1.2 The type of training shall reflect the type (i.e. character and classification) of waste the employee is working with.

5.2 Contracting Companies that Transport or Dispose of Waste

5.2.1 Prior to handling, shipping, or disposing of any waste generated by KMC, contractors must review the Contractor Environmental/Safety Manual and understand the waste regulations that apply to KMC.

6.0 REFERENCES

6.1 Environmental Manual

- *3.2.6.1 Classifying and Characterizing Waste*
- *3.2.6.2 Waste Storage and Inspections*
- *3.2.7.1 Selecting and Using Waste Contractors*
- *3.2.7.3 Transporting Regulated Wastes – Documentation Guide*

6.2 Regulations

- National Energy Board, Onshore Pipeline Regulations, 1999
- Transport Canada, Transportation of Dangerous Goods Regulations
- Environment Canada, Interprovincial Movement of Hazardous Waste Regulations
- Alberta Environment and Sustainable Resource Development, Waste Control Regulation
- Alberta Environment and Sustainable Resource Development, Alberta Users Guide for Waste Managers
- Alberta Energy Resources Conservation Board (ERCB), Directive 55: Storage Requirements for the Upstream Petroleum Industry, Directive 58: Oilfield Waste Management Requirements for the Upstream Petroleum Industry, and Directive 66: Requirements and Procedures for Pipelines
- British Columbia Ministry of Environment, Hazardous Waste Regulation
- British Columbia Ministry of Environment, Hazardous Waste Legislation Guide
- Environmental Protection Agency, Resource Recovery and Conservation Act, 40 CFR §260-282
- Environmental Protection Agency, Hazardous Materials Regulations 40 CFR §273
- Department of Transportation, Pipeline and Hazardous Material Safety Administration (PHMSA) 49 CFR §171-185

- Washington State Department of Ecology, Dangerous Waste Regulations WAC 173-303
- Washington State, Chapter 70.105 RCW Hazardous Waste Management

5.0 WATER QUALITY MONITORING MANAGEMENT PLAN

Background

The quality of water is determined by its biological, chemical and physical characteristics. Alteration of these characteristics can affect its potential value for the organisms present and/or human need or purpose. If not mitigated, the Project's construction could negatively influence water quality primarily through sediment releases due to on-shore and marine construction activities and Project-related releases such as (among others):

- activities associated with dredging of the marine environment (from onshore or from the marine environment);
- placement of fill in the marine environment during land reclamation activities;
- production of suspended sediment during pile installation;
- sediment inputs in run-off from disturbed areas due to development activities (*i.e.,* grading) (see the Soil Erosion and Sediment Control Contingency Plan provided in Appendix B); and
- hydrostatic test water withdrawal and discharge (see the Water Discharge Procedures Management Plan provided in Appendix C).

Elevated sediment levels can lead to reduced light penetration (reduced photosynthesis of plants), direct effects on health of organisms (*e.g.*, damage to gills of fish), and reduced habitat quality (*e.g.*, smothering of benthic habitat). Sediment is considered a deleterious substance under the federal *Fisheries Act*, and, depending on the amount, its release can be a violation of the *Fisheries Act* if prior organization has not been granted.

Changes in other parameters (*e.g.*, dissolved oxygen, pH) may be associated with hydrostatic testing or pouring of cement. These parameters are addressed in the Water Discharge Procedures Management Plan provided in Appendix C.

Changes in sediment levels are measured as total suspended solids (the amount of sediment in water in mg/L TSS) and turbidity (indication of how particles in the water column reflect light, in nephalometric turbidity units [NTU]). The relationship between TSS and turbidity varies with site conditions (*e.g.*, amount of phytoplankton, sediment, and colour in the water). Authorizations and permits for construction activities often refer to TSS levels, which need to be measured in the laboratory (and require a turnaround time of days). In practice, turbidity measurements provide a more responsive monitoring method, as they can be measured in the field using a meter, as well as in the laboratory, and provide real-time results. Because the relationship between TSS and turbidity varies with site conditions, a calibration is done to establish this relationship. Samples are collected for TSS and turbidity analysis over a range of conditions that occur during a sediment event.

Water quality guidelines for protection of aquatic life (freshwater and marine) provide the monitoring benchmarks for construction projects. The (Canadian Council of Ministers of Environment [CCME], 2007) guidelines apply to short term activities (duration of 24 hours or less) and longer term activities (24 hours to 30 days). There are guidelines for clear water (25 mg/L TSS and 8 NTU turbidity or less) and for turbid conditions (greater than 25 mg/L and 8 NTU), are provided in Table C.5-1. For Westridge Marine Terminal construction, the clear water conditions are likely most applicable. These guidelines typically apply at a defined distance from the construction activity (*i.e.*, they allow for a dilution zone).

TABLE C.5-1

WATER QUALITY GUIDELINES FOR TOTAL SUSPENDED SOLIDS

Conditions	TSS[1,2] (mg/L)	Turbidity[1,2] (NTU)
Clear, short term (24 hours or less)	Maximum increase of 25 mg/L from background levels	Maximum increase of 8 NTUs from background levels
Clear, longer term (inputs lasting 24 hours to 30 days	Maximum average increase of 5 mg/L from background levels	Maximum average increase of 2 NTUs from background levels
Turbid	Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Maximum increase is 10% of background levels when background level is ≥ 250 mg/L.	Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is > 80 NTUs.

Sources: 1 CCME 2013
2 BC MOE 2013

Water quality monitoring during marine construction will be necessary at Westridge Marine Terminal to protect aquatic resources during and following construction and to ensure compliance with applicable guidelines. The method, frequency and duration of monitoring will vary depending upon the following considerations (among others):

- sensitivity of the aquatic resources outside of the construction zone;
- regulatory requirements;
- construction activity/method (*i.e.*, dredging of the marine environment from onshore or from the marine environment, pile installation, etc);
- construction season and timing of marine construction activities; and
- tidal characteristics at the time of construction.

The water quality monitoring during marine construction may range from a few hours to one or more months and will be based on environmental and construction considerations prior to and throughout construction activities.

Objectives

The primary objective of the Water Quality Monitoring Management Plan is to ensure that the quality of the marine environment is maintained and not adversely affected due to construction. The measures to be taken to achieve this objective include:

- monitoring of water quality during both pre-construction and construction conditions;
- providing information and immediate feedback to assist in protecting aquatic resources;
- identifying key activities that have the potential to affect marine water quality;
- developing strategies and mitigation to reduce or avoid the potential effect and contingency measures to be implemented at the first indication of a potential adverse effect occurring; and
- close monitoring of these activities and the effectiveness of the mitigation during construction.

Management Approach

Prior to the commencement of Westridge Marine Terminal construction, information will be shared at start-up meetings where Trans Mountain representatives will outline the management plans, construction goals and procedures, contingency plans (see Appendix B) and schedules and procedures for handling high sediment loads. The Environmental Inspector and other inspection staff will participate in these meetings. A construction briefing will be held at the Westridge Marine Terminal to discuss potential effects

and outcomes of monitoring data on construction activities. The goal is to share information, provide prompt responses at the first indication of a potential adverse effect and to ensure that each group understands their respective responsibilities.

Within the area of marine construction, water quality will be monitored at pre-determined sampling locations. The sampling depth, frequency and duration will be determined by a Qualified Environmental Professional (QEP) as part of a site-specific Water Quality Monitoring Plan or by the Environmental Inspector. During construction, the QEP will regularly inform the Environmental Inspector of the data, including the interpretation of the results. The Environmental Inspector will use that information to continue or modify the construction activities, in consultation with the Contractor. Monitoring information will be shared with the NEB and any other applicable authorities at their request or immediately if a problem is identified.

Communication between the QEP, the Environmental Inspector and Contractor will be maintained throughout implementation of the Water Quality Monitoring Management Plan to ensure protection of aquatic resources during construction.

The Environmental Inspector will ensure the implementation of the Water Quality Monitoring Management Plan at Westridge Marine Terminal. The QEP or, if required, the Environmental Inspector will be responsible for the collection of water quality samples.

Sampling Methods

Water quality monitoring may range from routine to more detailed sampling, as deemed appropriate during phases of marine construction activities. Point samples will be collected at locations within and away from the construction area. Data gathered from locations away from the construction area will provide information regarding background levels and will be compared with results from within the construction area to identify any sediment release.

In-situ sampling results will be obtained using a portable turbidity meter for point measurements or a sonde for continuous measurements, either from the near-shore area or from an approved monitoring boat. If warranted (*e.g.*, during a suspected sedimentation event), representative water samples over a range of turbidity values will be taken and sent to a laboratory for analysis to form the basis of the TSS-turbidity relationship. A detailed photographic record will also be obtained for documentation purposes and reference.

Rationale for Water Quality Monitoring in the Marine Environment

The short-term mobilization of sediment during certain stages of marine construction activities (*e.g.*, dredging of the marine environment from onshore or from the marine environment, shoreline infill) is unavoidable. However, the use of appropriate mitigation measures (*e.g.*, turbidity curtains, clamshell dredging) typically results in minimal disturbances to fish and aquatic habitat. Monitoring water quality for turbidity and TSS concentrations is an effective way to confirm the effectiveness of the mitigation measures.

During construction activities equipment will be required in-water for the installation and of sediment containment measures (*i.e.*, turbidity curtains [see Drawing {Turbidity Curtain Installation – Tidal Conditions} provided in Appendix F]), as well as specific marine construction activities (*i.e.*, dredging of the marine environment from onshore or from the marine environment, pile installation, infilling, etc.). If the placement of the sediment containment measures (and other mitigation measures) is effective, mobilized sediment is not expected to occur outside the construction area; however, steps required to place and remove turbidity curtains may result in the mobilization of some sediment.

The duration for mobilization of sediment will vary depending on: the size of the system; type of construction method used; substrate in the construction area; and the success and ease of the installation and removal efforts of construction machinery. It is expected that the Environmental Inspector will determine whether monitoring will be limited to installation and removal of sediment containment measures or if it will occur over the entire course of the Westridge Marine Terminal construction.

It is recommended that the QEP or the Environmental Inspector conduct water sampling prior to marine construction activities to provide baseline turbidity and TSS levels and during construction. Results will be compared to the guidelines provided in Table C.5-1 (BC MOE 2013, CCME 2007) or as required by DFO or other appropriate regulatory authorities.

All *in-situ* turbidity values collected, both outside of the construction zone (background) and within the construction zone, will be converted to TSS. Both the turbidity and TSS levels will be compared to and monitored against thresholds outlined in Table C.5-1.

Triggers and Contingencies for Management Action

In the event that turbidity and/or calculated TSS levels exceed the guidelines provided in Table C.5-1 beyond the identified zone of influence, corrective measures will be required. These may include, for example adjusting the turbidity curtains or slowing down the rate of dredging of the marine environment (from onshore or from the marine environment).

Construction may resume when corrective measures have been completed to the satisfaction of the Environmental Inspector and/or the NEB, and TSS levels are below CCME guidelines. Where required, a variance report documenting the event will be made available to Trans Mountain.

Reporting

Trans Mountain will document water sample data and report the results of the assessment in a format and at times agreed upon by the NEB and other appropriate regulatory authorities. Where an event occurs as described above, additional event reporting can be provided once laboratory results and value conversions have been completed. Until that time, the QEP can report suspected exceedances based on turbidity thresholds in the CCME (1999) guidelines.

6.0 WATER DISCHARGE PROCEDURES MANAGEMENT PLAN

Background

Water discharge can transport sediment into waterbodies, including the marine environment. During Project construction, discharge of water may be necessary for construction, reclamation and maintenance of access roads as well as testing of facility piping or discharge from trucks for road/access maintenance/construction. Water discharge for these activities have the potential to adversely affect water quality and aquatic resources within the marine environment, due to disturbance to the land surface, disturbance to the sea bed or erosion during disposal of waste water. The Water Discharge Procedures Management Plan will provide steps to ensure that water use and discharge related to Project activities are properly managed. Refer to Section 8.3 of this EPP for potential mitigation applicable to the withdrawal and discharge of water for hydrostatic testing.

Objective

The objective of the Water Discharge Procedures Management Plan is to ensure that discharge of water for the Project is conducted in a manner that:

- maintains water quality;
- avoids soil erosion;
- reduces or avoids adverse effects on marine aquatic resources and habitat, wildlife, recreational land use and marine water users; and
- is conducted in accordance with applicable approvals and permit conditions.

Management Approach

Trans Mountain will prepare and provide to the NEB a summary of the details of all planned water discharges for the Project prior to hydrostatic testing of the piping. An example of a Water Discharge Form is provided at the end of this plan.

Water Discharge

Hydrostatic test water and water required for construction, reclamation and maintenance of access roads, will be obtained from the city of Burnaby. Where test water is not clean enough for release to the environment, alternate options for disposal will be considered (*i.e.*, reuse for testing elsewhere or pre-approved off-site disposal and treatment locations).

All waters to be released directly or indirectly into a waterbody will be tested prior to and during release. The need and type of testing of water to be released onto land or water will be in accordance with approval/permit/notification conditions as well as the testing requirement information provided on the water discharge planning sheets (see example at the end of this plan). Prior to the discharge of hydrostatic test water to land, appropriate testing and treatment measures will be implemented in accordance with Section 7(2)(e) and Section 7(3) of the *Oil and Gas Waste Regulation*, BC Reg. 254/2005 of the BC *Environmental Management Act,* guidelines outlined in CAPP (1996) and CCME (1999) water quality requirements. Note that waters containing freeze depressants will either be reused on subsequent tests or returned to the supplier.

Where the test water will not be discharged directly into marine environment waters, preferred discharge locations for dewatering will be located at non-marine locations on stable terrain areas (rather than directly into a waterbody), where feasible, to allow the discharged water to be filtered through vegetation and soils prior to returning to a waterbody. Preferred locations for dewatering include non-arable lands adjacent to waterbodies. Sediment reduction methods will be implemented on the banks and approaches to the discharge site, if warranted, to protect marine fish, fish habitat and water users from increased sedimentation or reduced water quality. Discharge locations will be monitored to ensure that no erosion or flooding occurs.

Water energy will be limited with the use of a dissipater and protective rock rip-rap, sheeting, tarpaulins or other equivalent materials to reduce or avoid the potential for erosion of soils during water discharge activities.

7.0 WEED AND VEGETATION MANAGEMENT PLAN

This Weed and Vegetation Management Plan (WVMP) has been prepared to meet the requirements for National Energy Board (NEB) filling as part of the Project Application and to address Trans Mountain's short and long-term problem vegetation monitoring and management procedures, decision criteria, as well as accountability and responsibility for the construction and operational phases of the Project.

This WVMP has been prepared to comply with all guidelines outlined in KMC's Integrated Vegetation Management (IVM) Plan (KMC 2011) as well as weed and pesticide regulations for the province of BC. This WVMP addresses designated weeds listed in the BC *Weed Control Act* and *Weed Control Regulation* as well as the BC *Forest and Range Practices Act* and associated *Invasive Plant Regulation* (Attachment C1). In BC, Provincial Noxious plants are those that must be controlled in all regions and Regional Noxious plants are those that must be controlled in the region(s) for which they are listed. Furthermore, plants listed as invasive under the BC *Forest and Range Practices Act* and *Invasive Plant Regulation* must be managed to prevent their introduction or spread. Problem woody vegetation identified in the IVM Plan will also be addressed in this report (Attachment C1).

Vegetation species of concern specific to the regional district of Greater Vancouver can be obtained from the Invasive Plant Council of Metro Vancouver. Trans Mountain may wish to contact the Invasive Plant Council of Metro Vancouver at a later date to determine additional species of concern and any specific mitigation recommended for the applicable area.

The WVMP will be part of Trans Mountain's general Operations Plan for the Project in Alberta and BC. The overall goal of the WVMP is to manage the spread of problem vegetation for facility identification and sight line maintenance, to provide access to the facility footprint for maintenance and to reduce accidents, fires and system failures caused by the presence of problem vegetation in accordance with applicable legislation.

Trans Mountain will utilize an IVM approach to carry out problem vegetation (*i.e.*, weeds, grasses, sedges, forbs, vines, ferns, brush and trees [deciduous and coniferous]) management practices for this plan and to meet the overall objectives of IVM for all Trans Mountain pipelines and facilities. Integrated Vegetation Management (IVM) is an adaptive management process involving the use of various methods in a cost-effective and responsible manner to reduce the use of herbicides, promote healthy ecosystems, provide measurable results and facilitate better management of problem vegetation. The WVMP will address non-chemical, cultural and chemical techniques for problem vegetation management along facility footprint and/or associated components (borrow sites, temporary access roads and TWS) through recommendations of vegetation management procedures, which include:

- timing considerations;
- select methods and equipment;
- specific vegetation management procedures based on the following six key considerations:
  - prevention;
  - identification;
  - monitoring;
  - treatment thresholds;
  - vegetation management options; and
  - post-treatment evaluation.

The use of herbicides for problem vegetation management on the facility footprint and/or associated components) will be conducted in accordance with the *Integrated Pest Management Regulation* as part of the BC *Integrated Pest Management Act*.

The WVMP consists of vegetation management measures to be implemented in the short-term, during the pre-construction, construction and post-construction environmental monitoring phases of Project construction and the long-term, during the regular operation and maintenance phase of the Project. Vegetation management measures to be implemented during both short-term and long-term periods are described further in Sections 6.0 and 8.1.

Weed information will be provided following completion of the Weed Survey for the Project that is scheduled prior to construction.

7.1 Plan Objectives

The objective of the WVMP is to manage problem vegetation that could otherwise affect the safe and efficient operation of the Project as well as adversely affect regulatory and environmental requirements. Specifically, the intent of the WVMP is to prevent, reduce and manage the potential spread of provincially and regionally designated weed species on the facility footprint and/or associated components as a result of construction activities. In addition, the intent is to reduce or manage provincially and regionally designated weed infestations as a result of operational activities to a level equivalent to that observed on adjacent lands with similar land use and similar land management and to manage problem vegetation to a level that is in accordance with regulatory requirements (Table C.7-3) and as outlined in the IVM Plan. Measures to be implemented in the short-term (during pre-construction, construction and post-construction environmental monitoring phases) and the long-term (during the regular operation and maintenance phase) as well as specific activities designed to support these measures, are provided in the following subsections to address the scope of each objective. The WVMP has been prepared to address a number of important objectives as determined by Trans Mountain.

- Allow access to facility infrastructure for maintenance by managing problem vegetation, including the growth/spread of provincially and regionally designated weeds on the facility footprint and/or associated components).
- Comply with the provisions of the BC *Wildfire Regulation* with respect to maintaining sites located within 300 m of forested lands or grassland areas in a manner that prevents any fire from spreading.
- Ensure compliance with Trans Mountain vegetation management policies, Environment, Health and Safety policy, environmental standards and guidelines and with NEB requirements and guidance.
- Reduce the incidence of accidents, fires and system failures caused by the presence of problem vegetation.
- Ensure compliance with federal and provincial problem vegetation management legislative requirements (*i.e.*, *Weed Control Act*).
- Respect any agreement made with the public, adjacent landowners and Aboriginal representatives affected by problem vegetation management (*i.e.*, chemical suppression).
- Ensure safe working conditions and protect public health and safety, environmental resources and ecologically sensitive areas.
- Maintain facility integrity and security as well as landscape aesthetics.
- Incorporate the most effective and efficient vegetation management treatments as determined through use of IVM principles.
- Reduce the need for vegetation management treatments through the use of IVM principles.
- Reduce long-term program costs.

7.1.1 Short-Term Objectives

In recognition of the time required for native woody vegetation (shrubs, and deciduous and coniferous species trees) to re-establish on disturbed areas following construction, problem vegetation (designated

and non-designated weeds [forbs]) as identified in provincial legislation and the IVM Plan will be addressed under short-term objectives.

Measures implemented in the short-term (during the construction phases of the Project), will include the following:

- conduct a pre-construction weed survey and record problem vegetation (designated weeds) infestations on and adjacent to the facility footprint and/or associated components;
- implement problem vegetation (designated weeds) treatments during the pre-construction phase, where warranted;
- monitor problem vegetation (all weeds) during the construction phase (primarily topsoil/root zone material storage windrows/berms) and implement treatments, where warranted;
- monitor problem vegetation (designated weeds) on the facility footprint and/or associated components during the post-construction environmental monitoring phase and implement treatments, where warranted;
- recommend effective mitigation measures based on species, densities, land use, land management, location and aerial extent for the pre-construction, construction and post-construction environmental monitoring phases of the Project;
- manage problem vegetation below established threshold levels required for the safe and efficient construction of the Project;
- ensure compliance with all pertinent government regulations, KMC policies and environmental standards and guidelines;
- continue ongoing consultation with the public, adjacent landowners and Aboriginal representatives to coordinate effective problem vegetation management strategies;
- monitor and evaluate the success of problem vegetation management strategies during the following years of the Post-Construction Environmental Monitoring (PCEM) Program; and
- utilize the most effective and efficient problem vegetation management techniques/strategies in subsequent years of the PCEM Program.

A Trans Mountain Vegetation Management Contractor trained and experienced in identifying problem vegetation, and familiar with provincially and regionally designated weeds in BC, will conduct on-ground monitoring to record the species and density of problem vegetation.

Problem vegetation density distribution will be ranked according to the Ministry of Forests codes (Luttmerding *et al.* 1990) which provide descriptions that encompass density and distribution as well as provide a visual schematic and verbal description of each code. The BC Ministry of Forests problem vegetation distribution codes are provided in Attachment C2 of this report.

Identified problem vegetation, which requires immediate management, will be reported with recommendations for problem vegetation management to the Environmental Manager. Depending on the species, land use, densities, aerial extent and through consultation with the public, adjacent landowners and Aboriginal representatives, options will be considered by the Trans Mountain Environmental Designate for problem vegetation management on the facility footprint and/or associated components). The effectiveness of problem vegetation management measures implemented during the pre-construction and construction phases will be outlined in the as-built report. Environmental Issues List for the Project (to be included and updated in all PCEM reports) and will be evaluated by a Reclamation Specialist during initial and subsequent PCEM of vegetation and soil conditions. Monitoring will be completed by inspecting all locations previously noted within the Environmental Issues List as having problem vegetation and where treatments were implemented, to report on the degree of success of the reclamation in these areas including the identification of problem vegetation species and their densities. A PCEM report will be prepared and the Environmental Issues List updated. Where PCEM identifies that further management

measures are required to manage problem vegetation, Trans Mountain will take appropriate action in a timely manner. Problem vegetation management activities will be conducted as often as the Reclamation Specialist determines is warranted, based on the effectiveness of the treatment strategies, until the problem vegetation species have been reduced to below threshold levels.

7.1.2 Long-Term Objectives

Trans Mountain is committed to regular review of all applicable problem vegetation reports (*i.e.,* Pre-Construction Weed Survey Report, final year PCEM report, Environmental Issues List and Post-Treatment Monitoring Report) on the facility footprint and/or associated components). As part of this commitment, measures implemented in the long-term will be implemented (*i.e.*, ongoing management of problem vegetation) to meet objectives outlined in the WVMP and the IVM Plan during regular operation and maintenance activities for the Project. Areas of the facility footprint and/or associated components) where ongoing operation and maintenance is not required, will be managed to revert to a natural vegetative state, where feasible. To meet Trans Mountain's long-term problem vegetation management goals, applicable short-term goals and measures discussed in Section 7.1.1 will be used along with the following measures:

- reducing or preventing the spread of problem vegetation on the facility footprint and/or associated components through ongoing monitoring and vegetation management, where warranted;
- addressing regulatory notices or complaints;
- reducing problem vegetation infestations to a level at or below the level observed in adjacent lands with equivalent or similar land use and land management;
- considering proactive and preventative problem vegetation management designed to reduce the use of herbicides when planning and constructing new facilities or when conducting operations and maintenance activities;
- continue ongoing consultation with the public, adjacent landowners and Aboriginal representatives to actively evaluate and use new problem vegetation management techniques and practices to improve the WVMP;
- actively using and evaluating new problem vegetation management techniques and practices to improve vegetation management programs by designing and managing more effective herbicide applications, testing alternatives to herbicides and using them where appropriate; and
- searching for products and application methods that have reduced environmental effects.

7.2 Environment, Health and Safety and Environmental Standards

The WVMP will be carried out in accordance with KMC's Environment, Health and Safety Policy (KMC 2012a) as well as KMC's Environmental Standards for Pesticides and Herbicides (KMC 2011).

7.3 Legislative Requirements for Vegetation Management

The management of problem vegetation must be in compliance with federal and provincial legislation as outlined in Table C.7-1. Specific regulatory requirements (*i.e.,* setback distances for herbicide application near waterbodies) that Trans Mountain must adhere to are provided in the IVM Plan as well as Sections 6.0 and 7.0 of the Westridge Marine Terminal EPP.

TABLE C.7-1

SUMMARY OF PRIMARY WEED AND VEGETATION MANAGEMENT LEGISLATION

Area	Regulatory Authority	Legislation	Regulations
Provincial (BC)	BC Ministry of Environment	*Integrated Pest Management Act*	*Integrated Pest Management Regulation*
		Environmental Management Act	--
	Ministry of Forests, Lands and Natural Resource Operations – Wildfire Management Branch	*Wildfire Act*	*Wildfire Regulation*
	Ministry of Forests, Lands and Natural Resource Operations	*Weed Control Act*	*Weed Control Regulation*
		Forest and Range Practices Act	*Invasive Plants Regulation*
		Wildlife Act	--
	BC Oil and Gas Commission	*Oil and Gas Activities Act*	--
Federal	Pest Management Regulatory Agency (Health Canada)	*Pest Control Products Act*	*Pest Control Products Regulations*
	Environment Canada	*Canadian Environmental Protection Act*	--
	Canada Wildlife Services	*Migratory Birds Convention Act*	--
	DFO	The *Fisheries Act*	*Operational Statement for the Maintenance of Riparian Vegetation in Existing Rights-of-Way*
	Transport Canada	*Transportation of Dangerous Goods Act*	*Transportation of Dangerous Goods Regulations*
	NEB	*NEB Act*	*NEB Onshore Pipeline Regulations*

7.4 Consultation

Trans Mountain will consult with the public, adjacent landowners and Aboriginal representatives affected by the Project regarding problem vegetation management and proposed methods of treatment.

Consultation information will be provided prior to construction.

7.5 Prevention

Preventative measures aimed at stopping the introduction, initial growth and spread of problem vegetation is an important component of the WVMP. These measures, where applicable, have been and will be incorporated into new facility design prior to construction and site maintenance activities as well as any other construction activities on the facility footprint and/or associated components.

A summary of the preventative measures for problem vegetation management that Trans Mountain will employ are provided below and supplement detailed preventative measures outlined in the IVM Plan.

Proposed Facilities

Surfacing Materials

- Use of appropriate surfacing materials within the facility development zone to reduce growth of problem vegetation. This includes ensuring surfacing material is of a correct thickness and free of organic material to reduce the establishment of problem vegetation. One or a combination of the following options will be used for surfacing materials for new construction and upgrading of existing structures:
  - crushed rock/gravel (washed where available); source sites will be visited prior to delivery of crushed rock/gravel to ensure site is acceptable due to the high risk of problem vegetation introduction;
  - landscape fabric (geotextile); and
  - asphalt and concrete.

Maintaining Perimeter Fences and Access Roads

- Problem vegetation growing adjacent to perimeter fences and access roads will be removed or managed to prevent fire hazards and reduced visibility, to allow for easy access to the facility and to comply with applicable legislation.

Seeding Disturbed Areas

- Seed appropriate native or non-native grass mixes and fertilize, where warranted, to revegetate disturbed areas.
- Ensure problem vegetation maintenance equipment is free of problem vegetation seeds or debris.
- Restrict vehicle travel through problem vegetation infested areas.
- Plant native shrub/tree species, where warranted, depending on the site-specific objectives.
- Remove problem vegetation when adjacent to the marine environment and replace it with compatible, low-growing plant species (*i.e.*, shrubs, grasses).
- Manage all problem vegetation on the facility footprint and/or associated components during all construction phases (pre-construction, construction, post-construction environmental monitoring) and the operational phase.
- Encourage alternative, compatible vegetation management techniques such as planting low growing shrubs, laying down turf grass or other types of approved vegetation management practices.
- Limit vehicle travel through problem vegetation infested areas.

7.6 Identification

Vegetation specialists will record their location and the aerial extent of weed infestations on the facility footprint and/or associated components, during their normal inspection/patrols, maintenance and monitoring activities. Trans Mountain defines a Vegetation Specialist as a person who has a demonstrated ability and experience in identifying problem vegetation species. The Vegetation Specialist will be:

- local Trans Mountain field personnel who have special training or experience in problem vegetation identification;
- Regional Environmental Managers who have training or experience in problem vegetation identification; and/or
- consultants who specialize in problem vegetation identification.

The Vegetation Specialist will be familiar with legislated problem vegetation in BC as well as problem vegetation identified in the IVM Plan. In addition, the Vegetation Specialist will be trained to identify problem vegetation at important growth stages (*i.e.*, trained to recognize when the problem vegetation cover is near or above the treatment threshold levels within a certain area). Vegetation identification guides will be issued to aid operators in their identification of problem vegetation. Where Trans Mountain staff is not trained to identify problem vegetation, a Trans Mountain Environmental Designate or a consultant specializing in problem vegetation identification and management will be retained to identify problem vegetation. Problem vegetation management on the facility footprint and/or associated components will target vegetation designated by relevant legislation (*i.e.*, provincially and regionally Noxious and Invasive plants in BC) as well as problem vegetation listed in the IVM Plan.

Attachment C1 lists the legislated problem vegetation in BC as well as woody problem vegetation of concern to Trans Mountain projects. Provincial rankings are in accordance with the BC *Weed Control Regulation* as well as the BC *Invasive Plants Regulation*.

7.7 Monitoring

As a component of Trans Mountain's Project due diligence, problem vegetation will be monitored during routine ground inspections (ground reconnaissance will continue during the PCEM phase of construction and relevant information will be provided to the Project Environmental Manager). Monitoring will be conducted as per the IVM Plan in conjunction with other scheduled ground inspection activities for regular maintenance and operations activities. Where potential concerns are identified during monitoring, species and density information of problem vegetation will be recorded as soon as practical, and will be provided to the Project Environmental Manager and PCEM Program Manager. Once the Project reaches the operational phase, a qualified environmental professional will conduct pre-treatment site monitoring in late spring of each year to determine the necessity for and the type of problem vegetation management required.

During regular maintenance and operations activities, incidental ground inspections for problem vegetation may be conducted to determine the extent (percent cover, composition, distribution, location of infestations, etc.) of problem vegetation (*i.e.*, presence of mature brush and trees, and weeds). Areas of new infestations, recommended treatment sites and adjacent landowner concerns will also be identified and documented during monitoring. To assist monitoring efforts, the baseline data collected during the pre-construction weed survey and the results of the PCEM Program (Environmental Issues Lists) will assist in establishing thresholds and determining if objectives of the WVMP are being met.

7.8 Treatment Thresholds

Setting treatment thresholds (based on federal and provincial legislation/regulations and/or requirements as well as accepted industry standards) includes prioritizing treatments when problem vegetation management becomes necessary in order to reduce the risk of problem vegetation exceeding the thresholds specified in the IVM Plan.

The treatment threshold objectives for problem vegetation species for the Project are as follows:

- problem vegetation must be maintained at levels, by density and distribution, equivalent to or less than levels on observed adjacent lands with equivalent or similar land use and land management;
- problem vegetation must be managed in compliance with provincial legislation and jurisdictional requirements (*i.e.,* the BC *Weed Control Act* and the BC *Forest and Range Practices Act*);
- problem vegetation specific to Trans Mountain projects, as outlined in the KMC IVM Plan, will be managed, where warranted; and
- in areas where the tolerance for problem vegetation is low (*i.e.*, under or adjacent to piping, diesel fuel or propane tanks or electrical control building), vegetation will be managed as per the IVM Plan for defined areas on the facility footprint.

The priority for managing sites (treatment priority) where the established threshold has been reached can be determined by the level of risk and is further described in the IVM Plan. Criteria for the site risk levels are summarized in Table C.7-2.

TABLE C.7-2

SITE RISK LEVELS AND TREATMENT

Risk Level	Purpose or Intent	Treatment	Construction	Operations
1 High Risk	To stop the spread of problem vegetation (*i.e.*, Noxious) weeds currently threatening non-infested or highly susceptible sites including agricultural land, forestry cutblocks and tree farms and/or if the site is adjacent to transportation corridors such as roads or waterways.	• Problem vegetation management will involve IVM principles that may combine two or more of the following vegetation management treatments: non-chemical; cultural/biological; and chemical. • Problem vegetation management will be based on one or more of the following: pre-construction weed survey and PCEM Program (Environmental Issues List) findings; the invasiveness of the problem vegetation; problem vegetation densities on adjacent land (facility footprints and/or associated components.); and adjacent land use. • All records of problem vegetation management will be tracked in the Problem Vegetation Management and Monitoring Database. • Noxious and Invasive weeds within BC must be controlled and managed, respectfully.	• Initial treatments, monitoring and follow-up treatments will be completed as soon as possible. • A pre-construction weed survey will be completed and problem vegetation treatments will occur during the pre-construction phase, where warranted. • During the construction phase, problem vegetation on topsoil/root zone material storage windrows/berms will be controlled and/or managed. • During the PCEM phase, problem vegetation identified will be controlled and/or managed.	• Initial treatments, monitoring and follow-up treatments will be completed as soon as possible. • Problem vegetation management will have a strong focus on annual monitoring data (and construction phase reporting [*i.e.*, pre-construction weed survey report and PCEM Program – Environmental Issues List) that identifies problem vegetation. The spread of Noxious weeds and woody problem vegetation will be stopped. In addition, woody problem vegetation will be managed when it is determined that the woody problem vegetation poses a risk to the access, maintenance and regular operations of the facility and associated components (borrow sites, temporary access roads and TWS).
2 Moderate Risk	To stop the increase of problem vegetation on sites in less susceptible areas. This includes sites adjacent to lands such as forested lands that have a well-established vegetation cover and are, therefore, less susceptible to problem vegetation introduction.		• Initial treatments, monitoring and follow-up treatments will be completed as soon as conditions are optimal and once problem vegetation management at high risk sites is complete. • A pre-construction weed survey will be completed and problem vegetation treatments will occur during the pre-construction phase, where warranted. • During the construction phase, problem vegetation on topsoil/root zone material storage windrows/berms will be controlled and/or managed. • During the PCEM phase, problem vegetation identified will be controlled and/or managed.	• Initial treatments, monitoring and follow-up treatments will be completed as soon as conditions are optimal and once problem vegetation management at high risk sites is complete. • Problem vegetation management will have a strong focus on annual monitoring data (and construction phase reporting [*i.e.*, pre-construction weed survey report and PCEM Program – Environmental Issues List) that identifies problem vegetation. The increase of problem vegetation species in less susceptible areas will be stopped. In addition, woody problem vegetation will be managed when it is determined that the woody problem vegetation poses a risk to the access, maintenance and regular operations of the facility and/or associated components.
3 Low Risk	To stop the increase and/or contain problem vegetation on sites in and adjacent to industrial lands.		• Initial treatments, monitoring and follow-up treatments will be completed as soon as conditions are optimal and once problem vegetation management at high and moderate risk sites is complete. • A pre-construction weed survey will be completed and problem vegetation treatments will occur during the pre-construction phase, where warranted. • During the construction phase, problem vegetation on topsoil/root zone material storage windrows/berms will be controlled and/or managed. • During the PCEM phase, problem vegetation identified will be controlled and/or managed.	• Initial treatments, monitoring and follow-up treatments will be completed as soon as conditions are optimal and once problem vegetation management at high and moderate risk sites is complete. • Problem vegetation management will have a strong focus on annual monitoring data (and construction phase reporting [*i.e.*, pre-construction weed survey report and PCEM Program – Environmental Issues List) that identifies problem vegetation. The increase of problem vegetation species will be stopped and/or contained where problem vegetation poses a risk on sites and adjacent to industrial lands. In addition, woody problem vegetation will be managed when it is determined that the woody problem vegetation poses a risk to the access, maintenance and regular operations of the pipeline and associated facilities.

7.9 Vegetation Management Options

Trans Mountain will implement an IVM approach for the treatment of problem vegetation utilizing different techniques for the area(s) of concern. The Pre-Treatment Monitoring Form completed for the infested area(s) will provide information required to develop a course of action. Depending on the type of problem vegetation and how it will be managed (*i.e.*, controlled or managed), various non-chemical (*i.e.*, mechanical and manual), cultural (*i.e.,* seeding) and chemical (*i.e.*, herbicide) vegetation management options will be considered for problem vegetation management on the facility footprint and/or associated components. An integrated approach combining non-chemical, cultural and chemical treatment options is generally most effective when tailored to the plant species and conditions at each site. The selection of a particular treatment option or technique will be determined and evaluated based on the following:

- urgency of the required treatment (*i.e.*, Noxious weeds, a legislative requirement for access to an area or concerns for facility safety or security);
- species (technique may differ if more than one undesirable species is being targeted);
- timing (growth stage of plants);
- bare ground versus vegetated;
- location of the problem vegetation;
- density and height of problem vegetation;
- accessibility to the problem vegetation (*i.e.*, terrain, slope, remote areas);
- safety issues to Trans Mountain staff, contractors and the public;
- risk of fire (fuel loading on the ground);
- short and long-term effects of the method(s) being considered;
- expected efficacy of the method(s) being considered;
- benefits and limitations of each method;
- cost-effectiveness of each method;
- objectives of problem vegetation management;
- land use and land management practices being carried out on the adjacent land;
- aesthetic consideration (plan holder reputation and community standing);
- environmental features such as the marine environment wildlife and fish habitat;
- environmental sensitivities in surrounding areas;
- the choice of herbicide, herbicide properties and toxicity and appropriate application methods/techniques/equipment; and
- the consequences of not treating.

Potential techniques proposed for the management of problem vegetation (additional techniques for the management of problem vegetation are provided in Sections 6.0 and 7.0 of the EPP) on or adjacent to the facility footprint and/or associated components include the following:

- **Non-Chemical Vegetation Management (manual and mechanical methods) -** consists of methods that destroy or suppress species through physical disruption. Such methods include pruning, pulling, digging, disking, brushing (selective slashing) and mowing. The degree of success of various mechanical treatment methods is dependent on the life cycle of the target species.

- **Cultural (seeding and revegetation) and Biological Vegetation Management -** cultural vegetation management is the establishment of competitive and desired vegetation to prevent or slow down invasion by problem vegetation and is a key component of successful problem vegetation management. Whether seeding to native plants or pasture grasses, it is important to consult with a Reclamation Specialist. Biological problem vegetation management involves the introduction of pests and parasites specific to certain species of problem vegetation. Agents (mainly insects) reduce the vigour of the problem vegetation and suppress their competitive ability against desirable plant species.

- **Chemical Vegetation Management (herbicides) -** herbicide application is an important option for the management of problem vegetation and provides an effective and time-efficient method of managing vegetation. A wide variety of treatment methods are available (*i.e.*, broadcast spraying, foliar spot spraying and wicking treatments, etc.) to help target specific species or problem areas. Where applicable, reduce the use of herbicides by spot spraying or wicking to target individual plants or broadcast spraying localized areas. Only qualified herbicide applicator contractors with valid Pest Control Services Licenses will undertake the application of herbicides on the facility footprint and/or associated components).

Appropriate herbicides will be identified by qualified Trans Mountain personnel or the Vegetation Management Contractor.

An integrated approach combining non-chemical, cultural and chemical treatment options can generally be the most effective when tailored to the species and conditions on the facility footprint and/or associated components. Herbicides alone will only be considered where other vegetation management techniques have proven ineffective in managing problem vegetation.

7.10 Post-Treatment Evaluations

The timing and procedure for evaluating specific treatment programs will depend on the treatment method. Trans Mountain will inspect problem vegetation management work carried out within three months of Vegetation Management Contractor activity using a Post-Treatment Inspection Form (Attachment C3). Each Vegetation Management Contractor's work shall be inspected to assess public and worker safety, environmental concerns, completion schedules and adherence to commitments made in the WVMP and the IVM Plan. The purpose of post-treatment evaluation is to measure the success of problem vegetation management and to evaluate the need for follow-up treatment(s).

Treatment program evaluations will be based on visual estimates as conducted by Trans Mountain employees assigned to problem vegetation management or others qualified and experienced to undertake the evaluations. A Post-Treatment Inspection Report will be completed following the evaluation.

7.11 Reporting and Accountability

Trans Mountain is committed to ensuring that the WVMP for the Project is implemented effectively, well documented and reviewed, and revised on a regular basis. Review and revision will ensure that the most effective monitoring and management practices are continually used to achieve the objectives. The tasks involved in implementing the WVMP have been broken out with each task assigned to a specific individual at Trans Mountain (Tables C.7-3 and C.7-4).

TABLE C.7-3

WEED AND VEGETATION MANAGEMENT PLAN RESPONSIBILITIES DURING CONSTRUCTION

	Environmental Manager	Vegetation Specialist	Environmental Inspector	Vegetation Management Contractor
Task 1: Ensure the pre-construction weed survey is completed prior to spring, summer and fall treatments and before the commencement of construction activities on the facility footprint and/or associated components.	A	R	C	--
Task 2: Based on the recommendations made by the Vegetation Specialist during the pre-construction weed survey, determine scope of work and proceed with any budgeting and internal approvals requiring action.	A	R	C	C
Task 3: Advise the Environmental Inspector where treatment and monitoring (pre-construction and construction) is required and provide a timeline for completing the work.	A	C	R	--
Task 4: Confirm that all regulatory approvals are up-to-date and in place for vegetation management and that the WVMP includes all regulatory requirements. Ensure all provincial legislation and requirements in the WVMP are followed during vegetation management activities.	A/R	C	C	C
Task 5: Hire and supervise the Vegetation Management Contractor.	A	--	R/C	C
Task 6: Conduct vegetation management activities and monitoring.	C	--	I/A	R
Task 7: Review herbicide application records and ensure vegetation management has been carried out according to site priorities and timelines.	A	C	R	C
Task 8: Provide the Post-Treatment Inspection and Monitoring Forms (completed by the Environmental Inspector or Vegetation Specialist) to the Environmental Manager.	I	R	A	--
Task 9: Ensure that all records of vegetation management are included in the Construction Monitoring database and included in the as-built report for the proposed Project.	A	I	R	--

Notes:
A = Accountable - the individual or group who is ultimately answerable, includes yes/no and power of veto. Only one "A" can be assigned to each task.

R = Responsible - the individual(s) or group(s) who actually arranges and contracts the task. The degree of responsibility is defined by the accountable person. An "R" can be shared.

C = Consulted - the individual(s) or group(s) to be consulted prior to a final decision or action being taken. Two-way communication.

I = Informed - the individual(s) or group(s) to be consulted prior to a final decision or action being taken. Two-way communication.

TABLE C.7-4

WEED AND VEGETATION MANAGEMENT PLAN RESPONSIBILITIES DURING OPERATIONS

	Environmental Manager	Environmental Specialist	Vegetation Specialist	Operations Supervisor	Vegetation Management Contractor
Task 1: Ensure annual and warranty vegetation monitoring and recommendations are completed prior to mid-June at all facility footprint locations.	A	R	C	C	--
Task 2: Based on the vegetation monitoring recommendations made by the Vegetation Specialist, determine vegetation management priorities and proceed with any budgeting and internal approvals requiring action.	I	A/R	C	C	C
Task 3: Advise the Operations Supervisor where treatment and monitoring is required and provide a timeline for completing the work.	I	A/R	C	C	--
Task 4: Confirm that all regulatory approvals are up-to-date and in place for vegetation management and that the WVMP includes all regulatory requirements. Ensure all provincial legislation and requirements in the WVMP are followed during vegetation management activities.	A/R	R/C	C	C	C
Task 5: Hire and supervise the Vegetation Management Contractor to implement requirements of the annual vegetation survey as well as any warranty work that is required.	I	A/R	--	R/C	C
Task 6: Conduct vegetation management and monitoring activity.	I	A	R	I	R
Task 7: Review herbicide application records and ensure vegetation management has been carried out according to site priorities and timelines.	I	A/R	C	C	C
Task 8: Provide Pre and Post-Treatment Inspection and Monitoring Forms to the Operations Supervisor and the Environmental Specialist.	I	A	R	I	--
Task 9: Maintain a database of Pre and Post-Treatment Inspection and Monitoring Forms for all facility footprint locations.	A/R	R/C	--	--	--
Task 10: Review the WVMP on a 5 year basis and make changes as warranted, with recommendations from a Vegetation Specialist or Operations Supervisor.	A	R/C	C	C	--

Notes: A = Accountable - the individual or group who is ultimately answerable, includes yes/no and power of veto. Only one "A" can be assigned to each task.

R = Responsible - the individual(s) or group(s) who actually arranges and contracts the task. The degree of responsibility is defined by the accountable person. An "R" can be shared.

C = Consulted - the individual(s) or group(s) to be consulted prior to a final decision or action being taken. Two-way communication.

I = Informed - the individual(s) or group(s) to be consulted prior to a final decision or action being taken. Two-way communication.

7.12 Problem Vegetation Management: Non-Woody Species

The following headings provide a breakdown of each of the steps required for effective non-woody problem vegetation management. This section is intended for guidance to Vegetation Specialists and/or for those conducting inspection or evaluation of non-woody problem vegetation management methods.

7.12.1 Identification

Non-Woody Problem Vegetation

- Identify types of non-woody problem vegetation and record their location on the facility footprint during the pre-construction weed survey, annual inspection/patrols and maintenance and monitoring activities. The Vegetation Specialist will monitor for non-woody problem vegetation. Refer to Attachment C1 for a list of plants of concern that will be the target of non-woody problem vegetation management.

- Pre-treatment and post-treatment evaluations will be conducted, where practical, in order to determine the efficacy of non-woody problem vegetation management methods.

7.12.2 Prevention

Preventing the Spread of Non-Woody Problem Vegetation

- Ensure that all equipment arriving onsite is clean of soil and vegetative debris prior to entering the work site. If equipment is in an unacceptable condition, clean with a shovel or sweep, high-pressure water or steam to remove remnant soil and vegetation debris prior to the equipment entering the work site.
- If necessary, clean equipment prior to leaving the work site, to reduce the risk of carrying non-woody vegetation, soil or vegetative debris to another location.
- Ensure all material brought to site (*i.e.*, gravel, soil, seed, etc.) is free of non-woody problem vegetation to the extent feasible.

7.12.3 Monitoring

Regular Inspections

- Conduct regular inspections to visually examine the facility footprint during maintenance and/or during routine operation activities and document the species, location, density and distribution of non-woody problem vegetation present.

Documentation

- Document vegetation presence (including desirable vegetation), population density and distribution on an annual basis. Record the following:
  - evaluation of any previous non-woody problem vegetation management; and
  - non-woody problem vegetation species, location, density and distribution (or other appropriate method).
- Maintain records of non-woody problem vegetation management in the Problem Vegetation Management and Monitoring Database.

7.12.4 Treatment Threshold

Determine Whether Treatment Threshold Has Been Reached

- Compare the density and distribution of each non-woody problem vegetation species present onsite to the density and distribution of the same species off-site, the reported pre-construction and PCEM phases weed survey densities and/or to listed thresholds in KMC's IVM Plan, to determine whether the treatment threshold has been reached. Record the information required for the treatment decision (whether treatments are necessary, the best timing of treatments and the best treatment option[s]).
- Consult with the local land or regulatory authority, as required, prior to making a treatment decision.

Management Decision

- Initiate the non-woody problem vegetation management decision process and action when the treatment threshold for a particular facility has been exceeded.

7.12.5 Treatment Options

Treatment Options

- Where practical, choose treatments that will have the least environmental effect while providing adequate problem vegetation management.

Monitoring Form

- Complete a Pre-Treatment Monitoring Form prior to a non-woody problem vegetation management decision being made. List the strategies that will be used to protect the various environmental features that are listed including the establishment of appropriate size buffer zones around the established Pesticide Free Zones (PFZs), as identified in KMC's IVM Plan, that take into account such factors as the type of equipment being used, the potential for drift, the soil type and the slope of the ground.

7.12.6 Non-Chemical Vegetation Management Options

Non-Chemical Vegetation Management

- Where practical, consider non-chemical vegetation management options as the primary methods to manage non-woody problem vegetation.

Mowing

- Mow non-woody problem vegetation, primarily grasses or other herbaceous species, where warranted. Mow non-woody problem vegetation using equipment such as commercial lawnmowers, garden tractors or industrial tractors.

String Trimmers

- Cut non-woody problem vegetation at the ground surface to remove herbaceous vegetation growing within landscaped areas and along fence lines.

- Combine the use of string trimmers with a pre-mowing herbicide application, where necessary. Allow an appropriate time between herbicide treatment and mowing to allow herbicide to be absorbed by the plants.

Hand Pulling

- Conduct hand pulling for certain (*i.e.*, weed species that do not reproduce vegetatively via root pieces) established non-woody problem vegetation that can be easily uprooted.

7.12.7 Cultural and Biological Vegetation Management Options

Cultural and Biological Vegetation Management

- Use natural treatments which promote the establishment of local, competitive vegetation, including grasses, to provide long-term management of non-woody problem vegetation, where feasible.

- If a native grass seed mix or a cover crop is to be used to help manage the spread and growth of non-woody problem vegetation, ensure a seed Certificate of Analysis is obtained for each native seed species prior to purchase in order to ensure that the highest seed grade available is obtained and that no undesirable species seed is present in the seed lot prior to seed purchase. Where an agronomic seed mix or cover crop is to be used to help manage the spread and growth of non-woody problem vegetation, ensure only seed species with a grade of Canada No. 1 are used and a seed Certificate of Analysis is obtained for each species prior to purchase.

- The release of biological management agents for non-woody problem vegetation management will be strictly monitored and adhere to all applicable legislation.

7.12.8 Chemical Vegetation Management Options

Chemical Vegetation Management

- Use herbicides where necessary to establish a stable plant community. Herbicides may be required to target specific plant species and complexes on the facility footprint, primarily grasses and herbaceous broad-leaf plants growing on gravel areas. The use of herbicides may be required for the following:

  - non-woody problem vegetation management in areas where non-chemical methods are not feasible or practical; and

  - management of non-woody problem vegetation where manual and mechanical treatment methods are not effective or practical.

- Only herbicides approved by Trans Mountain may be used.

Herbicide Application Contracts

- Initiate and monitor contracts for non-woody problem vegetation management that involve herbicide applications. Be knowledgeable of the application equipment, methods or techniques that may be used by contractors, including the benefits and limitations of each method, and the rationale/selection criteria that will be used in selecting a particular method or technique for non-woody problem vegetation management. All contractors are to be aware of Trans Mountain's safety requirements for the Project.

- Treatment area boundaries and environmentally sensitive areas will be marked/flagged and mapped. This information will be provided to the Vegetation Management Contractor. Marking/flagging will remain for at least 14 days following herbicide application.

Herbicide Labels

- Ensure familiarity with the properties, uses and label directions, precautions and limitations for each of the herbicide products applied.

- Consider the choice of herbicide, herbicide properties and toxicity, and appropriate application methods/techniques/equipment.

- Apply herbicides in accordance with manufacturer's instructions.

Proximity of Proposed Treatment Area to Water Sources (Wells)

- Do not apply herbicides for non-woody problem vegetation management within 30 m of a well or water intake (domestic, agricultural, commercial and industrial) unless completely satisfied that a smaller No Treatment Zone (NTZ) or PFZ will ensure that no herbicide enters the water supply, intake or well.

Marine Environment

- Prior to herbicide application, confirm the proximity to the marine environment and flag or mark any PFZs or NTZs.

- Do not apply herbicides within the NTZs or PFZ of the marine environment. Check the appropriate acts and regulations for NTZ and PFZ for specific herbicides.

Wildlife and Wildlife Habitat

- Be aware of and maintain appropriate protective buffer zones around inhabited raptor, heron and wood warbler nests, wildlife trees and mineral licks during non-woody problem vegetation management activities. Assess the size of these buffer zones on a site-by-site basis.

- Avoid treatment of low-growing plants that may be beneficial for wildlife habitat and browsing where practical.

- Field check each treatment site prior to undertaking non-woody problem vegetation management to confirm treatment area boundaries, the locations of any required PFZs, NTZs, sites for posting required treatment notices and the presence of other environmental conditions that would preclude the use of herbicides.

Applicator Qualifications

- Conduct or supervise all applications of herbicides by a person who holds a Pesticide Applicator Certificate in the Industrial Vegetation Category. Record the name and certificate numbers of the applicators who will supervise/undertake herbicide applications.

Equipment Maintenance and Calibration

- Application contractors will ensure that all equipment is calibrated prior to the work on the Project. Equipment will be calibrated in accordance to the manufacturer's directions. Equipment will also be calibrated if:
  - there is a change in application personnel;
  - any maintenance or equipment changes occur; and/or
  - there is a change to the formula or herbicide concentration.

Supervision

- The Certified Pesticide Applicator must:
  - be in continuous attendance at the site;
  - have available proof of certification with them at each treatment site;
  - within BC, supervise no more than four uncertified assistants at one time (BC *Integrated Pest Management Regulation* [BC MOE]);
  - maintain continuous contact, auditory and/or visual, with the uncertified assistants; and
  - be within 500 m of persons being supervised.

Treatment Notices

- Treatment notices must be posted or given to affected parties before each herbicide use in BC, and must not be removed for at least 14 days after the use or as defined by appropriate regulatory authority (BC *Integrated Pest Management Regulation*). Each treatment notice must be posted so that it is clearly visible and legible from each approach to access the treatment area, and must contain the following information:
  - the trade name or active ingredient of the herbicide that will be used;
  - the date and time of the herbicide use;
  - the confirmation number of KMC's IVM Plan;
  - a description of the treatment area;
  - precautions to be taken to prevent harm to people entering the treatment area; and
  - how to contact the plan holder or that person's agent to obtain information about the herbicide or herbicide use.

Mixing of Herbicides

- Ensure that the following procedures are adhered to when mixing herbicides:
  - conduct herbicide mixing in a safe and appropriate manner;
  - ensure the presence of personal washing stations (*i.e.*, eye was station) is present in the mixing area;

- ensure that appropriate personal protective equipment will be worn at all times by all personnel to reduce the risk of unwanted exposure to herbicides;
- where feasible, mixing stations will be located within the treatment areas; and
- no mixing of herbicides will occur within 15 m of a sensitive area (*i.e.*, marine environment or NTZ).

Regulatory Requirements

- Ensure that all use requirements specified in the manufacturer's instructions and any corresponding environmental protection laws, are adhered to during herbicide application. Ensure that all use requirements specified in the BC *Integrated Pest Management Regulation* are adhered to during herbicide applications.
- Any unused herbicide waste produced from rinsing containers (*i.e.*, rinsate) will be disposed of onsite, where feasible, in a manner that adheres to the requirements outlined in the BC *Environmental Management Act* and the BC *Hazardous Waste Regulation*.
- All herbicide containers will be triple rinsed/pressure rinsed and disposed of in accordance with the manufacturer's instructions or as outlined in the IVM Plan and the provincial guidelines detailed in the BC MOE document, Handbook for Pesticide Applicators and Dispensers (BC Ministry of Water, Land and Air Protection 2005).
- Contact local authorities regarding any new bylaws/permitting for the construction area. Ensure that all local area sanitation or monitoring requirements are adhered to during all construction and operational phases.
- Adhere to Workplace Hazardous Materials Information System (Health Canada 2010) and Transportation of Dangerous Goods standards for pesticide containment, transport, storage and spill response.
- Store, handle and transport herbicides in a container in which they were originally packaged and with the label originally affixed by the herbicide manufacturer, or in a labelled container designed for containing herbicides. The labelling on the replacement container must include the herbicide trade name, the name and concentration of each active ingredient in the herbicide and the product registration number under the federal *Pest Control Products Act*. The containment standards do not apply to tanks being used for mixing herbicides or for holding herbicides during use.
- Ensure that herbicides are transported or caused to be transported in a secure manner that prevents:
  - the escape, discharge or unauthorized removal of the herbicides from the transport vehicle; and
  - the contamination of food or drink intended for animal or human consumption, household furnishings, toiletries, clothing, bedding or similar items that are transported with the herbicides.
- If temporary herbicide storage in vehicle(s) is required, the storage area in the vehicle must:
  - adhere to all storage requirements outlined in the *BC Integrated Pest Management Act* and BC *Integrated Pest Management Regulations* and the *WorkSafe BC document Standard Practices for Pesticide Applicators* (Worksafe BC 2009);
  - be separate from, and not used for storage of, food intended for human or animal consumption;
  - be ventilated so that herbicide vapours are vented to the outside;
  - have on each door providing access to the vehicle herbicide storage area, a sign that is clearly visible to a person approaching the door with the words, written in block letters: "WARNING: CHEMICAL STORAGE - AUTHORIZED PERSONS ONLY";

- be locked when unattended;
- be accessible only to authorized personnel;
- be locked when unattended;
- be accessible only to authorized personnel; and
- notify the local fire department of the presence of herbicides on the premises.

Spill Response

- Follow the Marine Spill Contingency Plan or Spill Contingency Plan (see Appendix B) for responding to herbicide spills.
- Ensure spill treatment equipment is present or near storage (including mobile storage), mixing and loading sites.
- Equipment shall include: personal protective equipment; absorbent material; neutralizing material; a long handled broom; shovel; and a waste receiving container with lid.
- Keep a copy of the Marine Spill Contingency Plan or Spill Contingency Plan (see Appendix B) at or near each work site; ensure all personnel working on the Project are familiar with its contents.

Weather Monitoring

- Ensure that:
  - measurements are made to record weather conditions prior to and periodically during herbicide applications;
  - wind speed and direction, precipitation, temperature and sky conditions (clear, overcast, cloudy, partly cloudy) are recorded for foliar and soil herbicide applications;
  - temperature, precipitation, frost and dew conditions are recorded for wick/wipe-on applications; and
  - persons applying herbicides are responsible for checking each product label for guidelines for applying herbicides during various weather conditions.
- Stop herbicide applications if any of the following occur:
  - the maximum/minimum temperature stated on the herbicide label is exceeded;
  - the wind speed and/or direction cause the foliar or soil application of herbicide to drift and/or miss the target vegetation;
  - ground wind velocity is greater than 8 km/hour;
  - it begins to rain steadily, increasing the chances of excessive runoff and leaching; or
  - there is ice or frost on the foliage.

7.13 Problem Vegetation Management: Woody Species

Trans Mountain actively encourages the establishment of suitable low-growing natural vegetation in its reclamation seed mixes and in its ongoing application of problem vegetation management practices.

Woody problem vegetation management will be conducted on the facility footprint and associated components (borrow sites, temporary access roads and TWS) to ensure: protection of public safety and

environmental integrity; access for maintenance and inspection; and for the regular operation of the proposed Project as outline in the IVM Plan.

Woody problem vegetation management will be conducted due to the presence of the following conditions or issues:

- woody problem vegetation restricting aerial surveillance and/or visibility of the Project as outlined in Section 4.6;
- woody problem vegetation restricting the visibility of facility pipeline markers and warning signs;
- where woody problem vegetation affects the safety and operations of the facility;
- where woody problem vegetation increases the fire hazard potential;
- where woody problem vegetation affects site security by providing easier access over security fencing;
- where woody problem vegetation causes the deposition of organic debris or seed (seed rain) into stations that increases vegetation growth;
- where woody problem vegetation has reached threshold limits as outlined in the IVM Plan; and
- where woody problem vegetation restricts facility footprint access for maintenance, emergency response and/or patrols.

7.13.1 Treatment Thresholds

The decision to initiate treatment for woody problem vegetation management is based solely on the presence of target vegetation that has the potential to disrupt the normal operation, maintenance and safety of the facility footprint. Treatment decisions will also consider public safety, facility pipeline security, accessibility, species growth rates and social, economic and environmental considerations.

Management strategies will be achieved through the development and implementation of woody problem vegetation treatment procedures that address site-specific and regional considerations including appropriate regulatory authority legislation and regulations, consultation with the public, adjacent landowner and Aboriginal representatives as well as land use and site conditions on the facility footprint and/or associated components. To ensure effective implementation of woody problem vegetation treatment procedures, it is necessary to understand:

- types of treatments that are available for woody problem vegetation management;
- how woody problem vegetation management treatments may vary on the facility footprint and/or associated components;
- timing constraints for woody problem vegetation management treatments; and
- methods for implementing woody problem vegetation treatment procedures.

7.13.2 Woody Problem Vegetation Management Methods

Woody problem vegetation management activities include non-chemical, cultural and biological and chemical methods. Non-chemical methods typically include clearing of the vegetation using hand-held tools or heavy machinery. Cultural methods encourage regeneration of desirable vegetation species including natural regeneration or seeding on the facility footprint and/or associated components to competitive native grass species. Biological management involves introducing pests or parasites to target specific woody problem vegetation. Chemical management of woody problem vegetation may apply to both native and non-native woody species and included both spot treatments and less discriminate broadcast application of herbicides. Utilization of several or potentially all methods of problem vegetation management are likely in the scope of a project. Effective implementation of these methods will consider

the location and relevant timing constraints in addition to the risk for fire, unauthorized encroachments as well as public, adjacent landowner and Aboriginal representative commitments and operational requirements.

7.13.3 Management Method Variations

Woody problem vegetation management practices will vary on the facility footprint and/or associated components according to site-specific conditions. Since woody problem vegetation is likely to inhibit access on the facility footprint, trees and tall shrubs are removed from the majority of the facility except for specific locations with sensitive environmental conditions (*i.e.*, shoreline areas). Low shrubs are allowed to regenerate in a controlled manner such that the facility footprint can still be identified and that access is not inhibited.

7.13.4 Timing

Woody problem vegetation management activities may be disruptive for wildlife, biological or physical processes as well as other activities associated with the intended land use for areas on the facility footprint and/or associated components. Where practical, woody problem vegetation management will be reduced on the facility footprint. Adherence to specific timing constraints is necessary for compliance with environmental regulations, effective utilization of woody problem vegetation management procedures as well as providing respect to operating agreements with the public, adjacent landowners or Aboriginal representatives.

Timing constraints will vary according to the affected land use, the woody problem vegetation management procedures to be applied and the environmental components that may be affected.

Depending on the goals of woody problem vegetation management, certain plant species may respond most effectively to vegetation management practices at particular stages in their yearly growth cycle. Therefore, to ensure successful results from vegetation management practices, timing for these activities will be scheduled to occur during periods when they are anticipated to be most effective.

7.13.5 Selecting Methods and Equipment

Similar to planning the timing of woody problem vegetation management activities, selection of methods and equipment may require consideration for compliance with environmental regulations, environmentally sensitive features and providing respect to operating agreements with the public, adjacent landowners and Aboriginal representatives. Appropriate methods will:

- achieve objectives;
- not create safety issues or inhibit access on the facility footprint and/or associated components;
- reduce known environmental effects where possible without creating more; and
- achieve compliance with requirements of legislation as well as regulatory, public, adjacent landowner and Aboriginal representative agreements.

When assessing options for woody problem vegetation management, it is necessary to consider the respective advantages and disadvantages of each method. Furthermore, additional factors may influence which methods are selected, including:

- site characteristics including the species to be managed, sensitivity considerations and intended land use;
- expected response time from the point of treatment and the implications for both short-term and long-term operations; and
- logistical considerations and necessary resources including costs, equipment and crew.

Due to the broad landform and plant community variations encountered by the Project, the above-listed factors may vary on the facility footprint and/or associated components and, therefore, consideration will be made to how this variation may affect which methods are selected.

7.13.6 Identification

Woody Problem Vegetation

- Identify types of woody problem vegetation and record their location on the facility site and/or associated components during monthly inspection/patrols, maintenance and monitoring activities. The Vegetation Specialist will monitor for woody problem vegetation. Refer to Attachment C1 for a list of plants of concern that will be the target of woody problem vegetation management.

- Ensure that locations where management procedures are to be applied are properly communicated to personnel and that locations requiring special consideration are properly identified using stakes or flagging.

- Utilize maps, aerial photographs and/or Geographic Positioning Systems to communicate locations of special consideration, especially where woody problem vegetation management procedures are to vary during the scope of work or where the location of site-specific treatments is difficult to identify.

7.13.7 Monitoring

Regular Inspection

- Conduct regular inspections to visually examine the facility footprint and/or associated components) during maintenance and/or during routine operation activities and document the density, location and type of woody problem vegetation present.

Documentation

- On an annual basis, document vegetation presence (including desirable vegetation), population density and distribution. Monitor woody problem vegetation responses to management treatments throughout the proposed Project. Maintain records of woody problem vegetation management in the Problem Vegetation Management and Monitoring Database. Adjust procedures as necessary to achieve objectives of the WVMP plan.

7.13.8 Treatment Threshold

Determination

- With available size, density and distribution information of woody problem vegetation and by referencing accepted threshold levels, determine whether the treatment threshold has been reached. Record the information required for the treatment decision (whether treatments are necessary, the best timing of treatments and the best treatment option[s]).

- Consult with the local land authority, as required, prior to making a treatment decision.

Management Decision

- Initiate the woody problem vegetation management decision process and action when the treatment threshold for a particular facility site and/or associated components has been exceeded.

7.13.9 Treatment Options

Treatment Options

- Choose treatments that will have the least environmental effect while providing adequate management.

Monitoring Form

- Complete a Pre-Treatment Monitoring Form prior to a woody problem vegetation management decision being made. List the strategies that will be used to protect the various environmental features that are listed including the establishment of appropriate size buffer zones around the established PFZs that take into account such factors as the type of equipment being used, the potential for drift, the soil type, the slope of the ground and the potential for soil disturbance.

7.13.10 Non-Chemical Management Options

Non-Chemical Vegetation Management Options

- Where practical, consider non-chemical management options (*i.e.*, hand pulling or tree and stump removal) as the primary methods to manage woody problem vegetation as outlined in Section 4.7.
- Brushing activities will not occur during any regulated restricted period (*i.e.*, migratory bird nesting period).

Mowing/Brushing/Girdling/Pruning

- Utilize commercial lawnmowers, industrial tractors, brush mowers, hydro-axes, mulchers and/or hand-held trimmers when:
  - regional herbicide application is not feasible either for aesthetic, health, safety or environmental reasons;
  - herbicide application is localized and does not address large-scale woody problem vegetation management goals; and
  - objectives for woody problem vegetation management do not require short-term outcomes, allowing for natural succession.

Felling/Hand Clearing

- Fell all damaged or leaning trees immediately and remove any trees that fall off the facility footprint and/or associated components.
- Maintain low woody vegetation or vegetated ground mat within the vegetated buffer zone of marine environment and shoreline to the extent practical.

Geotextile

- Use porous, polypropylene geotextile fabric below mulches, crushed rock and/or gravel to prevent the root growth of woody problem vegetation.

7.13.11 Chemical Vegetation Management Options

See Section 7.12.8 of this WVMP.

ATTACHMENT C1

WEED SPECIES OF CONCERN

TABLE C1-1

WEED SPECIES OF CONCERN IN BRITISH COLUMBIA

Common Name	Scientific Name	BC Ranking
anchusa	*Anchusa officinalis*	Invasive
annual sow-thistle	*Sonchus asper (L.) Hill*	Provincial Noxious
baby's breath	*Gypsophila paniculata*	Invasive
black knapweed	*Centaurea nigra*	Invasive
blueweed	*Echium vulgare L.*	Regional Noxious (Thompson-Nicola), Invasive
brown knapweed	*Centaurea jacea*	Invasive
bohemian knotweed	*Fallopia x bohemica*	Provincial Noxious
bull thistle	*Cirsium vulgare*	Invasive
bur chervil	*Anthriscus caucalis*	Provincial Noxious
burdock	*Arcticum* spp.	Regional Noxious (Fraser-Fort George, Thompson-Nicola), Invasive
common burdock	*Arctium minus*	Invasive
common crupina	*Crupina vulgaris Cass.*	Provincial Noxious
common reed	*Phragmites australis*	Provincial Noxious
common tansy	*Tanacetum vulgare L.*	Invasive
common toadflax	*Linaria vulgaris (P.) Mill.*	Provincial Noxious
creeping (Canada) thistle	*Cirsium arvense (L.) Scop.*	Provincial Noxious, Invasive
Dalmatian toadflax	*Linaria vulgaris Hill.*	Provincial Noxious, Invasive
dense-flowered cordgrass	*Spartina densiflora*	Provincial Noxious
diffuse knapweed	*Centaurea diffusa Lam.*	Provincial Noxious, Invasive
dodder	*Cuscuta* spp.	Provincial Noxious
English cordgrass	*Spartina anglica*	Provincial Noxious
field scabious	*Knautia arvensis*	Regional Noxious (Thompson-Nicola), Invasive
flowering rush	*Butomus umbellatus*	Provincial Noxious
garlic mustard	*Alliaria petiolata*	Provincial Noxious
giant hogweed	*Heracleum mantegazzianum*	Provincial Noxious
giant knotweed	*Fallopia sachalinensis*	Provincial Noxious, Invasive
giant mannagrass/reed sweetgrass	*Glyceria maxima*	Provincial Noxious
gorse	*Tragopogon dubius Scop.*	Provincial Noxious, Invasive
Himalayan knotweed	*Polygonum polystachyum*	Provincial Noxious
hoary alyssum	*Berteroa incana*	Invasive
hoary cress	*Cardaria* spp.	Regional Noxious (Thompson-Nicola), Invasive
hound's-tongue	*Cynoglossum officinale L.*	Provincial Noxious, Invasive
Japanese knotweed	*Fallopia japonica*	Provincial Noxious, Invasive
jointed goatgrass	*Aegilops cylindrica Host*	Provincial Noxious
leafy spurge	*Euphorbia esula L.*	Provincial Noxious, Invasive
marsh plume thistle	*Cirsium palustre (L.) Scop.*	Regional Noxious (Fraser-Fort George), Invasive
meadow hawkweed	*Hieracium pilosella*	Invasive
meadow knapweed	*Centaurea pratensis*	Invasive
milk thistle	*Silybum marianum*	Provincial Noxious
nodding thistle	*Carduus nutans L.*	Invasive
North Africa grass	*Ventenata dubia*	Provincial Noxious
orange hawkweed	*Hieracium aurantiacum L.*	Regional Noxious (Thompson-Nicola), Invasive
oxeye daisy	*Chrysanthemum leucanthemum L.*	Regional Noxious (Thompson-Nicola), Invasive
perennial pepperweed	*Lepidium latifolium*	Regional Noxious (Thompson-Nicola), Invasive
perennial sow-thistle	*Sonchus arvensis L.*	Provincial Noxious
plumeless thistle	*Carduus acanthoides*	Invasive
puncture vine	*Tribulus terrestris*	Invasive
purple loosestrife	*Lythrum salicaria L.*	Provincial Noxious, Invasive
purple nutsedge	*Cyperus rotundus L.*	Provincial Noxious
rush skeletonweed	*Chondrilla juncea L.*	Provincial Noxious, Invasive
Russian knapweed	*Centaurea repens L.*	Invasive

TABLE C1-1 Cont'd

Common Name	Scientific Name	BC Ranking
saltmeadow cordgrass	*Spartina patens*	Provincial Noxious
scentless chamomile	*Matricaria perforata Merat.*	Provincial Noxious, Invasive
scotch broom	*Cytisus scoparius*	Invasive
scotch thistle	*Onopordum acanthium*	Invasive
smooth cordgrass	*Spartina alterniflora*	Provincial Noxious
spotted knapweed	*Centaurea maculosa Lam.*	Provincial Noxious, Invasive
St. John's wort	*Hypericum perforatum*	Invasive
sulphur cinquefoil	*Potentilla recta*	Regional Noxious (Thompson-Nicola), Invasive
tansy ragwort	*Senecio jacobaea L.*	Provincial Noxious, Invasive
teasel	*Dipsacus fullonum*	Invasive
velvetleaf	*Abutilon theophrasti Medik.*	Provincial Noxious
wild chervil	*Anthriscus sylvestris*	Regional Noxious (Fraser Valley)
wild oats	*Avena fatua*	Provincial Noxious
yellow flag iris	*Iris pseudacorus*	Provincial Noxious, Invasive
yellow nutsedge	*Cyperus esculentus L.*	Provincial Noxious
yellow star-thistle	*Centaurea solstitialis L.*	Provincial Noxious, Invasive
yellow toadflax	*Linaria vulgaris*	Invasive

Source: BC *Weed Control Act* and *Forest and Range Practices Act – Invasive Plant Regulation*

Notes:
- In accordance with the BC *Weed Control Act* and the *Forest and Range Practices Act*, Noxious weeds must be controlled while Invasive weeds must be managed.
- Consult the appropriate acts, regulations and Regional District information on a regular basis for updates to species ranking.

TABLE C1-2

PROBLEM VEGETATION OF CONCERN

Common Name	Scientific Name
Deciduous Trees	
balsam poplar	*Populus balsamifera*
big leaf maple	*Acer macrophyllum*
black cottonwood	*Populus trichocarpa*
Douglas maple	*Acer glabrum*
mountain alder	*Alnus viridis*
paper birch	*Betula papyrifera*
red alder	*Alnus rubra*
trembling aspen	*Populus tremuloides*
Coniferous Trees	
alpine larch	*Larix lyallii*
black spruce	*Picea mariana*
Douglas fir	*Pseudotsuga menziesii*
Engelmann spruce	*Picea engelmannii*
lodgepole pine	*Pinus contorta latifolia*
ponderosa pine	*Pinus ponderosa*
subalpine fir	*Abies lasiocarpa*
western hemlock	*Tsuga heterophylla*
western larch	*Larix occidentalis*
western red cedar	*Thuja plicata*
white spruce	*Picea glauca*
yellow cedar	*Thuja occidentalis*
Shrubs	
arbutus	*Arbutus sp.*
bitter cherry	*Prunus emarginata*
chokecherry	*Prunus virginiana*
Himalayan blackberry	*Rubus armeniacus*

TABLE C1-2 Cont'd

Common Name	Scientific Name
pin cherry	*Prunus pensylvanica*
salmonberry	*Rubus spectabilis*
scotch broom	*Cytisus scoparius*
thimbleberry	*Rubus parviflorus*
Wood's rose	*Rosa woodsii*
willow	*Salix sp.*
Grasses	
bamboo	*Bambuseae sp.*

TABLE C1-3

PROBLEM VEGETATION OBSERVED AT THE WESTRIDGE MARINE TERMINAL

Table will be completed when site-specific information is collected during the pre-construction weed survey to be completed prior to construction.

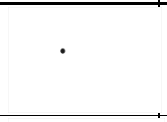
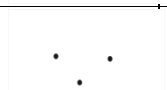
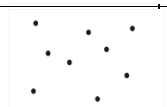
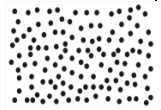
Common Name	Scientific Name

ATTACHMENT C2

WEED DISTRIBUTION CODES

TABLE C2-1

BRITISH COLUMBIA MINISTRY OF FORESTS WEED DISTRIBUTION CODES

Code	Description	Guidelines for Field Assessment*			
		No. of plants in 20 m x 20 m area (low shrubs, herbs and mosses)	No. of plants/ha 100 m x 100 m area (tall shrubs and trees)	Diagram	Approximate % Cover Range
1	Rare individual, a single occurrence	1	< 5		1-5
2	A few sporadically occurring individuals	2 to 5	5 to 50		1-5
3	A single patch or clump of species	1 patch (occupying an area smaller than one quadrant of the plot)	Variable (3 patches)		1-10
4	Several sporadically occurring individuals	≥ 6	> 50		5-10
5	A few patches or clumps of species	2-5 patches (each occupying an area smaller than one quadrant of the plot)	Variable (3 to 10 patches)		10-30
6	Several well-spaced patches or clumps	≥ 6 patches (each occupying less than one quadrant of the plot)	Variable (10 to many disjunct patches)		10-30
7	Continuous uniform occurrence off well-spaced individuals	Many	Many		10-30
8	Continuous occurrence of a species with a few gaps in the distribution	Many	Many (continuous matrix formed by species crowns with some openings)		30-60
9	Continuous dense occurrence of a species	Many	Many		>60

Source: Luttmerding *et al*. 1990

Note: * The distribution code is determined over a sufficiently large area to account for normal variation in distribution pattern.

ATTACHMENT C3

MONITORING FORMS

PRE-TREATMENT MONITORING FORM

Date: _____ Name: _____ Daily page: _____ Overall Page: _____

Location: _____ Type: ROW/Facility/Road Land Use: _____ Photos _____

Species Observed (corresponds to site sketch)		**Growth stage** (Seedling/Juvenile/Mature)	**Height** (cm)	**Density Code** (1-9)	**Designation** (Noxious/Invasive**)**
1	On site				
	Adjacent				
2	On site				
	Adjacent				
3	On site				
	Adjacent				
4	On site				
	Adjacent				
5	On site				
	Adjacent				
6	On site				
	Adjacent				
7	On site				
	Adjacent				
8	On site				
	Adjacent				
9	On site				
	Adjacent				
10	On site				
	Adjacent				

Sketch of Site - Location of Problem Vegetation

Environmental Features

Shoreline within 30 m ☐ yes ☐ no comments: _____

Riparian area within 10 m ☐ yes ☐ no comments: _____

Site requiring protection ☐ yes ☐ no comments: _____

Wildlife habitat within 10 m ☐ yes ☐ no comments: _____

Native plants present ☐ yes ☐ no comments: _____

Grazing concerns ☐ yes ☐ no comments: _____

Accessibility (circle) good/fair/poor comments: _____

Other: _____

Pesticide Free Zone

30 m ☐ 10 m ☐ none required ☐

Comments: _____

Treatment Options

Level of Management (circle): Destroy / Control / Manage

Management Methods (circle): Non-chemical / Cultural or Biological / Chemical

Method Type (circle):

- Non-chemical – Prune / Hand pulling or digging / Disking / Brushing (selective slashing) / Hand or equipment clearing / Mowing.
- Cultural/Biological - Seeding of native or agronomic species / Introduction of pests and parasites;
- Chemical (herbicide application) – Broadcast spraying / Spot spraying / Wicking

Rationale/Comments: _____

POST-TREATMENT MONITORING FORM

Date: _____ Name: _____ Daily page: _____ Overall Page: _____

Location: _____ Type: ROW/Facility/Road Land Use: _____ Ownership: Private/Public

Treatment Info

Vegetation Management Contractor Name:

Supervisor Name:

Date of Treatment: _____ Area Treated (ha): _____ Methods: Non-Chemical / Cultural/Biological / Chemical

Address: _____ Phone #: _____

Non-chemical Summary

Treatment Used:

Description:

Cultural/Biological Summary:

Treatment Used:

Description:

Chemical Summary:

Licensee Name: _____ Licence #: _____

Treatment Used: _____

Description: _____

Chemical Summary

Product Name	Active Ingredient	PCP No.	Target Species	App. Rate (L/ha)	Total Vol. (L)

Notes:

Environmental Protection

Required pesticide free zones were marked ☐ yes ☐ no comments: _____

Required pesticide free zones were maintained ☐ yes ☐ no comments: _____

Treatment area boundaries were marked ☐ yes ☐ no comments: _____

Treatment area boundary markings were adequate ☐ yes ☐ no comments: _____

Treatment notices posted ☐ yes ☐ no comments: _____

Shoreline within 30 m was observed ☐ yes ☐ no comments: _____

Waterbody/Riparian area within 10 m were observed ☐ yes ☐ no comments: _____

Wildlife habitat within 10 m were observed ☐ yes ☐ no comments: _____

Native plants were observed ☐ yes ☐ no comments: _____

Off site pesticide movement observed ☐ yes ☐ no comments: _____

_____

Non-target effects observed ☐ yes ☐ no comments: _____

_____

Other: _____

_____

Treatment Objectives

Treatment objectives were achieved ☐ yes ☐ no

Describe how/where objectives were/were not achieved: _____

_____

_____

_____

_____

_____

APPENDIX D

CONTACTS

TABLE D.0-1

EMERGENCY CONTACTS

BRITISH COLUMBIA		
Contact	Location	Phone Number
RCMP	Burnaby	911 or 1-604-294-7922
Emergency Medical Services (Ambulance)	Burnaby	911 or 1-604-872-5151
Hospital/Clinic	Burnaby Hospital (Burnaby)	1-604-434-4211
Fire	Burnaby	911 1-604-294-7190
BC Ministry of Environment 24-hour Spill Line	BC	1-800-663-3456
National Energy Board	Calgary	1-800-899-1265
Department of Fisheries and Oceans Observe, Record and Report Hotline	Alberta and BC	1-800-465-4336
Transportation Safety Board	Quebec	1-819-997-7887
Ministry of Environment Spill Response	BC	1-800-663-3456
Conservation Officer Service	BC	1-877-952-7277
WCSS Oil Spill Co-operative – 24-Hr Emergency	Alberta and BC	1-866-541-8888
Forest Fires	BC Forest Fires Reporting Centre	1-800-663-5555
Trans Mountain – EHS	Burnaby	1-604-268-3008
Trans Mountain – EHS	Kamloops	1-250-371-4017
Trans Mountain Operations Supervisor	Burnaby	1-604-268-3040
Trans Mountain Operations Supervisor	Sumas	1-604-268-3080
Trans Mountain Operations Supervisor	Kamloops	1-604-268-4040
Trans Mountain Operations Supervisor	Clearwater	1-250-587-6350
Trans Mountain – 24-hour Emergency Line	Alberta and BC	1-888-876-6711

APPENDIX E

WILDLIFE AND WILDLIFE HABITAT

Resource-specific mitigation measures have been identified for key onshore and marine wildlife and wildlife habitat encountered within the Westridge Marine Terminal site. The wildlife and wildlife habitat specific protection and management measures are provided in Table E-1.

Refer to the Environmental Facility Drawings of Westridge Marine Terminal for further details regarding key wildlife and wildlife habitat encountered and coinciding mitigation recommendations.

TABLE E-1

WILDLIFE AND WILDLIFE HABITAT SPECIFIC PROTECTION AND MANAGEMENT MEASURES

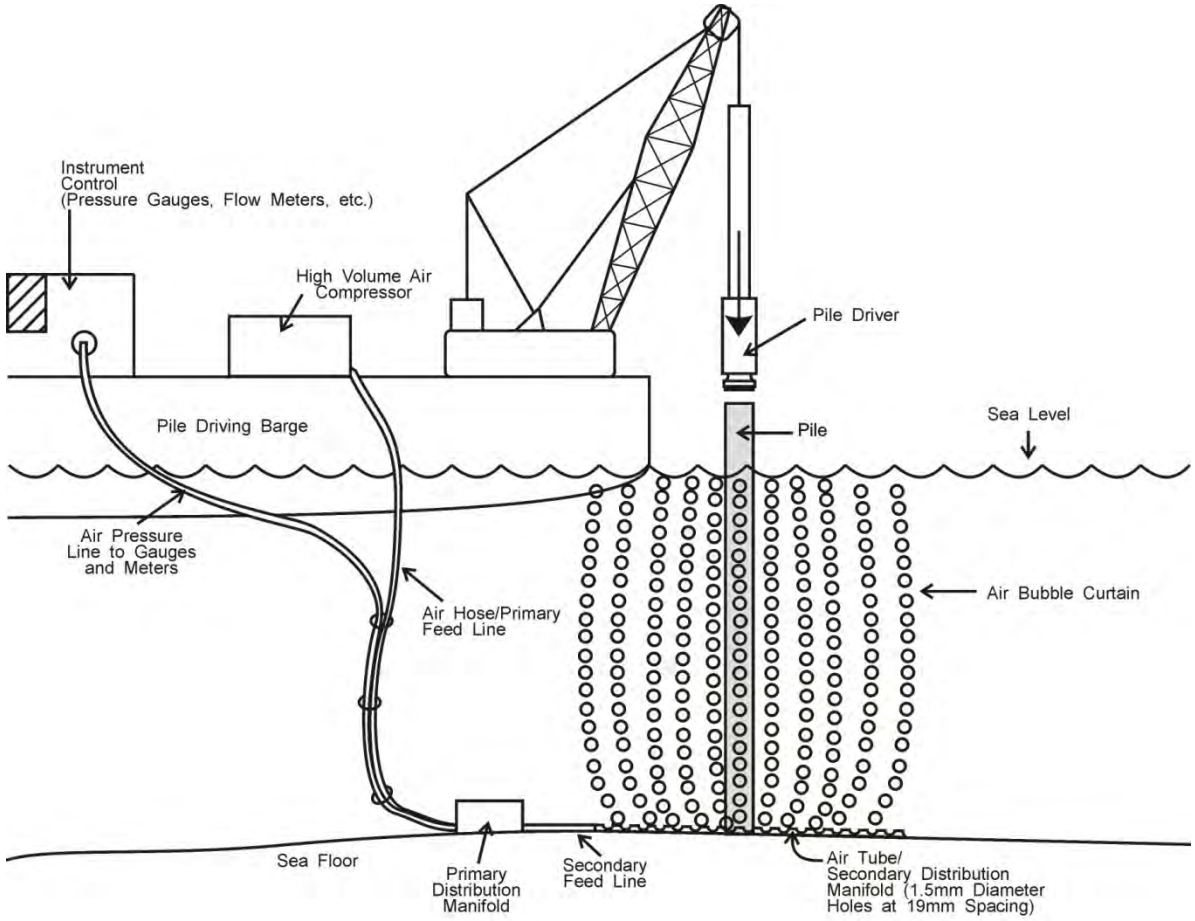
Concern	Recommended Mitigation
Habitat Loss/Alteration	• Complete pre-construction wildlife surveys to identify habitat features that warrant mitigation. • Do not clear timber, stumps, brush or other vegetation beyond the marked construction boundary. • Where grading is not required, cut/mow/walk down shrubs and small diameter deciduous trees at ground level to facilitate rapid regeneration. • Use natural recovery as the preferred method of reclamation on level terrain unless otherwise requested by the regulator and where bio-engineering (*e.g.*, shrub staking/planting) will be conducted. • Seed riparian and erosion prone areas with an approved native seed mix. • Avoid the use of pesticides (except for herbicides to control invasive plants or noxious weeds; only use as spot treatments and outside the migratory bird breeding season) (BC MOE 2012).
Wildlife Disturbance and Attraction of Wildlife During Construction	• Use low level and low intensity lighting. Do not use lighting in areas where no work is planned. Use downturned shaded fixtures in light standards and a higher lumen/watt ratio, such as metal halide lighting to prevent sky-lighting or bird disorientation/collisions. • Prohibit construction personnel from having pets at the terminal. • Prohibit construction personnel from feeding or harassing wildlife. • Dispose of food waste and industrial waste properly. • Report any issues related to wildlife encountered during construction and operation to the Environmental Inspector, who will report it to appropriate regulatory authorities, as warranted.
Migratory Birds	• Schedule clearing and construction activities outside the migratory bird breeding season of March 15 to August 15 (Wilson pers. comm.). In the event clearing or construction activities are scheduled during the migratory bird restricted activity period (RAP), follow the measures for conducting migratory bird nest sweeps described below. • In simple habitat types where active nests are easier to locate (*i.e.,* previously cleared areas and open areas with sparse vegetation and few trees), a nest sweep may be completed within 7 days of activity that is scheduled to occur within the migratory bird RAP. Use non-intrusive methods to conduct an area search for evidence of nesting (*e.g.,* presence of singing birds, territorial males, alarm calls, distraction displays). In the event an active nest is found, it will be subject to site-specific mitigation measures (*i.e.,* clearly marked protective buffer around the nest and/or non-intrusive monitoring). • In complex habitats where active nests are more difficult to find (*e.g.,* forests), it is recommended that pre-clearing be conducted. If this is not possible and activity is scheduled to occur within the migratory bird RAP, contact Environment Canada prior to activity to discuss the area to be cleared. Use non-intrusive methods to conduct an area search for evidence of nesting (*e.g.,* presence of singing birds, territorial males, alarm calls, distraction displays). In the event an active nest is found, it will be subject to site-specific mitigation measures (*i.e.,* clearly marked protective buffer around the nest and/or non-intrusive monitoring).
Important Bird Area - English Bay and Burrard Inlet (BC020)	• See measures above for Migratory Birds. • Conduct species specific surveys to identify important wildlife features for species known to occur in the area (*e.g.*, bald eagle nests). In the event these are found, consult with the appropriate regulatory authorities to discuss practical options and mitigation strategies.
Raptor Nest	• Schedule clearing and construction activities outside of sensitive time periods for raptors (provided below) to the extent feasible. In the event clearing is scheduled within these periods, in areas of suitable habitat, conduct raptor nest searches prior to clearing to locate active raptor nests. In the event an active raptor nest is discovered, consult with the appropriate regulatory authorities to discuss practical options and mitigation strategies. • In BC, eagle, peregrine falcon, gyrfalcon, osprey and burrowing owl nests are protected year-round by the BC *Wildlife Act* and may not be cleared. The *Guidelines for Raptor Conservation* (BC MOE 2013) provides information on sensitive breeding and nesting time periods and buffers for raptor nests according to their tolerance to human disturbance. These buffers range from 50 m to 500 m depending on the surrounding land use and species. During the breeding season, an additional 100 m "quiet" buffer is recommended. Clearly mark the appropriate buffers with fencing to prevent access to the nest. • If construction is unavoidable within the recommended year-round and breeding buffers, a Nest Management Plan addressing various mitigation (including nest monitoring during the breeding period) is recommended. • If construction activities require the removal of a raptor nest that is protected year-round under the BC *Wildlife Act* (*i.e.*, eagle, peregrine falcon, gyrfalcon, osprey and burrowing owl), Trans Mountain will work with the appropriate regulatory authorities to develop a Nest Removal Management and Compensation Plan. Upon confirmation the nest is inactive, nest removal should occur during the least risk window of August through December. When a nest is removed the installation of a replacement structure (*i.e.*, a platform on a pole or transplanted tree) should be erected in nearby suitable habitat (BC MOE 2013).
Great Blue Heron Nesting Colony	• Schedule clearing and construction activities outside of sensitive time periods for great blue heron (provided below), to the extent feasible. In the event clearing is scheduled within these periods, in areas of suitable habitat, conduct nest searches during the breeding season and prior to clearing to locate nesting colonies. In the event an active colony is discovered, discuss appropriate mitigation strategies with regulatory authorities, which may include establishing protective buffers during sensitive periods. • In BC, great blue heron nests are protected year-round under the BC *Wildlife Act*. The following are the recommended setbacks: 300 m (undeveloped), 200 m (rural), 60 m (urban) and a 200 m "quiet" buffer during the breeding season from the outer perimeter of all nesting trees. The least risk window is from September 1 to February 15 (BC MOE 2012a).
Species with Special Conservation Status	• In the event that a species with special conservation status is observed during construction, the appropriate regulatory authorities will be contacted to determine if additional mitigation measures are warranted. • Implement the Wildlife Species of Concern Discovery Contingency Plan in the event that wildlife species of concern are identified during construction.

APPENDIX F

DRAWINGS

LIST OF DRAWINGS

Drawing 1	Air/Bubble Curtain Installation (Pile Installation)
Drawing 2	Infilling – Rock Armouring
Drawing 3	Sediment Fence
Drawing 4	Turbidity Curtain Installation (Tidal Conditions)

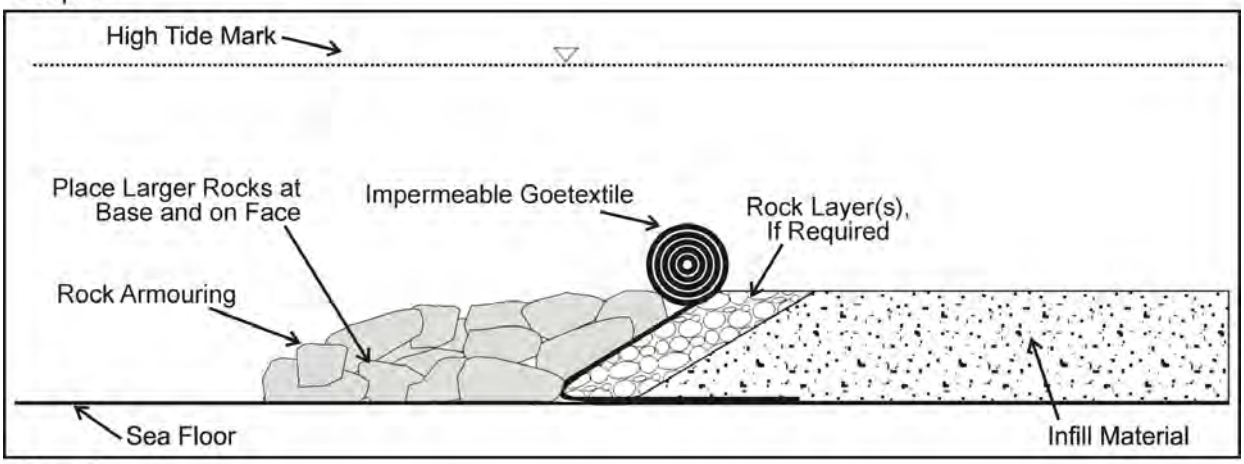


Notes:

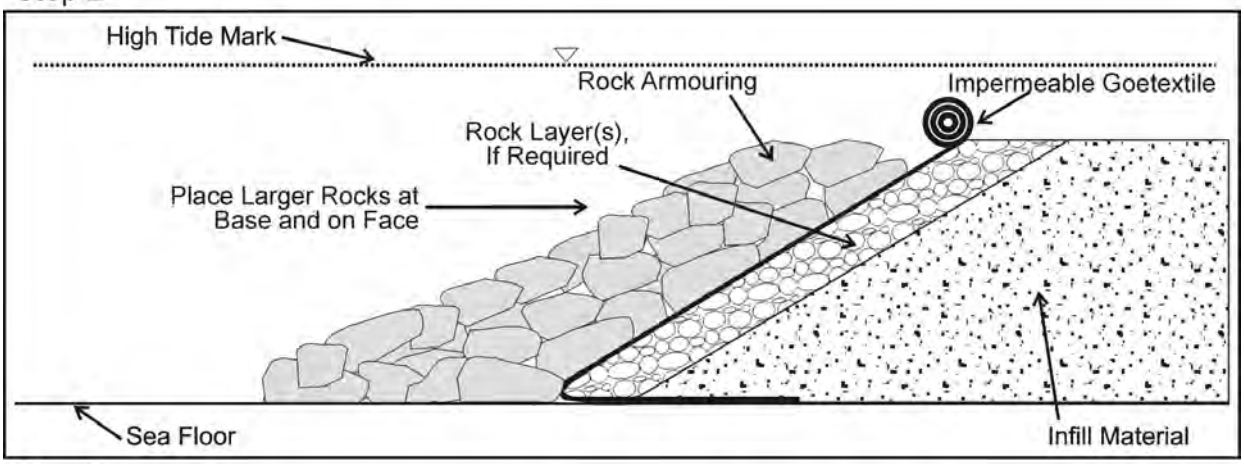
1. Proper placement and design is critical and qualified specialists should be involved. Ensure appropriate deployment hardware is available for the installation of the designed air bubble curtain.
2. Determine the number of layers and secondary distribution manifolds required for proper installation (*i.e.*, if the water column is deeper than 10.5 m, a second layer of secondary distribution manifolds will be required. If the water column is deeper than 21 m, a third layer of secondary distribution manifolds will be required). Larger manifolds, or multiple manifolds, will be required if the pile is inclined in order to obtain 100% coverage.
3. Determine the total length of secondary feed line required to carry an appropriate volume of air to the secondary distribution manifold(s). Keep secondary feed line lengths as short as possible to reduce wear on the lines during recovery and installation. Back pressure at the exit point, in-line friction and fitting losses should be considered when determining an appropriate length and inside diameter of the secondary feed lines. The appropriate number of supply lines required will be based on inside diameter of the secondary feed line and the total number of holes within the secondary distribution manifold(s).
4. Determine an appropriate sized compressor and primary feed line. The primary feed line should be sized to carry the total required capacity of the compressor to the primary distribution manifold.
5. Install the primary distribution manifold between the primary feed line and the secondary feed line(s). The primary distribution manifold will accept air from the primary feed line and redistribute it to the secondary feed line(s). Ensure valves are installed on the primary distribution manifold for each feed line. The primary distribution manifold should be easily accessible to allow for adjustments of air flow, if required.
6. Install appropriate meters and gauges for the primary feed line and each secondary feed line in an instrument control area, in order to monitor flow and pressure and ensure effectiveness of the system is maintained at all times.
7. Following installation of all required components, ensure that the bubble curtain covers 100% of the circumference of the pile. It is preferable to have multiple small bubbles surrounding the pile than a few large bubbles.
8. Monitoring of flow, pressure, coverage and effectiveness will continue for the duration of the pile installation or in-water activity.

tera ENVIRONMENTAL CONSULTANTS	TRANS MOUNTAIN EXPANSION PROJECT TRANSMOUNTAIN		
	AIR/BUBBLE CURTAIN INSTALLATION (PILE INSTALLATION)		
	7894	December 2013	Drawing 1

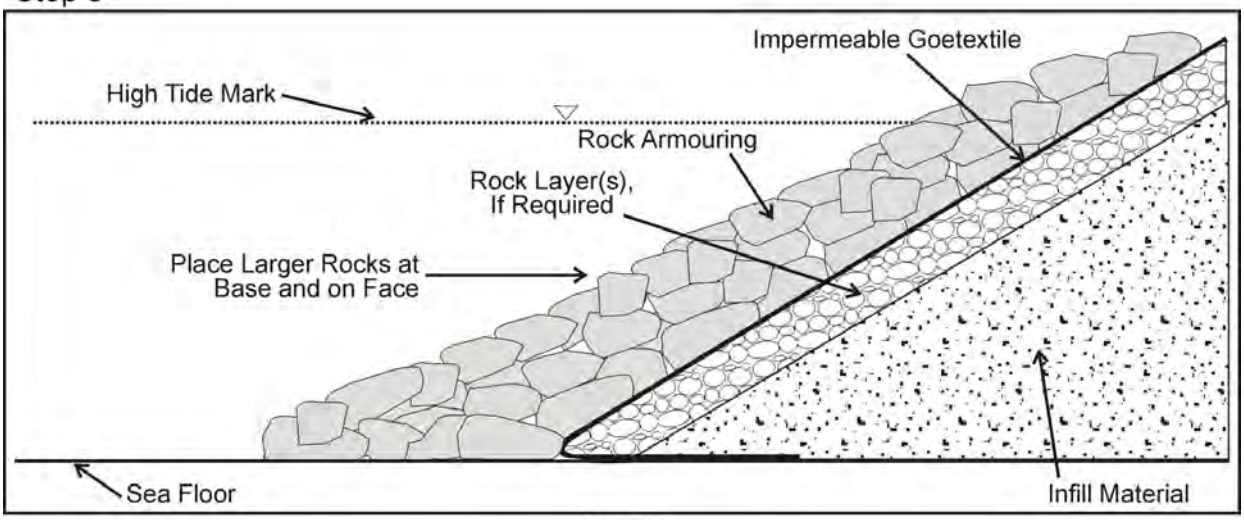
Step 1



Step 2



Step 3

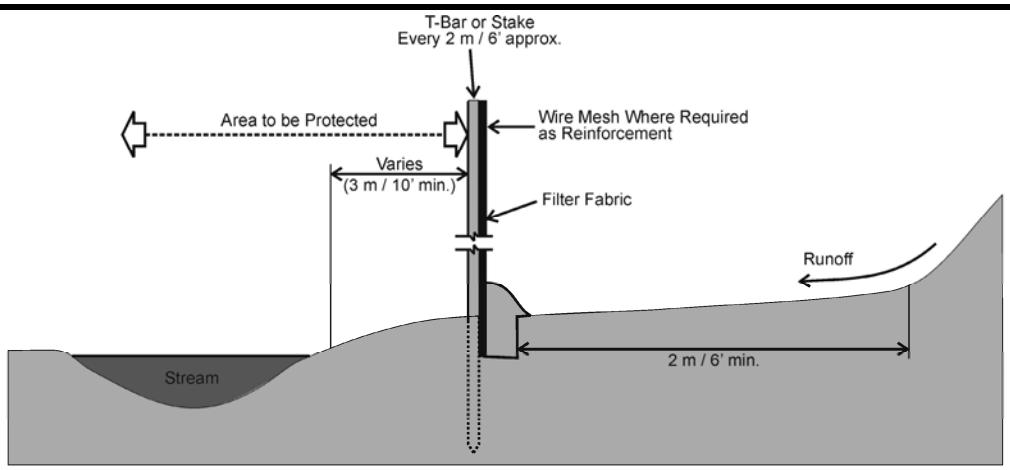


Profile
(Not to Scale)

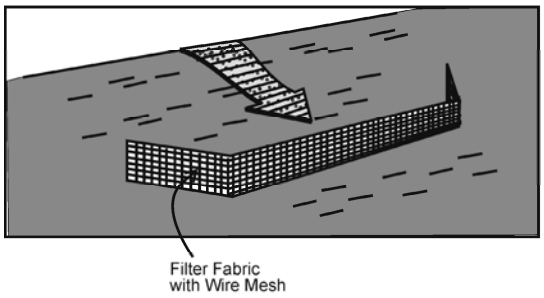
tera ENVIRONMENTAL CONSULTANTS	**TRANS MOUNTAIN EXPANSION PROJECT** TRANSMOUNTAIN		
	INFILLING - ROCK ARMOURING		
	7894	December 2013	Drawing 2 Page 1 of 2

Notes:

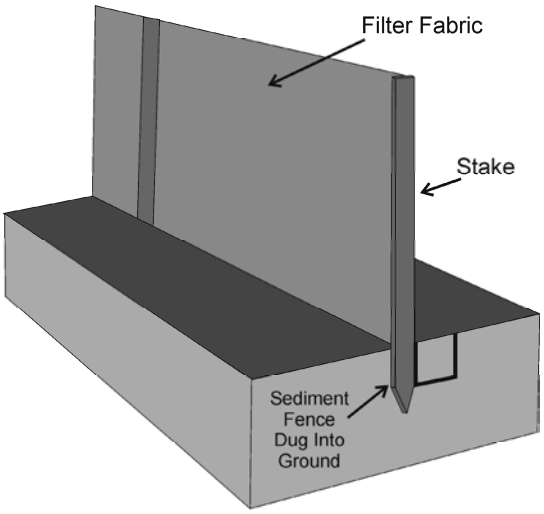
1. Proper placement and design is critical and qualified engineers should be involved.
2. Install infill, geotextile and rock filter layer(s) progressively, in order to contain fill material during construction of the infilled area. Install impermeable geotextile or rock filter layer(s) on top of infill material, if required. The impermeable geotextile material should be properly placed and anchored using concrete blocks or other appropriate anchoring techniques, as specified in the engineered design.
3. Place clean rock armouring material leaving a well-interlocked, smooth layer.
4. Rock armouring should be dense, durable, roughly equidimensional (not flat and thin), angular and clean.
5. Size of rock armour used is dependent upon desired slope, tidal patterns, current forces, wave action and storm effects specific to the area.
6. The minimum thickness of a riprap layer shall be 1.5 to 2 times the approximate dimensions of rock being used and will be determined as part of the engineering design.
7. Rock armouring should extend 0.5 m (min) above the high tide mark or to the top of the shoreline, as specified in the engineering design.
8. Where placement of rock armouring is adjacent to existing shoreline, the rock armouring should be flush with the natural contour to prevent additional scour.



Profile View
(Not to Scale)



Oblique View
(Not to Scale)



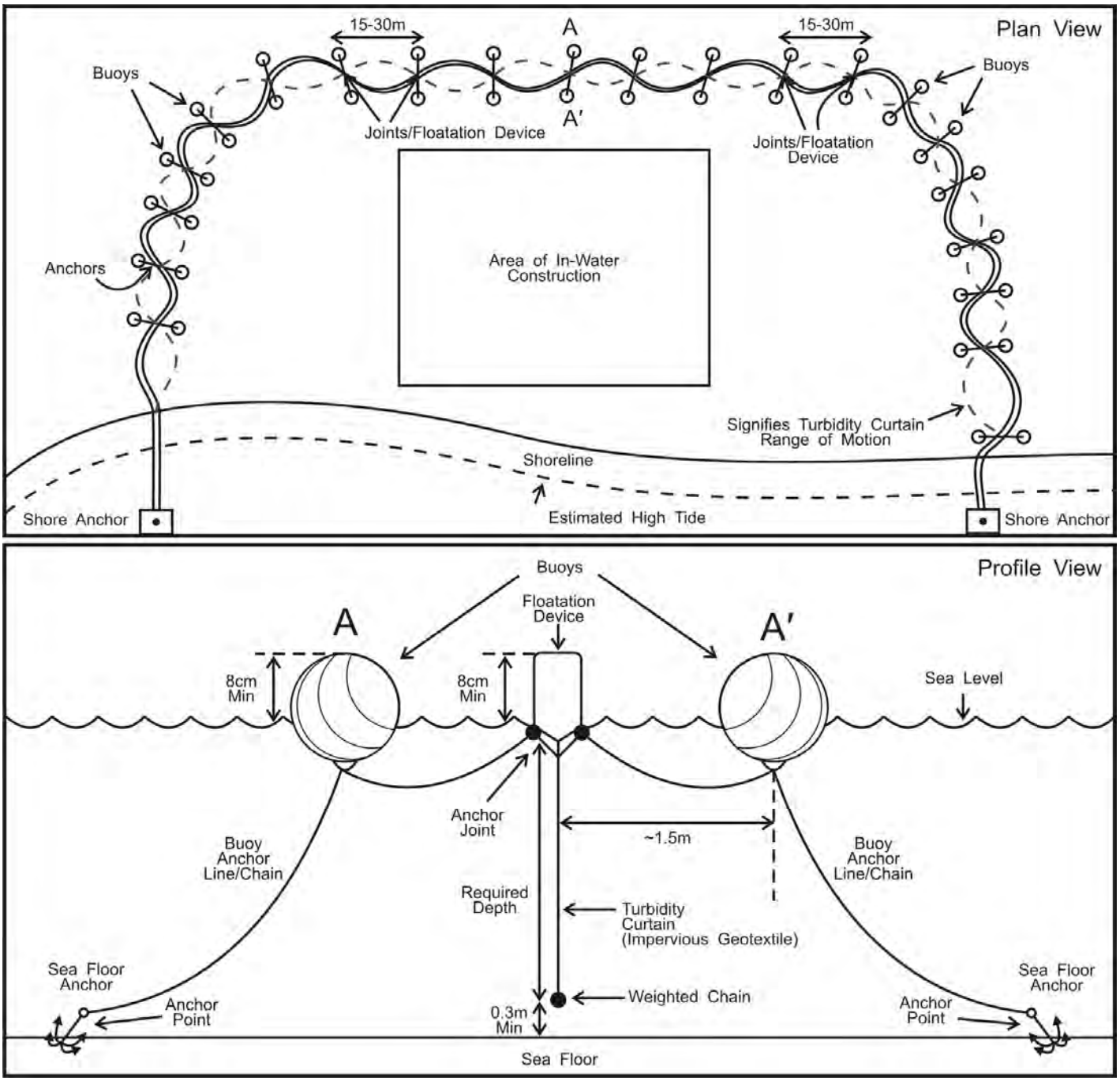
Oblique View
(Not to Scale)

Representation Only

Notes:

1. Watercourses that have moderate to high sensitivity of fish habitat and/or have steep approach slopes at the proposed crossings may need sediment fences during construction, as determined by Trans Mountain's Environmental Inspector(s).
2. Install sediment fences at the base of approach slopes to watercourses prior to clearing and grading using the method and materials above or other approved designs.
3. Ensure sediment fence is keyed into the substrate. Excavate a narrow trench, place the base of the sediment fence in the trench and place the fill back into the trench, securing the sediment fence in place.
4. Place sediment fences a minimum 2 m (6 feet), if feasible, from the toe of the slope in order to increase ponding volume.
5. Maintain sediment fences in place at the base of the approach slopes until revegetation of the construction right-of-way is complete.
6. In areas with frequent traffic, install two or more sediment fences in a staggered and overlapped configuration to allow vehicle passage without removal or opening of the sediment fence.
7. Ensure that sediment fences, if removed or damaged, are reinstalled or repaired prior to the end of the work day.
8. Install sediment fences, where warranted, to eliminate the flow of sediment from clean subsoil piles and disturbed areas into nearby wetlands.
9. Remove any sediment fences around wetlands that remain after the disturbed area is revegetated and the area is stable.

tera ENVIRONMENTAL CONSULTANTS	**TRANS MOUNTAIN EXPANSION PROJECT** TRANSMOUNTAIN		
	SEDIMENT FENCE		
	7894	December 2013	Drawing 3



tera ENVIRONMENTAL CONSULTANTS	TRANS MOUNTAIN EXPANSION PROJECT TRANSMOUNTAIN		
	TURBIDITY CURTAIN INSTALLATION (TIDAL CONDITIONS)		
	7894	December 2013	Drawing 4 Page 1 of 2

Notes:

Design, Construction and Installation Considerations

1. Proper placement and design is critical and qualified specialists should be involved. Ensure all required permits and approvals are in place prior to installation.
2. Install turbidity curtains parallel to the direction of flow, where practical.
3. Prior to installation, determine the appropriate required length (based on tidal conditions and water depth) of the turbidity curtain required to achieve maximum effective depth. Typically, turbidity curtains that are installed in waters deeper than 3 to 4 m cause increased load and strain on the mooring system, resulting in reduced effective depth.
4. Prior to installation, determine the appropriate sized gap (minimum 0.3 m) required between the sea floor and the bottom of the turbidity curtain (determined during mean low tide conditions). This gap is designed to prevent increased turbidity, resulting from contact between the curtain and the sea floor during tidal flows. In the event that the curtain must be extended to the sea floor, a heavy woven pervious filter fabric should be used as a replacement for standard turbidity curtain material (*i.e.*, an impervious geotextile). Heavy woven pervious filter fabric allows water to penetrate the fabric surface, reducing pressure on the curtain during tidal activity.
5. When determining the amount of required material, an additional 20% of total length should be acquired in order to ensure enough material is available to reduce stress on the system during tidal activities. Ensure that the total enclosed area accounts for periods of high tide.
6. Prior to installation, ensure any seams in the turbidity curtain fabric are appropriately enclosed to ensure full strength and effectiveness is achieved.
7. Determine/set appropriate shoreline anchor points (*i.e.*, an existing pile).
8. Set appropriate anchor points and joints that have sufficient holding power to retain the turbidity curtain under typical tidal conditions for the area. Ensure anchors are positioned to be on both sides of the turbidity curtain to minimize movement and reduce the risk of the curtain overrunning and pulling out the anchors during tidal fluctuations. Maintain a 15-30 m continuous gap between anchor points/joints. Ensure anchors are installed above the high tide mark.
9. Install appropriate bottom anchors (*i.e.*, grappling hook, plow, fluke type) required for the sea floor conditions in the work area. Bottom anchors should be installed to hold the turbidity curtain in the appropriate position without affecting the turbidity curtain. Anchor lines should be attached to the buoys, as opposed to the turbidity curtain, to prevent submersion of the floatation device during tidal activity or increased strain on the turbidity curtain. Slack in the anchor line should be sufficient to allow the buoy and curtain to adjust with tidal changes without causing restrictions in the buoy or turbidity curtain, or submerging/pulling the turbidity down. Regular maintenance checks should take place to ensure anchor lines remain intact and to remove any entangled debris.
10. Select bright coloured (*e.g.*, orange, yellow) buoys and floatation devices that will attract the attention of boaters and other water-users within the vicinity of construction. All floatation devices and buoys will be flexible, buoyant units, contained in an individual sleeve or collar attached to the curtain. Required buoyancy of the flotation device will be sufficient enough to support the weight of the turbidity curtain and maintain a freeboard of at least 8 cm above the water surface.
11. Following anchor placement, secure the furled turbidity curtain (floatation upper and weighted lower) firmly to one of the onshore anchor points and move sequentially through all anchor points until the entire turbidity curtain is in position. If required, make any adjustments to the anchor placement, as deemed necessary, to ensure proper installation is achieved. Once secure, the furling lines may be loosened to allow the turbidity curtain to drop. Ensure turbidity curtains reach the appropriate pre-determined depth and, if required, ensure an appropriate gap exists between the bottom of the curtain and the sea floor.

Removal Considerations

1. Prior to removal, ensure all sediment has sufficiently settled within the contained area. Allow at least 6-12 hours (minimum) following in-water activity for sediment to settle. If required, remove sediment to restore the original depth/contour or to achieve the planned elevation. Any excavated materials that will not be returned to the sea floor (spoils) must be taken to an upland area to be stored and stabilized or disposed of properly.
2. Remove all components related to the installation of the turbidity curtain in such a manner as to minimize turbidity.
3. Furl the turbidity curtain prior to removal from the water to reduce the risk of damage to the geotextile material.
4. Ensure the shore is free of debris (*i.e.*, sharp rock, garbage, etc.) prior to removal of the turbidity curtain in order to minimize damage to the geotextile material.

APPENDIX G

DETAILS

Detail Environmental Facility Drawing

Information to be added prior to construction.