Hearing Order OH-001-2014
Board File: OF-Fac-Oil-T260-2013-0302

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., c. 19, s. 52, 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 ("CPCN") and other related approvals pursuant to Part III of the NEB Act.

FINAL ARGUMENT OF TRANS MOUNTAIN

August 20, 2015

To: The Secretary
National Energy Board
517 – 10th Avenue S.W.
Calgary, AB T2R 0A8

TABLE OF CONTENTS

1. INTRODUCTION 6

1.1 Overview 6
1.2 The NEB Process 11
1.3 Issues Outside of the NEB's Jurisdiction 17
1.4 Emergency Response 19
1.5 Trans Mountain's Proposed Routing Will Minimize Environmental Impacts 22
1.6 The Project Will Result in Significant Economic Benefits for Canada 24
1.7 Meaningful Aboriginal Engagement and Participation 26
1.8 Reasonable Mitigation of Stakeholder Concerns 27
1.9 Draft Conditions 31
1.10 Organization of Final Argument 36

2. LEGAL FRAMEWORK 39

2.1 Overview 39
2.2 Determining the Canadian Public Interest 39
2.2.1 Environmental Benefits and Burdens 47
2.2.2 Social Benefits and Burdens 66
2.2.3 Economic Benefits and Burdens 68
2.2.4 Aboriginal Engagement 76
2.3 TERMPOL Review 81
2.4 Provincial Considerations 84
2.5 Legal Framework Conclusion 89

3. PROJECT DESIGN 91

3.1 Overview 91
3.2 The Project 94
3.3 Project Alternatives 96
3.4 Routing 101
3.4.1 Routing Criteria and Engagement 103
3.4.2 Landowner Engagement 109
3.5 Potential Municipal Infrastructure Impacts and Mitigation 110
3.6 Construction 116
3.7 Watercourse Crossings 119

3.8 Existing Pipeline Segments ... 122
3.9 Pump Stations ... 127
3.10 Terminals Design and Location ... 129
3.11 Terminals Fire Protection ... 134
3.12 Westridge Marine Terminal Design and Location ... 140
3.13 Operations and Maintenance ... 142
3.14 Routine Inspection and Leak Detection ... 144
3.15 Seismic and Natural Hazards ... 146
3.16 Geotechnical Considerations ... 150
3.17 Risk Assessment ... 153
3.18 Environmental Protection Plans ... 159
3.19 Reclamation Management Plan ... 161
3.20 Project Design Conclusion ... 162

4. EMERGENCY RESPONSE ... 165

4.1 Overview ... 165
4.2 NEB Emergency Management Program Requirements ... 166
4.3 Consultation Regarding the Emergency Management Program Documents ... 167
4.4 Pipeline and Facilities Spill Response ... 169
4.5 Marine Spill Response ... 170
4.6 Emergency Response Conclusion ... 173

5. PUBLIC PARTICIPATION ... 174

5.1 Overview ... 174
5.2 Trans Mountain's Public Consultation Program ... 174
5.3 Public Information and Outreach Tools ... 176
5.3.1 Public Consultation Activities ... 177
5.4 Landowner Consultation ... 180
5.4.1 Government Consultation ... 182
5.5 Future and Ongoing Consultation ... 183
5.6 Conclusion ... 186

6. ABORIGINAL ... 188

6.1 Aboriginal Interests and Consultation with Aboriginal Groups ... 188
6.1.2 Identification Method ... 192
6.1.3 Aboriginal Engagement Program Design ... 194

6.1.4 Engagement Tools ... 196
6.1.5 Modifications to the Project as a Result of Engagement ... 198
6.1.6 Government of Canada's Consultation Process with Aboriginal Groups ... 199
6.1.7 Aboriginal Oral Traditional Evidence Hearings ... 201
6.1.8 Interests, Concerns and Mitigations ... 203
6.2 Aboriginal Procurement, Employment and Training ... 211
6.3 Future and Ongoing Consultation ... 215

7. ENVIRONMENT ... 217

7.1 Overview ... 217
7.1.2 Purpose of EA ... 217
7.1.3 Methodology ... 219
7.2 Findings of Trans Mountain's ESA ... 231
7.2.1 Pipeline and Facilities ... 231
7.2.2 Increased Marine Shipping to and from the Westridge Marine Terminal ... 294
7.2.3 Cumulative Effects Assessment ... 348
7.3 Follow-up and Monitoring ... 352
7.4 Environment Conclusion ... 357

8. SOCIAL ... 359

8.1 Overview ... 359
8.2 Social Aspects of Pipeline and Facilities ESA ... 360
8.2.1 Heritage Resources ... 361
8.2.2 Traditional Land and Resources Use ... 362
8.2.3 Social and Cultural Well-Being ... 364
8.2.4 Human Occupancy and Resource Use ... 365
8.2.5 Infrastructure and Services ... 365
8.2.6 Navigation and Navigation Safety ... 365
8.2.7 Community Health ... 366
8.3 Social Aspects of Marine Shipping ESA ... 367
8.3.1 Traditional Marine Resource Use ... 367
8.3.2 Marine Commercial, Recreational and Tourism Use ... 370
8.3.3 Human Health Risk Assessment ... 375
8.4 Social Conclusion ... 398

9. ECONOMIC 399

9.1 Economic Overview 399
9.2 Purpose and Need for Project 400
9.3 Cost of Surplus Capacity 402
9.4 Estimated Cost Savings as a Result of the Project 406
9.5 The Project will Result in Increased Netbacks for Producers 407
9.5.1 Netbacks and Price-Setting Mechanisms 407
9.5.2 The Asian Premium 408
9.6 Benefit-Cost Analysis 409
9.7 Economic Cost of a Spill 413
9.8 Upgrading and Refining in Canada 418
9.9 Employment and Economy 420
9.10 Tolls and Tariffs 422
9.11 Need for the Project 425
9.11.1 Economic Benefits of the Project 429
9.11.2 Local Benefits 434
9.12 Conclusion 435

10. CONCLUSION 439

TRANS MOUNTAIN FINAL ARGUMENT

1. INTRODUCTION

1.1 Overview

Trans Mountain has applied (the "Application") to the National Energy Board ("NEB" or "Board") pursuant to section 52 of the NEB Act[1] for a CPCN and related approvals for the Trans Mountain Expansion Project (the "Project" or "TMEP"). Trans Mountain believes the Project, which is an expansion of its existing system, is a responsible way to meet the demands from Canadian producers for increased market access in a manner that minimizes environmental and social risks and maximizes opportunities and economic benefits.

The Project is the response to requests for pipeline transportation service from oil producers and refiners in Western Canada on the West Coast of North America. Canadian production is currently constrained by a lack of pipeline infrastructure affecting Canada's ability to obtain world prices. Additional pipeline capacity is required for growing Canadian production to better access West Coast and offshore markets, which will help Canadian production obtain world market prices—to the benefit of all Canadians. The TMEP has the additional and fundamental benefit of paralleling the existing Trans Mountain Pipeline system ("TMPL") for 73 per cent of its route and other existing linear disturbances for another of 16 per cent of the route. This means that 89 per cent of the proposed route will follow existing linear disturbances which will minimize environmental impacts. Similarly, the associated path for marine export will utilize established and well managed shipping lanes. The remaining 11 per cent of new routing was selected according to routing criteria, which includes avoidance of residential neighbourhoods within urban areas that have grown since

[1] RSC 1985, c N-7 [NEB Act].

the TMPL was constructed in 1953.[2] The risks and potential impacts of the Project's route are well known—the TMPL has been operating for more than 60 years along most of the very same route.

This expansion builds on Trans Mountain's history of ongoing successful expansions to the TMPL. Since the TMPL was completed in 1953, Trans Mountain has added throughput capacity and facilities to respond to growing demand and changing shipper needs. Between 1957 and 2013, the capacity of the TMPL system has increased from 150,000 barrels per day to more than 300,000 barrels per day.[3] As a result, Trans Mountain has experience in successfully expanding the capacity of the TMPL.

The Project has significant commercial support and has already received approval of its toll methodology from the Board.[4] In October 2011, Trans Mountain held the first of three binding open season processes ("Open Season") to determine shipper interest in the Project. During the Open Season strong shipper response resulted in an increase of the Project's nominal capacity from 755,000 barrels per day to 890,000 barrels per day to accommodate the committed volumes from

---

[2] Exhibit B2-1 - Trans Mountain Pipeline ULC - Volume 4A: Project Design & Execution - Engineering (December 16, 2013) (A3S0Y8), 4A-6. - 4A-13; Exhibit B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 – (August 1, 2014) (A62087); Exhibit B255 - Trans Mountain Pipeline ULC - Technical Update No. 2 - (August 22, 2014) (A62400); Exhibit B290 - Trans Mountain Pipeline ULC - Project and Technical Update No. 4 (December 1, 2014) (A64687); Exhibit B415 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A71581)

[3] Exhibit B1-1 - V1 SUMM – (December 16, 2013) (A3S0Q7), 1-2.

[4] Exhibit C2-2 - BP Canada Energy Trading Company - Written Evidence of BP Canada Energy Trading Company (December 13, 2012) (A49778); Exhibit C2-9 - BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. - Written Argument of BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. (February 20, 2013) (A50539); Exhibit C11-2 - Nexen Marketing - Written Evidence of Nexen Marketing (December 13, 2012) (A49780); Exhibit C14-2 - Statoil Canada Ltd. - Written Evidence of Statoil Canada Ltd. (December 13, 2012) (A49781); Exhibit C15-4 - Suncor Energy Marketing Inc. and Suncor Energy Products Partnership - Written Evidence (December 13, 2012) (A49786); Exhibit C16-6 - Total E&P Canada Ltd. - Written Direct Evidence of Total E-P Canada Ltd. (February 6, 2013) (A50376).

all shippers.[5] As a result of the strong commercial support of the Project, Trans Mountain signed long-term firm transportation contracts of 15 and 20 years with 13 shippers, for a total volume of 707,500 barrels per day, which represents approximately 80 per cent of the total volume of the expanded TMPL.[6]

The TMEP shippers are comprised of some of the largest energy companies in Canada and the world: BP Canada Energy Trading Company; Canadian Natural Resources; Canadian Oil Sands Limited; Cenovus Energy Inc.; Devon Canada Corporation; Husky Energy Marketing Inc.; Imperial Oil Limited; Nexen Marketing Inc.; Statoil Canada Ltd.; Suncor Energy Marketing Inc.; Suncor Energy Products Partnership; Tesoro Refining & Marketing Company; and Total E&P Canada Ltd. These shippers have direct access to large volumes of supply—either through their own production, as marketers or as refiners of crude oil.[7]

After the successful Open Season process, Trans Mountain filed a toll methodology application with the NEB in June 2012 for the TMPL expansion. The NEB approved the application in May 2013.[8] The NEB toll methodology approval and long-term firm shipper contracts demonstrate the fundamental commercial underpinning for the Project.

Kinder Morgan Canada Inc. ("KMC") has operated the TMPL since 2005 and will construct and operate the TMEP, if approved. The Project will be fully integrated with the existing TMPL system and operated as one system, resulting in two pipelines with a combined capacity of 890,000 barrels

[5] NEB, Reasons for Decisions – Trans Mountain Pipeline ULC - RH-001-2012 (May 2013), 7.

[6] NEB, Reasons for Decision – Trans Mountain Pipeline ULC - RH-001-2012 (May 2013), 7-8.

[7] Exhibit B1-4 - V2 3of4 PROJ OVERVIEW (December 16, 2013) (A3S0R0), 2-41.

[8] NEB, Reasons for Decision – Trans Mountain Pipeline ULC - RH-001-2012 (May 2013).

per day.[9] Trans Mountain recognizes that the timing of the Project coincides with a heightened public awareness and related concern of the risks associated with the transportation of petroleum products. This heightened awareness does not change the nature of the risks, all of which are well understood. Decades of operation of the TMPL has provided Trans Mountain with a comprehensive understanding of the risks inherent to this pipeline corridor and Trans Mountain has existing operations and maintenance systems in place to address these risks. For the TMEP, Trans Mountain will leverage its existing knowledge and systems, complete systematic assessments of risk and incorporate all planned mitigation and improvements described in its evidence to enhance system safety and reliability.[10] Trans Mountain has consistently demonstrated its commitment to environmental excellence—in 2010 it received an Emerald Award for the environmental initiatives undertaken for the Anchor Loop Project through Jasper National Park.[11] Trans Mountain will exercise the same care for the TMEP.

Trans Mountain has sufficient financial resources to safely construct and operate the Project. Trans Mountain is a wholly-owned subsidiary of Kinder Morgan Energy Partners, L.P. ("KMEP"). KMEP is the largest midstream and the fourth largest energy enterprise in North America. It owns an interest in or operates approximately 130,000 km of pipelines transporting natural gas, refined petroleum products, crude oil and carbon dioxide. When the Application was filed, the KMEP family of companies had a combined enterprise value of approximately $105 billion.[12] Through

[9] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-41.

[10] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-46.

[11] Exhibit B1-2-V2 1 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0Q8), 2-5.

[12] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-1; enterprise value as of December 9, 2013.

its relationship with KMEP and KMC, Trans Mountain has the financial wherewithal and experience to ensure the Project meets or exceeds any Board requirements.

In its written evidence, Natural Resources Canada references the new *Pipeline Safety Act*[13] which introduces a suite of new measures to strengthen incident prevention, preparedness and response, and liability and compensation. These measures, taken together, aim to ensure that Canada's federally regulated pipeline safety system is world class and will remain so in the future.[14]

The *Pipeline Safety Act* is important because it reiterates some provisions that are already a matter of policy and law. For example, it reinforces the polluter-pay-principle and confirms unlimited liability in some circumstances. The *Pipeline Safety Act* reassures the public by providing clarity with respect to the financial requirements that an NEB regulated pipeline company will be expected to demonstrate. Trans Mountain will demonstrate financial capacity at levels consistent with the legislation and expects that the forthcoming regulations will provide additional guidance regarding these financial requirements.[15]

While not directly responsible for marine shipping, Trans Mountain is an active member of the maritime community and has demonstrated a commitment to continuous improvement of safety and efficiency of shipping from its Westridge Terminal. The federal Tanker Safety Expert Panel recommended additional contributions to ensure rapid and sufficient oil spill response. The Panel's December 2013 report aims to improve Canada's system for ship-source oil spill preparedness and response in order to better protect the public and the environment. On May 13, 2014, the

---

[13] SC 2015, c 21.

[14] Exhibit C249-9-1 - NRCan Written Evidence Submission TMX (May 27, 2015) (A4Q0V2), 9-12; Bill C-46 received Royal Assent on June 18, 2015, however, regulations to support the legislation have not yet been provided.

[15] Trans Mountain Reply Evidence, Section 4 – Corporate Liability (August 20, 2015), 4-1.

Government of Canada announced it would further strengthen Canada's tanker safety system with additional measures based on recommendations from the Tanker Safety Expert Panel.[16]

Trans Mountain is a sophisticated applicant that will leverage its decades of experience with the TMPL to responsibly construct, integrate and operate the Project as part of one system. The Project will, if approved, respond to the demonstrated market demand for additional pipeline capacity for Canadian production in a manner that minimizes and mitigates potential burdens and creates benefits for all Canadians.

1.2 The NEB Process

Trans Mountain filed its Application for the Project on December 16, 2013 to expand the TMPL. The Application was the culmination of significant stakeholder engagement, data collection and expert analysis including the over 60 years of experience with most of the proposed pipeline route and current intensive study of the proposed corridor and alternate routes. A robust public engagement program was undertaken including 159 open houses or workshops to understand stakeholder concerns and interest[17] and more than 24,000 points of engagement with Aboriginal groups to discuss the Project.[18] By consulting thousands of individuals, Trans Mountain improved and optimized its Project planning and mitigation measures to address the concerns it has heard from all stakeholders and Aboriginal groups. Mitigation measures resulting from Trans Mountain's engagement efforts include, for example, re-routing the Westridge delivery pipelines

[16] Trans Mountain Reply Evidence, Section 59 – Marine Transportation (August 20, 2015), 59-5 – 59-6.

[17] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-30.

[18] Trans Mountain Reply Evidence, Appendix 7A; Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015), 5

in the City of Burnaby ("Burnaby"), British Columbia ("B.C."),[19] and enhanced Tanker Acceptance Standards.[20] Trans Mountain's work with Aboriginal groups and stakeholders will not end once the regulatory process for the TMEP is complete. It is an ongoing process that will continue throughout the life of the Project.

The Application consists of eight volumes, including the environmental and socio-economic assessment ("ESA"), risk assessments and an overview of the Aboriginal and stakeholder engagement carried out by Trans Mountain. The information contained in the Application addresses the filing requirements contained in Part III of the NEB Act (as outlined in the Board's Filing Manual[21]) and the information required under section 19(1) of *Canadian Environmental Assessment Act, 2012* ("CEAA 2012").[22] The Application is Trans Mountain's formal request to the NEB to recommend approval of the Project. It forms the basis for the NEB regulatory process for the Project.[23]

The information provided by Trans Mountain in the Application and subsequent filings is comprehensive. It ensures the NEB has sufficient information to make a recommendation regarding the Project. The Application was deemed complete by the NEB on April 2, 2014 after more than three months of review by the Board.[24] The Board's completeness determination means

---

[19] Exhibit B290-2 – Part 1 Westridge Delivery Line Routing Update (December 1, 2014) (A4F5D5), 9.

[20] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 49-50.

[21] NEB Filing Manual, Released 2014-03; Each volume of the Application contains a checklist detailing how Trans Mountain satisfied the common information requirements in the NEB Filing Manual.

[22] SC 2012, c 19, s 52, s 19(1) [CEAA 2012].

[23] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-32.

[24] Exhibit A016 - National Energy Board - Letter to Trans Mountain Pipeline ULC - Application for the Trans Mountain Expansion Project - Completeness Determination and Legislated Time Limit (April 3, 2014) (A59502).

that the Application contains enough information to allow for participants to engage in a public hearing.

Certain intervenors complained that the Project hearing was unfair and lacked rigour. For example, Robyn Allan, an intervenor who subsequently withdrew from the hearing, asserted in a motion that the Board's decision to forgo oral cross-examination threatened both the legitimacy of the Project hearing and the NEB as an institution.[25] The Board dismissed Ms. Allan's motion, stating that the process outlined in Hearing Order OH-001-2014 ("Hearing Order") satisfied the natural justice requirements for notice, an opportunity to know the case to be met and to be heard.[26]

Complaints regarding the sufficiency of the Board's process could not be more divorced from reality. The scrutiny and rigour of the review which the Project has undergone has been one of the most extensive in NEB history or any other regulatory review in the country. An unprecedented 2,118 Applications to Participate were reviewed by the Board before the Hearing Order was issued in April 2014. Based on its review of these applications and late Applications to Participate the Board granted parties intervenor status, commenter status or denied participation status if the applicant did not satisfy the participation requirements of the NEB Act. The Board granted participation status in the TMEP regulatory process to more than 400 intervenors and 1,250 commenters.[27] The Board's approach to determining participation in this hearing was confirmed by the Federal Court of Appeal when it dismissed an application for leave to appeal in which the

[25] Exhibit C9-1-2 - Notice of Motion 1 Robyn Allan April 14, 2014 (April 4, 2014) (A3V8U7), 8.

[26] Exhibit A32-1 - Ruling No. 14 - Notices of motion from Ms. Robyn Allan and Ms. Elizabeth May to include cross-examination of witnesses - Trans Mountain Project (May 7, 2014) (A3W5J1), 3.

[27] Exhibit A014 - National Energy Board - Letter and Appendices - Application for Trans Mountain Expansion Project - Ruling on Participation (April 3, 2014) (A59504); Exhibit A98-1 - Ruling No. 41 - Ruling on Participation - Trans Mountain's new preferred corridor through Burnaby Mountain (October 27, 2014) (A4D7G2).

applicants argued, *inter alia*, that the NEB's Ruling on Participation was unconstitutional on the ground it violated the applicants' freedom of expression as guaranteed by section 2(b) of the *Canadian Charter of Rights.*[28] The NEB has permitted all applicants who are directly affected and many applicants who have relevant information or expertise to participate in the TMEP process—including several late applicants. The Federal Court of Appeal has refused appeals of the Board's participation decision. The facts, and the extensive record, demonstrate that the Board's process has been fair and broadly inclusive.

In reviewing the Project, the NEB must comply with the review timelines mandated by Parliament, which requires the Board to issue its report to the Governor in Council within 15 months, unless extended.[29] The Board must, within these timelines, submit a recommendation to the Governor in Council about whether a CPCN should be issued for the Project. Thus, the regulatory process for the Project is "a process for gathering and testing evidence for the Board's preparation, as an expert tribunal, of its recommendation to the Governor in Council about whether to issue a certificate under section 52 of the NEB Act."[30] At the outset of the proceeding, the Board indicated that its review of the Application would "be no less rigorous compared to past assessments."[31] The public record demonstrates the Board has achieved that goal.

---

[28] *Lynne M Quarmby and others v National Energy Board and others*, 2015 FCA 19.

[29] NEB Act, s52(4), 58(4) or 58(5).

[30] Exhibit A32-1 - Ruling No. 14 - Notices of motion from Ms. Robyn Allan and Ms. Elizabeth May to include cross-examination of witnesses - Trans Mountain Project (May 7, 2014) (A3W5J1), 4.

[31] Exhibit A32-1 - Ruling No. 14 - Notices of motion from Ms. Robyn Allan and Ms. Elizabeth May to include cross-examination of witnesses - Trans Mountain Project (May 7, 2014) (A3W5J1), 6.

158 The Board's report to the Governor in Council may also contain the Board's decision on approvals
159 requested by Trans Mountain under section 58 of the NEB Act.[32] The NEB Chair specified the
160 time limit for the Board to issue its report for the Governor in Council within a 15-month time
161 frame pursuant to sections 52(4), 58(4) and 58(5) of the NEB Act.[33] The Board, with the approval
162 of the Chairperson, subsequently announced an excluded period under section 52(5) of the NEB
163 Act from July 11, 2014 until February 3, 2015 to allow Trans Mountain to complete and file certain
164 studies.[34] The NEB is required to release its report by January 25, 2016.[35] In the twenty months
165 since Trans Mountain filed the Application, more than 400 intervenors have actively participated
166 in one of the most comprehensive regulatory processes in the Board's history.

167 The regulatory process for the Project was designed individually and independently by the Board
168 based on the specific circumstances of the Application. The Application has been subject to a full
169 review pursuant to the requirements of the NEB Act, the CEAA 2012, the Board's Filing Manual
170 and additional filing requirements identified by the Board relating to marine shipping. In order to
171 achieve its statutory mandate to consider the Application in a timely manner, the Board was
172 required to maintain the deadlines set out in the Hearing Order and the subsequent rulings and
173 procedural directions.[36] Despite these deadlines, the Hearing Order provided opportunities for
174 Aboriginal groups to provide oral traditional evidence and for all intervenors to ask numerous

---

[32] Exhibit A16-1 - Letter to Trans Mountain Pipeline ULC - Trans Mountain Expansion Project - Completeness Determination and Legislated Time Limit – (April 3, 2014) (A3V6H7), 2.

[33] Exhibit A16-1 - Letter to Trans Mountain Pipeline ULC - Trans Mountain Expansion Project - Completeness Determination and Legislated Time Limit – (April 3, 2014) (A3V6H7), 2.

[34] Exhibit A58-1 - Letter to Intervenors - Excluded period from 11 July 2014 to 3 February 2015 pursuant to subsection 52(5) of the National Energy Board Act (July 15, 2014) (A3Z2W5), 1.

[35] Exhibit A116-1 - Procedural Direction No. 8 – Revised hearing events and steps table (December 12, 2014) (A4F9Q4), 1.

[36] Exhibit A41-1 - Procedural Direction No. 3 – Process for hearing motions to compel full and adequate responses to information requests (June 3, 2014) (A3X5I6), 1.

175 rounds of written information requests ("IRs"), file written evidence and provide both written and
176 oral final argument. The process met the natural justice requirements for notice, an opportunity to
177 know the case to be met and to be heard.

178 All intervenors and the Board had multiple opportunities to vigorously test Trans Mountain's
179 evidence by asking IRs. The Board asked Trans Mountain more than 400 questions in six rounds
180 of IRs with additional specific IRs regarding routing, the Technical Review Process of Marine
181 Terminal Systems and Transshipment Sites ("TERMPOL") report and outstanding filings.[37]
182 Intervenors were granted two rounds of IRs and asked more than 17,000 questions.[38] Additional
183 specific intervenor IR rounds were added by the Board for outstanding filings, the TERMPOL
184 report, seismic reports and for intervenors who received late participant funding.[39] The record
185 demonstrates that this process provided all parties with numerous, adequate opportunities to test
186 Trans Mountain's Application, understands the evidence, and prepare to respond. The process has
187 been both fair and reasonable for all parties.

---

[37] Exhibit A18-1 - Letter and Information Request No. 1 to Trans Mountain Pipeline ULC (April 15, 2014) (A3V8V6); Exhibit A82-1 - Letter to Trans Mountain - NEB Round 2 Information Requests Requiring Full and Adequate Responses (September 26, 2014) (A4C4I9); Exhibit A127-1 - Letter and Information Request No. 3 to Trans Mountain Pipeline ULC (January 9, 2015) (A4G4L5); Exhibit A144-1 - Letter and Information Request No. 4 to Trans Mountain Pipeline ULC (March 20, 2015) (A4J8Z2); Exhibit A157-1 - Letter and Information Request No. 5 to Trans Mountain Pipeline ULC (April 29, 2014) (A4K9C6); Exhibit A107-1 - Follow-up information request to Trans Mountain regarding new preferred corridor studies (November 24, 2014) (A4F2K3); Exhibit A121-1 - Letter and Information Request to Trans Mountain regarding the TERMPOL report and outstanding filings (December 17, 2014) (A4G1Q2); Exhibit A189-1 Letter and Information Request Round 6 to Trans Mountain (July 15, 2015) (A4R4W1).

[38] Exhibit B38-1 - Trans Mountain - Notice of Motion (May 28, 2014) (A3X3Y4); Exhibit B328-1 - Trans Mountain Pipeline ULC - Response to Adams Lake Indian Band Notice of Motion re IR Round 2 responses (March 12, 2014) (A4J4Z8), 2.

[39] Exhibit A116-1 - Procedural Direction No. 8 – Revised hearing events and steps table (December 12, 2014) (A4F9Q4); Exhibit A140 - National Energy Board - Procedural Directive No. 11 - Process for hearing motions to compel full and adequate responses to round 2b of intervenor and TERMPOL Report IRs (March 3, 2015) (A68095); Exhibit A143 - National Energy Board - Ruling No. 56 - Notice of motion from Trans Mountain dated 27 February 2015 requesting leave to file outstanding documents (March 13, 2015) (A68732); Exhibit A152 - National Energy Board - Ruling No. 61 - Notice of motion from Trans Mountain dated 31 March 2015 requesting leave to file its outstanding Seismic Hazard Update late (April 15, 2015) (A69507).

1.3 Issues Outside of the NEB's Jurisdiction

The issues considered by the Board in relation to the Project form the basis of the evidence presented by Trans Mountain in this proceeding. Throughout the regulatory process, many of the intervenors and commenters have raised issues that are outside the Board's jurisdiction and are thus not necessarily addressed in the evidence. Trans Mountain respectfully submits that the Board must give due consideration to its jurisdiction when assessing the Project and its impacts.

The Hearing Order included timelines and a process for the Project hearing and attached a list of issues that the NEB would consider pursuant to the NEB Act ("List of Issues").[40] The Board specifically stated in the List of Issues that it did not intend to consider the "environmental and socio-economic effects associated with upstream activities, the development of oil sands or the downstream use of the oil transported by the pipeline."[41] Some parties challenged the List of Issues on the basis that the Board's exclusion of upstream and downstream effects violated their freedom of expression[42] or engaged a person's right to "life, liberty and security of the person" under the

[40] Exhibit A15-3 – National Energy Board – Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2). The NEB List of Issues included: 1. The need for the proposed project. 2. The economic feasibility of the proposed project. 3. The potential commercial impacts of the proposed project. 4. The potential environmental and socio-economic effects of the proposed project, including any cumulative environmental effects that are likely to result from the project, including those required to be considered by the NEB's Filing Manual. 5. The potential environmental and socio-economic effects of marine shipping activities that would result from the proposed project, including the potential effects of accidents or malfunctions that may occur. 6. The appropriateness of the general route and land requirements for the proposed project. 7. The suitability of the design of the proposed project. 8. The terms and conditions to be included in any approval the Board may issue. 9. Potential impacts of the project on Aboriginal interests. 10. Potential impacts of the project on landowners and land use. 11. Contingency planning for spills, accidents or malfunctions, during construction and operation of the project. 12. Safety and security during construction of the proposed project and operation of the project, including emergency response planning and third-party damage prevention.

[41] Exhibit A15-3 – National Energy Board – Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2), 18.

[42] Exhibit A084 - National Energy Board - Ruling No. 34 - Lynne M. Quarmby and others – Notices of motion dated 6 and 15 May 2014 (October 2, 2014) (A63200); Exhibit A063 - National Energy Board - Ruling No. 25 - Motions requesting that the Board include in the List of Issues the environmental and socio-economic effects associated with upstream activities and downstream use (July 23, 2014) (A61912).

Canadian Charter of Rights And Freedoms.[43] The Board correctly denied these motions. The Federal Court of Appeal dismissed two separate applications for leave to appeal alleging that the NEB erred in law or jurisdiction by refusing to consider the environmental and socio-economic effects of upstream and downstream activities associated with the TMEP.[44] Based on this scrutiny, it is clear that the List of Issues fairly and reasonably focuses on the matters that have a sufficiently direct connection with the Project and are within the Board's statutory mandate, as required by the Federal Court of Appeal.[45]

Aspects of marine shipping are also outside the Board's jurisdiction. Marine shipping on Canada's West Coast is overseen and regulated under the *Canada Shipping Act, 2001* and *Canada Marine Act* by a variety of federal and international authorities such as Port Metro Vancouver ("PMV"), the Pacific Pilotage Authority, the Canadian Coast Guard, Transport Canada and the International Maritime Organization. This framework imposes binding legal requirements and associated punitive measures for any non-compliance for all vessels calling on the Westridge Marine Terminal. Marine shipping routes are aqueous highways and users are subject to the applicable rules and regulations of these passages. The NEB does not regulate marine shipping in Canada or internationally. The Board's review is limited to "[t]he potential environmental and socio-economic effects of marine shipping activities that would result from the proposed Project, including the potential effects of accidents or malfunctions that may occur."[46] The existing

---

[43] Exhibit A074 - National Energy Board - Ruling No. 29 - Mr. L.D. Danny Harvey – Notice of Motion dated August 12, 2014 – Trans Mountain Expansion Project (August 19, 2014) (A62323).

[44] *City of Vancouver v National Energy Board and Trans Mountain Pipeline ULC* (October 16, 2014), Ottawa, 14-A-55 (FCA); *LD Danny Harvey v National Energy Board and Trans Mountain Pipeline ULC* (October 24, 2014), Ottawa, 14-A-59 (FCA).

[45] *Forest Ethics Advocacy Association v Canada (National Energy Board)*, 2014 FCA 245,2014 FCA 245 paras 67-69.

[46] Exhibit A15-3 – National Energy Board – Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2), 18.

regulation of marine shipping, such as the location of shipping lanes, is outside of the Board's jurisdiction.

Intervenor issues pertaining to the continued operation of the existing TMPL[47] are within the jurisdiction of the NEB but are outside of the scope of the TMEP regulatory process.[48]

1.4 Emergency Response

Another key area of concern raised by intervenors and commenters is Trans Mountain's ability to respond to accidents or malfunctions associated with the Project. This issue is addressed in detail in Section 6 - Aboriginal of this final argument; however, given the importance of emergency response and its interplay with other issues before the Board, Trans Mountain provides a brief overview of the pertinent evidence here.

The record provides evidence of Trans Mountain's and KMC's plans for addressing Project-related risks. While Trans Mountain's primary goal is to prevent spills from occurring in the first place, Trans Mountain is also in the process of enhancing the existing Emergency Management Program ("EMP") for the TMPL to address emergency management for the expanded system, once TMEP is in operation. Based on decades of operational experience, Trans Mountain has optimized its operational structure and emergency prevention, preparedness and response plans.

Trans Mountain's EMP satisfies all regulatory requirements. In accordance with the *Onshore Pipeline Regulations* ("OPR"),[49] management systems and protection programs will be developed

[47] Trans Mountain Reply Evidence, Section 8 – Landowner Relations (August 20, 2015).

[48] Exhibit A81-1 - Ruling No. 33 - Motions to compel full and adequate responses to the first round of intervenor information requests (September 26, 2014) (A4C4H5), 4.

[49] SOR/99-294.

to anticipate, prevent, manage, and mitigate events that may adversely affect the safety and security of the pipeline, Trans Mountain's employees, the public, property and the environment. In the unlikely event that an accident occurs, Trans Mountain is prepared to respond efficiently and effectively. Trans Mountain has a practiced spill-response field organization structure that will be enhanced for TMEP, including the creation of a dedicated EMP group. Importantly, emergency response measures will be tailored to the unique geographic hazards of the expanded TMPL system components.

Trans Mountain engages in comprehensive consultation with the public regarding emergency prevention, preparedness and responses and enhancements to its EMP to address Project requirements. Emergency preparedness and response is an adaptive and continuing process. Trans Mountain is committed to consulting with stakeholders and Aboriginal groups at every stage of the EMP development process and over the life of the Project. This includes consultation regarding the impact of potential TERMPOL recommendations. Through ongoing review and revision Trans Mountain will ensure that the EMP is current and meets, or exceeds, regulatory requirements and protects the public and the environment.[50]

Although Trans Mountain does not own the tankers that call at the Westridge Marine Terminal and is not responsible for the tanker traffic, it is committed to further strengthening the existing marine safety regime for tankers and the continued development of a response program that would benefit all marine users in the Project area and improve overall safety. As an example of the robust marine safety regime prevalent in the Project area, the Pacific Pilotage Authority, a Crown corporation responsible for safe marine pilotage on Canada's West Coast, said that it has never

[50] Trans Mount Reply Evidence, Section 70.1.2 – EMP Review and Revision (August 20, 2015), 70-3.

had a navigational issue with an oil tanker in PMV. The Pacific Pilotage Authority confirmed that tankers are safe and have used PMV as Canada's pacific gateway without incident for more than a half-century.[51]

The Board should also consider the financial responsibility and structure of the Applicant in deciding whether to recommend approval of the Project under the NEB Act.[52] Trans Mountain and KMC have sufficient financial resources to deal with all credible risks, however unlikely, that may potentially arise as a result of the construction or operation of Project. Trans Mountain completed thorough evaluations to assess the spill-related environmental effects that could result from a large oil spill at almost any location along the proposed corridor, including assessment of credible worst-case pipeline spill scenarios.[53] Trans Mountain determined the cost of a hypothetical worst-case spill scenarios to be $300 million after an extensive analysis by HJ Ruitenbeek Resource Consulting.[54] Upon completion of the expansion, Trans Mountain will have more than adequate financial capacity to meet the estimated worst-case spill scenario, consisting of $750 million of spill liability insurance and equity in the order of $3.2 billion.[55] In the event that liability occurs that is in excess of its insurance, Trans Mountain expects that any losses and claims would be paid out of cash reserves and cash flow from operations.[56] In summary, Trans Mountain has adequate plans and financial resources to address risks and construct and operate the Project safely and in the public interest.

---

[51] Pacific Pilotage Authority - Letter of Comment (June 19, 2015) (A70792).

[52] NEB Act, s 52(2)(d)

[53] Exhibit B 18-2 – V7 5.2.8.3 F5.2.5 TO 10.0 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V6)

[54] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 22, 27-28.

[55] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 22, 27-28.

[56] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 24.

1.5 Trans Mountain's Proposed Routing Will Minimize Environmental Impacts

Trans Mountain's proposed routing is the singular most important benefit of the Project when it comes to minimizing environmental impacts. The amount of undisturbed land required for the Project was significantly reduced because the proposed route parallels existing linear disturbances for approximately 89 per cent of its length. Trans Mountain has been safely operating the TMPL for more than 60 years on the majority of this route. While this is a major project, it has the unusual advantage of building upon an existing project and an existing footprint. The proposed corridor for the Project was developed with the goal of minimizing impacts on potentially affected parties and the environment. Trans Mountain's routing criteria are:

(a) wherever feasible, install the TMEP segments on or adjacent to the existing TMPL easement;

(b) where that is not feasible, install the TMEP segments adjacent to easements or rights-of-way of other linear facilities including other pipelines, power lines, highways, roads, railways, fibre optic cables and other utilities;

(c) or, if that is not feasible, install the TMEP segments in a new easement selected to balance a number of engineering, construction, environmental, community and socio-economic factors; and lastly

(d) in the event a new easement is necessary, minimize the length of the new easement before returning to the TMPL easement or other rights-of-way.[57]

The application of Trans Mountain's routing criteria resulted in minimizing the use of new pipeline corridor to 11 per cent of the total corridor. The proposed pipeline corridor is generally 150 m in

[57] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (A3S0Y8), 4A-6.

width centered on the existing TMPL easement, except where deviations are required, for example to avoid areas that have significant environmental value or to minimize routing through areas of extensive urban development to minimize social impact.[58]

Locating a pipeline project contiguous to existing liner disturbances has been recognized by regulators as the key method to reduce environmental impacts. The Brunswick Pipeline Project Joint Review Panel ("JRP") recognized minimizing environmental disturbance through the use of existing corridors where practicable as acceptable criteria to evaluate pipeline routing.[59] The JRP conducted an environmental assessment ("EA") under the former *Canadian Environmental Assessment Act* and commented:

> The Board recognizes EBPC's efforts to minimize any new permanent and temporary Project footprint by utilizing existing RoWs and other disturbed lands to the extent possible, and by considering site-specific landowner requests to reduce easement width where feasible.
>
> The Board notes that using existing linear corridors, where appropriate, tends to reduce environmental impacts. The Board finds that EBPC has maximized the use of existing RoWs. Based on the application of the principle of minimal land disturbance combined with the rigours of the overall route selection process, the Board finds that the lands required for the Brunswick Pipeline Project are reasonable and appropriate.[60]

Minimizing new linear disturbances therefore in turn reduces environmental impacts. Trans Mountain followed this well-established infrastructure design principle in its route selection by

[58] Exhibit B5-10 - V5A ESA 02of16 BIOPHYSICAL (December 16, 2013) (A3S1L4), 4-1; Exhibit B2-1 - Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-7 – 4A-10.

[59] NEB - Reasons for Decision - Emera Brunswick Pipeline Company Ltd. - GH-1-2006 (May 31, 2007).

[60] NEB - Reasons for Decision - Emera Brunswick Pipeline Company Ltd. - GH-1-2006 (May 31, 2007), 72-73.

paralleling existing disturbances for 89 per cent of the route, a remarkable achievement for a Project of this length.

Trans Mountain has direct experience in the effective design, construction and operation of projects in areas that are environmentally sensitive and important. The routing proposed by Trans Mountain and experience from other projects will minimize environmental impacts. For example, Trans Mountain's Anchor Loop Project was constructed through Jasper National Park in Alberta and Mount Robson Provincial Park in B.C., both of which are part of the UNESCO Canadian Rocky Mountain Parks World Heritage Site. Following an extensive engagement program with Aboriginal communities, local stakeholders and environmental groups, KMC, as operator of the TMPL, implemented unique and restorative mitigation measures. These measures include constructing greenhouses to grow indigenous plants for the area in order to meet or exceed the stringent environmental standards for the Project. The mitigation measures were successful at achieving the desired end results and management objectives of Parks Canada. In 2010, KMC was awarded a prestigious Emerald Award from the Alberta Emerald Foundation in recognition of its excellent environmental initiatives undertaken for the Anchor Loop Project.[61]

In Trans Mountain's view, its proposed routing and know-how from recent projects will effectively minimize environmental impacts.

1.6 The Project Will Result in Significant Economic Benefits for Canada

The Project is a market response to address the inadequate transportation capacity, and current lack of diversified market access and optionality for Canadian oil production, which has resulted

[61] Exhibit B1-2 – V2_Lof4_PROJ_OVERVIEW (December 16, 2013) (A3S0Q8), 2-5.

in extraordinary price discounts for that production. The Project will enable Canadian production to have an opportunity to garner higher prices through production priced in the West Coast Asia/Pacific region rather than the US Gulf Coast region. As a result of the market access provided by the Project, Canadian oil production revenues are forecasted to rise by approximately $61 billion over the first 20 years of Project operations to the benefit of all Canadians.[62]

The evidence before the Board demonstrates that the Project's increased market access for Canadian production will result in significant economic benefits to Canada and its regions. The economic benefits associated with the Project include an increase to Canada's Gross Domestic Product by approximately $4.9 billion during the construction phase of the Project and by at least $13.3 billion over the first 20 years of the operations phase. The Project will also generate about $1.4 billion in additional tax revenues for the federal government during the operations phase and an additional $1.1 billion in provincial taxes. An additional $14.7 billion in income taxes and royalty payments to the federal and provincial governments was estimated in the Application, as a result of the expected approximately $45 billion in higher netbacks to oil producers attributable to the market access opportunity provided by the Project.[63] Further, the expected higher netbacks to producers were revised upwards from $45 billion to $61 billion, in the April 2015 update to the market analysis that was completed in response to NEB IR No. 4.2.[64] Federal and provincial

[62] By comparison to the IHS and Conference Board of Canada written evidence filed in 2013, this includes the impact of an increase in the estimated higher netbacks to producers from approximately $45 billion to approximately $61 billion, and a proportionate increase in the fiscal impact of higher netbacks from approximately $14.7 billion to approximately $19.9 billion, as a result of the revised market analysis completed in April 2015 in response to NEB IR No. 4.2. BC's share increases proportionately from approximately $0.8 billion to approximately $1.1 billion. See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42 and Trans Mountain Reply Evidence, Report 1.03 - Reply to Economic Costs and Benefits of TMX for B.C. and Metro Vancouver (Goodman and Rowan Report) (August 20, 2015).

[63] Exhibit B286-2 - Report - Conference Board of Canada (November 24, 2014) (A4F2K9), 6-8; Exhibit B1-4 - V2 3of4 PROJ OVERVIEW (December 16, 2013) (A3S0R0), 2-42.

[64] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 11.

income taxes and royalties can be expected to increase proportionately from $14.7 to $19.9 billion.[65] It should be noted that the report completed by the Conference Board of Canada did not include the positive economic impact of increased tanker traffic on marine (i.e., port) operations in its analysis as this was considered a downstream impact outside the List of Issues. Intervenors[66] included negative economic impacts from a potential spill on port operations but did not include positive Project impacts. As indicated in Trans Mountain's reply evidence,[67] each tanker calling at PMV brings approximately $108 million of economic benefits to the local Vancouver economy on an annual basis. This amounts to approximately $2.2 billion during the first 20 years of Project operations, excluding the indirect and induced impacts from multiplier effects. If the Project proceeds, Trans Mountain will also provide an additional investment of $100 million in Western Canada Marine Response Corporation ("WCMRC").[68]

1.7 Meaningful Aboriginal Engagement and Participation

Trans Mountain understands that Aboriginal engagement and meaningful consultation is not a one-size-fits-all approach. Based on this understanding, Trans Mountain made every effort to provide Aboriginal groups with opportunities to engage in meaningful dialogue in the manner they choose, and in a way that met their objectives and values. Through the implementation of an innovative Aboriginal Engagement Program, Trans Mountain tailored its engagement approach to accommodate the myriad of diverse objectives and values it encountered. The sharing of

---

[65] Trans Mountain Reply Evidence, Attachment 1.02 - Reply to Dr. Catherine Douglas and the Pro Information Pro Environment United People Network "Economic Costs and Benefits of TMX for B.C. and Metro Vancouver" (August 20, 2015).

[66] Exhibit C77-31-8 - Appendix 83 (May 27, 2015) (A4L9G4).

[67] Trans Mountain Reply Evidence, Attachment 1.06 - Reply to City of Vancouver "Potential Economic Impact of a Tanker Spill on Ocean-Dependent Activities in Vancouver" (August 20, 2015).

[68] Exhibit B18-32 – V8A 5.4.4.7.2 TO T5.5.3 MAR TRANS ASSESS – (December 17, 2013) (A3S0Q7)

information was integral to this process. As a result of the information it received, Trans Mountain made significant modifications to the Project in order to (i) reduce impacts on the land and marine environment; (ii) address concerns regarding routing and construction; (iii) address socio-economic considerations; and (iv) enhance Aboriginal involvement and engagement. The success of Trans Mountain's Aboriginal engagement initiatives is underscored by the fact that as of August 5, 2015, 27 Aboriginal groups have publicly expressed support for the Project as detailed in Section 4 - Emergency Response of this final argument.[69]

Trans Mountain is committed to creating initiatives that increase the capability for Aboriginal peoples to participate in the economy and to share in the success of the Project. Through the implementation of employment and procurement initiatives, Trans Mountain will support qualified Aboriginal and regional businesses in obtaining Project-related contracts and employment.[70] Where possible, Trans Mountain will work with interested Aboriginal groups to facilitate community economic development and share Project benefits through education, training and community investment.[71] The establishment of partnerships and shared goals will result in long-term benefits for both Trans Mountain and Canada's fast-growing Aboriginal population.

1.8 Reasonable Mitigation of Stakeholder Concerns

Trans Mountain has made every effort to meaningfully engage all stakeholders in the planning of the Project to ensure they are informed and that their concerns were understood and considered.

---

[69] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[70] Exhibit B5-26 – Trans Mountain Pipeline ULC – Volume 5B: ESA – Socio Economic (December 13, 2013) (A3S1R5).

[71] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 146; Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

393 Since 2012, before the Application was submitted, Trans Mountain has consulted with thousands
394 of individuals through 159 open houses or workshops along the pipeline and marine corridors and
395 organized more than 1,700 meetings between Project team members and stakeholder groups. In
396 addition, Trans Mountain has responded to 954 media inquiries, provided 432 interviews and
397 responded to approximately 553 phone inquiries and 1,506 emails received from the public.[72]

398 The information gained from numerous stakeholder engagements has been incorporated into
399 Project plans and Project-related mitigation measures. Stakeholder engagement also provided
400 Trans Mountain with valuable feedback regarding the scope of the ESA, potential mitigation
401 measures to reduce environmental and socio-economic impacts, and routing alternatives where it
402 is not possible to follow the existing TMPL.

403 The numerous commitments made by Trans Mountain during the regulatory process are
404 demonstrative of its dedication to incorporating feedback from stakeholders. Trans Mountain has
405 made hundreds of commitments during the regulatory process, many of which resulted from
406 stakeholder input,[73] to address concerns raised during consultation and through IRs. All of these
407 commitments will be tracked, updated and made publically available on Trans Mountain's website.
408 The evidence on the record details Trans Mountain's transparent approach to refining and
409 optimizing the Project based on feedback from stakeholders to minimize and avoid impacts.

---

[72] Exhibits B1-6, B1-7, B1-8, B1-9– Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 3A, Public Consultation (December 16, 2013) (A3S0R2, A3S0R3, A3S0R4, A3S0R5 plus appendices); Exhibit B27 – Trans Mountain Pipeline ULC – Consultation Update No. 1 – Errata (March 20, 2014) (A59343); Exhibit B248, B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 and Consultation Update No. 2 – (August 1, 2014) (A62087 and A62088); Exhibit B306-12, B306-13, B306-14, B306-15, B306-16, B306-17, - Trans Mountain Pipeline ULC – Response to NEB IR No. 3.005a - Consultation Update No. 3 (February 3, 2015) (A4H1W2, A4H1W3, A4H1W4, A4H1W5, A4H1W6, A4H1W7); Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[73] Exhibit B306-3 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.001A – Attachment 1 (February 3, 2015) (A4H1V3); Exhibit B413 - Trans Mountain Pipeline ULC - Responses to National Energy Board Information Request No. 6 (July 22, 2015) (A4R6I4) 3.

The routing modifications made in Burnaby are a prime example of Project refinements made in response to stakeholder feedback. The existing TMPL alignment through Burnaby was constructed more than 60 years ago. Extensive urban development has encroached along the TMPL alignment in Burnaby over the decades since construction. Trans Mountain received consistent feedback from residents and stakeholders in Burnaby requesting that the Project routing minimize disruption to their residential and developed areas.[74] Residents from the Northcliffe and Westridge neighborhoods repeatedly requested that Trans Mountain consider a trenchless option through Burnaby Mountain instead of routing through residential streets.[75]

Implementing stakeholder feedback in Burnaby was not easy. Trans Mountain employed considerable effort and resources to ensure that its alignment would minimize disruption to Burnaby streets. To meet the Filing Manual requirements, Trans Mountain identified studies involving geotechnical investigations, surveys and fieldwork on the Burnaby Mountain corridor on lands belonging to Burnaby. Delay occurred when Trans Mountain was unable to acquire municipal permits from Burnaby enabling Trans Mountain to access Burnaby lands and conduct its studies, requiring Trans Mountain to seek NEB and Court orders to access the site.[76] These steps were taken in response to landowner and stakeholder feedback that indicated they preferred to avoid routing the pipeline through Burnaby streets.

---

[74] Exhibit B099 - Trans Mountain Pipeline ULC - Response to NEB Information Request Regarding Project Corridor - Appendix A Routing Consultation Summary (June 10, 2014) (A3X9S4).

[75] Exhibit B290-2-Part 1, Westridge Delivery Line Routing Update (December 1, 2014) (A4F5D5), 19.

[76] Exhibit B290-2 – Part 1 Westridge Delivery Line Routing Update (December 1, 2014) (A4F5D5), 6.

427 Trans Mountain provided evidence to the NEB demonstrating the Burnaby Mountain route has the
428 fewest impacts to directly affected residents.[77] In response to this stakeholder feedback, Trans
429 Mountain analyzed alternative routing options through Burnaby. It informed the NEB of a
430 potential trenchless routing through Burnaby Mountain that would significantly reduce disruption
431 to Burnaby streets. On May 12, 2014, Trans Mountain confirmed on the record that its preferred
432 route for the Westridge Delivery Pipelines had changed from the original proposed pipeline
433 corridor via Burnaby streets to the proposed revised pipeline corridor using a trenchless
434 construction method via Burnaby Mountain.[78]

435 Trans Mountain acknowledges that it encountered other stakeholders who expressed concerns
436 regarding the proposed Burnaby Mountain routing. All reasonable efforts were employed to
437 address such concerns. For example, on August 5, 2014, Burnaby requested supplemental
438 information concerning Trans Mountain's geotechnical, environmental and archaeological field
439 investigations on Burnaby Mountain.[79] Trans Mountain provided comprehensive responses to each
440 of Burnaby's requests on August 12, 2014 and asked Burnaby to confirm whether it was satisfied
441 with these responses.[80] Trans Mountain's response included specific technical responses to each
442 of Burnaby's concerns and seven reports including tree assessments, land and geotechnical
443 information. Trans Mountain noted that meaningful engagement with Burnaby was important and
444 provided the contact information for Trans Mountain's President, Ian Anderson, if Burnaby wished

[77] Exhibit B290-2 – Part 1 Westridge Delivery Line Routing Update (December 1, 2014) (A4F5D5), 9.

[78] Exhibit B032-2- Trans Mountain Pipeline ULC - Trans Mountain Responses to NEB IR 1, 1 of 2 (May 14, 2014) (A3W9H8), 246.

[79] Exhibit B258-12 - Attachment 11 - Burnaby letter to Trans Mountain re response to July 25 letter and NCQ (September 3, 2014) (A4A7F4).

[80] Exhibit B258-14 - Attachment 13 - Trans Mountain letter to Burnaby re response to August 5 letter (September 3, 2014) (A4A7F6).

to engage further. To date, Burnaby has preferred that communications with Trans Mountain occur through the NEB process, rather than through direct engagement. Trans Mountain confirmed with the NEB on December 1, 2014 that its preferred installation method for the Westridge Delivery Pipelines is a tunnel through Burnaby Mountain, based on the studies and engagement that were completed and in response to directly affected stakeholders' concerns.

Reasonable people can—and do—have differences of opinion. The purpose of the regulatory process is to allow parties to articulate their views and provide evidence to support the reasoning behind their views. Ultimately, it is up to the Board to determine whether the Project is in the public interest, considering and balancing the social, environmental and economic impacts of the Project on all Canadians. Trans Mountain is confident that it has put the best available evidence on the record to address concerns received from Aboriginal groups and stakeholders and to support the Board in making a favourable public interest recommendation.

1.9 Draft Conditions

Trans Mountain recognizes that any Board approval imposes an obligation to construct and operate the TMEP within the constraints and parameters imposed by the conditions of the Board and the Governor in Council. On April 16, 2014, the Board released draft section 52 CPCN conditions following its preliminary review of Trans Mountain's Application ("2014 Draft Conditions").[81] On August 12, 2015, the Board released Procedural Direction No. 17 which contained the Board's updated draft section 52 CPCN conditions for comment by all participants ("2015 Draft

[81] Exhibit A019 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A59688)

Conditions").[82] The Board stated that Trans Mountain and intervenors should provide their comments on the draft conditions in their respective written argument-in-chief submissions.

Other than the general comments below on the 2015 Draft Conditions, the body of this final argument refers to the 2014 Draft Conditions. Trans Mountain reviewed the Board's 2015 Draft Conditions and has provided its comments on these conditions in reply evidence, including any proposed changes to the 2015 Draft Conditions.[83]

Pre-Construction Compliance Timelines

In the 2015 Draft Conditions, the Board released 85 updated conditions within initial filings due prior to commencing construction. Several filing deadlines are not compatible with Trans Mountain's construction schedule, specifically when read with the definition of "construction" that was recently advanced by the Board in the Northern Gateway proceeding:

> Any in-field activity that may have an impact on the environment and which is necessary for installing, or preparing to install, the required infrastructure, the oil pipeline, the condensate pipeline, or Kitimat Terminal. Construction activities include, but are not limited to, clearing, mowing, grading, trenching, drilling, boring, blasting, dredging, and conducting geotechnical investigations. Construction activities do not include activities associated with normal surveying operations or data collection activities.[84]

Pending regulatory approval, including condition and routing filings to the Board's satisfaction, construction of the Project is scheduled to commence in June 2016. Trans Mountain estimates a

---

[82] Exhibit A199 - National Energy Board - Procedural Direction No. 17 – Draft conditions for comment (August 12, 2015) (A71776)

[83] Trans Mountain Reply Evidence, Appendix 1A – Comments on Updated Conditions (August 20, 2015).

[84] Exhibit A346-5 – Panel-Commission – Attachment B to Potential Conditions for Northern Gateway Project (April 12, 2013) (A3G7X1), 1.

two-year construction period and an in-service date in 2018.[85] Pipeline construction activities are progressive, commencing with survey and proposed right-of-way preparation and continuing through pipe stringing, welding, pipe inspection, trenching, lowering-in, backfilling and reclamation.[86] These activities are performed sequentially and move along the construction right-of-way to ensure that benefits arising from a phased construction approach are maximized.[87]

In order to meet the timing of certain pre-construction conditions in the 2015 Draft Conditions, Trans Mountain must file compliance materials in 2015 and early 2016, well before the Board issues its recommendation to the Governor in Council and while the Governor in Council is considering the report. Trans Mountain accepts the risk, in making these compliance filings, that the Governor in Council may not recommend approval of the Project or that conditions may change as a result of the Governor in Council's decision. In respect of 2015 Draft Conditions 13 and 14, Trans Mountain submits that the filing deadlines have already passed and are impossible to comply with based on a June 2016 start date. Inherently, the referenced 2015 Draft Conditions preclude Trans Mountain from commencing activities to prepare the right-of-way in accordance with a construction schedule that has already been the subject of substantial planning and consultation.

The construction commencement date plays a significant role in complying with environmental protection windows and maximizing employment, training and education benefits. Given the conjunctive nature of the schedule, Trans Mountain's ability to commence construction in June 2016 means, for example, that LRBW are utilized to avoid sensitive times and further reduce

---

[85] B371-2 – Trans Mountain Response to NEB IR No. 4 (June 12, 2015) (A4K4W3), 6.

[86] B306-14 – Trans Mountain Response to NEB IR No. 3.005a-Attachment 1-Part 3 (June 12, 2015) (A4H1W4), 3-15.

[87] B306-14 – Trans Mountain Response to NEB IR No. 3.005a-Attachment 1-Part 3 (June 12, 2015) (A4H1W4), 3-15.

impacts on fish and fish habitat. Refer to Section 7.2.1.8 - Fish and Fish Habitat of this final argument for further details.

The majority of Project-related employment opportunities for Aboriginal groups will be through contracting opportunities related to Project construction. To date, Trans Mountain has worked with more than 30 Aboriginal groups to conduct a workforce analysis and collect information about individuals interested in employment opportunities via Trans Mountain's online employment and skills portal. Details of Trans Mountain's engagement with Aboriginal groups on employment, training and procurement was discussed in Section 6 - Aboriginal of this final argument. Delay in construction directly corresponds to a delay in employment opportunities and delay in sharing other long-term successes of the Project with Aboriginal groups.

Trans Mountain's schedule for training and education initiatives with Aboriginal groups is currently underway.[88] Draft reports of Trans Mountain's Training and Education Monitoring Plan and Aboriginal, local, and regional skills and business capacity inventories were shared with Aboriginal groups on May 4, 2015.[89] The reports provided an in-depth overview of the plans in place to maximize business and employments opportunities, and were followed up with individual meetings between Trans Mountain and Aboriginal groups to discuss specific employment interests, business capabilities and procurement planning.[90] In light of the efforts already made to facilitate input and complete these comprehensive plans, Trans Mountain submits that it will file preliminary reports as soon as possible to comply with the conditions. Although, Trans Mountain

[88] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 146.

[89] Trans Mountain Reply Evidence, Appendix 7A (August 20, 2015).

[90] Trans Mountain Reply Evidence, Appendix 7A (August 20, 2015).

will not know whether the Board will recommend approval of the Project, it intends to file the requested reports no later than November 1, 2015, which is still seven months in advance of the early works, to provide adequate time for review of the training and education reports.

In order to reconcile the construction schedule with compliance filing requirements, Trans Mountain respectfully requests that: (i) the early works as described in reply evidence[91] be approved by way of a section 58 Order and that all condition compliance filings related to early works are required to be filed at least 30 days prior to commencing construction of those early works, consistent with similar conditions in the section 58 Order issued by the Board in GH-001-2014;[92] and (ii) the other construction activities (not included in the section 58 Order) authorized pursuant to a section 52 CPCN have the condition compliance filing deadlines specified in Trans Mountain's comments on the 2015 Draft Conditions in reply evidence.[93] As indicated above, Trans Mountain will begin compliance filings in late 2015 and early 2016 to meet the timelines in the 2015 Draft Conditions comments.

Route Re-alignments

Trans Mountain has undertaken a number of re-routes in response to additional information gained through Aboriginal engagement and public consultation. It has also committed to conducting and filing an ESA for several proposed detailed route re-alignments that extend beyond the preferred corridor for the pipeline. Condition 9 reflects the out of corridor options for Ohamil Indian Reserve 1, Tzeachten Indian Reserve 13 and Surrey Bend Regional Park. However, this Condition does not

[91] Trans Mountain Reply Evidence, Section 64 – Early Works (August 20, 2015).

[92] NEB – Report – NOVA Gas Transmission Ltd. – GH-001-2014 (April 2015), 180 – 185.

[93] Trans Mountain Reply Evidence, Appendix 1A – Comments on Updated Draft Conditions (August 20, 2015).

include Trans Mountain's commitment in section 17 of its reply evidence to further investigate and study re-routes for United Boulevard and Hartley Avenue, Coquitlam[94] and Whitemud Drive Corridor, City of Edmonton.[95] Trans Mountain requests that these locations must be added to 2015 Draft Condition No. 9. Trans Mountain's complete comments on the 2015 Draft Conditions are filed with reply evidence.[96]

1.10 Organization of Final Argument

The subsequent sections of this final argument are organized as follows:

Part I

2. Legal Framework and summary of evidence supporting the Board's Recommendations and orders - details the comprehensive regulatory framework to assess whether the Project is in the Canadian public interest, including the NEB Act and the CEAA 2012 legislative regimes and provides an overview of the benefits and burdens of the Project in that context;

Part II – Provides detailed review of the issues required to be considered by the Board or raised by intervenors.

3. Project Design – describes the physical Project facilities and mitigation measures;

4. Emergency Response – describes the comprehensive system that Trans Mountain has implemented to prevent and respond to emergencies;

---

[94] Trans Mountain Reply Evidence, Section 17: Pipeline Corridor and Routing (August 20, 2015), 17-3.

[95] Trans Mountain Reply Evidence, Section 17: Pipeline Corridor and Routing (August 20, 2015), 17-8 to 17-9.

[96] Trans Mountain Reply Evidence, Appendix 1A – Comments on Updated Conditions (August 20, 2015).

5. Public Participation – describes Trans Mountain's public engagement program;

6. Aboriginal – details Trans Mountain's engagement program with Aboriginal communities and groups;

7. Environment – discusses the potential effects the Project may have on the environment, as well as the effect of the environment on the Project and how these effects have influenced mitigation, engineering, design and safety of the Project;

8. Social – discusses social elements of the Project including public participation, the NEB process and the potential Project-related effects on individuals, groups, communities and society;

9. Economic – discusses the potential economic effects the Project may have on individuals, communities, regions and nationally;

Part III

10. Conclusion; and

Appendix "A" – Trans Mountain's responses to letters of comment, which is filed separately. Certain letters are also referenced in the body of this final argument.

Trans Mountain relies on the evidentiary record established to date, including its reply evidence filed with this argument. Trans Mountain does not accept or agree with all statements made by intervenors in their written evidence or commenters in their letters of comment. However, Trans Mountain does not respond to every point or position asserted by intervenors or commenters with

577 which it disagrees. Trans Mountain's silence on any matter does not indicate acceptance or
578 endorsement of any particular position.[97]
579

[97] Trans Mountain Reply Evidence, Section 1 – Introduction (August 20, 2015).

2. LEGAL FRAMEWORK

2.1 Overview

The Project is being considered within a comprehensive regulatory framework to assess whether it is in Canadian public interest. The NEB is the master of that process with a mandate to promote safety and security, environmental protection and efficient energy infrastructure and markets in the Canadian public interest. With respect to the Project, the NEB's determination falls within the legislative regimes established under the NEB Act and the CEAA 2012.

In this section, Trans Mountain addresses the legal framework that governs the Board's public interest recommendation under the NEB Act and its determination under the CEAA 2012 as to whether the Project as a whole is likely to cause significant adverse environmental effects after taking into account mitigation measures. Other federal regulatory processes and provincial considerations are detailed at the end of this section.

2.2 Determining the Canadian Public Interest

Under the NEB Act, the Board's directive with regard to assessing whether a pipeline is needed and in the public interest is laid out in section 52(2):

> 52. (1) If the board is of the opinion that an application for a certificate in respect of a pipeline is complete, it shall prepare and submit to the minister, and make public, a report setting out
>
> (*a*) Its recommendation as to whether or not the certificate should be issued for all or any portion of the pipeline, taking into account whether the pipeline is and will be required by the present and future public convenience and necessity, and the reasons for that recommendation; and
>
> (*b*) Regardless of the recommendation that the board makes, all the terms and conditions that it considers necessary or desirable in the public interest to which the certificate will be subject if the governor in council were to direct the board to issue the certificate, including

> terms or conditions relating to when the certificate or portions or provisions of it are to come into force.
>
> Factors to consider
>
> (2) In making its recommendation, the Board shall have regard to all considerations that appear to it to be directly related to the pipeline and to be relevant, and may have regard to the following:
>
> (*a*) the availability of oil, gas or any other commodity to the pipeline;
>
> (*b*) the existence of markets, actual or potential;
>
> (*c*) the economic feasibility of the pipeline;
>
> (*d*) the financial responsibility and financial structure of the applicant, the methods of financing the pipeline and the extent to which Canadians will have an opportunity to participate in the financing, engineering and construction of the pipeline; and
>
> (e) any public interest that in the Board's opinion may be affected by the issuance of the certificate or the dismissal of the application.[98]

The Board must prepare and submit a report to the Minister setting out its recommendation and reasons regarding whether the pipeline is required in the public convenience and necessity and if a certificate should be issued. Regardless of its recommendation, the NEB's report must include "all the terms and conditions that it considers necessary or desirable in the public interest" to which the CPCN will be subject if the Governor in Council were to direct the Board to issue the certificate.[99] The NEB has been regulating federal pipelines in Canada for 56 years and the Board's expertise is well established in Canadian jurisprudence. The Federal Court of Appeal confirmed that section 52 of the NEB Act instructs the Board to identify the relevant issues that it must consider in the case before it, and apply its interpretation of the issues to the facts of the proposed Project.[100]

---

[98] NEB Act, s 52.

[99] NEB Act, s 52(1)(b).

[100] *Forest Ethics Advocacy Association v Canada (National Energy Board)*, 2014 FCA 245, para 64.

632 Trans Mountain requests that the Board:

633 (a) recommend the issuance of a CPCN, pursuant to section 52 of the NEB Act,
634 authorizing the construction and operation of the Project;

635 (b) issue an order, pursuant to section 52 of the NEB Act, exempting Trans Mountain
636 from the requirements of sections 31(c), 31(d) and 33 of the NEB Act (Plan, Profile,
637 Book of Reference ("PPBoR") filings) in relation to temporary lands or
638 infrastructure required for construction of the Project. These early works activities
639 include: the development of camp locations, stockpile sites, contractor staging areas
640 (i.e., co-located with camps or stockpile sites), access roads for the first 10 km of
641 each pipeline spread (i.e., including temporary, clear-span bridges associated with
642 these access roads), and clearing activities associated with the first 10 km of each
643 pipeline spread, to be undertaking outside of the migratory bird restricted activity
644 period;[101]

645 (c) grant leave, pursuant to section 45(1) of the OPR,[102] to reactivate the NPS 24
646 pipeline segment from Hinton, Alberta to Hargreaves, B.C. (together, the
647 "Reactivated Segments"); and

648 (d) grant such further and other relief as the Board may consider appropriate.[103]

[101] Trans Mountain Reply Evidence, Section 64 - Early Works (August 20, 2015).

[102] SOR/99-294.

[103] Exhibit B1-1-V1 SUMM (December 13, 2013 (A3S0Q7), 1-10.

The Board has been characterized by the Federal Court of Appeal as "the main guardian of the public interest in this regulatory area."[104] The Board defines the concept of public interest as follows:

> The public interest is inclusive of all Canadians and refers to a balance of economic, environmental and social considerations that changes as society's values and preferences evolve over time.[105]

The Board has also been clear in its belief that a uniform set of criteria with which any and all projects can be evaluated to determine if they are in the public interest does not exist. In Brunswick, the Board stated:

> [T]here are no firm criteria for determining the public interest that will be appropriate to every situation. Like "just and reasonable" and "public convenience and necessity", the criteria of public interest in any given situation are understood rather than defined and it may well not serve any purpose to attempt to define these terms too precisely. Instead, it must be left to the Board to weigh the benefits and burdens of the case in front of it...
>
> ...Since the public interest is dynamic, varying from one situation to another (if only because the values ascribed to the conflicting interests alter), it follows that the criteria by which the public interest is served may also change according to the circumstances. In addition, it is worthwhile to note that while the Board may be guided by past decisions, it need not be bound by them; indeed, it may be imprudent to be so bound given the dynamic nature of the public interest, and the inherent exercise of administrative discretion in the Board's decision-making process.[106]

In the context of the public interest, the Enbridge Northern Gateway JRP confirmed that "all Canadians" mean people locally, regionally and nationally; not just those in physical proximity to

---

[104] *Forest Ethics Advocacy Association v Canada (National Energy Board)*, 2014 FCA 245, para 23.

[105] National Energy Board, "Strategic Plan", (April 16, 2015) online: < http://www.neb-one.gc.ca/bts/whwr/gvrnnc/strtgcpln-eng.html?pedisable=true>.

[106] NEB Reasons for Decision - Emera Brunswick Pipeline Company Ltd. - GH-1-2006 (May 2007), 10-11.

a project.[107] Further, the Board recently acknowledged that "various decisions of the courts have established that a specific individual's or locale's interest is to be weighed against the greater public interest, and if something is in the greater public interest, the specific interests must give way."[108]

The Board has developed a structured, yet flexible, framework for assessing whether a pipeline project is in the public interest. According to the Board, "[r]egulating in the Canadian public interest means factoring economic, environmental and social considerations into our decision-making process." [109] By considering all the evidence that is presented on the record through the lens of these factors, the Board is able to make decisions that represent the ever-evolving interests and concerns of Canadians. In other words, the Board must carefully weigh all of the evidence in this proceeding when making a recommendation to the Governor in Council with respect to the Project. This means that the Board is recognized as an expert tribunal with extensive pipeline regulation experience. The Board can employ this experience in order to determine the issues before it and make a recommendation based on findings of fact and its review of scientific and technical information. The Governor in Council will ultimately decide whether the Board should issue a CPCN for the Project.

---

[107] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, Chapter 2.3.

[108] NEB Reasons for Decision - Emera Brunswick Pipeline Company Ltd. (May, 2007), 10; NEB Reasons for Decision - Sumas Energy 2, Inc. (March 2004), 9; NEB Report - North Montney Mainline (April 2015) (A4K5R6), 106.

[109] National Energy Board. 2014. "Responsibilities", online: <https://www.neb-one.gc.ca/bts/whwr/rspnsblt/index-eng.html> Acquired April 16, 2015.

692 The Board's ability to make a public interest recommendation is not an unfettered power. It must
693 rely only on the facts that are established to its satisfaction through the regulatory process, and
694 must also proceed in compliance with the principles of natural justice.[110]

695 ***Issues to Consider in Determining the Public Interest***

696 In July 2013, the Board released the List of Issues for the Project and set out those topics it would
697 consider during the public hearing. Each broadly defined issue required the Board to balance the
698 benefits and burdens of the Project in order to determine whether the public interest test is met.
699 The List of Issues was subsequently attached to the Hearing Order issued on April 2, 2014. The
700 Federal Court of Appeal dismissed two separate applications for leave to appeal that alleged the
701 NEB erred in law or jurisdiction by refusing to include the environmental and socio-economic
702 effects of upstream and downstream activities within the Project's List of Issues.[111]

703 Shortly after, the Federal Court of Appeal in *Forest Ethics Advocacy Association v Canada*
704 *(National Energy Board)* concluded that the legislation and policy allow the Board to consider that
705 the "public interest" mainly relates to the pipeline project itself, not to upstream or downstream
706 facilities and activities.[112] The operation of upstream facilities are not contingent on pipelines; they
707 will continue to operate whether the Project is constructed or not. Downstream use of products
708 shipped on pipelines are far too remote for the Board to reasonably assess and consider technically
709 in the context of the Canadian public interest.[113] Similar to other NEB decisions, there is no direct

---

[110] NEB Report - North Montney Mainline (April 2015) (A4K5R6), 8.

[111] *City of Vancouver v National Energy Board and Trans Mountain Pipeline ULC* (16 October 2014), Ottawa, 14-A-55 (FCA); *LD Danny Harvey v National Energy Board and Trans Mountain Pipeline ULC* (October 24, 2014), Ottawa, 14-A-59 (FCA).

[112] *Forest Ethics Advocacy Association v Canada (National Energy Board)*, 2014 FCA 245, para 69.

[113] NEB Reasons for Decision – OH-1-2009- Keystone XL Pipeline Project (March 2010) (A1S1E7), 75.

710 connection in this case that is strong enough to warrant a consideration of the environmental and
711 socio-economic effects associated with upstream and downstream facilities and activities. The
712 validation by the Court demonstrates that the List of Issues has undergone a thorough vetting and
713 one appropriate for the Board's ultimate recommendation to the Governor in Council regarding
714 the issuance of a certificate under section 52 of the NEB Act.

715 ***Balancing Benefits and Burdens***

716 When determining whether to recommend the issuance of a CPCN, the Board must consider any
717 public interest that may be affected by granting or refusing the application, the burdens the project
718 could place on Canadians and the benefits the project could bring to Canadians.[114] A company's
719 policies and practices are also public interest considerations that can inform the Board's
720 assessment of the Project.[115]

721 Tsawout First Nation, Upper Nicola Band and Living Oceans Society filed a report entitled "Public
722 Interest Evaluation of the Trans Mountain Project", which was prepared by Dr. Thomas Gunton,
723 Dr. Sean Broadbent, Dr. Marvin Shaffer, Dr. Chris Joseph and Mr. James Hoffele (the "Gunton
724 Report").[116] Trans Mountain filed an expert report in reply to the Gunton Report in its reply
725 evidence.[117] The Gunton Report states how the Board should consider the public interest. It
726 contains the following assertions: the information provided by Trans Mountain is insufficient; a

[114] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 8.

[115] NEB Report – Northwest Mainline Komie North Extension (January 2013) (A3F0Y9), 41.

[116] Exhibit C355-15-28 -Tsawout First Nation Expert Report. Public Interest Evaluation of the TMEP (May 27, 2015) (A4Q1G6); Exhibit C214-18-7 - Attachment F to written evidence of Living Oceans - Public Interest Assessment - Dr Gunton et al. (May 27, 2015) (A4L9S2); C363-21 - Upper Nicola Band Written Evidence (May 27, 2015) (A70333).

[117] Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015).

benefit-cost analysis is required; and that the Board should review projects on a comparative basis, effectively picking winners and losers. For the reasons detailed in Section 9 - Economic, Trans Mountain submits that the conclusions of the Gunton Report are incorrect, as it is not based on objective assumptions or credible analysis. Trans Mountain has filed extensive information on the public record about the benefits and burdens of the Project. Contrary to the recommendations of the Gunton Report, Trans Mountain submits that the Board should allow the market to select the optimal mix of timing and services to meet its needs. A benefit-cost analysis is not required to evaluate whether the Project is in the public interest.[118]

In the following sections, Trans Mountain discusses the social, economic and environmental benefits and burdens of the Project as well as engagement with Aboriginal groups in order to support the Board in making its public interest recommendation to the Governor in Council. The Brundtland Commission coined the term "sustainable development" in 1987 and provided the following definition which has since been widely referenced: "development…..that meets the needs of the present without compromising the ability of future generations to meet their own needs."[119] The Brundtland Commission also described the three pillars of sustainable development—environmental protection, economic well-being and social justice. The Brundtland Commission report is instructive in its application to regulated industries: in order to have sustainable development the decision maker should be informed by fact to ensure that social, environmental and economic benefits and burdens are balanced in the development of the project for the public good. Lawmakers and regulators have also recognized the concept of sustainable

[118] Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 5 – 7.

[119] Brundtland et al., Our Common Future, the Report of The World Commission on Environment and Development, (Oxford University Press: Oxford, 1987), 8.

development. One of the purposes of CEAA 2012 is to "promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy."[120] Trans Mountain submits that when the benefits and burdens of this Project are fairly balanced, it clearly meets that test, and is in the public interest.

2.2.1 Environmental Benefits and Burdens

In light of the task before the Board, it is necessary to consider the associated benefits and burdens of the Project, including those related to the environment. Section 7 - Environment provides a detailed discussion of the evidence before the Board in relation to the potential environmental effects of the Project and associated mitigation measures. The purpose of the discussion that follows is to highlight some of the key environmental benefits and burdens that are of particular importance in this proceeding. Trans Mountain submits that, in view of the environmental benefits associated with the Project, the proposed mitigation measures and the Board's jurisdiction, the environmental evidence supports a recommendation that the Project is in the public interest. Trans Mountain further submits that, in light of the test under the CEAA 2012 that is discussed below, the evidence demonstrates that the Project will not cause significant adverse environmental effects.

This section addresses three topics:

(1) the legal test under CEAA 2012;

(2) the environmental effects related to the pipeline and facilities; and

(3) the environmental effects related to marine shipping, including:

[120] CEAA 2012, section 4(1)(h).

(a) the regulation of marine shipping;

(b) the environmental effects on marine mammals from routine operations; and

(c) potential oil spills resulting from marine incidents.

2.2.1.1 Legal Test Under CEAA 2012

The Project is a "designated project" under the CEAA 2012. The NEB is the authority responsible for conducting a CEAA 2012 EA and determining whether the Project as a whole is likely to cause significant adverse environmental effects after taking into account mitigation measures.[121] The Board has integrated its CEAA 2012 determination into its public interest recommendation. Its EA under CEAA 2012 and the environmental matters considered by the Board under the NEB Act will both form part of the Board's report.[122]

The Project must be properly scoped to ensure that the EA focuses on relevant issues and concerns and does not include unimportant or irrelevant information that will not assist the NEB in determining whether the Project is likely to cause significant adverse environmental effects. The NEB's recommendation on the scope of factors that are relevant to the CEAA 2012 EA were set out in the Factors and Scope of the Factors for the Environmental Assessment issued on April 2, 2014.[123] The ESA considered the potential effects of the physical facilities and activities of the Project within spatial and temporal boundaries that the Project may potentially interact with and

[121] CEAA 2012, s 15(b).

[122] Exhibit A15-3 - Hearing Order OH-001-2014 (April 3, 2014), 4.

[123] Exhibit A013 - National Energy Board - Letter - Application for Trans Mountain Expansion Project - Factors and Scope of the Factors for the Environmental Assessment pursuant to the *Canadian Environmental Assessment Act*, 2012 (April 3, 2014) (A59505).

783 have an effect on components of the environment.[124] Specifically, this includes the pipeline, the
784 Westridge Marine Terminal, storage tanks, other facilities and construction, operation,
785 maintenance and abandonment activities, as well as increased marine shipping.

786 The goal of an EA is to ensure the integration of environmental factors into planning and decision-
787 making processes in order to promote sustainable development in a coordinated manner. This has
788 been entrenched in Canadian environmental assessment legislation and Canadian jurisprudence.[125]
789 Under CEAA 2012, the NEB's job is to ensure that the environmental effects of the Project are
790 identified and assessed so that mitigation can be implemented to avoid or minimize any significant
791 adverse environmental effects. If significant adverse environmental effects cannot be avoided, then
792 the federal Cabinet must determine whether the effects are justified before the Project can proceed.
793 This is the central test of CEAA 2012.

794 Following the findings of the environmental effects assessment, Trans Mountain conducted an
795 assessment of the likely cumulative effects of the Project based on the CEAA 2012 and guidance
796 documents. All EA's conducted under CEAA 2012 consider the likely effects of the proposed
797 project that overlap with the effects of past, existing and reasonably foreseeable future
798 developments in the area that have been or will be constructed. Trans Mountain has conducted a
799 rigorous assessment of the cumulative effects of the Project that satisfies all legal requirements.

---

[124] Exhibit A013 - National Energy Board - Letter - Application for Trans Mountain Expansion Project - Factors and Scope of the Factors for the Environmental Assessment pursuant to the *Canadian Environmental Assessment Act*, 2012 (April 3, 2014) (A59505).

[125] CEAA 2012, s 4(1)(h); *Bow Valley Naturalists Society v Canada (Minister of Canadian Heritage)*, [2001] 2 FC 461, para 17.

From a legal standpoint, the test for determining significance is objective and conjunctive.[126] All decisions about whether or not the Project will likely cause significant adverse environmental effects must be supported by findings based on the requirements set out in CEAA 2012.[127] After considering proposed mitigation measures, there still must be a project caused environmental effect that is: (i) adverse, (ii) significant and (iii) likely. The test for systematically determining the likelihood of significant adverse environmental effects is straightforward and can be broken down into the following steps:

(a) First, the NEB must ask whether there is an effect on the environment caused by the Project. Negligible residual environmental effects are those that are predicted to result in no measurable or detectable change in the environment. If there is no effect, the analysis stops here.

(b) Second, if there is an effect on the environment caused by the Project, the NEB must ask whether the effect would be adverse. If the effect is not adverse, the analysis stops here–if the effect is not adverse, it cannot be significant.

(c) Third, if there is an adverse effect on the environment caused by the Project, the NEB must determine whether that effect is significant after considering the mitigation measures that address the effect. Factors that should be considered in determining whether an adverse effect is significant include magnitude of the effect; geographic extent of the effect; duration and frequency of the effect; the

[126] CEA Agency, "Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects", (Ottawa: Federal Minister of Supply and Services, 2012), online: <https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=D213D286-1&offset=2&toc=hide> [*CEAA Reference Guide*]; *Bow Valley Naturalists Society v Canada (Minister of Canadian Heritage),* [2001] 2 FC 461, para 49.

[127] *CEAA Reference Guide*.

degree to which the effect is reversible or irreversible; and ecological context.[128] If the adverse effect is not significant, the significance determination ends.

(d) Fourth, if the NEB finds that there is a significant and adverse environmental effect after taking mitigation measures into account, the NEB must consider whether the significant adverse environmental effect is "likely" to occur. The likelihood of a significant adverse effect is based on the evidence before the NEB.

(e) Finally, in the event that the NEB determines the Project is likely to cause significant adverse environmental effects, it must refer to the Governor in Council the matter of whether those effects are justified in the circumstances in accordance with section 52(2) of CEAA 2012.

The Federal Court of Appeal in *Bow Valley Naturalists Society v Canada (Minister of Canadian Heritage)* endorsed the above conjunctive test, based upon its review of the Canadian Environmental Assessment Agency's ("CEA Agency") Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Effects.[129]

Significance determinations under the CEAA 2012 also involve questions of relativity. In the JRP Report for the Mackenzie Gas Project, the panel concluded that, "[t]here may well be impacts on individuals that, from an individual perspective, would be significant but which, again, the Panel might conclude would not be significant in the broader context."[130] Therefore, when reviewing any potential adverse effect on local individuals or communities, the Board should consider that

[128] *CEAA Reference Guide*.

[129] *Bow Valley Naturalists Society v Canada (Minister of Canadian Heritage)*, [2001] 2 FC 461, para 49.

[130] CEAA-MVEIRB Joint Review Panel, Foundation for a Sustainable Northern Future, Report of the Joint Review Panel for the Mackenzie Gas Project (December 2009), 103.

potential effect relative to the overall positive and negative impacts of the Project. This should involve a balanced analysis of whether the potential effect is significant and likely to occur in the context of the Project and the benefits and opportunities that the Project brings to all Canadians.

Finally, while an EA is intended to make reasonable predictions about what is likely to occur, it cannot be expected to predict all effects with certainty or finality. This was confirmed by the Federal Court of Appeal in *Alberta Wilderness Association v Express Pipelines Ltd*. when it held that, "[n]o information about the probable future effects of a project can ever be complete or exclude all possible future outcomes".[131] Thus, the objective of an EA is to make reasonable predictions of whether the Project is likely to result in significant adverse environmental effects while acknowledging that a degree of uncertainty is inherent in the assessment. In past cases, this has led the Board to complete its EA of a project in cases where mitigation and follow-up strategies were unproven or had not been finalized, and where there was potential for unanticipated impacts.[132] More recently, the Northern Gateway JRP noted whether a proponent's mitigation measures would provide protection to species in the project area, following a precautionary approach and identifying where additional research could result in benefits.[133]

2.2.1.2 Environmental Effects of the Project – Pipeline and Facilities

Trans Mountain has made significant efforts to reduce the environmental effects of the Project, and has approached its pipeline and facilities design with a view to maximizing benefits and minimizing burdens. The Application contains a detailed ESA for the Project to support the

[131] *Alberta Wilderness Assn. v Express Pipelines Ltd.* (1996), 137 DLR (4th) 177, para 10 (FCA).

[132] NEB-CEAA Joint Review Panel, Environmental Assessment of the Express Pipeline Project: Joint Review Panel Report OH-I-95, (May 1996), 42-45, 72-73, 116.

[133] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 267.

857 Board's environmental recommendations.[134] The company's mitigation measures are detailed in
858 the Environmental section of this argument and highlighted below to inform the CEAA 2012
859 analysis.

860 The Board has repeatedly recognized that the use of existing linear corridors and right-of-ways
861 reduces environmental impacts.[135] As detailed in the introduction of this final argument, Trans
862 Mountain maximized the use of the existing TMPL right-of-way and other existing linear
863 disturbances to the greatest extent practicable to reduce environmental and socio-economic effects
864 while facilitating efficient pipeline operations.[136] Where it was not possible to route the Project
865 along the existing TMPL right-of-way, Trans Mountain evaluated construction along other
866 pipelines, power lines, highways, roads, railways, fiber optic transmission systems and other
867 utilities where access management arrangements are already in place.[137] The proposed route for
868 the Project is on or adjacent to the existing TMPL easement for 73 per cent of the total length,
869 approximately 16 per cent follows other existing rights-of-way and approximately 11 per cent will
870 be in a new corridor.[138] By following existing linear disturbances for 89 per cent of the route, Trans

---

[134] Trans Mountain's ESA for the Project was bifurcated into two separate volumes in the Project Application, Volumes 5 and 8. Volume 5A of the Project Application contains Trans Mountain's assessment of the biophysical and socio-economic setting for the pipeline and associated facilities, including marine resources in the vicinity of the Westridge Marine Terminal. The environmental and socio-economic setting for marine transportation is described in Volume 8A of the Project Application.

[135] NEB - Reasons for Decision - Emera Brunswick Pipelines Company Ltd. - GH-1-2006 (May 2007), 72-73; NEB – Reasons for Decision – Enbridge Pipelines Inc. – OH-4-2007 (February 2008), 28-29;

[136] Exhibit B5-10 - Trans Mountain Pipeline ULC -Volume 5A: ESA - Biophysical (December 16, 2013) (A3S1L4), 4-1.

[137] Exhibit B5-10 - Trans Mountain Pipeline ULC -Volume 5A: ESA - Biophysical (December 16, 2013) (A3S1L4), 4-1.

[138] Exhibit B2-1 - Trans Mountain Pipeline ULC - Volume 4A: Project Design & Execution - Engineering (December 16, 2013) (A3S0Y8), 4A-6. - 4A-13; Exhibit B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 – (August 1, 2014) (A62087); Exhibit B255 - Trans Mountain Pipeline ULC - Technical Update No. 2 - (August 22, 2014) (A62400); Exhibit B290 - Trans Mountain Pipeline ULC - Project and Technical Update No. 4 (December 1, 2014) (A64687); Exhibit B415 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A71581).

Mountain has significantly reduced the environmental impacts and land required for the Project. Trans Mountain's plans for pipeline routing are addressed in detail in the Project Design section of this final argument.

In addition to optimizing routing, Trans Mountain invested in environmental benefits for protected areas in close proximity to the Project. Trans Mountain identified environmental net benefits and offset opportunities within certain protected areas through its stakeholder engagement process which included park-specific workshops environmental and socio-economic assessment workshops, environmental protection plan workshops and various stakeholder meetings.[139] In planning for investments in protected areas, Trans Mountain considered existing management plans. These benefits include:

(a) Finn Creek Provincial Park - $110,000
for restoration of a former rest area and signage improvements;

(b) North Thompson River Provincial Park - $750,000
for trail and park facility upgrades, park education and enhancements, invasive vegetation control and park access road upgrades; and

(c) Lac du Bois Grasslands Protected Area - $1,195,000
for reclamation of fibre optic right-of-way and trails, an invasive vegetation survey and cultural and grassland awareness signage.[140]

For potential environmental burdens, Trans Mountain has implemented several lines of defence to manage any residual effects from onshore facilities, starting with the design of the facilities

[139] ESA workshop in Section 1.5.3.1 of Volume 3A and EPP workshops in Section 1.18 of Update No. 4.

[140] Trans Mountain Reply Evidence, Section 49 – Environmental Net Benefits (August 20, 2015), 49-1 – 49-6.

themselves, through to implementing a schedule that will ensure construction activities occur at times that result in minimal impact to the environment. Residual impacts on the physical environment, such as soil, water and air, will be controlled through comprehensive monitoring, risk management and reclamation programs. For example, although a modest increase in greenhouse gas ("GHG") emissions will result from the construction and operation of the proposed pipeline and related facilities. Trans Mountain will achieve a reduction in GHG emissions at the Westridge Marine Terminal as a result of the Project by 3.8 kT CO2e annually through upgrading existing technology.[141] On balance, and accounting for the resulting increase in marine traffic, this mitigation limits the overall increase of GHG emissions attributable to Project-specific marine shipping to about 300 tonnes per year CO2e.

2.2.1.3 Regulation of Marine Shipping

Impacts to the marine environment must be viewed in the context of: (1) existing vessel traffic; and (2) Trans Mountain's abilities and the Board's jurisdiction with respect to marine traffic management.

With respect to point (1), the Project-related tankers calling at the Westridge Marine Terminal will use the already established, well defined, federally regulated major traffic route between the PMV area and the Pacific Ocean—the Project will not result in a new marine transportation route or new anchorages.[142] The importance of this cannot be understated. The use of existing shipping lanes and anchorages greatly decreases any incremental adverse environmental or socio-economic effects as compared to a scenario requiring new shipping lanes and anchorages.

---

[141] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2), 173-178.

[142] Exhibit B18-20 - V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-67.

911 It is also important to note that PMV is Canada's busiest port. In 2012, PMV activities at terminals
912 in Burrard Inlet, the Lower Fraser River and Delta included: the handling of approximately 123
913 million tons of cargo; the handling of over 3,000 calls by foreign vessels; and the transit of 191
914 cruise ships.[143] There are currently about 475,000 vessel movements per year of which tankers
915 accounted for about 1,500 movements (0.3 per cent) in 2009 to 2010.[144] Needless to say, there is
916 significant marine vessel traffic currently using this aqueous highway in the PMV. As a result of
917 the Project, tankers calling at the Westridge Marine Terminal will increase from approximately
918 five tankers per month up to 34 per month, resulting in a potential increase of approximately 29
919 tankers per month. Within the Juan de Fuca Strait, Trans Mountain predicts the Project-related
920 increase in marine traffic will represent 6.6 per cent of total marine traffic volume, compared to
921 1.1 per cent currently.[145] Given the existing and anticipated future third-party vessel traffic in the
922 marine regional study area, marine traffic management and associated environmental effects is a
923 collective issue that is best addressed at a regional scale. Trans Mountain is committed to
924 participating in such initiatives.

925 With respect to point (2) above, Trans Mountain requires all vessels that arrive at the Westridge
926 Marine Terminal to comply with all applicable local, national and international regulations.[146]
927 However, because Trans Mountain does not own or operate the vessels, Trans Mountain has no
928 direct control over the actions of vessel owners and operators. Trans Mountain has committed to
929 continuing to enforce its tanker acceptance criteria, which requires tankers and barges to be

[143] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 447.

[144] Exhibit B18-20 - V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-61.

[145] Exhibit B18-20 - V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-68-69.

[146] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 413.

equipped, maintained and operated in accordance with international and federal regulations and best practices. The requirements for marine safety are largely governed by the *Canada Shipping Act, 2001* and the *Canada Marine Act* for which Transport Canada is the primary agency for enforcing. Although Trans Mountain does not own or operate vessels it is an active member of the maritime community and has demonstrated its commitment to improvements to the safety and efficiency of marine traffic calling at Westridge. In addition, the technical details of the marine shipping related to the Project have been examined by the TERMPOL Review Committee. Trans Mountain voluntarily agreed to support and adopt each of the 17 recommendations and 31 findings proposed by the TERMPOL Review Committee.[147]

Moreover, the Board's review of marine shipping is limited to potential environmental and socio-economic effects that would result from marine transportation associated with the proposed Project, including potential effects of accidents or malfunctions.[148] There are no proposed or widely accepted risk acceptance criteria for marine oil spills primarily because tanker traffic is regulated. Trans Mountain does not condone oil spills of any nature and no spill is acceptable to Trans Mountain. In addition to relying on the already robust existing regulations and shipping standards to address navigation and safety issues associated with marine vessel traffic, Trans Mountain has proposed additional precautionary measures for Project tankers as well as enhancements to the existing response regime that will ensure the likelihood of oil spills in the study area remains similar to the current level of risk prevalent in the Project area. Furthermore, should an oil spill accident occur, the proposed enhanced response regime will ensure that the region is better equipped to respond to it than today's regime is. A quantitative marine risk

[147] Exhibit B300-2 – Trans Mountain Response to NEB IR TERMPOL Rpt and Outstanding Filings (January 2, 2015) (A4G3U5), 1.

[148] Exhibit A15-3 – National Energy Board – Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2), 18.

assessment shows a substantial reduction of risks, on a risk per cargo transported basis as a result of measures proposed by Trans Mountain.[149]

Marine shipping on Canada's West Coast is regulated in accordance with Canadian Law, primarily through the *Canada Shipping Act, 2001* and *Canada Marine Act*, by a variety of federal authorities (e.g., PMV, the Pacific Pilotage Authority, the Canadian Coast Guard, Transport Canada) aligned with the auspices of the various International Maritime Organizations Conventions. These regulations include binding requirements and punitive measures for any non-compliance. The JRP considering the Northern Gateway Project recognized that there is an existing regulatory regime to provide for costs associated with spills in marine waters and that this regime is not regulated by either the NEB or the CEA Agency.[150] This legal framework provides certainty that all vessels calling on the Westridge Marine Terminal will meet the requirements of the applicable regulations.

The existing shipping lanes that will be used by Project-related vessels are well defined, internationally recognised, highly regulated and used by multiple parties and vessel types. This is akin to a public highway that is used every day. The addition of more users on the road will have only a small effect on the overall risk. Nonetheless, Trans Mountain fully understands the importance of the issue and the potential environmental impacts if something were to go wrong. The potential impacts and mitigation strategy have been comprehensively assessed and addressed in the marine ESA, during both normal operations as well as in case of accidents and malfunctions.[151]

---

[149] Trans Mountain Reply Evidence, Section 60 – Marine Risk Assessment (August 20, 2015), 60-6.

[150] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, Chapter 7.1.4.

[151] Exhibit B18-22 - V8A 4.2.1 F4.2.2 TO 4.2.3.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X6), 8A-101.

2.2.1.4 Environmental Effects of the Project – Marine Mammals

In assessing the potential environmental effects of Project-related shipping activities, Trans Mountain conducted an assessment of the potential impacts on marine mammals. In particular, it assessed the impacts on the southern resident killer whale as one of the indicator species. Due to the current Endangered status of the southern resident killer whale population, coupled with the fact that the entire population spends much of its time in the marine regional study area, the EA concluded that any residual effect, however small, beyond current levels was undesirable, and, for that reason, determined that underwater noise effects on southern resident killer whales may be significant.[152] This conclusion is therefore of particular interest in evaluating the benefits and burdens of the Project.

As detailed in Section 7 - Environment of this final argument, the stressors affecting the southern resident killer whale population will continue to affect these species with or without the Project. Furthermore, if the Project proceeds, vessels calling at the Westridge Marine Terminal will continue to represent a comparatively small proportion of total marine transportation activity in the Salish Sea. It is forecasted that Project tankers in the future will comprise only about 6.6 per cent of all large commercial vessels trading in the Project area. As such, rather than Project-specific efforts, industry wide efforts are necessary to mitigate the effects of maritime commerce and other activities on marine mammals in the region.

Under CEAA 2012, Project approval for these residual effects will require justification of any significant adverse effect. Trans Mountain submits that this justification must take into consideration the context in which the impact is predicted. As discussed above, neither Trans

[152] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-325.

Mountain nor the NEB have direct control over marine vessel activity within the southern resident killer whale critical habitat. The fact that the shipping lanes are already well established and used by numerous vessels including those engaged in national and international trade and commerce—all of which contribute to the existing impact—is part of the context. PMV is Canada's largest port and will continue to host marine vessel traffic. As a result, the impacts on the southern resident killer whale population assessed as part of the Application are occurring regardless of whether the Project is approved and is an issue that must be addressed by all users.[153]

With respect to mitigation, PMV has established the "Enhancing Cetacean Habitat and Observation Program" ("ECHO"), which seeks to better understand and manage potential effects on cetaceans (i.e., whales, porpoises and dolphins) resulting from commercial vessel activities throughout the southern coast of B.C. Along with other stakeholders, Trans Mountain is actively supporting the ECHO Program and its initiatives to undertake research and explore solutions to offset the effects of underwater noise from marine vessel traffic on the southern resident killer whale population and associated Aboriginal traditional uses. The ECHO Program is also investigating technological solutions such as real time whale detection technologies that that may provide means to reduce ship strikes while simultaneously allowing maritime commerce and other activities to proceed. On July 29, 2015 Trans Mountain executed a funding agreement with Vancouver Fraser Port Authority (doing business as PMV), wherein Trans Mountain will contribute $1.6 million to the ECHO Program to support its research initiatives. The terms of this agreement are not contingent on approval of the Project.[154]

---

[153] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 154.

[154] Trans Mountain Reply Evidence, Section 51 – Environmental Monitoring (August 20, 2015), 51-1.

Trans Mountain has also committed to developing a Marine Mammal Protection Program ("MMPP") to support southern resident killer whale recovery. The program will focus on strategies that will be implemented during the operations phase in order to contribute to the ongoing southern resident whale recovery strategies.[155] The results of the ECHO Program studies will be reviewed by Trans Mountain with a view to incorporating the resulting recommendations in the MMPP.

In addition, Trans Mountain considered two large scale mitigation measures: (i) altering the shipping lanes to avoid sensitive habitat; and (ii) setting speed restrictions.[156] In response to an NEB IR, Transport Canada stated that it "is not currently contemplating alternative shipping lanes or vessel speed restrictions for the purpose of reducing impacts on marine mammals from marine shipping in British Columbia; however, Transport Canada is participating in the ECHO program … as an Advisory working group member."[157] Therefore, Project-related marine vessel traffic will use the existing anchorages and shipping lanes for the entirety of their route in accordance with Transport Canada's directions.

Trans Mountain's evidence and commitments to cooperate and support the industry wide program regarding the southern resident killer whale, coupled with the benefits of the Project discussed herein, provide the Board with the necessary information to conclude that the significant adverse environmental effect predicted within this context is clearly justified, and is likely to be mitigated, in the circumstances.

---

[155] Exhibit B32-1 – Trans Mountain Letter NEB IR No. 1 May 1, 2014 (May 14, 2014) (A3W9H7), 326.

[156] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 253.

[157] Exhibit C353-6-2 - Transport Canada Responses to NEB Information Requests received July 15, 2015 (July 27, 2015) (A4R7L6), 5; Exhibit C353-7-3 - TC Responses to Tsawout First Nation Motions to Compel Full and Adequate Responses to IRs (August 4, 2015) (A4R9H2).

2.2.1.5 Environmental Effects of the Project – Oil Spills Resulting from Marine Incidents

On low probability occasions, marine incidents may result from equipment and human failure on tankers, including grounding of a loaded tanker or collisions between loaded tankers and other vessels. Such incidents may cause the release of hazardous substances, and thus Trans Mountain has identified them as a potential environmental burden associated with the Project. However, because of the current robust marine safety regime applicable to all vessels, which Det Norske Veritas ("DNV") considers to be "in line with global best practices", the likelihood of such occurrence is low. Trans Mountain has proposed additional preventive measures applicable to Project tankers that will, according to DNV, raise "the level of care and safety in the study area to well above globally accepted shipping standards". The comprehensive marine and navigation risk study conducted for the Project by DNV provides evidence that a major oil spill will remain a low likelihood event in the region.[158]

With mitigation measures in place, Trans Mountain determined that the probability of a credible worst-case oil cargo spill from a Project tanker is forecast to have a potential return period of once in 2841 years. Therefore the combined risk mitigation effect of all measures is significant and the absolute risk of an oil cargo spill from a Project tanker is low. The existing marine network is well managed and safe and has the capacity to safely accommodate Project tankers with the application of agreed risk mitigation measures. Oil cargo spill risk in the region will remain similar to and comparable with current conditions. This fundamental conclusion from the Application has been

[158] Exhibit B21-1 - V8C TR 8C 12 01 OF 03 TERMPOL 3.15 RISK ANAL–(December 17, 2014) (A3S5F4); Exhibit B21-2 - V8C TR 8C 12 02 OF 03 TERMPOL 3.15 RISK ANAL - (December 17, 2014) (A3S5F6); Exhibit B21-3 - V8C TR 8C 12 03 OF 03 TERMPOL 3.15 RISK ANAL - (December 17, 2014) (A3S5F8).

reinforced by Trans Mountain's subsequent refinements, based on the TERMPOL committee's endorsements.[159]

Responsibilities and Plans for Spill Response

Once a tanker has completed loading and leaves the Westridge loading facility and terminal, the responsibility for the ship and its cargo fall under the jurisdiction of the *Canada Shipping Act, 2001* and associated marine transport regulations. The existing regime comprising the International Oil Pollution Compensation Funds and Canada's Ship-source Oil Pollution Fund together provide in excess of $1.44 billion of funding to compensate eligible spill costs in the event of an incident.[160]

Shipping oil spill incidents are responded to by WCMRC. The responsibility for a tanker-based marine spill lies with the tanker owner. WCMRC has enhanced its current response capacity to limit the effects of an oil spill incident in the Project area. The regulation of marine oil spill response is primarily defined in the *Canada Shipping Act, 2001* and administered by Transport Canada. The Act requires that: oil spill Response Organizations[161] be certified by the Minister; all large vessels and oil handling facilities have an arrangement with a certified Response Organization as a condition of operating in Canadian waters; and that the Response Organization meets or exceeds the planning standards that define minimum levels of capacity as set by regulations under the *Canada Shipping Act, 2001*.[162]

---

[159] Exhibit B300-2 – Trans Mountain Response to NEB IR TERMPOL Rpt and Outstanding Filings (January 2, 2015) (A4G3U5), 18 – 21.

[160] Trans Mountain Reply Evidence, Section 62 – Marine Emergency Preparedness and Response (August 20, 2015), 62-20.

[161] "response organization" means a qualified person to whom the Minister issues a certificate of designation under subsection 169(1) of the *Canada Shipping Act, 2001*.

[162] *Canada Shipping Act, 2001*, SC 2001, c 26.

WCMRC is the Response Organization for the West Coast of Canada. Current planning standards require a minimum capacity to respond to oil spills of up to 10,000 tonnes in up to 72 hours plus travel time. WCMRC currently maintains capacity significantly in excess of the minimum planning standard requirement. With support of WCMRC, Trans Mountain has proposed an enhanced response regime for the Project area that will significantly reduce response time both within and outside of PMV and be capable of delivering 20,000 tonnes of capacity within 36 hours from dedicated resources staged anywhere within the area. This represents a response capacity that is double the minimum and a delivery time that is half the existing planning standards.

Marine Incident Assessment

Trans Mountain's assessment of marine incidents is based on a comprehensive evaluation that includes a quantitative navigation risk assessment together with determining credible worst-case oil spill volume, as detailed in Section 7 - Environment of this final argument. Stochastic modelling of crude oil spills originating at several locations in the Burrard Inlet, Strait of Georgia in an area near the Fraser River Estuary, Gulf Islands and Strait of Juan de Fuca together with detailed deterministic spill modelling were used in the assessment. The scope and methods used in the Marine Ecological Risk Assessment ("Marine ERA") were based on additional application filing requirements as outlined in correspondence from the NEB to Trans Mountain in a letter dated September 10, 2013.[163]

Trans Mountain's position on the physical and chemical properties of diluted bitumen as well as its fate, transport and toxicity in the case of a spill to a marine environment is based on its own

[163] NEB - Letter and Filing Requirements to Trans Mountain Pipeline ULC - Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities - Trans Mountain Expansion Project (September 10, 2013) (A53984).

research corroborated by a growing body of evidence regarding the fate and behaviour of diluted bitumen.[164] The studies support the assertion that higher viscosity oils such as diluted bitumen do not readily disperse as fine droplets into the water column, and are less likely to form oil mineral aggregates than light conventional crude oils.[165] This is a difference that facilitates rather than hinders oil recovery in the unlikely event of spill.

As detailed in Section 4 - Emergency Response of this final argument, in the unlikely event of a spill or release during loading at the Westridge Marine Terminal, Trans Mountain will respond immediately under the Terminal Emergency Response Plan ("ERP"). Section 7 - Environment of this final argument provides a detailed review of oil spills resulting from marine incidents. Finally, Section 9 - Economic of this final argument discusses the financial aspects of a marine oil spill including evidence illustrating that adequate financial resources are available to meet claims in the event of a spill.

Trans Mountain is confident that it has adequately assessed the potential consequences of a marine oil spill in accordance with NEB and other federal guidance for emergency response and contingency planning and to ensure that risks are mitigated. Based on the findings of the ESA, the probability of a significant residual environmental effect of an oil spill arising from marine incidents as a result of the construction and operations of the Project is very low.

Trans Mountain remains confident that accidents and malfunctions related to the pipeline and facilities and the increase in Project-related marine shipping activities have a low probability of

[164] Exhibit B18-2 – V7 5.2.8.3 F5.2.5 TO 10.0 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V6) at 6-65.

[165] Trans Mountain Reply Evidence, Section 25 – Fate and Behavior of Oil (August 20, 2015)

occurrence.[166] These topics are addressed in detail in Section 7.2.1.12 - Accidents and Malfunctions (Pipeline and Facilities) and Section 7.2.2.9 - Oil Spills Resulting from Marine Incidents of this final argument. Concrete and significant socio-economic benefits will result from the Project, as detailed in Section 8 - Social and Section 9 - Economic of this final argument.

Trans Mountain submits that given the detailed environmental assessment and thorough mitigation measures on record, the Project as a whole is not likely to cause significant adverse environmental effects after taking into account mitigation measures, with the exception of the potential effect of sensory disturbance on southern resident killer whale based on the existing status of that species. It is Trans Mountain's view that these potential effects, in the existing circumstances, are justified in accordance with section 52(2) of CEAA 2012.

2.2.2 Social Benefits and Burdens

Social elements that may interact with the Project include heritage resources, traditional land and resource use, traditional marine resource use, social and cultural well-being, human occupancy and resource use (including marine commercial, recreational and tourism use), infrastructure and services, navigation and navigation safety, community health and human health risk assessment.[167]

In order to assess local and regional interests, which vary across the numerous areas through which the Project traverses, and to allow for a more accurate estimation of social effects, Trans Mountain examined the above elements as they apply in the context of particular regions.[168] General and

[166] Trans Mountain Reply Evidence, Section 43 – Community Health (August 20, 2015), 43-1.

[167] Exhibit B5-26 - Trans Mountain Pipeline ULC - Volume 5B: ESA - Socio-Economic (December 16, 2013) (A3S1R5), vi; for the purposes of this final argument the use of the word "Social" is separate from "Economic".

[168] Exhibit B5-26 - Trans Mountain Pipeline ULC - Volume 5B: ESA - Socio-Economic (December 16, 2013) (A3S1R5), v.

site-specific mitigation and enhancement measures have been recommended and will be implemented to ensure that the potential adverse social effects are eliminated or reduced and potential positive effects are enhanced during Project activities. The potential benefits to communities, industry and local/regional economies, in combination with various monitoring programs and investment initiatives, result in positive net overall socio-economic effects. The potential effects and benefits are discussed in detail in Section 8 - Social of this final argument.

Trans Mountain's Application for the TMEP is founded on relationships with stakeholders along the TMPL, which span more than 60 years.[169] The majority of landowners affected by the Project are already familiar with Trans Mountain, as approximately 73 per cent of the Project follows the existing TMPL alignment.

Trans Mountain's Community Benefit Program provides for a legacy for communities impacted by the construction of the pipeline along the pipeline corridor. As detailed in Section 8 - Social of this final argument, Trans Mountain has worked with numerous communities and educational institutions along the pipeline corridor to offer a legacy to communities, including community programs and infrastructure improvements, environmental stewardship, ecological benefits and educational scholarships and bursaries. These legacies serve the important purpose of building the social and human capital of communities along the pipeline right-of-way.

On October 16, 2014, the District of Hope and Trans Mountain signed a Memorandum of Understanding for a Community Benefit Agreement resulting in a $500,000 financial contribution towards upgrades at the Hope Community Recreation Park. On November 6, 2014, the District of

[169] Exhibit B306-12 – Trans Mountain Response to NEB IR No. 3.005a-Attachment 1-Part 1 (February 3, 2015) (A4H1W2), 82.

Barriere and Trans Mountain signed a Memorandum of Understanding for a Community Benefit Agreement that will see $290,000 contributed towards improvements in Barriere, including upgrades to bike and pedestrian trails, construction of a playground splash pad, provision and planting of trees and funding for education to provide support to students in trades, technology and environmental programs. In addition to the above examples, Trans Mountain has executed Memorandums of Understanding for Community Benefit Agreements with a total value of $5.5 million as of July 31, 2015.[170] Parties who have executed agreements with Trans Mountain, representing 87 per cent of the proposed pipeline corridor, include: City of Edmonton, Strathcona County, Parkland County, City of Spruce Grove, Town of Stony Plain, Town of Edson, Town of Hinton, Village of Valemount, Thompson-Nicola Regional District (Areas A, B, O and P), Municipality of Clearwater, District of Barriere, City of Kamloops, City of Merritt, Municipality of Hope, Thompson Rivers University and Kwantlen Polytechnic University.[171]

2.2.3 Economic Benefits and Burdens

The Board has previously emphasized that properly functioning markets will produce outcomes in the public interest and "[i]n order for markets to function properly, there must be adequate transportation capacity to connect supply to markets."[172] Market efficiency is in the public interest because, as part of the Board's regulatory framework, one of the Board's goals is that Canadians benefit from efficient energy infrastructure and markets.[173] Markets will not be well-functioning if energy supplies continue to be trapped and priced at a significant discount to world market prices

[170] This information is also included in Consultation Update No. 4.

[171] Exhibit B306-12 – Trans Mountain Response to NEB IR No. 3.005a-Attachment 1-Part 1 (February 3, 2015) (A4H1W2), 83.

[172] NEB-Reasons for Decision - TransCanada Keystone Pipeline GP Ltd. – OH-1-2007 (September 2007), 56; NEB-Reasons for Decision - Enbridge Pipelines Inc. Alberta Clipper Expansion Project (February 2008), 65.

[173] NEB-Reasons for Decision – TransCanada Keystone Pipeline GP Ltd. – OH-1-2007 (September 2007), 56.

as a result of inadequate transportation infrastructure. Such a situation is clearly contrary to the Canadian public interest. Trans Mountain has demonstrated strong market demand for the Project by executing 13 long-term firm service contracts with well capitalized and knowledgeable companies, and by obtaining NEB approval for its tolling methodology in Decision RH-01-2012.

The Project involves a $5.4 billion capital cost expenditure.[174] This large investment in Canadian infrastructure will make a significant contribution to realigning Canada's pipeline system with changing supply/demand fundamentals. Trans Mountain's reply evidence clearly demonstrates the benefits of the Project to Canadian energy producers. This includes the benefits associated with improved market access for Canadian crudes to help ensure that extraordinary price discounts are avoided in future. Through the Project, Western Canadian oil production will also have the opportunity to realize higher netback prices on production that is priced in the Asia/Pacific region.[175] By helping eliminate discounts on oil that does not have adequate market access and by attracting higher world prices for Canadian production, the Project will help ensure that Canada benefits from efficient energy infrastructure and the market value for its oil resources.

Volumes 1, 2 and 5B of Trans Mountain's Application highlight the socio-economic benefits that the TMEP offers to Canadians. The Project's effects on employment and the economy are expected to be positive, due to anticipated opportunities related to regional employment, contracting/procurement, municipal economic benefits, training and capacity development, as well as the substantial benefits anticipated at the provincial and national level.[176] While there may be

[174] Exhibit B1-1 - V1_SUMM (December 16, 2013) (A3S0Q7).

[175] Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-43.

[176] Exhibit B5-40 – V5B ESA 15 of 16 SOCIOEC (December 16, 2013) (A3S1S9), 7-334.

some short-term negative implications for business and livelihoods due to construction-phase land disturbance in select areas, compensation will be negotiated for any proven loss that property owners or tenure holders incur.[177] Trans Mountain's evidence demonstrates that the many positive effects associated with construction and routine operation will far outweigh any short-term negative implications.[178]

The Conference Board of Canada's report entitled "Expansion of the Trans Mountain Pipeline: Understanding the Economic Benefits for Canada" details the anticipated quantifiable economic benefits related to the Project.[179] The construction and operation of the Project will provide substantial economic and fiscal benefits to Canada and its regions. There will be significant benefits to the parties directly involved, to Canadian oil production and to all Canadians and their governments including:

(a) The development (construction) period is forecasted to boost Canadian Gross Domestic Product ("GDP") by approximately $4.9 billion, with $2.8 billion accruing to B.C. and $1.4 billion to Alberta. There will be a total of 58,000 person-years of employment generated across Canada during development, with approximately 36,000 in B.C. and 15,000 in Alberta.

(b) There will be $646 million in federal taxes generated during the Project development phase and an additional $568 million of provincial taxes, with $309 million received by B.C. and $168 million by Alberta.

---

[177] Exhibit B5-40 – V5B ESA 15 of 16 SOCIOEC (December 16, 2013) (A3S1S9), 7-334.

[178] Exhibit B5-40 – V5B ESA 15 of 16 SOCIOEC (December 16, 2013) (A3S1S9), 7-334.

[179] Exhibit B286-2 - Report- Conference Board of Canada (November 24, 2014) (A4F2K9).

(c) There will be an overall boost to employment of 50,000 to 65,000 person-years during the first 20 years of operations, with 60 per cent of the jobs being created in B.C. and 20 per cent in Alberta.

(d) The operations phase will boost Canadian GDP by at least $13.3 billion over the first 20 years. B.C. will see the largest impact with a boost of about $8.5 billion, followed by Alberta at almost $4 billion.

(e) The Project will generate about $1.4 billion in additional tax revenues for the federal government during operations and an additional $1.1 billion in provincial taxes, with B.C. receiving about $727 million and Alberta receiving about $278 million.

(f) Oil producer revenues in Trans Mountain's reply evidence are forecasted to rise by $45.4 billion over the first 20 years of the pipeline's operations, as a result of higher netbacks that can be attributed to Western Canadian oil producers having access to new markets through the Project. This revenue associated with higher netbacks is expected to generate total federal and provincial fiscal benefits of $14.7 billion, with Alberta receiving $8.2 billion and the federal government $6.1 billion. The revised market analysis completed in April 2015, in response to NEB IR No. 4.2, increased the estimated higher netbacks to $61 billion; this results in a proportionate increase in federal and provincial fiscal benefits from $14.7 to $19.9 billion.[180]

(g) In addition to the tax benefits created at the federal and provincial levels, the Project will also yield benefits to communities along the right-of-way through employment

[180] Trans Mountain Reply Evidence, Attachment 1.02 - Reply to Dr. Catherine Douglas and the Pro Information Pro Environment United People Network "Economic Costs and Benefits of TMX for B.C. and Metro Vancouver" (August 20, 2015); Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 3.

and economic activity, and generating additional property taxes for the life of the pipeline. As part of the environmental and socio-economic analysis presented in Volume 5B, it was estimated that the additional property taxes generated by the Project will be about $22.1 million (a 103 per cent increase) annually in B.C. and $3.2 million (a 119 per cent increase) annually in Alberta.[181]

(h) As previously discussed, the report prepared by the Conference Board of Canada did not include the positive economic impact of increased tanker traffic on marine operations in the analysis. Intervenors[182] nonetheless included negative economic impacts on port operations from a potential spill while excluding the positive impacts of the Project. Each calling tanker brings approximately $108 million in economic benefits to the local Vancouver economy on an annual basis. During the first 20 years of Project operations, this amounts to approximately $2.2 billion excluding the indirect and induced impacts from multiplier effects.[183]

(i) Trans Mountain is committed to supporting WCMRC in implementing enhancements to improve marine spill response capacity in the region. The enhancements will benefit the entire shipping community in the Salish Sea. If the Project proceeds, Trans Mountain will support the enhancement of WCMRC's existing resources through an additional investment of approximately $100 million. Trans Mountain is committed to supporting WCMRC in implementing enhancements to improve marine spill response capacity in the region. The

[181] Exhibit B286-2 - Report- Conference Board of Canada (November 24, 2014) (A4F2K9), 6-8; Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42.

[182] Exhibit C77-31-8 - Appendix 83 (May 27, 2015) (A4L9G4).

[183] Trans Mountain Reply Evidence, Attachment 1.06 - Reply to City of Vancouver "Potential Economic Impact of a Tanker Spill on Ocean-Dependent Activities in Vancouver" (August 20, 2015).

> enhancements will benefit the entire shipping community in the Salish Sea.[184] If the Project proceeds, Trans Mountain will support the enhancement of WCMRC's existing resources through an additional investment of approximately $100 million.[185]

Throughout the review process, Trans Mountain has proactively identified and mitigated potential burdens on communities that may be negatively impacted in the absence of such mitigation. A comprehensive assessment of potential environmental and socio-economic effects of the proposed pipeline and facilities is provided in Volume 5A and Volume 5B of the Application. The identification of potential socio-economic effects and development of mitigation measures designed to reduce any negative impacts have been facilitated by thorough and ongoing consultation with local communities, Aboriginal groups and other stakeholders.

Trans Mountain developed an extensive suite of mitigation commitments, which are summarized in Environmental Protection Plans ("EPP"), that will reduce adverse local Project effects during construction and routine operations and that also seek to maximize local economic opportunities. For each potential effect, Trans Mountain has noted the mitigation it will undertake to minimize adverse effects and maximize opportunities (i.e., local/regional economic opportunities). Trans Mountain's proposed mitigation measures are summarized in the EPPs, which are detailed further in Section 3.18 – Environmental Protection Plans of this final argument.

---

[184] Trans Mountain Reply Evidence, Section 62- Marine Emergency Preparedness and Response (August 20, 2015), 62-7.

[185] Exhibit B18-32 - V8A 5.4.4.7.2 TO T5.5.3 MAR TRANS ASSESS –(December 17, 2013) (A3S4Y6), 8A-608; Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-81.

The Pipeline EPPs also include mitigation particular to the socio-economic environment including a Socio-Economic Management Plan and the Agricultural Management Plan. EPPs also identify resource-specific mitigation and measures related to the protection of traditional use resources or culturally sensitive areas (e.g., use of Aboriginal Monitors, Traditional Land Use Sites Discovery Contingency Plan, Heritage Resources Discovery Contingency Plan).

Trans Mountain has also made extensive commitments regarding environmental compliance which are detailed in Volume 6A, including environmental inspection during construction and post-construction monitoring. Trans Mountain has also made commitments (based on the draft conditions issued by the NEB) regarding monitoring of socio-economic effects including developing: (i) training and education monitoring plan;[186] (ii) Aboriginal, local and regional employment and business opportunity monitoring;[187] and, (iii) monitoring of adverse socio-economic effects during construction.[188]

Trans Mountain acknowledges that through its ongoing consultation process, as well as through the evidentiary process of the hearings, oil spills having consequences outside of company property may have negative economic impacts on local communities if not mitigated. The Application and subsequent evidence has documented the comprehensive measures that are in place to reduce the risks of such an incident occurring, to reduce the consequences if such an incident does occur and to mitigate through compensation and restoration any residual consequences in the event of an occurrence.

---

[186] Exhibit B32-2-Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8), 146-149.

[187] Exhibit B32-2-Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8), 155-158.

[188] Exhibit B32-2-Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8), 125-129.

Trans Mountain has sufficient financial capacity to fund restoration efforts and compensate those affected based on estimates of pipeline spill costs and those originating from the Westridge Marine Terminal.[189] Specifically, Trans Mountain maintains both general liability and spill liability insurance that would be maintained throughout the operating life of the Project.[190] The compensation regime for tankers based spills is governed by the *Marine Liability Act*.[191] Under those provisions, the tanker owner is the responsible party. Compensation mechanisms are met through insurance carried by the ship owners and adherence to international compensation regimes that are currently capped through provisions in the International Oil Pollution Compensation Fund ("IOPC Fund") and Canada's complementary Ship-source Oil Pollution Fund. The IOPC Fund consists of two tiers which backstop the funding available to the ship owner's insurance required under the Civil Liability Convention. Countries can opt in or out of the second tier; however, Canada subscribes to both. Together, this regime provides in excess of $1.44 billion of funding to compensate eligible spill costs in the event of an incident.[192] Moreover, under the Civil Liability Convention to which Canada is a party, ship owner liability is unlimited in event of negligence.[193]

The evidence provided by Trans Mountain in support of the Project adheres to the guidance provided by the Board, is in line with the evidence submitted in support of other projects that have received Board approval and demonstrates that the Project would result in substantial economic

[189] Exhibit B018 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 7, 8A (December 17, 2013) (A56025).

[190] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 24-30.

[191] SC 2001, c 6.

[192] Trans Mountain Reply Evidence, Section 62 – Marine Emergency Preparedness and Response (August 20, 2015), 62-17.

[193] Trans Mountain Reply Evidence, Section 61 – Marine Spill Liability Compensation (August 20, 2015), 61-11.

and societal benefits that far outweigh any potential burdens and risks once mitigation efforts are accounted for.

2.2.4 Aboriginal Engagement

The objectives of Trans Mountain's Aboriginal Engagement Program were achieved in a variety of ways, including through the sharing of Project information, providing capacity funding to review the Application, negotiating group and community-specific protocols and discussing the adequacy of planned impact mitigation.[194] Trans Mountain has made every reasonable effort to ensure that all Aboriginal groups, including communities, associations and councils, who express an interest in Project engagement have been provided an opportunity to engage in meaningful dialogue in the manner they choose, and in a way that meets their objectives and values.[195] Trans Mountain submits that the process and outcomes of Trans Mountain's Aboriginal engagement efforts support a recommendation that the Project is in the public interest.

Meaningful and Responsive Aboriginal Engagement

Trans Mountain made significant efforts to gain a better understanding of Aboriginal interests, values, concerns, contemporary and historic activities, Aboriginal traditional knowledge and the important issues facing each potentially affected Aboriginal group as part of its assessments. This understanding was guided by Traditional Ecological Knowledge ("TEK"), Traditional Land and Resource Use ("TLRU"), Traditional Marine Resource Use ("TMRU") studies and Cultural Use Assessments conducted by Aboriginal groups with Trans Mountain's support. The results of the studies and assessments are incorporated into the Socio-Economic Effects Assessment of

[194] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-11.

[195] Exhibit B10-3 - V5D TR5D1 2of4 TRAD LAND RESOURCE (December 16, 2013) (A3S2G9). The results of this study are detailed in Section 5.4.4 of Volume 5D-1 (December 16, 2013) (A3S2G9).

Traditional Land and Resource Use, Traditional Marine Resource Use and Cumulative Effects Assessment contained in the Application.[196] The results are also incorporated into the EPP and environmental alignment sheets to inform site-specific mitigation. The opportunity to conduct community-led and Trans Mountain-funded studies for the Project were provided at the request of interested Aboriginal groups.[197]

There is a close relationship between TLRU and the condition of the environment and the resources therein. In this regard, many of the concerns raised by Aboriginal groups related to environmental impacts associated with the Project. To gather site specific environmental resource data, Trans Mountain conducted extensive environmental studies along the proposed pipeline corridor. The assessment considered the potential environmental effects of the construction, operations and maintenance of the Project, the ways in which these effects could be minimized or avoided altogether, and mitigation and reclamation strategies that would further reduce these effects. Details of Trans Mountain's EPPs are addressed in Section 3.18 of this final argument. As discussed therein, Trans Mountain is committed to developing and implementing an environmental education program to ensure that all personnel working on the construction of the Project are informed of the location of and avoid impacts to TLRU sites.

---

[196] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-12; Exhibit B241-3 – Trans Mountain Pipeline ULC Traditional Land Use Part 1 of 4 (July 21, 2014) (A3Z4Z2); Exhibit B291-31 – Part 13 Traditional Marine Resource Use Supplemental Report (December 1, 2014) (A4F5D2); Exhibits B1-6, B1-7 , B1-8, B1-9– Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 3A, Public Consultation (December 16, 2013) (A3S0R2, A3S0R3, A3S0R4, A3S0R5 plus appendices); Exhibit B27 – Trans Mountain Pipeline ULC – Consultation Update No. 1 – Errata (March 20, 2014) (A59343); Exhibit B248, B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 and Consultation Update No. 2 – (August 1, 2014) (A62087 and A62088); Exhibit B306-12, B306-13, B306-14, B306-15, B306-16, B306-17, - Trans Mountain Pipeline ULC – Response to NEB IR No. 3.005a - Consultation Update No. 3 – (A4H1W2, A4H1W3, A4H1W4, A4H1W5, A4H1W6, A4H1W7); Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015); Exhibit B5-41 - V5B ESA 16 of 16 SOCIOEC (December 16, 2013) (A3S1T0), 8-33.

[197] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2016) (A3S0U5).

In some cases, Aboriginal groups expressed concerns regarding the ability to maintain their role as environmental stewards if the Project is constructed. Trans Mountain has committed to engaging Aboriginal groups through all phases of the Project. During Project construction, Aboriginal Monitors will work with Environmental Inspectors to provide traditional knowledge to the construction program to implement the EPPs to ensure protection of the environment and to monitor mitigation success in protecting the environment.[198]

Aboriginal groups also expressed concerns regarding the effects of an oil spill on community health, either indirectly through impacts on cultural activities, sensitive sites or food resources, or directly through increased stress, anxiety and the perception of contamination. Trans Mountain acknowledges the high level of First Nation, government and public concern about spills, and evidence from past spills demonstrates that Aboriginal peoples who rely on subsistence foods and natural resources are at greatest risk for adverse effects.

To protect sensitive environmental areas (e.g., the Adams River) Trans Mountain has adopted measures such as strategically placed pipeline valves near waterways and trenchless river crossings at some locations. Trans Mountain remains confident that accidents and malfunctions related to the pipeline and facilities and the increase in Project-related marine shipping activities have a low probability of occurrence. Further, the construction and routine operations will not result in significant adverse effects on the ability of Aboriginal communities to continue to use land, waters or resources for traditional purposes, and thus the Project's contribution to potential broader

[198] Exhibit B11-4 - V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3), 1-3.

cultural impacts related to access to and use of natural resources is also considered not significant.[199]

Through the Aboriginal Engagement Program, as detailed in Section 6 - Aboriginal, Trans Mountain works collaboratively with Aboriginal groups to support access to economic development opportunities that will arise as a result of the Project. These include employment and procurement opportunities and education, training and community investments to maximize access to these opportunities.[200] To foster the creation and development of these opportunities, a funding program has been established to contribute to education and training initiatives that focus on pipeline construction and related transferable skills. Trans Mountain has also connected Aboriginal business offerings relevant to Project construction or operation business opportunities.[201]

Trans Mountain's approach to Aboriginal engagement in relation to the Project has been inclusive and responsive. In total, 27 Aboriginal groups in communities in Alberta and B.C. (including Vancouver Island) have provided written letters of support for the Project.[202] In several cases, Aboriginal groups expressed their view that the Project will result in positive effects.[203] Trans Mountain continues its engagement with Aboriginal groups to address their Project specific concerns and maximize Project-related benefits.

---

[199] Trans Mountain Reply Evidence, Section 41 – Social and Cultural Well-Being (August 20, 2015), 41-2.

[200] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2016) (A3S0U5).

[201] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-1-2.

[202] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015), 9; Lake Cowichan First Nation - Letter of Support (May 25, 2015) (A70174).

[203] See, e.g., Canim Lake Band - Withdraw of Objection to Trans Mountain Expansion Project (January 20, 2015) (A4G7F0); Paul First Nation - Letter of Comment (April 28, 2014) (A3W1J4).

1366 ***Aboriginal Interests and the Duty to Consult***

1367 Pursuant to the List of Issues, the Board will consider the potential impacts of the Project on
1368 Aboriginal interests. The Board does not owe the Crown's constitutional duty to consult with
1369 Aboriginal groups. Ultimately, the legal responsibility to meet the duty lies with the Crown.[204] The
1370 duty to consult arises whenever the Crown has knowledge, real or constructive, of the potential
1371 existence of an Aboriginal or treaty right, and contemplates conduct that may adversely affect it.
1372 The content of the duty varies with the circumstances and will depend on factors before the Court,
1373 such as the subject matter and the strength of the claim.

1374 The Crown may rely on the regulatory process established by the Board to fulfill the duty to
1375 consult.[205] In August 2013, the Major Projects Management Office (Natural Resources Canada)
1376 ("MPMO") indicated that the federal Crown would rely on the NEB's public regulatory process,
1377 to the extent possible, to fulfil any Crown duty to consult Aboriginal groups with respect to the
1378 proposed Project.[206] The Crown clearly indicated that it did not delegate the duty to consult to
1379 Trans Mountain.[207]

1380 In Trans Mountain's view, Aboriginal groups have been adequately consulted regarding the
1381 Project. The NEB process has provided ample opportunities for Aboriginal groups to participate
1382 and be heard. In total, over 130 Aboriginal groups raised issues with the Board related to

---

[204] *Standing Buffalo Dakota First Nation v Enbridge Pipelines Inc*, 2009 FCA 308, para 34; *Quebec (Attorney General) v Canada (National Energy Board)*, [1994] 1 SCR 159, 184.

[205] *Carrier Sekani Tribal Council v British Columbia (Utilities Commission)*, 2010 SCC 43, para 56, citing *Haida Nation v British Columbia (Minister of Forests)*, 2004 SCC 73, para 51.

[206] Exhibit A1-1 - Attachments 1-4 of Letters to Aboriginal Groups with Description of the Trans Mountain Expansion Project (August 13, 2013) (A3K1S9).

[207] Exhibit C249-13-8 – 7 – NRCan on behalf of Government of Canada-Response to Pacheedaht First Nation IRs (July 14, 2015) (A4R4A0), 5.

Aboriginal interests and title issues. The Board expected Trans Mountain to consult with potentially impacted Aboriginal groups early in the Project planning and design phases[208] and Trans Mountain took this responsibility seriously. Based on its interactions with Aboriginal groups, Trans Mountain submits that it has proposed mitigation measures that adequately address the Project-related concerns it received from Aboriginal groups.

2.3 TERMPOL Review

In conjunction with the NEB review process, Trans Mountain initiated the voluntary TERMPOL process under Transport Canada's jurisdiction. The TERMPOL process is a voluntary federal review process that focuses on safety and the TERMPOL Review Committee completed a structured technical review of the marine transportation components of the Project. The review process was chaired and led by Transport Canada and the TERMPOL Review Committee consisted of a number of federal agencies, each expert in their field.

Trans Mountain commissioned a number of studies to provide recommendations to Transport Canada, the TERMPOL Review Committee and other relevant responsible authorities to understand and improve the safety of marine transportation related to the Project. The purpose of the TERMPOL review was to assess the safety and risks associated with tanker movements between the Pacific Ocean to, from and around the Westridge Marine Terminal resulting from the Project. The TERMPOL review for the Project included consideration of:

(a) review of ship casualty data, global, national, regional and local;

(b) ship design and operation;

[208] NEB Filing Manual, Released 2014-03.

(c) navigational and physical characteristics of the entire route within Canada's Territorial Sea, from approaches to the terminal;

(d) metocean conditions including wind, wave and weather conditions for the entire route;

(e) current traffic count and evaluation for the different vessel categories identified operating within the study area;

(f) forecast traffic and evolution of different vessel categories identified operating within the study area;

(g) terminal design and infrastructure;

(h) hazard identification;

(i) incremental risk and accident analysis resulting from the Project along the transit route and at the terminal, and the related mitigating measures;

(j) pollution prevention program; and

(k) contingency plans.

Although the TERMPOL review process was voluntary, Trans Mountain sought to draw on the expertise of the TERMPOL Review Committee to provide significant information to enhance the safety of the Project. The review process allowed Trans Mountain to develop safety measures and then seek endorsement of those measures from the TERMPOL Review Committee, including Transport Canada.[209]

[209] Exhibit B300-2 – Trans Mountain Response to NEB IR TERMPOL Rpt and Outstanding Filings (January 2, 2015) (A4G3U5), 1.

The TERMPOL Review Process Report on the Trans Mountain Expansion Project and the recommendations therein was submitted to the NEB on December 11, 2014.[210] Trans Mountain voluntarily agreed to adopt each of the reports 17 recommendations and 31 findings in the manner outlined in Trans Mountain's response to the Board.[211] In its report, the TERMPOL Review Committee acknowledged the robust nature of all current measures and endorsed a number of key improvements proposed by Trans Mountain which include:

(a) Expanded use of tethered and untethered tug escort;

(b) Extension of pilot disembarkation zone;

(c) Establishing enhanced situational awareness;

(d) Safety calls by laden tankers;

(e) Notices to Industry;

(f) Engagement and awareness strategy led by Pacific Pilotage Authority;

(g) More use of Automatic Identification Systems ("AIS") and radar reflector by smaller vessels; and

(h) Enhanced oil spill response regime.

Trans Mountain is actively working with the appropriate agency to develop plans that will ensure the recommendations and findings are wholly satisfied prior to the Project, if approved, becoming operational.

[210] Exhibit C353-4 - Transport Canada - TERMPOL Review Process Report on the Trans Mountain Expansion Project (December 11, 2014) (A64923).

[211] Exhibit B300-2 – Trans Mountain Response to NEB IR TERMPOL Rpt and Outstanding Filings (January 2, 2015) (A4G3U5).

The Application contains a list of potential federal permits and approvals required for the Project.[212] Trans Mountain intends to work with federal regulatory agencies to provide them the information they need to fulfill the information requirements for their regulatory processes.

2.4 Provincial Considerations

Trans Mountain is continuing its work with provincial and municipal agencies to understand their expectations for information and permits related to federally regulated projects. A list of potential provincial permits and approvals in both Alberta and B.C. is also provided in the Application.[213] Ultimately, though, the Project is federally regulated by the NEB, and while Trans Mountain will endeavour to work with the Provinces and municipalities and to satisfy their needs, regulatory approval of the Project is a federal decision.

In July 2012, the Province of B.C. announced five conditions that it said must be met for B.C. to consider support for heavy oil pipelines. Trans Mountain has endeavored to address these conditions, some of which are of interest to other governments and stakeholders, as follows:

(a) **Successful completion of the environmental review process** - The NEB has a well-established process to review Trans Mountain's Application for the Project, including completing an environmental assessment under CEAA 2012. The NEB will make a recommendation whether the Project is in the Canadian public interest. The NEB also has an Environmental Assessment Equivalency Agreement with the B.C. Environmental Assessment Office.[214]

---

[212] Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-59-2-60.

[213] Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-59-2-60.

[214] National Energy Board – B.C. Environmental Assessment Office Equivalency Agreement (June 21, 2010).

(b) **World-leading marine oil spill response, prevention and recovery systems for B.C.'s coastline and ocean to manage and mitigate the risks and cost of heavy oil pipelines and shipments** – The federal Tanker Safety Expert Panel made recommendations in December 2013 to ensure rapid and sufficient oil spill response. In May 2014, the Government of Canada announced it would further strengthen Canada's tanker safety system with additional measures based on recommendations from the Tanker Safety Expert Panel and other studies.[215] These recommendations will improve Canada's system for ship-source oil spill preparedness and response in order to better protect the public and the environment. The TERMPOL review process also allowed Trans Mountain to develop safety measures and then seek endorsement of those measures from the TERMPOL Review Committee, including Transport Canada.[216] The TERMPOL Review Committee acknowledged the robust nature of all current measures and endorsed improvements proposed by Trans Mountain. Trans Mountain voluntarily agreed to adopt each of the findings and recommendations in the TERMPOL report[217] The Westridge Marine Terminal safety regime is based on regulatory requirements, local experience (since 1953) and international best practices. It is comprehensive, well established and has proven to be safe and effective. Trans Mountain is committed to supporting WCMRC in implementing enhancements to improve marine spill response capacity in the region. The enhancements will benefit the

[215] Trans Mountain Reply Evidence, Section 59 – Marine Transportation (August 20, 2015), 59-5 – 59-6.

[216] Exhibit B300-2 – Trans Mountain Response to NEB IR TERMPOL Rpt and Outstanding Filings (January 2, 2015) (A4G3U5), 1.

[217] Exhibit B300-2 – Trans Mountain Response to NEB IR TERMPOL Rpt and Outstanding Filings (January 2, 2015) (A4G3U5).

entire shipping community in the Salish Sea.[218] If the Project proceeds, Trans Mountain will support the enhancement of WCMRC's existing resources[219] through an additional investment of approximately $100 million. The results of this investment are as follows: (i) planning standards for marine emergency response capacity will double with a delivery time that is half the existing planning standards; (ii) times for initiating a response will be reduced to a maximum of two hours of notification in the PMV and six hours for the remainder of the response area, with the ability to deliver 20,000 tonnes of capacity within 36 hours; (iii) close to 100 new WCMRC staff will be hired; and (iv) five new bases will be opened at locations along the shipping route in Southern B.C., some of which will operate 24 hours per day.

(c) **World-leading practices for land oil-spill prevention, response and recovery –** The new *Pipeline Safety Act*[220] introduces a suite of new measures to strengthen incident prevention, preparedness and response and liability and compensation and these measures, taken together, aim to ensure that Canada's federally regulated pipeline safety system is world class and will remain so in the future.[221] KMC has an established EMP that is central to KMC's response to an emergency. Key elements of this program include information on responder health and safety, initial

[218] Trans Mountain Reply Evidence, Section 62- Marine Emergency Preparedness and Response (August 20, 2015), 62-7.

[219] Exhibit B18-32 - V8A 5.4.4.7.2 TO T5.5.3 MAR TRANS ASSESS –(December 17, 2013) (A3S4Y6), 8A-608; Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-81.

[220] SC 2015, c 21.

[221] Exhibit C249-9-1 - NRCan Written Evidence Submission TMX (May 27, 2015) (A4Q0V2), 9-12; Bill C-46 received Royal Assent on June 18, 2015, however, regulations to support the legislation have not yet been provided.

response actions, communication and notification protocols, site assessment, containment and recovery methods and protection of sensitive areas including wildlife protection. The NEB enforces the monitoring and auditing of the EMP through the OPR.[222] To ensure that companies are fulfilling their obligations under the OPR, EMPs are subject to audit by the NEB. Board staff regularly conduct compliance verification activities, emergency response exercise evaluations and emergency procedures manual reviews to verify that companies are prepared to anticipate, prevent, manage and mitigate emergency situations. KMC staff, through interactions with the NEB during emergency response exercises and other compliance verification activities, continuously demonstrate compliance with EMP requirements including the ability to anticipate, prevent, manage and mitigate emergency situations.[223] Trans Mountain has utilized design criteria, leak detection and containment systems, fire detection and suppression systems, operations management and emergency response planning to minimize risks of land-based incidents.[224]

(d) **Legal requirements regarding Aboriginal and treaty rights are addressed, and First Nations are provided with the opportunities, information and resources necessary to participate in and benefit from a heavy-oil project** – As detailed previously in this final argument, Trans Mountain has endeavoured to gather Aboriginal perspectives on rights and interests, and identify issues and concerns relating to those rights and the Project. Trans Mountain views working with

[222] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-82 to 1-84.

[223] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 403-408.

[224] Exhibit B18-1 - V7 1.0 TO 5.2.8.3 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5), Application Volume 7, 7-19 – 7-20.

Aboriginal communities along the route as part of its long-term commitment to promote open, transparent and mutually beneficial relationships with these communities and with Aboriginal businesses.[225] This is evidenced by the 26 support letters received for the Project from affected Aboriginal communities.[226]

(e) **B.C. receives a fair share of the fiscal and economic benefits of a proposed heavy oil project that reflects the level, degree and nature of the risk borne by the province, the environment and taxpayers** – B.C. will receive enormous economic benefits as a result of the Project. Spending on the Project during the construction phase is expected to generate approximately $1.2 billion of combined provincial and federal government revenues, including $394 million to B.C. An additional $2.5 to $3.3 billion in combined federal and provincial revenues is forecast to be generated over the first 20 years of pipeline operations. B.C. will receive the largest share of revenues of any provinces, at least $887 million. Higher Canadian producer revenues are expected to generate total federal and provincial fiscal benefits of $19.9 billion, of which B.C.'s share will be approximately $1.1 billion.[227] Communities in B.C. are expected to receive increased property taxes of

[225] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-84 – 1-86.

[226] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[227] By comparison to the IHS and Conference Board of Canada written evidence filed in 2013, this includes the impact of an increase in the estimated higher netbacks to producers from approximately $45 billion to approximately $61 billion, and a proportionate increase in the fiscal impact of higher netbacks from approximately $14.7 billion to approximately $19.9 billion, as a result of the revised market analysis completed in April 2015 in response to NEB IR No. 4.2. BC's share increases proportionately from approximately $0.8 billion to approximately $1.1 billion. See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42 and Trans Mountain Reply Evidence, Report 1.03 - Reply to Economic Costs and Benefits of TMX for B.C. and Metro Vancouver (Goodman and Rowan Report) (August 20, 2015).

> approximately $22 million per year.[228] Each tanker calling at PMV brings approximately $108 million of economic benefits to the local Vancouver economy on an annual basis.[229] There will be an overall boost to employment of 50,000 to 65,000 person-years during the first 20 years of operations, with 60 per cent of the jobs being created in B.C. and 20 per cent in Alberta.[230]

Trans Mountain has endeavored to address B.C.'s five conditions, as detailed above, through a comprehensive analysis of the potential benefits, effects and risk mitigation for the expansion. If approved by the NEB, the construction and long-term operation of the Project including the associated marine activities will be done to the highest standards of environmental performance, support Aboriginal communities and benefit British Columbians, Albertans and Canadians.[231]

2.5 Legal Framework Conclusion

The evidentiary record provides the Board with sufficient information to factor and balance economic, environmental and social considerations into its public interest recommendation regarding the Project.[232] The Board's public interest consideration is inclusive of all Canadians—meaning people locally, regionally and nationally.[233] When the potential impacts and risks of the

---

[228] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-77 – 1-86.

[229] Trans Mountain Reply Evidence, Attachment 1.06 - Reply to City of Vancouver "Potential Economic Impact of a Tanker Spill on Ocean-Dependent Activities in Vancouver" (August 20, 2015).

[230] Exhibit B286-2 - Report- Conference Board of Canada (November 24, 2014) (A4F2K9), 6-8; Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42.

[231] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-78.

[232] National Energy Board. 2014. "Responsibilities", online: <https://www.neb-one.gc.ca/bts/whwr/rspnsblt/index-eng.html> Acquired April 16, 2015.

[233] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, Chapter 2.3.

Project are balanced with the predicted benefits and Trans Mountain's plans to avoid, mitigate and manage those effects and risks, it is clear that the Project is in the Canadian public interest.

3. PROJECT DESIGN

3.1 Overview

In designing the Project, Trans Mountain has drawn on its extensive experience with safely operating the TMPL for more than 60 years. The Project's design will meet or exceed the requirements of the OPR, Canadian Standards Association ("CSA") Z662, Oil and Gas Pipeline Systems, and include an iterative risk-based assessment process that identifies high-consequence areas of the design. Design considerations and mitigation measures have been proposed to reduce the overall risk. Following years of engagement, Trans Mountain worked diligently to address the concerns that were raised by stakeholders and Aboriginal groups, including by modifying its engineering designs.

The JRP for the Northern Gateway Project provided guidance regarding the expectations for a pipeline project's engineering design at the hearing stage. The JRP expected the proponent to follow good engineering practice, consisting of applying informed judgment and proven and accepted engineering methods, procedures and practices to address technical problems.[234] It said:

> The application of good engineering practice results in an appropriate, cost-effective solution that meets the needs of the project, meets regulatory requirements, and protects the safety of persons, the environment, and property, when the solution is properly implemented and maintained. Where there are potential unknowns that are difficult to predict accurately due to natural variability, the Panel finds that a precautionary approach is needed in applying good engineering practice.[235]

A pipeline proponent's responsibility is to provide a level of engineering information that meets or exceeds regulatory requirements for a thorough and comprehensive review, in terms of whether

[234] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 52.

[235] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 52.

or not it can construct and operate a project in a safe and environmentally responsible manner.[236] Regulators have acknowledged that final designs require a greater level of detail about the Project's precise route and geotechnical conditions than is available at the hearing stage.[237]

In this section Trans Mountain has detailed its approach to the design of the Project and proposed mitigation measures. The TMEP design process focused on ensuring the safe shipment and storage of crude oil throughout the Project's life. Trans Mountain is employing risk-based design as the basis of identifying optimal risk-mitigation measures, such as valve placement and location, and incorporating those risk mitigation measures into the final design. This risk-based design process constitutes the engineering assessment through which the final design will be arrived at. Risk based design is an iterative process that utilizes evaluations of risk to identify areas where risk mitigation measures can be incorporated into design, and directs the selection of appropriate measures. [238]

The iterative risk-based design approach, which is described further in Trans Mountain's reply evidence,[239] is currently underway, and will continue to progress through to completion of the detailed design with incorporation of specific risk mitigation measures into the final design. Some examples of typical risk mitigation strategies include: the mitigation of third party damage through increased depth of cover, increased wall thickness or pipeline markers, mitigation of environmental consequences through the refinement of valve placement and the mitigation of geotechnical threats through threat avoidance.[240]

---

[236] NEB-Reasons for Decision-Mackenzie Gas Project GH-1-2004 (December 2010), Volume 2, 113.

[237] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 52.

[238] Exhibit B291-10 – Trans Mountain Follow-Up Response to NEB F-IR No. 2.110c (December 1, 2014) (A4F5A1), 2.

[239] Trans Mountain Reply Evidence, Section 10 – Pipeline System & Engineering Design (August 20, 2015), 10-2.

[240] Trans Mountain Reply Evidence, Section 10 – Pipeline System & Engineering Design (August 20, 2015), 10-2.

Trans Mountain applied good engineering practice to ensure compliance with all applicable laws and regulations, as well as industry-accepted codes and standards, KMC standards, specifications, manuals and recommended practices and giving particular consideration to the range of terrain and environmental conditions that the TMEP will cross. The Project will be designed in accordance with the OPR, which incorporate, by reference, the applicable CSA Z662 Oil and Gas Pipeline Systems standard.[241] The recently updated CSA Z662-15 pipeline standard, released in June 2015, applies to the Project and Trans Mountain will meet it.[242] The NEB has required the use of these standards for other major pipeline projects.[243] The Project was designed to meet or exceed all applicable regulations and standards. In some instances, such as the specified use of Category II pipe instead of Category I for added fracture initiation resistance, the Project design has exceeded the applicable regulations and standards. In its written evidence, Natural Resources Canada confirmed that it was satisfied with Trans Mountain's pipeline integrity and materials commitments and had no additional concerns:

> NRCan notes that the proponent has made the following commitments related to the Project:
>
> i) Trans Mountain will implement weld toughness testing of submerged arc welds at minus 5 degrees Celsius (-5°C) temperature.
>
> ii) Trans Mountain will commit to implementing weld toughness testing of electric welded pipe at minus 5 degrees Celsius (-5°C) temperature.
>
> iii) Engineering Critical Assessment (ECA) based flaw acceptance criteria expected to be available at the end of Q4, 2015 and will be made available to Natural Resource Canada.

---

[241] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-4; *National Energy Board Onshore Pipeline Regulations*, SOR/99-294, s 4(1)(d).

[242] Exhibit B413-1 - Trans Mountain Pipeline ULC Response to NEB IR No 6 (July 22 2015) (A4R6I4), 118.

[243] CEAA-MVEIRB Joint Review Panel, Foundation for a Sustainable Northern Future, Report of the Joint Review Panel for the Mackenzie Gas Project (December 2009), 113.

> iv) Compliance with CSA Z245.30-14 for field-applied external coatings for TMEP.
>
> v) Trans Mountain will provide NRCan with a copy of TMEP Coating Specifications by 30 June 2015.
>
> As such, NRCan is satisfied that Trans Mountain has provided satisfactory responses to pipeline integrity and material issues and has no additional requests or concerns.
> [emphasis added] [244]

This evidence demonstrates that the Project design has met the pipeline integrity and material design requirements of Natural Resources Canada, which is an expert agency with a mandate to enhance the responsible development of Canada's natural resources.

3.2 The Project

The physical components of the Project include the installation of new pipeline segments and reactivation of existing lines that are currently maintained in a deactivated state; construction of pump stations; expansion of existing terminals through the addition of new tanks and other infrastructure and construction of a new dock complex at Westridge Marine Terminal; and the addition of new power lines under the jurisdiction of the appropriate provincial authorities.[245]

The scope of the Project specifically involves the following applied-for facilities:

(a) using existing active 610 mm (NPS 24) and 762 mm (NPS 30) OD buried pipeline segments;

(b) constructing three new 914 mm (NPS 36) OD buried pipeline segments totaling approximately 987 km:

(i) Edmonton to Hinton – 339.4 km;

---

[244] Exhibit C249-9-1 – Natural Resources Canada - Written Evidence (May 27, 2015) (A4Q0V2).

[245] Exhibit B1-1 - Trans Mountain Pipeline ULC – V1 SUMM (December 16, 2013) (A3S0Q7), 1-2.

(ii) Blue River to Darfield – 158.4 km; and

(iii) Black Pines to Burnaby – 367.9 km;

(c) Constructing one new 1,067 mm (NPS 42) OD buried pipeline segment:

(i) Hargreaves to Blue River – 121 km

(d) reactivating two 610 mm (NPS 24) OD buried pipeline segments that have been maintained in a deactivated state:

(i) Hinton to Hargreaves – 150 km; and

(ii) Darfield to Black Pines – 43 km;

(e) constructing two, 3.6 km long 762 mm (NPS 30) OD buried delivery lines from the Burnaby storage Terminal to the Westridge Marine Terminal (the Westridge Delivery lines);

(f) Installing 25 new sending or receiving traps (18 on the Edmonton-Burnaby mainlines), for in-line inspection tools at nine existing sites and two new sites[246];

(g) adding 12 new pumping units. 10 at existing TMPL site and 2 units at a new greenfield site;

(h) constructing 20 new tanks located at the terminals near Edmonton (5), Sumas (1) and Burnaby (14), preceded by demolition of two existing tanks near Edmonton (1) and Burnaby (1), for a net total of 18 tanks added to the system; and

(i) 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

[246] Exhibit B371-36 – Trans Mountain Response to NEB IR No. 4.59a-Attachment 1 (April 13, 2015) (A4K4Z7).

decommissioning of the existing berth, which was assessed in Trans Mountain's ESA.[247]

Trans Mountain has been issued two CPCN's for the existing TMPL and plans to utilize the Anchor Loop segment and the active NPS 30 segment between Darfield, B.C. and Black Pines, B.C. for the Project, if approved.[248]

The above pipeline segments and facilities comprise the physical components of the Project.

3.3 Project Alternatives

Section 19(1)(g) of CEAA 2012 mandates the consideration of "alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means." In the CEA Agency's Operational Policy Statement Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012 "alternative means", as referred to in section 19(1)(g) of the Act, are defined as "the various technically and economically feasible ways under consideration by the proponent that would allow the designated project to be carried out." Alternative means may include options for alternative locations, routes and methods of development, implementation and mitigation. According to the

[247] Exhibit B5-9 -Trans Mountain Pipeline ULC - V5A ESA 01of16 BIOPHYSICAL (December 16, 2013) (A3S1L3), ii-iii; Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 117; Exhibit B5-21 - V5A ESA 13 of 16 BIOPHYSICAL - (December 16, 2013) (A3SIR0), 7-404 to 7-501; Trans Mountain notes that it has not finished developing all of the information required by the NEB for a decommissioning application pursuant to section 45.1 of the *National Energy Board Onshore Pipeline Regulations*, therefore, Trans Mountain will submit a separate application for decommissioning the existing berth after the required information is available.

[248] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 4-5; Exhibit B301-9-Trans Mountain Pipeline ULC - Response to Robyn Allan Notice of Motion 8 dated January 5, 2015– Updated Attachment Summary (January 15, 2015) (A4G5E7). The first, OC-2, was issued in August 1960 and provided for the original construction of the pipeline including two 80 km pipeline loops. The second, OC-49, was issued in November 2006 and provided for the construction of the NPS36 Anchor Loop.

Alternative Means Operational Policy Statement, alternative means should be compared on the basis of environmental effects, as well as technical and economic feasibility to determine a preferred alternative. A full EA is not required for each of the various alternatives considered; only the preferred alternative.[249] The Federal Court of Appeal in *Alberta Wilderness Association v Express Pipelines Ltd* confirmed that the decision of which alternative means to consider is a question of the Panel's judgment.[250] The RH-001-2012 proceeding demonstrated the need and benefits of expanding the existing TMPL.[251] In developing the Application, Trans Mountain evaluated pipeline concepts to different destinations and also considered alternative marine terminal locations.

Trans Mountain considered alternative locations for the Westridge Marine Terminal. This analysis was based on the feasibility of comparable marine and pipeline access, and screening based on technical, economic and environmental considerations. The alternative locations in B.C. included Kitimat and Roberts Bank in Delta. Trans Mountain ultimately concluded that constructing and operating a new marine terminal and supporting infrastructure would result in significantly greater cost, a larger footprint and additional environmental effects, as compared to expanding existing facilities. Based on this, Trans Mountain did not continue with a further assessment of alternative termini for the Project.[252]

---

[249] CEA Agency, Operational Policy Statement, "Addressing "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*", (March 2015), 2-4.

[250] *Alberta Wilderness Assn. v Express Pipelines Ltd.* (1996), 137 DLR (4th) 177, para 17 (FCA).

[251] Exhibit B1-4 - V2 3of4 PROJ OVERVIEW (December 16, 2013) (A3S0R0), 2-46.

[252] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 232-233.

Trans Mountain's rationale for choosing the Westridge Marine Terminal as the preferred alternative was based on the expectation that Roberts Bank would result in a significantly greater footprint and estimated $1.2 billion higher capital cost and assumed higher operating costs. In addition, it is imperative that the Board be mindful of the adverse effects that would stem from an alternative terminal location, namely, it would result in a larger footprint and incremental environmental effects—an additional storage terminal with an estimated 100 acres of land required, a larger dock structure with a seven km trestle and a 14 km longer pipeline that diverges further from the existing TMPL system corridor. Trans Mountain's ability to utilize the existing Westridge Marine Terminal and avoid a larger footprint and incremental environmental effects is an excellent demonstration of why this pipeline has been responsibly planned and is in the public interest. [253]

Currently, Aframax and Panamax class of tankers call on the Westridge Marine Terminal to transport oil. Trans Mountain will use a majority of Aframax with some Panamax size tankers for the Project.[254] Aframax and Panamax tankers are permitted by PMV.

Trans Mountain considered a number of alternative pipeline corridors in the ESA.[255] For example, two primary locations were considered to cross the main stem of the Fraser River between the cities of Surrey and Coquitlam using horizontal directional drilling ("HDD"), a trenchless method of construction.

---

[253] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 179-89.

[254] Exhibit B18-20 - V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-72.

[255] Exhibit B5-27 - V5B ESA 02of16 SOCIOEC (December 16, 2013) (A3S1R6).

In Trans Mountain's view, the use of alternative corridors is appropriate to provide Trans Mountain with the flexibility to address technical issues and stakeholder concerns. For example, Trans Mountain requires an alternative corridor for its proposed Pembina River crossing.[256] At this crossing Trans Mountain is proposing a HDD crossing method which does not support the alternate open cut installation method at the same location. Therefore, an alternative corridor for an open cut crossing method is required as a contingency in the event that its preferred HDD crossing method is not feasible.[257]

Trans Mountain is requesting that the Board recommend approval of the preferred corridor as well as the limited alternative corridors, as identified in Trans Mountain's response to NEB IR 3.017(a) and (b).[258] In Trans Mountain's view, seeking approval for a 150 m preferred corridor, with specific alternatives, provides interested parties with sufficiently finalized routing. The JRPs for the Northern Gateway[259] and Sable Gas Projects[260] recognized that ongoing consultation with stakeholders would require adjustments to the proposed project corridor, which is subsequently finalized during the detailed routing process and detailed design. It is important to note that Trans Mountain has studied the limited alternative corridors and provided the Board with sufficient information regarding environmental, social economic and engineering information to satisfy the requirements of the Filing Manual and support Board recommended approval of the alternatives.

---

[256] Exhibit B324-34 - 13.1 Geotechnical Feasibility Report Pembina River Crossing (February 27, 2015) (A4I6H2).

[257] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A65693), 162.

[258] Exhibit B306-2 - Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A65693), 160-171.

[259] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 8.

[260] Joint Review Panel Report, Sable Gas Projects (October 1997), 81.

Trans Mountain's consideration of pipeline corridor alternatives has also been influenced by engagement with Aboriginal groups located along the Project right-of-way.[261] Based on discussions with Aboriginal groups located along the Project right-of-way, Trans Mountain confirmed to the Board that it is seeking the necessary approvals and permits to construct the TMEP in the preferred corridor across a number of Indian Reserves as of July 31, 2015, such as: Zoht IR 4 and 5 and Joeyaska IR 2 (Lower Nicola Indian Band ("LNIB")) and Popkum IR 1 (Popkum First Nation).[262]

Trans Mountain has not reached an agreement with Shxw'ōwhámel First Nation ("Shxw'ōwhámel") regarding the Ohamil IR 1 TMPL Alternate corridor. Therefore, Trans Mountain is seeking approval for the preferred pipeline corridor. Trans Mountain is requesting approval from the NEB (consistent with a similar condition in GH-001-2012[263]) for the preferred pipeline corridor with a condition that, concurrent with the filing of the PPBoR pursuant to section 33 of the NEB Act, Trans Mountain will also file with the Board a description of any proposed detailed route alignment that is located outside of Trans Mountain's preferred corridor, as well as supporting information.[264]

With respect to Tzeachten IR 13, Trans Mountain is also requesting approval from the NEB for the preferred routing with a condition that Trans Mountain must either secure necessary land rights

[261] Exhibit B415-2 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A4R8Z4).

[262] Exhibit B415-2 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A4R8Z4).

[263] NEB – Reasons for Decision – NOVA Gas Transmission Ltd. GH-001-2012, (January 2013), 102.

[264] Exhibit B415-2 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A4R8Z4), 2.

to construct across Tzeachten IR 13 or request approval of the alternative route filed with the NEB, concurrent with the filing of the PPBoR pursuant to section 33 of the NEB Act.[265]

Trans Mountain also considered alternative pipeline corridors for the Westridge Delivery Pipelines in response to feedback from residents and stakeholders.[266] In May 2014, as detailed in Section 3.3 - Route Selection and Land Acquisition, Trans Mountain informed the NEB that its preferred route for the Westridge Delivery Pipelines had changed from the original proposed pipeline corridor via Burnaby streets to the proposed revised pipeline corridor using a trenchless construction method via Burnaby Mountain.[267] To support this change, Trans Mountain considered environmental, economic and engineering factors, and stakeholder feedback, comparing the Burnaby streets option and the tunnel through the Burnaby Mountain Conservation Area.[268]

Trans Mountain reasonably considered alternative pipeline corridors and marine terminal locations in satisfaction of the statutory requirements under CEAA 2012. The consideration of these alternatives was informed by engagement with affected stakeholders and Aboriginal communities.

3.4 Routing

Pipeline routing is a primary design feature affecting the potential for environmental impacts. Past decisions of the Board, where it has recognized that the use of existing linear corridors and right-

[265] Exhibit B415-2 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A4R8Z4), 3.

[266] Exhibit B099 - Trans Mountain Pipeline ULC - Response to NEB Information Request Regarding Project Corridor - Appendix A Routing Consultation Summary (June 10, 2014) (A3X9S4).

[267] Exhibit B032-2- Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8), 246.

[268] Exhibit B290-2 – Part 1 Westridge Delivery Line Routing Update (December 1, 2014) (A4F5D5), 8-9.

of-ways reduces environmental impacts, have similar application to the Project.[269] Efforts to minimize any new permanent and temporary footprints by utilizing existing rights-of-way and other disturbed lands to the greatest extent possible, and considering site-specific landowner requests to reduce the width of easements, were considered reasonable and appropriate measures in the context of the Brunswick Pipeline Project.[270] Similarly, the Board concluded that disruptions and burdens of the Southern Lights Project were minimized by using existing infrastructure, installing facilities on existing Enbridge sites and routing a light sour crude oil pipeline along existing right-of-ways to the greatest extent possible.[271] In the decision approving Enbridge Pipelines (Westpur) Inc.'s ACCE Expansion Project, the NEB noted that:

> By selecting a new pipeline RoW route that is parallel to and contiguous with its existing RoW, the Board is satisfied that Enbridge Westspur has chosen a route that minimizes adverse impacts to the land, landowners, and nearby residents while providing efficiencies and synergies for construction and operation of adjacent compatible facilities and overlapping footprints.[272]

The route for the ACCE Expansion Project was adjacent to an existing right-of-way that was in place for 50 years and was well known to all interested parties.[273] Given that Trans Mountain has maximized the use of the existing linear disturbances, including the existing TMPL right-of-way that has been safely operating for more than 60 years, this is an important consideration that must be factored into the NEB's recommendation on the Project.

---

[269] NEB - Reasons for Decision - Emera Brunswick Pipelines Company Ltd. - GH-1-2006 (May 2007), 72-73; NEB – Reasons for Decision – Enbridge Pipelines Inc. – OH-4-2007 (February 2008), 28-29.

[270] NEB – Reasons for Decision – Emera Brunswick Pipeline Company Ltd. – GH-1-2006 (May 2007), 72.

[271] NEB – Reasons for Decision – Enbridge Southern Lights GP – OH-3-2007 (February 2008), 67.

[272] NEB – Reasons for Decision – Enbridge Pipelines (Westpur) Inc. – OH-2-2007 (June 2007), 17-18.

[273] NEB – Reasons for Decision – Enbridge Pipelines (Westpur) Inc. – OH-2-2007 (June 2007), 17.

3.4.1 Routing Criteria and Engagement

Trans Mountain's pipeline route selection is one of the hallmarks of this Project. The route was developed with the goal of minimizing impacts on potentially affected parties and the environment. Trans Mountain's routing criteria is summarized as follows:

(a) wherever feasible, install the Line 2 segments on or adjacent to the existing TMPL easement;

(b) where that proves not feasible, install the Line 2 segments adjacent to easements or rights-of-way of other linear facilities including other pipelines, power lines, highways, roads, railways, fibre optic cables and other utilities;

(c) or, if that is not feasible, install the Line 2 segments in a new easement selected to balance a number of engineering, construction, environmental and socio-economic factors; and lastly; and

(d) in the event a new easement is necessary, minimize the length of the new easement before returning to the TMPL easement or other rights-of-way.[274]

As detailed above, the proposed route for the Project parallels existing linear disturbances for 89 per cent of its length: the proposed pipeline corridor is on or adjacent to the existing TMPL easement for 73 per cent of the total length of new pipeline and approximately 16 per cent follows other existing rights-of-way. A total of 11 per cent of the TMEP will be in a new corridor.[275] By

[274] Exhibit B2-1 - Trans Mountain Pipeline ULC - Volume 4A: Project Design & Execution - Engineering (December 16, 2013) (A3S0Y8), 4A-6.

[275] Exhibit B2-1 - Trans Mountain Pipeline ULC - Volume 4A: Project Design & Execution - Engineering (December 16, 2013) (A3S0Y8), 4A-6. - 4A-13; Exhibit B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 – (August 1, 2014) (A62087); Exhibit B255 - Trans Mountain Pipeline ULC - Technical Update No. 2 - (August 22, 2014) (A62400); Exhibit B290 - Trans Mountain Pipeline ULC - Project and Technical Update No. 4 (December 1, 2014) (A64687); Exhibit B415 - Trans Mountain Pipeline ULC - Updated Response NEB IR No 3 017a (July 31, 2015) (A71581).

configuring the TMEP in this manner Trans Mountain has significantly reduced the amount of undisturbed land required for the Project. Furthermore, Trans Mountain will be able to utilize adjacent right-of-way and existing roads and linear disturbances for access to the construction site, as well as the right-of-way itself, so that only minimal new access will be required for the Project. This will result in a dramatic reduction in the disturbance to the environment and on Aboriginal traditional land resource use. These measures will greatly minimize impact from the Project.

The proposed pipeline corridor is generally 150 m in width centered on the existing TMPL easement, except where deviations are required, for example to avoid areas that have significant environmental value or to minimize routing through areas of extensive urban development.

Trans Mountain formed a Routing Committee that is comprised of representatives of its various discipline teams involved in the corridor selection process, including land, engineering, construction, environment, stakeholder engagement and Aboriginal engagement as needed. Pipeline routing specialists consider all available information and factor that information into the corridor selection process, and subsequently into the definition of the Project footprint and use during Project design and execution planning. Potential adjustments to the pipeline corridor, for example based on stakeholder feedback, were compiled and reviewed by the Routing Committee to inform the Project routing.

Trans Mountain has engaged with affected stakeholders in order to optimize its routing. The City of Coquitlam requested a revision of the proposed corridor to avoid impacts to prominent businesses, industrial vacancies and proximity of City of Coquitlam utilities within Schooner Street.[276] Trans Mountain is not prepared at this point to relocate the proposed TMEP corridor

[276] Exhibit C70-3-2 - City of Coquitlam Summary of Evidence (May 27, 2015) (A4Q0I9), 5.

away from the existing right of way along Schooner Street as it is not consistent with the routing criteria set out in the Application to the NEB. The proposed corridor reduces the amount of new rights-of-way imposed on the City of Coquitlam, thus reducing impacts to the City of Coquitlam's future development.[277] Nevertheless, in Trans Mountain's view, the City of Coquitlam's routing proposal has merit and warrants further investigation and study. Trans Mountain requests a condition that concurrent with the filing of Trans Mountain's PPBoR, pursuant to section 33 of the NEB Act, Trans Mountain will also file with the Board a description of any proposed detailed route alignment that is located outside of Trans Mountain's preferred corridor, as well as supporting information for the re-route.[278]

Trans Mountain will provide copies of the above filings to affected parties and submits that such a condition is supported by a similar condition in the NEB's GH-001-2012 decision regarding the NOVA Gas Transmission Ltd. Northwest Mainline Komie North Extension where the potential for routing outside the corridor existed post certification.[279]

Metro Vancouver's evidence discusses rerouting to avoid sensitive ecosystems.[280] This has been a major focus of Trans Mountain's route planning design methodology since the Project's inception. For example, Trans Mountain used HDD underneath the Hope Redwoods Natural Area and the City of Surrey park. As stated in Trans Mountain's reply evidence:

> "[w]here Trans Mountain was unable to avoid routing through sensitive ecosystems, construction methods and practices have been explored and developed in order to minimize the required work

[277] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor & Routing (August 20, 2015), 13-3.

[278] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor & Routing (August 20, 2015), 13-3.

[279] NEB – Reasons for Decision – NOVA Gas Transmission Ltd. GH-001-2012, (January 2013) 102.

[280] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3).

> space and right of way required and the impacts within the affected zones.[281]

In Surrey Bend Regional Park, for example, a custom construction methodology will be used to minimize the environmental impact and limit intrusion to 6 m into park land, which Trans Mountain will completely rehabilitate. In other parks such as Douglas Taylor Park and Sumas Mountain temporary workspace has been reduced by 10 m in width, as much as feasibly possible, to preserve sensitive lands. Refer to Trans Mountain's reply evidence for further examples. [282]

The City of Surrey filed a report that discusses two possible alternatives to the current routing through Surrey Bend Regional Park.[283] As discussed in response to an NEB IR, the concerns presented by the City of Surrey about the proposed corridor through Surrey Bend Regional Park are manageable and can be mitigated to provide a no net loss solution. Trans Mountain is nonetheless committed to continue to pursue and investigate options with the Ministry of Transportation regarding sharing their right-of-way through the region with the potential to avoid having to route through Surrey Bend Regional Park. In order to accommodate this in an efficient manner, Trans Mountain is requesting approval from the NEB (consistent with a similar condition in GH-001-2012) for the preferred pipeline corridor with a condition that concurrent with the filing of the PPBoR pursuant to section 33 of the NEB Act, Trans Mountain will also file with the Board

---

[281] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor & Routing (August 20, 2015), 13-1.

[282] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor & Routing (August 20, 2015), 13-1.

[283] Exhibit C76-12-2 - Environmental Assessment of Pipeline Placement Options Within and Adjacent to Surrey Bend Regional Park (Part 1) (May 28, 2015) (A4Q2J6); Exhibit C76-12-3 - Environmental Assessment of Pipeline Placement Options Within and Adjacent to Surrey Bend Regional Park (Part 2) (May 28, 2015) (A4Q2J7); Exhibit C76-12-4 - Environmental Assessment of Pipeline Placement Options Within and Adjacent to Surrey Bend Regional Park (Part 3) (May 28, 2015) (A4Q2J8); Exhibit C76-12-5 - Environmental Assessment of Pipeline Placement Options Within and Adjacent to Surrey Bend Regional Park (Part 4) (May 28, 2015) (A4Q2J9); Exhibit C76-12-6 - Environmental Assessment of Pipeline Placement Options Within and Adjacent to Surrey Bend Regional Park (Part 5) (May 28, 2015) (A4Q2K0).

a description of any proposed detailed route alignment that is located outside of Trans Mountain's preferred corridor, as well as supporting information for the re-route.[284]

While Trans Mountain has finalized a preferred pipeline corridor, alternative corridors have been identified in a limited number of specific areas. Trans Mountain is carrying technically feasible alternative corridors as a response to issues raised during Aboriginal, stakeholder and landowner engagement. These alternative corridors provide flexibility to address remaining Aboriginal, landowner or stakeholder issues. The alternative corridors generally fit into three categories:

(a) alternative trenchless crossing methods, which may be required as contingencies depending on the constructability of the proposed alignment;

(b) alternatives to proposed Provincial Park crossings, which are dependent upon a Provincial Government decision; and

(c) alternatives to proposed First Nation Indian Reserve crossings, which are dependent on agreement from First Nations.[285]

As detailed in the Project Alternatives section above, Trans Mountain received strong feedback from stakeholders and it made every effort to reconsider its planned routing. Trans Mountain's efforts to incorporate stakeholder feedback in its Project routing in the Burnaby area is a prime example of this approach.

The original TMPL was constructed in Burnaby over 60 years ago. Over the following decades, increased urbanization in Burnaby has resulted in extensive urban development in the vicinity of the TMPL right-of-way. Trans Mountain received feedback from residents and stakeholders in

[284] Exhibit B413-13 – Trans Mountain Response to NEB IR No. 6.20-Attachment 1 (July 22, 2015) (A4R6J5).

[285] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A65693), 160-165.

Burnaby requesting a routing that would minimize disruption in residential areas.[286] As a result, Trans Mountain informed the NEB in May 2014 that its preferred route for the Westridge Delivery Pipelines had changed from the original proposed pipeline corridor via Burnaby streets to the proposed revised pipeline corridor using a trenchless construction method via Burnaby Mountain.[287] The change in routing required geotechnical investigation, surveys and fieldwork on Burnaby lands in order to meet Filing Manual requirements. Delay occurred when Trans Mountain was unable to acquire a municipal permit from Burnaby enabling Trans Mountain to access and conduct investigations on Burnaby lands. This required Trans Mountain to seek NEB and Court orders to access the lands.[288] Trans Mountain employed considerable effort and resources to ensure that its alignment would minimize disruption to Burnaby streets and the general public. All of these steps were taken in response to landowner and stakeholder feedback that indicated their preference for the proposed tunnel alternative through Burnaby Mountain. Trans Mountain acknowledges that some parties did not support the Burnaby Mountain routing. However, Trans Mountain provided evidence to the NEB demonstrating the Burnaby Mountain route has the fewest impacts to, and addressed the concerns of, directly affected residents as well as the general public.[289]

---

[286] Exhibit B099 - Trans Mountain Pipeline ULC - Response to NEB Information Request Regarding Project Corridor - Appendix A Routing Consultation Summary (June 10, 2014) (A3X9S4).

[287] Exhibit B032-2- Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8), 246.

[288] Exhibit B290-2 – Part 1 Westridge Delivery Line Routing Update (December 1, 2014) (A4F5D5), 6; Exhibit A097 - National Energy Board - Ruling No. 40 and Order MO-122-2014 - Trans Mountain notice of motion and Notice of Constitutional Question dated 26 September 2014 (October 23, 2014) (A63788).

[289] Exhibit B290 - Trans Mountain Pipeline ULC - Project and Technical Update No. 4, Part 1 of 2 (December 1, 2014) (A64687).

Trans Mountain's proposed routing is a major benefit of the Project. Paralleling existing linear disturbances for almost all of the Project's length "minimizes adverse impacts to the land, landowners and nearby residents"[290] as repeatedly recognized by the NEB.

3.4.2 Landowner Engagement

Trans Mountain implemented a robust landowner engagement program. Relying on past regulatory processes and legal precedent, Trans Mountain determined those land rights categories that conferred an "interest in land" and would require notice under section 87.1 of the NEB Act. Those groups and individuals who were included within the group entitled to receipt of section 87.1 Notices were engaged directly on an individual basis and received a full set of Project materials during personal visits. These groups and individuals were also approached to obtain consent to survey for the Project. Those groups and individuals who did not have "an interest in land" and would not be receiving section 87.1 Notices became members of the general stakeholders group for the Project and were engaged as part of the TMEP Stakeholder Engagement Program, which is described in Section 5 - Public Participation of this final argument. Trans Mountain maintained a database that documented all concerns and comments received from landowners and other land interest holders to inform the Project routing and design.[291]

Evidence from the City of New Westminster and North Shore No Pipelines Expansions ("NS NOPE") raised issues regarding the potential impacts of the Project upon adjacent properties and impacts upon property values as a result of an oil spill.[292] As detailed in reply evidence, which

[290] NEB – Reasons for Decision – Enbridge Pipelines (Westpur) Inc. – OH-2-2007 (June 2007) (A0Z4E5), 17-18.

[291] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3.006(a) (February 3, 2015) (A4H1V2), 30-31.

[292] Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5), 29; Exhibit C259-8-2 - NSNOPE written evidence (J Edmonds) (May 26, 2015) (A4L5V1), 23.

concluded that no permanent effects on property prices from the 2007 Westridge oil spill incident and no evidence that the presence of an oil or gas pipeline lowers property values for properties adjacent to pipelines. Trans Mountain relies on its reply evidence and expert literature review regarding other property value issues. [293]

If a CPCN is issued for the Project, Trans Mountain will file its PPBoR with the NEB. Trans Mountain will provide notices to affected landowners under section 34 of the NEB Act regarding the detailed routing of the Project. Landowners can engage in the NEB's detailed routing process at that time. The Board confirmed that submissions regarding the detailed route of the pipeline are premature and will not be considered at this time.[294]

3.5 Potential Municipal Infrastructure Impacts and Mitigation

The Board has previously endorsed Trans Mountain's approach of proposing mitigation measures to minimize impacts to municipal infrastructure, complying with all NEB crossing regulations and working collaboratively with municipalities.[295] In the planning and design of the Project, Trans Mountain will continue to work with municipalities to accommodate reasonably foreseeable plans for municipal infrastructure including roads and utilities.[296] This section addresses concerns raised by municipal governments with respect to potential Project-related impacts on municipal infrastructure and Trans Mountain's response, including any mitigation measures.

---

[293] Trans Mountain Reply Evidence, Section 9 - Landowner & Other Compensation (August 20, 2015), 9-1 – 9-2.

[294] Exhibit A137 - National Energy Board - Procedural Direction No. 10 – Various clarifications and reminders (February 13, 2015) (A66126).

[295] NEB Reasons for Decision-Emera Brunswick Pipeline Company Ltd. – GH-1-2006 (May 31, 2007), 57.

[296] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6.19 (July 22, 2015) (A4R6I4), 90.

The municipalities of Surrey, Burnaby, Coquitlam, Abbotsford and the Township of Langley retained Associated Engineering to complete an assessment of the additional costs that will be incurred by each municipality to operate, maintain and construct municipal infrastructure impacted by the existing Trans Mountain pipeline and the TMEP.[297] This report estimates these additional costs to be in the range of $93,000,000 and proposes mitigation measures to assist in reducing cost impacts. The City of Edmonton separately filed a report by ISL Engineering claiming $12,003,500 in municipal infrastructure mitigation costs for Trans Mountain's proposed Whitemud Drive alignment.[298]

Trans Mountain believes it is reasonable for the Project to reimburse municipalities for any modifications to their existing infrastructure in advance of construction required to accommodate the Project. In the planning and design of the Project, Trans Mountain is willing to work with municipalities to minimize impacts and accommodate reasonably foreseeable plans for municipal infrastructure including roads and utilities in the design and placement of the pipeline. Once the Project is in operation, any subsequent design and development of municipal infrastructure would be completed with the pipeline in place, in consultation with Trans Mountain to mitigate impact and costs and in the event that modifications or relocations of the pipeline are required to accommodate new municipal infrastructure, Trans Mountain would look to the municipality for reimbursement.[299]

---

[297] Exhibit C76-10-6 - Cost Impacts of the Trans Mountain Expansion on Lower Mainland Municipalities - Report by Associated Engineering (Part 1) (May 27, 2015) (A4Q0Q0); Exhibit C76-10-7 - Cost Impacts of the Trans Mountain Expansion on Lower Mainland Municipalities - Report by Associated Engineering (Part 2) (May 27, 2015) (A4Q0Q1); Exhibit C76-10-8 - Cost Impacts of the Trans Mountain Expansion on Lower Mainland Municipalities - Report by Associated Engineering (Part 3) (May 27, 2015) (A4Q0Q3).

[298] Exhibit C345-4 - The City of Edmonton Written Evidence (May 27, 2015) (A70332).

[299] Exhibit B052 - Trans Mountain Pipeline ULC - Responses to Information Requests from City of Surrey Round 1 (April 6, 2014) (A3X6A5), 17-18.

Under section 75 of the NEB Act, Trans Mountain is responsible to fully compensate parties for all damages suffered as a result of Trans Mountain exercising its rights under the NEB Act. As detailed in Trans Mountain's reply evidence, standard industry practice is for subsequent utilities to accommodate prior utilities.[300] To date, Trans Mountain has made the following commitments to municipalities:

(a) continue to pay municipal taxes that are in excess of the costs of municipal services required and received by Trans Mountain;

(b) pay for land rights on municipal lands required for the TMEP;

(c) pay for modifications to municipal infrastructure required to accommodate TMEP, including staff and consultants time for design and monitoring of construction to ensure the integrity of municipal infrastructure;

(d) work jointly with municipal staff to identify and address specific municipal issues and concerns with Trans Mountain through joint Technical Working Groups;

(e) enter into crossing agreements to clearly specify rights and responsibilities, including cost coverage for crossings of municipal infrastructure;

(f) continue to work with municipalities through pipeline operations and pipeline protection to develop ways to more efficiently meet regulatory requirements, protect public safety and ensure pipeline integrity; and

(g) follow regulatory requirements and standard industry practices for design and implementation of utility crossings.[301]

---

[300] Trans Mountain Reply Evidence, Attachment 1.05 - Reply to the City of Abbotsford, City of Burnaby, City of Coquitlam, City of Surrey, Township of Langley "Cost Impact of the Trans Mountain Expansion on Lower Mainland Municipalities" (August 20, 2015), 8.

[301] Trans Mountain Reply Evidence, Attachment 1.05 - Reply to the City of Abbotsford, City of Burnaby, City of Coquitlam, City of Surrey, Township of Langley "Cost Impact of the Trans Mountain Expansion on Lower Mainland Municipalities" (August 20, 2015), 8.

The City of Abbotsford, Burnaby, City of Coquitlam, City of Surrey, Township of Langley are requesting that Trans Mountain go further and indemnify them for any future, speculative additional costs related to operations and maintenance, future modifications and installation of additional municipal infrastructure, over and above the revenues they currently receive from Trans Mountain in the form of taxes and fees. Trans Mountain submits this would be discriminatory, as compared to how other similar utilities are treated. Such broad indemnification is also in conflict with established precedent, standard industry practice and principles of fairness, and is thus not warranted.[302]

With respect to the City of Edmonton's comments on indemnification, Trans Mountain confirmed that it is reasonable to reimburse municipalities, including the City of Edmonton, for any modifications to their existing infrastructure required to accommodate the Project. Part of those reimbursements are expected to include reasonable staff time to plan for and review detailed design. [303] Trans Mountain responded to the City of Edmonton's routing-related concerns in reply evidence. In Trans Mountain's view, the Whitemud Drive corridor is consistent with the general routing approach taken through the City of Edmonton, where use of corridors was selected versus use of the existing Trans Mountain easement in order to avoid high density urban areas to the extent possible. Trans Mountain has proposed forming a joint Technical Working Group with the City of Edmonton to work towards resolution of issues with the Whitemud Corridor identified in its evidence.[304]

---

[302] Trans Mountain Reply Evidence, Attachment 1.05 - Reply to the City of Abbotsford, City of Burnaby, City of Coquitlam, City of Surrey, Township of Langley "Cost Impact of the Trans Mountain Expansion on Lower Mainland Municipalities" (August 20, 2015), 8.

[303] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6.19 (July 22, 2015) (A4R6I4), 90.

[304] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor and Routing (August 20, 2015), 13-1.

1986 Based on the evidence submitted by the City of Edmonton, Trans Mountain commits to further
1987 investigation of the Lewis Estates alternative. Accordingly, Trans Mountain is requesting approval
1988 from the NEB (consistent with the similar condition in the Komie North Extension Project)[305] for
1989 the preferred pipeline corridor with a condition that concurrent with the filing of the PPBoR
1990 pursuant to section 33 of the NEB Act, Trans Mountain will also file with the Board a description
1991 of any proposed detailed route alignment (i.e., the Lewis Estates option), as well as supporting
1992 information for the re-route.[306]

1993 The City of Surrey filed a report asserting that due to the age of the TMPL it is nearing the end of
1994 its useful life.[307] The regulation of the existing TMPL system is outside of the scope of this
1995 proceeding. Nevertheless, Trans Mountain comprehensively refuted the assertions in the City of
1996 Surrey's report in reply evidence, which confirms that the TMPL is appropriately managed and
1997 monitored in accordance with the relevant NEB standards including the OPR and CSA Z662, and
1998 that the means and measures employed in maintaining and operating the pipeline (including robust
1999 integrity management and maintenance programs) provide assurance for continued safe operation
2000 of the pipeline. There is no evidence that indicates that the TMPL segments identified by the City
2001 of Surrey are nearing the end of their useful life nor is there evidence to suggest that the pipeline
2002 should be replaced.[308]

---

[305] NEB – Reasons for Decision – NOVA Gas Transmission Ltd. GH-001-2012, (January 2013), 102.

[306] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor and Routing (August 20, 2015), 13-10.

[307] Exhibit C76-10-9 - TMP-TMX Routing Options and Feasibility of Abandoning the Existing Pipeline through the COS - Report by Associated Engineering (May 27, 2015) (A4Q0Q6).

[308] Trans Mountain Reply Evidence, Section 13 – Pipeline Corridor & Routing (August 20, 2015), 13-4 – 13-7.

Burnaby filed a report titled "Assumptions of Trans Mountain for the Trans Mountain Expansion Project in Burnaby", which asserts that Trans Mountain made a number of assumptions in the Application for the TMEP that are unreasonable in regards to Burnaby.[309] This assertion is incorrect. In a specific response report, Trans Mountain established that its Application was based on sound and reasonable facts and assumptions with respect to Burnaby.[310] For example, Burnaby raised concerns that Trans Mountain's Application for the TMEP, as proposed, potentially conflicts with a number of the bylaws of Burnaby.

As a federally regulated entity under the NEB Act, if Trans Mountain is granted a CPCN for the TMEP, it will proceed to apply for all federal, provincial and municipal permits and authorizations that are required by law. The NEB confirmed in Ruling No. 40 that federally regulated pipelines are required, through operation of law and the imposition of conditions by the NEB, to comply with a broad range of provincial laws and municipal bylaws. The Board has jurisdiction to determine that specific Burnaby bylaws are inoperative or inapplicable to the extent they conflict with or impair the exercise of Trans Mountain's powers under the NEB Act. [311] To this end, Trans Mountain intends to work collaboratively with municipalities, including Burnaby, to understand the application and operation of municipal bylaws and standards to the construction and operation of the TMEP. Trans Mountain has committed to work with Burnaby, when it is ready to re-engage, and the Board has provided guidance specific to Burnaby regarding the application of municipal bylaws. Therefore Trans Mountain submits that the law on this issue is well understood and that

---

[309] Exhibit C69-44-11 - Assumptions of Trans Mountain for the Trans Mountain Expansion Project in the City of Burnaby (May 27, 2015) (A4L8G5), 21.

[310] Trans Mountain Reply Evidence, Attachment 1.04 - Reply to the City of Burnaby "Assumptions of the Trans Mountain for the Trans Mountain Expansion Project in the City of Burnaby" (August 20, 2015), 1.

[311] Exhibit A97-1 - Ruling No. 40 - Trans Mountain notice of motion and Notice of Constitutional Question dated 26 September 2014 (October 23, 2014) (A4D6H0), 2.

this issue is reasonably resolved. Trans Mountain relies on the detailed responses in its reply evidence for the other issues raised in Burnaby's report.[312]

Trans Mountain is actively engaging with municipalities[313] and has used Technical Working Groups to address Project-related concerns from participating municipalities. For example, in Technical Working Group meetings the City of Abbotsford expressed a concern regarding the effect of the existing and proposed pipelines on the cleaning of drainage and irrigation infrastructure. Through these meetings, Trans Mountain received a proposal from the City of Abbotsford to replace some trenchless road crossings with open-cut methodology, in return for Trans Mountain installing culverts across the right-of-way for certain drainage and irrigation ditches. Trans Mountain is confident that it can work collaboratively with the City of Abbotsford to address this issue.[314] In Trans Mountain's view, Technical Working Groups provide an effective forum for Trans Mountain to collaborate with affected municipalities and, identify, and implement mutually beneficial solutions regarding their Project-related concerns.

3.6 Construction

Trans Mountain filed an overview of its construction scope, execution strategy, resources and schedule in Volume 4B of the Application.[315] Project construction activities will be planned to minimize disturbance and impact to the environment, landowners and the community.[316] This will

---

[312] Trans Mountain Reply Evidence, Attachment 1.04 - Reply to the City of Burnaby "Assumptions of the Trans Mountain for the Trans Mountain Expansion Project in the City of Burnaby" (August 20, 2015).

[313] Exhibit B413-2 - Trans Mountain Response to NEB IR 6.19 (July 22, 2015) (A4R6I4), 88-91.

[314] Trans Mountain Reply Evidence, Section 16 – Pipeline Construction Planning & Execution (August 20, 2015), 16-3.

[315] Exhibit B5-1 - V4B 1.0 TO 4.2.1.1 PROJ DES AND EXEC-CONSTR (December 16, 2013) (A3S1K5).

[316] Exhibit B11-4 - V6B 1 of 2 PIPELINE EPP (December 16, 2013) (A3S2S3), 8-1.

include the use of trenchless technologies, which are described in Section 3.7 - Watercourse Crossings, in select locations to minimize potential disruption or environmental impact. As detailed in Section 5 - Public Participation, dialogue and engagement has taken place with affected stakeholders and Aboriginal groups regarding Trans Mountain's construction plans for the Project. This engagement will continue throughout the construction and post-construction phases, to notify local communities when, where and for how long construction and/or disturbances may take place.

Intervenors such as Shxw'ōwhámel[317] for example, raised concerns regarding increased traffic as a result of construction. Yarrow Ecovillage expressed concerns regarding access to a portion of their property during construction.[318] Calvin Taplay and other intervenors[319] expressed concerns that construction would impede emergency access to homes and businesses.[320] Trans Mountain acknowledges and will addresses any potential residual effect of increased traffic on highways and access roads during construction in the Application.[321] A range of mitigation measures are identified in the Application to address Project-related traffic effects, including:

(a) providing daily shuttle bus services from staging areas to work sites and for local workers from pre-determined regional staging areas;

(b) delivering equipment via rail or boat to temporary stockpile sites along the proposed pipeline corridor which will limit the distances travelled by heavy loads on regional highways;

---

[317] Exhibit C312-13-3 - Attachment to SFN Response to Government of Canada IR 40 – (July 14, 2015) (A4R4K5), 17.

[318] Exhibit C394-2-1 - Yarrow Ecovillage Written submission (May 27, 2015) (A4Q1L3), 7.

[319] Trans Mountain Reply Evidence, Section 19 – Construction Safety and Security (August 20, 2015), 19-1.

[320] Exhibit C340-8-1 - Calvin Taplay - Evidence Submitted for Trans Mountain Pipeline Expansion Project (May 27, 2015) (A4L9H5), para 9.

[321] Exhibit B5-38 - V5B ESA 13 of 16 SOCIOEC (December 16, 2013) (A3S1S7), 7-118.

(c) the proposed Traffic and Access Control Management Plan[322] which will minimize the development of new access routes, control public access along the construction right-of-way, select appropriate access routes that cause the least disturbance to high quality and sensitive wildlife habitat, manage traffic on these routes and determine appropriate construction mitigation measures;

(d) with respect to Mr. Taplay's concerns, ensuring emergency access, with Incident Plans and Public Information Plans to consider potential impacts to emergency vehicle access, notify emergency response providers and develop localized plans to ensure access;[323] and

(e) concerns regarding property access, such as those from Yarrow Ecovillage, will be addressed by the construction contractor. Trans Mountain has committed to maintaining the requested access for Yarrow Ecovillage at all times throughout the construction process.[324]

Trans Mountain concluded that the effect of an increase in traffic on highways and access roads during construction will be isolated in frequency, reversible in the short-term, low to medium in magnitude and not significant.[325] Trans Mountain's proposed traffic mitigation measures will minimize potential effects of the Project caused by increases in traffic in the Project area.

---

[322] Exhibit B11-7 - V6C 1 of 2 FACILITIES EPP (December 16, 2013) (A3S2S6), C-1.

[323] Trans Mountain Reply Evidence, Section 19 – Construction Safety and Security (August 20, 2015), 19-1.

[324] Trans Mountain Reply Evidence, Section 16 – Pipeline Construction Planning & Execution (August 20, 2015), 16-2.

[325] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-127 – 7-128.

Intervenors such as Metro Vancouver stressed the importance of Trans Mountain ensuring that its construction activities protect the environment and sensitive lands.[326] In order to ensure that environmental disturbances are mitigated and minimized, Trans Mountain will implement Project-specific EPPs throughout construction.[327] The EPPs are discussed in Section 3.18 - Environmental Protection Plans, including Trans Mountain's responses to intervenor concerns.

3.7 Watercourse Crossings

Effective watercourse crossing designs are important strategies used to minimize the environmental impacts of the Project. Trans Mountain is committed to constructing the most suitable pipeline watercourse crossings based on all relevant environmental, social and technical factors. These factors include:

(a) hydrological issues such as flow volumes, depth, width and channel stability, including scour;

(b) fish and fish habitat, including the species and life stages that are anticipated to be present in the potential zone of influence at the crossing location at the time of construction;

(c) geotechnical issues including the stability of the bank and valley slopes, subsurface conditions and the risk of debris flow;

(d) construction issues including complexity, crossing configuration, topography, risk, safety, schedule and cost;

(e) regulator, resource manager, Aboriginal community, other community and stakeholder input; and

[326] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3), 69.

[327] Exhibit B316-2 – Trans Mountain Response to Langley IR No. 2 (February 18, 2015) (A4H8T4), 23-25.

(f) permanent and temporary access to watercourses and across watercourses.

Trans Mountain selected the appropriate crossing method for each watercourse crossing. The potential watercourse crossing construction methods considered by Trans Mountain include trenched (i.e., open cut without flow isolation or using flow isolation methods) and trenchless methods (e.g., HDD).[328]

Trenched open-cut crossings allow for excavation of the pipeline trench through a frozen, dry or wet channel with no isolation of flow in the construction area from the rest of the channel. This method is often used for smaller crossings of non-classified drainages, where there are no fisheries or water quality considerations, for watercourses that are dry or frozen to the bottom during construction or for large watercourses where methods to isolate flow cannot be employed or are otherwise unfeasible. [329]

Isolated trenched techniques divert flow around or across the construction zone using dam and pumps, flumes or diversion channels to allow ditch excavation, pipe installation and backfilling to occur away from flowing water. Isolated techniques are used for small or medium sized watercourses where fisheries values, habitat potential and timing constraints at the crossing location allow.[330] Trenchless methods include bore installation, HDD, micro-tunneling, tunneling and aerial crossings. [331]

---

[328] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-13- 4A-18.

[329] Exhibit B306-42 – Trans Mountain Response to NEB IR No. 3.039a-Attachment 1 Part01 (February 3, 2015) (A4H1Z2).

[330] Exhibit B306-42 – Trans Mountain Response to NEB IR No. 3.039a-Attachment 1 Part01 (February 3, 2015) (A4H1Z2).

[331] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-13 – 4A-18.

To facilitate the watercourse crossing selection process, Trans Mountain investigated the fish and fish habitat potential at all probable watercourse crossings identified within the proposed pipeline corridor. For those few sites that were unable to be investigated, a fish and fish habitat Risk Management Framework was developed as a conservative approach to account for any fish or fish habitat potential that may exist at those sites. Watercourses of high sensitivity were reviewed in an iterative process for locating crossings, revising crossing techniques and modifying mitigation measures at each pipeline watercourse crossing.[332]

Trans Mountain has undertaken a review of the watercourse crossings with respect to potential for serious harm. The results of this self-assessment are currently under review by the NEB. If Authorization is required under the *Fisheries Act*, measures to offset the serious harm will be developed. At this time, Trans Mountain does not anticipate any serious harm to fish or fish habitat, based on the primary crossing methods proposed.[333]

Trans Mountain's reply evidence contains responses to intervenor concerns regarding its watercourse crossing design for the Project. The Nooaitch Indian Band recommended that "[h]ydraulic isolation should be required for any small to medium-sized streams which are hydraulically connected to fish habitat, regardless of whether there are fish or fish habitat at the crossing location."[334] Trans Mountain confirmed in its reply evidence that hydraulic isolation will be implemented for any small-to-medium-sized streams that are hydraulically connected to fish

[332] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-13 – 4A-18.

[333] Exhibit B323-3 - Self Assessment Potential for Serious Harm to Fish and Fish Habitat Part 1 of 7 (February 27, 2015) (A4I6C1); refer to Exhibit B323 - Trans Mountain Pipeline ULC - Notice of Motion regarding Outstanding Filings- Part 1 of 3 (February 27, 2015) (A67182) for Parts 2 to 7.

[334] Exhibit C258-9-1 - Nooaitch Written Evidence Documents for Filing (May 27, 2015) (A4Q0F4); refer to the following report within Nooaitch Indian Band's Written Evidence: "Review of Trans Mountain Pipeline Expansion Project NEB Application", Northwest Hydraulic Consultants Ltd. (May 26, 2015), 9.

habitat, regardless of whether there are fishes or fish habitat at the crossing location, unless flow volumes exceed threshold limits for open-cut with flow isolation methodologies or site conditions preclude the ability to isolate the watercourse.[335] Refer to Trans Mountain's reply evidence for responses to watercourse-specific concerns from intervenors regarding crossings.[336]

3.8 Existing Pipeline Segments

As discussed above, the TMEP incorporates sections of pipeline that have already been built for previous projects. This design decision will reduce the additional environmental impact of the Project by incorporating sections of right-of-way that have already been disturbed. Some of these sections have been taken out of service, and will be reactivated as part of the design and construction of the Project while others are currently active. The Reactivated Segments include the NPS 24 pipeline segment from Hinton, Alberta to Hargreaves, B.C. and the NPS 24 pipeline segment from Darfield, B.C. to Black Pines, B.C. Refer to the projection description in Section 3.2 of this final argument.

The TMEP also incorporates two pipeline segments that are currently active into Line 2: the NPS 36 pipeline segment from Hinton, Alberta to Hargreaves, B.C. and the NPS 30 pipeline segment from Darfield, B.C. to Black Pines, B.C. (together, the "Active Segments"). [337]

The Reactivated Segments include an approximately 80 km segment through Jasper National Park. Trans Mountain has previously worked with the Parks Canada with respect to the TMX-Anchor

[335] Trans Mountain Reply Evidence, Section 14 – Watercourse Crossing Design (August 20, 2015), 14-1.

[336] Trans Mountain Reply Evidence, Section 14 – Watercourse Crossing Design (August 20, 2015), 14-1 – 14-10.

[337] Exhibit B32-3 – Trans Mountain Response to NEB IR No. 1 2 of 2 (May 14, 2014) (A3W9H9), 441-444; Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 170-171.

Loop Project, and is familiar with the requirements and expectations of the Parks Canada when conducting routine maintenance projects and or new projects in Jasper National Park. Trans Mountain is committed to working with the Parks Canada in their development of Management Objectives/Desired End Results that address ecological and commemorative integrity for the proposed reactivation activities on the Project. Trans Mountain will prepare an EPP that will describe general and specific mitigation measures which support the Management Objectives/Desired End Results. Further, Trans Mountain has made the following commitments with respect to Reactivated Segments in Jasper National Park:

(a) Trans Mountain will, where required, submit all the necessary permit applications to the Parks Canada for the reactivation work;

(b) Trans Mountain will conduct the Post-Reactivation Environmental Monitoring Program during a period of up to the first five complete growing seasons (or during years one, three and five) following commissioning of the Project or in accordance with NEB certificate conditions;

(c) Trans Mountain has committed to further impact analysis in accordance with the Parks Canada Directive on Implementation of CEAA 2012 following the results of the In-Line Inspections of the 24-inch pipeline;

(d) Trans Mountain will work with potentially affected local Aboriginal and Métis communities identified by Parks Canada; and

(e) Trans Mountain will meet the requirements of the Parks Canada directive on human burials in National Park and NHS settings: Management Directive 2.3.1: Human Remains, Cemeteries and Burial Grounds. [338]

[338] Exhibit B67-1 – Trans Mountain Response to GoC Parks IR No. 1 (June 4, 2014) (A3X6G6), 11.

In its written evidence, Parks Canada concludes that "with the implementation of Trans Mountain's environmental protection and mitigation measures along with any site-specific conditions required by Parks Canada and if Management Objectives/Desired End Results are accomplished, it is unlikely that the Project will cause significant adverse effects to ecological or commemorative integrity and visitor experience of Jasper National Park or the Yellowhead Pass National Historic Site."[339] To ensure the safety of the Reactivated Segments, Trans Mountain completed an engineering assessment[340] and committed to in-line inspections utilizing high-resolution tools. In-line inspections of the Reactivated Segments will include a metal loss tool, an axial flaw detection tool, geometry tool and a recently added electromagnetic acoustic transducer tool.[341] The Reactivated Segments will be also subjected to hydrostatic testing. Additionally, Trans Mountain conducted a threat-based assessment of the Reactivated Segments which considered the status of materials as well as the design, construction and operational variables associated with the pipeline system.[342] This assessment has identified that appropriate mitigation and controls will be required in order to ensure that the magnitudes of threats for the reactivated sections will not exceed those that are associated with best practices.[343] Trans Mountain relies on the detailed responses in its reply evidence in response to the potential conditions proposed by Parks Canada.[344]

---

[339] Exhibit C347-1-1 - Parks Canada TMX Written Evidence (May 26, 2015) (A4L5U9), 12.

[340] Exhibit B255-35 – Part 6.1 Updating Engineering Assessment Reactivation (August 22, 2014) (A4A4E7).

[341] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 158-163.

[342] Exhibit 255-36 – Part 6.1 Updated Engineering Assessment Reaction Appendix A (August 22, 2014) (A4A4E8).

[343] Exhibit B32-3 – Trans Mountain Response to NEB IR No. 1 2 of 2 (May 5, 2014) (A3W9H9), 440.

[344] Trans Mountain Reply Evidence, Section 18 – Pipeline Reactivation (August 20, 2015), 18-1 – 18-4.

Intervenor Lisa Craig stated in her evidence that no plans have been outlined to determine the state of the existing pipeline and its ability to withstand higher flow.[345] This statement is incorrect. As detailed in reply evidence, Trans Mountain's engineering assessment for the relevant sections of the existing TMPL included in-line inspections, proposed future inspections and mitigations and a review of factors of safety for maximum operating pressures. The engineering assessment concluded that the TMPL exceeded the minimum factor of safety for new pipelines of 1.25 as required by CSA Z662.[346]

Most of the expanded TMPL system will be normally operating well below its maximum operating pressure.[347] The TMEP proposal does not include changing the licensed operating pressure on the Active Segments, and Trans Mountain notes that they are currently being used to transport heavy crude oil similar to what will be transported in the new pipeline. An engineering assessment for the Active Segments moving into service has been filed with the Board.[348] The assessment concludes that the two segments are safe to operate under the proposed operating pressures and volumes related to TMEP service. Additionally, as these segments are currently in use, they are subject to the existing programs for integrity and risk assessments and are actively maintained and managed to keep them fit for service.

As such Trans Mountain believes that the proposed changes will result in nominal impact on the Active Segments and submits that no further engineering assessment is necessary at this time. With

[345] Exhibit C87-3-1 - Lisa Craig Evidence (May 27, 2015) (A4L6S1), para 1.

[346] Trans Mountain Reply Evidence, Section 12 – Pipeline Engineering Assessments (August 20, 2015), 12-1.

[347] Trans Mountain Reply Evidence, Section 12 – Pipeline Engineering Assessments (August 20, 2015), 12-2.

[348] Exhibit B259-3 – TMEP Engineering Assessment-Active Segments to Line2 Service (September 4, 2014) (A4A7Q2).

respect to valves along the reactivation segments, several new automated Remote Mainline Block Valves ("RMLBV") and check valves will be installed. Several existing manual RMLBV will be automated to allow remote operation of the valves. Not all RMLBV's will be automated since doing so at some valve locations provides negligible difference in the volume of product released and little or no value in mitigating the impact of a spill.[349]

Shxw'ōwhámel filed the Accufacts Pipeline Integrity Management Operation and Maintenance Report ("Accufacts Report"). As detailed in Trans Mountain's reply evidence, "[m]uch of the Accufacts Report focuses on the current operation and integrity of the existing TMPL as well as the existing emergency management plans and programs in place for the existing system."[350] The Accufacts Report does not focus on the issues within the scope of this proceeding, specifically the changes in the TMPL to accommodate the TMEP, and the enhanced EMP for the Project. Trans Mountain's evidence, such as its engineering assessment referenced above, confirms that the existing TMPL is safe to operate under parameters proposed for service after the Project is in operation.

In summary, there is no compelling evidence that would cause Trans Mountain to reconsider the results of its engineering and pipeline assessments that confirm the continued safe operation of the TMPL, Active Segments and Reactivated Segments after the Project is in-service.[351]

---

[349] Exhibit B067-1 - Trans Mountain Response to GoC Parks IR No. 1.13 (June 4, 2014) (A3X6G6), 6.

[350] Trans Mountain Reply Evidence, Attachment 1.14 - Reply to Shxw'ōwhámel First Nation "Accufacts Pipeline Integrity Management Operation and Maintenance Report" (August 20, 2015), 17; Trans Mountain Reply Evidence, Section 12 – Pipeline Engineering Assessments (August 20, 2015), 12-1.

[351] Trans Mountain Reply Evidence, Attachment 1.14 - Reply to Shxw'ōwhámel First Nation "Accufacts Pipeline Integrity Management Operation and Maintenance Report" (August 20, 2015), 18.

3.9 Pump Stations

Trans Mountain has designed its facilities in a manner to ensure safe and efficient operation of the Project. Pump stations and other facilities have been designed with numerous operational, safety and containment features. The primary focus of the design process has been to reduce the risk of a failure to the greatest extent practicable, with a secondary focus on limitation of negative impacts should a failure still occur.

To accomplish this, the Project adopted a similar approach to facilities design as that described above for pipeline design. Specifically, the Project adopted a risk-based approach to design, incorporated feedback and suggestions from the consultation process and drew upon its extensive operating experience with the existing Trans Mountain Pipeline.

The proposed pump station design is a prime example of the significant benefits of the Project compared to proposed greenfield pipeline projects. The Project will require the construction of 11 new pump stations for the proposed Line 2 and one new pump station for the existing Line 1 at Black Pines, B.C., which will also share the site with a Line 2 pump station. Trans Mountain has located the new pump stations on the same site as existing pump stations wherever possible. Out of the 12 new pump stations, only two will not be co-located with existing pump stations.[352] By locating most of the pump stations for the two lines on the same sites, Trans Mountain has reduced the additional environmental impacts of the Project.

The leak containment design at the proposed new pump station sites will use a hydrocarbons containment area. Site grading around the pump building and yard piping will direct any leak to

[352] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 298-299.

the containment area. The containment area will have a hydrocarbon detector which will notify the Supervisory Control and Data Acquisition ("SCADA") system if a leak occurs. Any leaked hydrocarbons would be held in place until required remedial measures can be implemented.[353] All of the pump buildings at existing pump stations use concrete containment systems, some of which drain to the waste oil sump tank.[354]

The leak containment measures at existing pump stations and the proposed new pump stations are adequately designed for the volumes and type of product that will be transported by the Project.[355]

In accordance with Filing Manual requirements, Trans Mountain also considered alternative locations for pump stations. In general, the existing TMPL terminals and pump station sites are sufficiently large to accommodate TMEP facilities. Factors considered in finalizing the site selection included:

(a) optimization of pipeline hydraulics;

(b) terrain suitability;

(c) environmental suitability;

(d) availability of road access and electrical power; and

(e) landowner considerations.[356]

---

[353] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 298-299.

[354] For specifics regarding the containment system in place at existing pump stations, refer to Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 298-299.

[355] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 298-299.

[356] Exhibit B1-4 - V2 3of4 PROJ OVERVIEW (December 16, 2013) (A3S0R0), 2-58.

3.10 Terminals Design and Location

In the past, the Board has found that adhering to regulations, industry codes and standards is satisfactory when it comes to terminal design. The Board has accepted pipeline terminal designs where proponents commit to meeting all applicable regulations, codes and standards.[357] In assessing an application for proposed facilities, the NEB has stated it considers the facility's design and proposed operation to determine whether the project would be constructed and operated in a safe, reliable and environmentally responsible manner.[358]

Trans Mountain's terminal design meets all required industry standards[359] and reflects decades of experience constructing and operating terminals for the TMPL. The Project significantly reduces incremental environmental impacts by modifying existing terminals, rather than building new ones.

Trans Mountain has proposed the expansion of the Westridge, Burnaby, Sumas and Edmonton terminals. These terminals currently have 57 tanks with a combined capacity of approximately 1,718,690 cubic metres (10,810,000 barrels).[360] The anticipated location, number and capacities of all these tanks are described in Volume 4A of the Application and subsequent updates.[361]

---

[357] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 67.

[358] NEB - Reasons for Decision, Mackenzie Gas Project GH-1-2004 (December 2010), Volume 2, 113.

[359] Exhibit B2-1 - V4A 1.0 TO 3.4.4.1.1 PROJ DESIG ENGIN (December 16, 2013) (A3S0Y8), 4A-47.

[360] The Project application proposed the demolition of two existing tanks and the addition of approximately 20 tanks for a total of approximately 75 tanks and capacity of approximately 2,569,280 cubic m (16,160,000 barrels).

[361] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution - Engineering (December 16, 2013) (A3S0Y8), 4A-46; Exhibit B371-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 100.

All the tanks Trans Mountain proposes to construct as part of the TMEP will be located within secondary containment designed in accordance with CSA Standard Z662 and the National Fire Protection Association Code 30.[362] Additionally, Trans Mountain has voluntarily committed to adhere to the requirements of the Alberta Fire Code and the British Columbia Fire Code ("BCFC"), whichever is applicable in a given location.[363]

The general concerns raised with respect to secondary containment for terminal facilities included whether the capacity of secondary containment for the proposed expansions is sufficient.[364] Under CSA Standard Z662, Trans Mountain is obligated to ensure the secondary containment capacity of a shared containment area is at least 110 per cent of the volume of the largest tank in the area. In accordance with its commitment to comply with the Alberta Fire Code and BCFC, Trans Mountain has stated that for the Westridge, Burnaby and Edmonton terminals, capacity will equal 100 per cent of the largest tank plus 10 per cent of the volume of the rest of the tanks in the containment area.[365] This means that for these terminals, the secondary containment capacity will exceed that required by CSA Standard Z662. In the Sumas terminal, where there will be two tanks in a shared containment area, the secondary containment capacity will be 110 per cent of the volume of the larger of the tanks.[366] In each terminal, Trans Mountain has proposed secondary

[362] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 435.

[363] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 435, 439.

[364] Exhibit A144-1 - Letter and Information Request No. 4 to Trans Mountain Pipeline ULC (A4J8Z2) (March 20, 2015), 30-35; Exhibit A127-1 - Letter and Information Request No. 3 to Trans Mountain Pipeline ULC (January 9, 2015) (A4G4L5), 78-82.

[365] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 452, 467.

[366] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 462.

containment capacity in accordance with industry standards. Where non-mandatory codes exceed industry standards, Trans Mountain has committed to adhere to the higher standard.

For the Burnaby Terminal, there will be sufficient secondary and tertiary containment capacity for a volume nearly twelve times the capacity of the largest tank.[367] In the very low probability event of a simultaneous multiple-tank failure,[368] something neither CSA standards nor fire codes set requirements for, there will be sufficient containment capacity for 70 per cent of the total proposed storage volume at the Burnaby Terminal.[369] Tanks will be designed to the rigorous requirements of the latest edition of American Petroleum Institute Standard 650. Tanks will only be filled to capacity for part of the time they are in operation. The proposed secondary containment volumes at the terminals are sufficient even in the event of a simultaneous multiple-failure.

The NEB requested information from Trans Mountain related to the draining of storm water from secondary containment at the terminals.[370] Trans Mountain has a long history of safely draining storm water from its terminals. As an example, at its Sumas Terminal, Trans Mountain performs visual inspections for a buildup of storm water daily (including weekends and holidays). In the event water needs to be released, an operator can reach the terminal to do so in an estimated 30 to 75 minutes.[371] The final selection of drainage systems will be finalized at the beginning of the

[367] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 467.

[368] Trans Mountain has provided a discussion on the low probability of a simultaneous multiple-tank failure in response to NEB Information Request 4.26.

[369] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 467-468.

[370] Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3, (February 3, 2015) (A4H1V2), 440-442, 444-447; Exhibit B371-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 109.

[371] Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 415.

detailed engineering phase after an evaluation of the positive and negative attributes of each system.[372] At the Edmonton Terminal, Trans Mountain anticipates that a motor operated valve will be installed at the Remote Impoundment Annex. The motor operated valve will ordinarily be closed, but will open to release collected storm water into the remote impoundment. In the unlikely event that product is released from a tank at the same time that the storm water is being drained, a hydrocarbon detector within the Remote Impoundment Annex will trigger and cause the motor operated valve to close, minimizing the risk of a spill.[373]

At all times during construction there will be secondary containment available; either new containment structures will be built before existing are removed, or temporary modifications to intermediate secondary containment berms will be necessary to construct new tanks, without disturbing the containment function of the overall tank area.[374] Trans Mountain has existing and effective safe work procedures for constructing and operating tanks in shared containment areas. These will be followed and adapted to the proposed expansions at these terminals to ensure potential impacts are avoided.[375]

---

[372] Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 440-442.

[373] Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3, (February 3, 2015) (A4H1V2), 445.

[374] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 437.

[375] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 439-440.

Intervenors including Burnaby,[376] Simon Fraser University[377] and Dorothy Doherty[378] raised concerns regarding the proposed location and tank spacing for the expansion to the Burnaby Terminal. Ms. Doherty states that the Burnaby Terminal should be decommissioned.[379] Trans Mountain notes that the development around Burnaby Terminal, including the residential neighbourhoods and Simon Fraser University, occurred after the terminal was constructed. With respect to the proposed location of new tanks and infrastructure at Burnaby Terminal, using existing infrastructure minimizes environmental effects, which is consistent with good project planning and best environmental practices. The minimum spacing of the proposed storage tanks will be in accordance with the applicable regulatory requirements, including the requirements of National Fire Protection Association Code 30, which is consistent with the spacing required by the BCFC. Trans Mountain also filed a specific report which replies to each concern in Simon Fraser University's "Gap Analysis".[380]

As detailed in reply evidence, the topography of the Burnaby Terminal will make the minimum spacing relevant only for adjacent tanks within each terrace and within the two-tank or three-tank groupings proposed. The spacing between tanks on different terraces and in different groupings will be not less than "one diameter" and in most cases substantially greater.[381] The location of the

[376] Exhibit C69-44-2 - Burnaby Fire Department - Trans Mountain Tank Farm Tactical Risk Analysis - Part 1 - Report and Appendix A (A4L8F6) (May 27, 2015), 6, 25.

[377] Exhibit C404-5-2 - Revised Report - Etkin, Higuchi, Thompson and Dunn (June 12, 2015) (A4Q5Z1), sections 4-5.

[378] Exhibit C109-3-1 - Written Evidence Doherty (May 27, 2015) (A4L8U3), sections 4-5.

[379] Exhibit C109-3-1 - Written Evidence Doherty (May 27, 2015) (A4L8U3), section 5.

[380] Trans Mountain Reply Evidence, Attachment 1.01 - Reply to Simon Fraser University "Hazards to Simon Fraser University Associated with the Trans Mountain Expansion Project: A Gap Analysis" (David Etkin, Kaz Higuchi, Sarah Thompson, Markus Dann) (August 20, 2015).

[381] Trans Mountain Reply Evidence, Section 24 – Facility Risk Assessment (August 20, 2015), 24-12.

proposed new tanks at the Burnaby Terminal will also result in set-backs greater than those established in Burnaby bylaws.[382] In summary, Trans Mountain's proposed location and spacing for its new terminal tanks meet all relevant regulatory requirements and are consistent with environmental best practices of using existing infrastructure to minimize disturbances.

3.11 Terminals Fire Protection

The Board requested information regarding fire protection at the Westridge, Burnaby, Sumas and Edmonton terminals during the regulatory process.[383] Fire suppression systems will be finalized during the detailed engineering phase, should the Application be approved.[384] These systems, and the equipment chosen to be part of them, will be designed, manufactured and constructed in accordance with National Fire Protection Association Standards and other relevant standards that have been identified.[385] Additionally, Trans Mountain has provided the Board with a list of fire detection technologies it is considering for the tanks. These include linear wire heat detector technology, linear fiber heat detector technology and triple infrared detector technology.[386] The KMC EMP and ERPs for terminals, and fire pre-plans, will be reviewed and enhanced to address the needs of the expanded pipeline system.

---

[382] Trans Mountain Reply Evidence, Section 21 – Facility Siting (August 20, 2015), 21-2.

[383] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 432-436, 458; Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 405, 406, 444-447; Exhibit B371-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 118-120.

[384] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 435; Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 446-447.

[385] Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 446-447.

[386] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 435.

The most suitable technologies for the proposed tanks will be selected during the detailed engineering and design phase. Specifications and drawings will be developed under the supervision of experienced and competent professional engineers, specializing in fire protection. Trans Mountain has also retained the services of an industrial fire-fighting specialist to provide advice on conceptual and detailed design.[387]

With respect to the Westridge Terminal, information was requested regarding the protection of the proposed dock complex structure from a tanker fire.[388] The Westridge Marine Terminal fire protection system will include fire-water and fire-foam systems. The fire-water system will have the following features:

(a) a new backflow preventer on the existing Burnaby fire-water main;

(b) two new submersible pumps, taking water from Burrard Inlet; and

(c) fire mains constructed of high density polyethylene ("HDPE") where underground.

The-fire foam systems will have the following features:

(a) new centralized foam building complete with a foam concentrate storage tank and injection system;

(b) foam distribution system serving the new dock complex and shore infrastructure; and

(c) foam mains constructed of HDPE, where underground.[389]

---

[387] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 435.

[388] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 458; Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 405-406.

[389] Exhibit B2-2 - V4A 3.4.4.1.3 F3.4.17 TO 4.0 PROJ DESIG ENGIN (December 16, 2013) (A3S0Y9), 4A-101 – 102.

Burnaby filed evidence asserting that "the TMEP lacks appropriate consideration for original facility fire protection premises and industry best practices in petroleum fire protection, as the proposal only seeks to comply with minimum federal and provincial code requirements."[390] Burnaby's assertion is incorrect. Trans Mountain's proposed design for Burnaby Terminal includes a robust fire protection system that exceeds minimum statutory requirements. Specific examples include:

(a) All of the property line set-backs will meet or exceed the requirements of NFPA Code 30 and Burnaby bylaws.

(b) The uphill tank to tank spacing will exceed the requirements of NFPA Code 30 and the BCFC.

(c) Trans Mountain will comply with the additional secondary containment volume requirements of the BCFC.

(d) CSA Standard Z662, NFPA Code 30 and the BCFC do not set limits on the number of tanks that can share a common secondary containment area. Trans Mountain has limited the maximum number of tanks to three per shared secondary containment area.

(e) The fire protection system for the proposed new storage tanks will be designed to extinguish a full-surface fire, utilizing fixed foam chamber/nozzle arrangement and automated foam application.[391]

With regards to the risk of tank fires and fires resulting from a product release within a containment area, determination of level of risk is made with reference to the broadly accepted Major Industrial

[390] Exhibit C69-44-2 - Burnaby Fire Department - Trans Mountain Tank Farm Tactical Risk Analysis - Part 1 - Report and Appendix A (A4L8F6) (May 27, 2015), 3.

[391] Trans Mountain Reply Evidence, Section 24 – Facility Risk Assessment (August 20, 2015), 24-18.

Accidents Council of Canada ("MIACC") criteria. The risk assessment using the MIACC criteria determined that the level of risk is acceptable from a land use planning perspective, without mitigation. Despite that, Trans Mountain has proposed mitigation measures to reduce the level of risk to better than what would be acceptable under the MIACC approach. Trans Mountain has used the MIACC criteria to identify hazards or concerns, examine each hazard for the consequence (potential impact on nearby areas) and the probability of occurrence. The risk determination does not include emergency planning or other forms of mitigation and thus provides a conservative worst-case situation. Trans Mountain detailed its approach to risk assessments, mitigation and aggregated risk in response to IRs from the NEB.[392]

Trans Mountain has utilized design criteria, leak detection and containment systems, fire detection and suppression systems, operations management and emergency response planning to minimize risks.[393] The fire protection systems are designed in accordance with expert advice of fire protection specialists, legislative requirements, industry guidelines and international best practices.[394]

Burnaby asserted that there is insufficient roadway access to the Burnaby Terminal to allow for safe access and egress of fire response deployment positions.[395] Trans Mountain's proposed

[392] Exhibit B32-3 – Trans Mountain Response to NEB IR No. 1 2 of 2 (May 14, 2014) (A3W9H9), 479-481; Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 468-472; Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 128; Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 101-106.

[393] Exhibit B18-1 - V7 1.0 TO 5.2.8.3 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5), Application Volume 7, 7-19 – 7-20.

[394] Exhibit B239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 458; Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 405, 406; Exhibit B306-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 468-472.

[395] Exhibit C69-44-2 - Burnaby Fire Department - Trans Mountain Tank Farm Tactical Risk Analysis - Part 1 - Report and Appendix A (A4L8F6) (May 27, 2015), 34.

primary and secondary access routes at Burnaby Terminal will be designed and constructed to accommodate wheel loads from emergency apparatus or equipment, as given in the International Association of Fire Chiefs Emergency Vehicle Size and Weight Regulation Guideline. The proposed primary access routes at Burnaby Terminal will be designed to accommodate the movement of emergency apparatus or equipment. Secondary access routes will be primarily intended for routine inspection and maintenance activities, but may also be used for emergency response, if appropriate. Overhead utility crossings at proposed roads will be designed and constructed with clearances to enable the passage of emergency apparatus or equipment. Drainage crossings at proposed access roads will consist of culverts designed and constructed to support wheel loads from emergency apparatus or equipment. In summary, the proposed primary access routes at Burnaby Terminal will be designed and constructed so that emergency response access is available from a minimum of two independent directions.[396]

Burnaby also expressed concerns in its intervenor evidence regarding the risk of tank fire boil-over, which occurs when steam expands in the bottom portion of a tank and forces the contents above the top of the tank.[397] For the reasons outlined below, Trans Mountain believes that a boil-over event is not a credible scenario for the Burnaby Terminal.

As detailed in Trans Mountains' IR responses, boil-over events are extremely rare. All of the new storage tanks proposed for the Project will have water-draw piping, which can be used to remove water, and fixed roofs (an added barrier to the floating roof and seals) to prevent rain for getting

[396] Trans Mountain Reply Evidence, Section 24 – Facility Risk Assessment (August 20, 2015), 24-51.

[397] Exhibit C69-44-2 - Burnaby Fire Department - Trans Mountain Tank Farm Tactical Risk Analysis - Part 1 - Report and Appendix A (A4L8F6) (May 27, 2015), 59; Exhibit C69-44-12 - Opinion on Potential Off-Site Risks of the Proposed Expansion of Burnaby Tank Farm (May 27, 2015) (A4L8G6), 4-8.

in the tank.[398] These and other mitigation measures further reduce the likelihood of a boil-over incident occurring. A significant amount of time is required for a boil-over event to develop. Given fire prevention, detection, suppression and other mitigation measures the likelihood of a fire occurring, developing into a full-surface tank fire, and ultimately causing a boil-over event is therefor very low. With the assistance of emergency responders, it is reasonable based on the available evidence, to expect that there will be adequate time to recognize the potential danger of a tank full-surface fire and to evacuate the danger zone.[399]

All of the proposed new storage tanks will have numerous safety features, combined with anticipated high utilization to support Westridge Marine Terminal operations, which will minimize the potential for water to accumulate in the tanks. All of the tanks will have automated fire detection and suppression systems to prevent and/or extinguish full-surface fires. As such, Trans Mountain believes that a boil-over event is not a credible scenario for Burnaby Terminal. In addition, boil over can only occur after a lengthy burn period of many hours, during which time emergency management measures, including evacuations, if appropriate, would be highly effective in reducing consequences to the public. The extremely low probability of boil-over events combined with the opportunity to mitigate consequences is the reason that Trans Mountain did not consider boil-over scenarios to be the credible worst-case scenarios for the terminal risk assessments.[400]

---

[398] Exhibit B413-2 Trans Mountain Response to NEB IR No. 6.23 (July 22, 2015) (A4R6I4), 104.

[399] Trans Mountain Reply Evidence, Attachment 1.03 - Reply to the City of Burnaby "Burnaby Fire Department Trans Mountain Tank Farm Tactical Risk Analysis" (August 20, 2015), 29-31.

[400] Trans Mountain Reply Evidence, Attachment 1.03 - Reply to the City of Burnaby "Burnaby Fire Department Trans Mountain Tank Farm Tactical Risk Analysis" (August 20, 2015), 29-31.

Trans Mountain has safely operated the Westridge, Burnaby, Sumas and Edmonton terminals for over sixty years. During this time, Trans Mountain has continually maintained effective fire suppression equipment and systems and is committed to doing so for the Project. Trans Mountain has analyzed the credible risks in accordance with widely accepted industry standards. Proven fire protection mitigation measures have been proposed by Trans Mountain to minimize those risks.

3.12 Westridge Marine Terminal Design and Location

Natural Resources Canada, and other intervenors including the City of Vancouver,[401] raised questions regarding the possibility of sea levels rising which could result in safety hazards, such as tidal conditions over-topping the Westridge Marine Terminal, terminal downtime or damage to infrastructure.[402] Trans Mountain's evidence is that Westridge Marine Terminal dock elevation will be designed to accommodate expected tidal fluctuations and withstand a predicted future long term 0.5 m increase in sea level rise.[403] In addition, should the actual amount of long term, sea level rise exceed projections, there are a number of adaptive strategies that can be applied, if necessary, in the future to mitigate these effects without compromising the safety of operations of the Westridge Marine Terminal.[404] In its evidence, Environment Canada stated that it is satisfied that Trans Mountain has "acknowledged and allowed for a broader range of plausible sea level rise

[401] Exhibit C77-27-9 - City of Vancouver - Written Evidence Appendix 8 (May 27, 2015) (A4L7W6), 24.

[402] Exhibit B118-1 – Trans Mountain Response to City Burnaby IR No. 1 (June 18, 2014) (A3Y2E6), 74; Exhibit B119-1 – Trans Mountain Response to City of Vancouver IR No. 1 (June 18, 2014) (A3Y2G6);

[403] Exhibit B118-1 – Trans Mountain Responses to City of Burnaby IR No. 1 (June 18, 2014) (A3Y2E6), 74; Exhibit B119-1 – Trans Mountain Response to City of Vancouver IR No. 1 (June 18, 2014) (A3Y2G6), 85, 86; Exhibit B339-2 – Response to District of North Vancouver IR No. 2 Notice of Motion (March 12, 2015) (A4J5F2), 6, 7.

[404] Exhibit B129-1 – Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 20.

by 2100."[405] Trans Mountain similarly responded to the City of Vancouver's concerns in its reply evidence.[406]

Concerns were also raised by intervenors regarding dredging work to be completed at the Westridge Marine Terminal in order to ensure the stability of the terminal.[407] Dredging related to Westridge Marine Terminal is defined as excavation and removal of structurally unsuitable material from the vicinity of the existing foreshore in order to accommodate the foreshore extension necessary according to project design and engineering requirements. Upon completion of detailed engineering and design it may be the case that dredging is not needed, or can be significantly reduced, at the Westridge Marine Terminal.[408] If dredging at Westridge Marine Terminal is necessary to remove structurally unsuitable material, Trans Mountain's primary goal will be to complete the dredging within the Fisheries and Oceans Canada ("DFO") least-risk work window for Burrard Inlet.[409] In addition, once detailed engineering and design of the foreshore extension and comprehensive construction planning has been completed for the Westridge Marine Terminal, Trans Mountain has committed to submit the duration of dredging and the results of the sediment dispersion modelling to the NEB for review no later than 60 days prior to the start of dredging activities.[410] This will ensure that dredging activities are considered in advance and do not result in any unacceptable effects on water quality.

---

[405] Exhibit C121-3-1 – EC written evidence - (May 27, 2015) (A4L8Y6), 135.

[406] Trans Mountain Reply Evidence, Section 20 – Facility Engineering and Design (August 20, 2015), 20-1 - 20-3.

[407] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 47, 51.

[408] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 47.

[409] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 283.

[410] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 283.

The District of North Vancouver raised concerns in its intervenor evidence related to the proposed Westridge Marine Terminal expansion and designated vessel anchorages having the potential to create noise and light issues for residents.[411] Trans Mountain responded in its reply evidence that when detailed design has progressed to the point where mechanical equipment can be selected, a predictive noise modelling study will be done and the results will be used to optimize noise reduction. Trans Mountain will design lighting at Westridge Marine Terminal within acceptable levels to meet the relevant requirements, the Canada Occupational Health and Safety Regulations and the International Ship and Port Facility Security Code. Furthermore, Trans Mountain will conduct an area lighting study that will include consideration of impact to the surrounding communities to further minimize this impact of its plans for the Project.[412] PMV has enacted noise and light effects mitigation measures requirements for all vessels anchoring within PMV jurisdiction. Such requirements are published in the PMV Port Information Guide.

3.13 Operations and Maintenance

The existing TMPL has operated safely for over sixty years. Trans Mountain operates in accordance with the OPR.[413] Companies are responsible for meeting the requirements of the OPR to manage safety, security and environmental protection throughout the entire lifecycle of their facilities, from design, through to construction, operation and abandonment. The OPR was revised in April 2013 to require operating companies to have a management system that applies a systematic, comprehensive and proactive approach to managing risk, in order to promote safety, security and environmental protection.

---

[411] Exhibit C106-8-1 - Affidavit of Julie Pavey (May 27, 2015) (A4Q0E9), 18.

[412] Trans Mountain Reply Evidence, Section 20 - Facility Engineering & Design (August 20, 2015), 20-3.

[413] *National Energy Board Onshore Pipeline Regulations*, SOR/99-294.

To meet these requirements KMC has established and implemented an Integrated Safety and Loss Management System ("ISLMS") which applies to all activities throughout the lifecycle of their facilities. There are currently sixteen programs in the ISLMS, including programs for: Damage Prevention, Public Awareness, Environmental Protection, Integrity Management, Safety Management, Emergency Management, Security Management, Control Room Management, Operation and Maintenance and Engineering. The ISLMS has processes for monitoring performance and continually improving activities; this includes periodic internal audits and assessments that are performed on various programs. Additionally, the programs are subject to regular inspections and audits conducted by federal and provincial regulators. The facilities to be constructed as part of the TMEP will be integrated into the existing ISLMS. Existing processes, activities and plans will be modified and appropriately scaled to include the facilities constructed during TMEP. The expanded pipeline and facilities will be operated from the current Control Centre in Sherwood Park, Alberta, and the new pipeline will be monitored using the leak detection systems presently utilized to monitor the TMPL. All field operations and maintenance activities will continue to be carried out by qualified personnel, and the system maintenance activities will be managed using KMC's existing Computerized Maintenance Management System.[414]

The TMEP facilities will be constructed and operated in accordance with the most recent requirements including the OPR, which references CSA Z662-15 and the *Canada Labour Code*.[415] The OPR and CSA Z662-15 reference additional standards and publications, the applicable elements of which have been incorporated into KMC's management system, operations and maintenance systems, programs, processes and training.

---

[414] Exhibit B5-7 – V4C 1.0 TO APPB PROJ DES AND EXEC-OP AND MAINT (December 16, 2013) (A3S1L1), 4C-3.

[415] RSC 1985, c L-2.

3.14 Routine Inspection and Leak Detection

Reliable SCADA and leak detection systems are necessary for safe and efficient pipeline system operations.[416] Specifically, in order to minimize potential damage from spills during operation, early detection of leaks and breaks is paramount.[417]

Over the sixty year period, the existing TMPL system has operated with the goal of preventing leaks. KMC has a long and successful history with the implementation of the computational pipeline monitoring system ("CPM System"), which provides continuous leak detection. The CPM System is a state-of-the-art, real-time, transient, computational pipeline leak detection system, which are widely viewed as the most effective type of system for liquid petroleum transmission pipelines. Highly accurate flow meters will be installed at all receipt and delivery locations and at all intermediate pumping stations along the pipeline route. Pressure transmitters and other instrumentation for the measurement of fluid parameters will also be installed along the Project route, where appropriate. The leak detection systems for the Project will be in compliance with the relevant industry standard CSA Z662-15. Trans Mountain is also reviewing other technologies for leak detection including external methods and an alternative computational method, that monitors flow and pressure signals and bases leak detection on a probabilistic analysis of those signals, for incorporation at the detailed design phase.[418]

The Primary Control Centre will be the normal location for the monitoring and control of the TMEP. The SCADA system will collect information about fluid parameters, and other information

[416] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 76.

[417] NEB Reasons for Decision GH-1-2004, Mackenzie Gas Project (December 2010), Volume 2, 145.

[418] Exhibit B5-7 – V4C 1.0 TO APPB PROJ DES AND EXEC-OP AND MAINT (December 16, 2013) (A3S1L1), 4C-23.

as described in the Application, to enable the effective monitoring and control of the Project. The SCADA system will also collect information for the CPM System. Where the CPM System determines that flow or pressure parameters on the system fall out of expected tolerances, the leak detection system will issue an alarm in the Primary Control Centre.[419]

Additional detection systems include in-line inspection runs using smart ball tools—a highly sensitive acoustic technology which can pinpoint very small pipeline leaks, regularly scheduled aerial and ground patrols of the rights-of-way and facilities, and public awareness programs including the engagement of local municipal and emergency response agencies.[420]

As with the existing system, the TMEP will have emergency shutdown systems which will automatically initiate in the event of certain abnormal conditions. Automatic shutdown systems will be designed in accordance with legislative requirements, and designed such that their operation does not increase the risk of further abnormal conditions occurring.

Shxw'ōwhámel filed intervenor evidence suggesting that Trans Mountain implement a leak detection system that can effectively detect small leaks and provide timely identification of larger leaks to minimize the risk of spills.[421] Trans Mountain uses Real-Time Transient Modelling in its CPM System, which provides industry leading sensitivity for leak detection. As stated in Trans Mountain's reply evidence, current regulations in Canada require only a single leak detection system, while regulations in Germany require two systems running in parallel on a single pipeline.

---

[419] Exhibit B5-7 – V4C 1.0 TO APPB PROJ DES AND EXEC-OP AND MAINT (December 16, 2013) (A3S1L1), 4C-23.

[420] Exhibit B5-7 – V4C 1.0 TO APPB PROJ DES AND EXEC-OP AND MAINT (December 16, 2013) (A3S1L1), 4C-23.

[421] Exhibit C312-8-9 - Piteau Groundwater Report Part 1 (May 27, 2015) (A4Q1A7), 12.

In an effort to continuously improve leak detection, in 2015 Trans Mountain will be installing a second complementary CPM System that will operate in parallel with the existing system. The new CPM System will use a different technology to recognize leaks. If the application to the existing TMPL system proves successful, the new CPM System will also be implemented for the Project. The CPM System will complement KMC's systemic approach to leak detection, which includes: monitoring, aerial and ground surveillance patrols, in-line inspection as well as additional measurements for the Project.[422] With respect to Shxw'ōwhámel's interest in effective leak detection, Trans Mountain's CPM leak detection capacity not only meets, but far exceeds regulatory requirements and maximizes CPM leak detection capability.

3.15 Seismic and Natural Hazards

Trans Mountain has carefully considered seismic activity and its potential impact on the Project, relying on both its 60 years of experience operating the TMPL system and new analysis obtained specifically for the design, construction and operation of the Project. Trans Mountain has identified portions of the proposed pipeline and some terminals which are located in seismically active areas. Based on Trans Mountain's analysis, the greatest seismic threat arises from the potential for active faults, with hazards stemming from strong ground motions and permanent ground displacement due to surface fault rupture.[423]

Trans Mountain has filed a number of seismic assessments and reports including: a preliminary seismic hazard assessment for the TMEP,[424] a semi-quantitative hazard assessment of geohazards

[422] Trans Mountain Reply Evidence, Attachment 1.16 - Reply to Shxw'ōwhámel First Nation "Review of Trans Mountain Expansion Project Groundwater Issues Associated with Ohamil I.R. 1 and Peters I.R. 1 and 2" (August 20, 2015), 4.

[423] Exhibit B4-1 – V4A APPJ 01 OF 45 SEISM ASSESS STUDY (December 16, 2013) (A3S1F6), i.

[424] Exhibit B4-1 – V4A APPJ 01 OF 45 SEISM ASSESS STUDY (December 16, 2013) (A3S1F6).

as part of the Risk Assessment Report in Technical Update Number 1,[425] and a Seismic Hazard Update on March 31, 2015.[426]

During the initial design phase, hazard assessments have used ground-motion predictions based on the Geological Survey of Canada's single reference ground condition.[427] During the detailed engineering and design phase, seismic investigations will be undertaken for all areas along the route identified as having elevated liquefaction or landslide potential, and ground-motion predictions will be updated based upon the data obtained.[428] This process has been described in the preliminary hazard assessment,[429] and further explained in response to NEB IR 2.094.[430]

The constructability of the Project, which can be affected by terrain and geohazards. [431] Trans Mountain has provided a table summarizing potential constructability problems and potential mitigation for each type of geohazard.[432]

---

[425] Exhibit B248-19 – Trans Mountain Pipeline ULC – Technical Update 1 – Cons update 2 Part 2 Risk Update Pt 2 (August 1, 2014) (A3Z8G2).

[426] Exhibit B-358-2 – 01.0 TMEP - March 2015 Seismic Hazard Update Main Report and Appendix A – (March 31, 2015) (A4K0Z3).

[427] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.093 a (July 21, 2014) (A3Z4T9), 368.

[428] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.093 b (July 21, 2014) (A3Z4T9), 369.

[429] Exhibit B4-1 – V4A APPJ 01 OF 45 SEISM ASSESS STUDY (December 16, 2013) (A3S1F6), 40.

[430] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.094 (July 21, 2014) (A3Z4T9), 370-371.

[431] Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-12.

[432] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.098 (July 21, 2014) (A3Z4T9), 378-383.

Trans Mountain's risk identification and management plan for threats of existing and potential geohazards will be updated as additional site specific information is obtained through detailed investigations, and modified as geohazards are encountered during construction.[433] Intervenor Dorothy Doherty expressed concerns about seismic activity along the coast, citing examples of earthquakes that triggered tsunamis in the Pacific.[434] Ms. Doherty requests that the TMEP commits to using construction standards well above the accepted standards to address the risk of such events. The risk-based approach to design and construction described above is a rigorous, industry-leading, world-class approach that goes well beyond the minimum requirements of CSA Z662. This will allow the design team to identify potential risks and adopt mitigation measures during design to address those risks.[435] Further details regarding this approach are included in Trans Mountain's reply evidence.[436]

Trans Mountain has also committed to develop seismic performance standards during the detailed design phase.[437] While there are presently no guidelines in force in Canada that prescribe a performance standard for seismic design with respect to pipelines,[438] Trans Mountain will utilize provincial and national building code guidelines for specific facilities to provide a standard against

[433] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.099 (July 21, 2014) (A3Z4T9), 384-385.

[434] Exhibit C109-3-1 – Written Evidence D. Doherty (June 12, 2015) (A4L8U3).

[435] Trans Mountain Reply Evidence, Section 15 – Seismic Hazards (August 20, 2015), 15-10.

[436] Trans Mountain Reply Evidence, Section 15 – Seismic Hazards (August 20, 2015), 15-10.

[437] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.092 a (July 21, 2014) (A3Z4T9), 365-366.

[438] Exhibit B4-1 – V4A APPJ 01 OF 45 SEISM ASSESS STUDY (A3S1F6), i.

which to assess the Project. These will include the National Building Code of Canada, the Alberta Building Code, the B.C. Building Code and other recognized standards and practices.[439]

The Burnaby Residents Opposing Kinder Morgan Expansion ("BROKE") expressed concern regarding the Project's seismic design basis.[440] The Project will be designed to withstand the larger of ground motions with a 1:2475 annual exceedance probability, as provided by the National Building Code of Canada and deterministic ground-motion predictions for credible earthquake sources, both modified to reflect site-specific conditions. The Project will also be designed to withstand permanent ground displacement, transient ground displacement and seismic wave propagation arising from earthquakes that produce design-level ground motions.[441] Trans Mountain provided detailed analysis of these scenarios in its reply evidence responding to BROKE's filing.[442] BROKE also presented ground motion predictions for deterministic in-slab and shallow-crustal earthquake scenarios to identify those which might produce peak ground acceleration or peak ground velocity in excess of the 1:2475 design basis. Trans Mountain has also responded to these scenarios in its reply evidence.[443] Trans Mountain and BROKE agree that the seismic risk to TMEP infrastructure from in-slab earthquakes is negligible to low.[444]

Trans Mountain has and will continue to research seismic risk and geohazards to ensure the TMEP is designed and built to minimize risks. Once constructed, Trans Mountain will draw upon the

---

[439] Exhibit 239-13 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 2 – Request 2.092 a (July 21, 2014) (A3Z4T9), 365-366.

[440] Exhibit C41-8-1 – Seismic Hazard Assessment – Molnar (May 27, 2015) (A4L6U4).

[441] Trans Mountain Reply Evidence, Section 15 – Seismic Hazards (August 20, 2015), 15-1.

[442] Trans Mountain Reply Evidence, Section 15 – Seismic Hazards (August 20, 2015), 15-1.

[443] Trans Mountain Reply Evidence, Section 15 –Seismic Hazards (August 20, 2015), 15-5.

[444] Trans Mountain Reply Evidence, Section 15 – Seismic Hazards (August 20, 2015), 15-5.

expertise it has from operating the TMPL system for over 60 years to manage risks associated with geohazards and seismic activity.

3.16 Geotechnical Considerations

In addition to the seismic risks and considerations described above, the Project will be exposed to geotechnical risks, such as mudslides, flooding debris flows and rock slides. Trans Mountain has extensive experience in dealing with these issues with respect to the existing TMPL system, and has done, and will continue to do, considerable work to identify risks and hazards for the TMEP.

The Stó:lō Collective indicated concern regarding geotechnical hazards in the Fraser Valley.[445] Trans Mountain acknowledges that such hazards have historically occurred along the pipeline route, and will continue to occur. Trans Mountain has designed the Project in a manner that avoids such hazards wherever possible, and implements mitigation measures where avoidance is not possible.[446] In order to identify and adequately design for geohazards along the route, Trans Mountain and its geotechnical consultants have undertaken studies, which include the preparation of a Quantitative Geohazard Frequency Assessment.[447] This assessment includes identifying and assessing 14 categories of geohazards along the proposed route, based on a review of historical data, satellite and air photo imagery, LiDAR (a remote sensing technology) and terrain mapping.

---

[445] Exhibit C326-9-1 – StoloCollective Evidence Submissions – Final Filed (May 27, 2015) (A4L7A2).

[446] Trans Mountain Reply Evidence, Section 11 – Pipeline Geotechnical Assessment (August 20, 2015), 11-1; see also Exhibit B2-1 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 4A, Project Design & Execution – Engineering (December 16, 2013) (A3S0Y8), 4A-12.

[447] Exhibit B248-19 – Trans Mountain Pipeline ULC Tech Update 1 Cons Update 2 Part 2 Risk Update Pt02 (August 1, 2014) (A3Z8G2).

Following this assessment, Trans Mountain's geohazard team has further reviewed the identified sites and completed field inspections and assessments.[448]

Trans Mountain's geotechnical assessment has identified that Mountain Pine Beetle infestations may change the hydrological regime and impact the frequency and intensity of certain geohazards, as indicated by the Upper Nicola Band.[449] However, Trans Mountain's assessment indicates the construction of the Project is unlikely to change the distribution and magnitude of Mountain Pine Beetle infestations and the resulting changes to hydrology and slope stability. Details of Trans Mountain's assessment are included in its reply evidence.[450]

The Upper Nicola Band indicated concern about acid rock drainage and metal leaching from the pipeline itself.[451] Trans Mountain acknowledges that there is a risk that exposure of rock outcrops or excavated bedrock during construction may leach metals from the exposed rock or produce acid rock drainage. To address this potential, Trans Mountain has carried out desktop and field assessment of metal leaching and acid rock drainage to identify/characterize those units with an increased potential to leach metals and/or produce acidic drainage. The details of these studies are included in Trans Mountain's reply evidence.[452]

There has been considerable attention paid by intervenors to geotechnical risks at and around Burnaby Mountain. Trans Mountain has proposed a number of mitigative measures to address

---

[448] Trans Mountain Reply Evidence, Section 11 – Pipeline Geotechnical Assessment (August 20, 2015), 11-1.

[449] Exhibit C363-21-15 - Upper Nicola Band Witness Statement of Bernadette Wanda Manuel 26 May 15 (00251211xC6E53) (May 27, 2015) (A4Q1T0).

[450] Trans Mountain Reply Evidence, Section 11 – Pipeline Geotechnical Assessment (August 20, 2015), 11-3.

[451] Exhibit C363-21-17 - Upper Nicola Band Traditional Use Study (TUS) (00224420xC6E53) (May 27, 2015) (A4Q1T2).

[452] Trans Mountain Reply Evidence, Section 11 – Pipeline Geotechnical Assessment (August 20, 2015), 11-5.

these concerns. Proposed tunneling through Burnaby Mountain will be completed entirely from portals within the Burnaby and Westridge Terminal facilities, and there will be no impact to the Burnaby Mountain Conservation Area lands through clearing or any other construction activities. The tunnel will be backfilled to prevent the development of a conduit for groundwater flow. With respect to the potential to destabilize the mountain, Trans Mountain's analysis shows that construction of the Burnaby Mountain Tunnel would not have a negative impact on the stability of the mountain slopes.[453] Burnaby retained Pakalnis & Associates ("Pakalnis") as geotechnical consultants. Pakalnis has submitted a report that identified a number of points regarding geotechnical design; Trans Mountain responded to each of these points in its reply evidence, confirming the geotechnical information collected in support of the Burnaby Mountain tunnel was adequate. For example, Pakalnis states that future geotechnical drilling is expected with subsequent evaluation. In response, Trans Mountain confirmed that future drilling that is planned for the Burnaby Mountain Tunnel will be completed from the planned portal locations and will not require land access to Burnaby property, including the Burnaby Mountain Conservation Area.[454]

Intervenor evidence submitted by Burnaby included the "Geotechnical Review of Trans Mountain Expansion Project (TMEP), Burnaby Terminal Geotechnical Investigation"[455] and the "Geotechnical Review of Trans Mountain Expansion Project (TMEP), Westridge Marine Terminal Offshore Geotechnical Investigation".[456] These reports were prepared by MineIt Consulting Inc., and included various concerns related to the geotechnical investigations conducted at each

[453] Trans Mountain Reply Evidence, Section 11 – Pipeline Geotechnical Assessment (August 20, 2015), 11-6.

[454] Trans Mountain Reply Evidence, Section 11 – Pipeline Geotechnical Assessment (August 20, 2015), 11-6.

[455] Exhibit C69-44-6 - Burnaby Terminal Geotechnical Investigation Report (May 27, 2015) (A4L8G0).

[456] Exhibit C69-44-5 - Westridge Marine Terminal Geotechnical Investigation (May 27, 2015) (A4L8F9).

terminal. Trans Mountain has provided detailed responses to the MineIt reports in its reply evidence.[457] A common issue with the MineIt reports is a failure to appreciate the current stage of design; many of the issues raised in the reports will be addressed during detailed design and the associated site-specific assessments and investigations.

During the detailed design phase, seismic design of the terminals, including tanks, secondary containment and earthen, concrete and steel structures, will be in accordance with API 650, Annex E, the National Building Code of Canada, the BCFC, the British Columbia Building Code and the Alberta Building Code and the Project will be designed for accordingly.[458] There is also a tertiary containment area at Burnaby Terminal, which provides an extra level of safety should a seismic event occur during operations.

3.17 Risk Assessment

The identification, assessment and mitigation of risks is a critical part of Trans Mountain's engineering design process. Trans Mountain filed its initial risk assessment for the proposed new and expanded facilities.[459] The assessment is used to inform detailed design and was also used in development of ERPs.[460] Trans Mountain has committed to undertake final risk assessments for the proposed facilities after detailed engineering and design is nearing completion to optimize

[457] Trans Mountain Reply Evidence, Section 20 – Facility Engineering and Design (August 20, 2015), 20-4.

[458] Trans Mountain Reply Evidence, Section 20 – Facility Engineering and Design (August 20, 2015), 20-4.

[459] Exhibit B32-2 – Trans Mountain ULC – Trans Mountain Response to NEB IR No. 1 – Request 1.98 (May 14, 2014) (A3W9H9), 479-481; Exhibit B371-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 4 – Request 4.21 (April 13, 2015) (A4K4W3), 100.

[460] Exhibit B32-2 – Trans Mountain ULC – Trans Mountain Response to NEB IR No. 1 – Request 1.98a (May 14, 2014) (A3W9H9), 479-480.

mitigation measures and to comply with any additional requests that might be requested as part of the NEB's conditions of approval if the Project is approved.[461]

The JRP for the Enbridge Northern Gateway Project indicated a favourable view towards the type of semi-quantitative risk assessment undertaken by TMEP, stating:

> Risk assessments based solely on historical incident records provide poor insight into future performance since incident records do not account for new technology and learnings that occur from the incident investigations. Northern Gateway said that it strives for continued improvement. The Panel finds that Northern Gateway's semi-quantitative risk assessment is a sound approach to designing a pipeline system because it provides a framework to anticipate, prevent, manage, and mitigate potential hazards at the design stage of the project.[462]

As detailed in Trans Mountain's reply evidence, the most common theme in the evidence submitted is the misperception and mischaracterization of the purpose of the pipeline risk assessment. Many intervenors contend that to facilitate a risk evaluation, the expected frequency of full-bore ruptures along the entire length of the pipeline should be reported as a 'return period'. For example, the City of New Westminster's evidence contains the following statements:

> Failure frequencies provided by KMC are sub-divided into smaller risks by considering the risk of rupture due to separate causes, rather than the overall risk of rupture due to all causes combined. Risks are also presented at scales that are difficult for most readers to understand. Local governments should be provided with a better understanding of the number of full-bore rupture events expected <u>over the life of the project over each main segment of pipeline for all causes of ruptures combined</u>.[463] [emphasis added]

[461] Exhibit B32-2 – Trans Mountain ULC – Trans Mountain Response to NEB IR No. 1 – Request 1.98 a (May 14, 2014) (A3W9H9), 480-481.

[462] Enbridge Northern Gateway Joint Review Panel Report (December 2013), Volume 2, 80.

[463] Exhibit C72-5-2-City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5), 34.

Trans Mountain submits that the 'return period' approach to risk assessment, compared to Trans Mountain's dynamic segment approach described below, is incorrect for two reasons:

(a) When calculating failure rates for linear infrastructure, such as pipelines, return period varies as a function of pipeline length, such that all other factors being equal, the return period increases as the length of pipeline that is being evaluated decreases. Aggregating failure likelihood over the length of a pipeline in order to report it in terms of a return period is contrary to, and inconsistent with how the consequences of failure manifest themselves, which is location-specific. Failure likelihood or risk results reported as 'return periods' for linear infrastructure are therefore misleading and make it difficult to interpret results, especially when attempting to compare pipeline performance against industry benchmarks or incident statistics, which are reported on a per-unit-length per-year basis. [464]

(b) The 'return period' concept is misleading in that it is predicated on an assumption of static threat levels. In reality, pipelines operate in a changing environment that includes time-dependent threat mechanisms for which regular assessments (such as in-line inspection) are made. Maintenance and repair operations are regularly undertaken to prevent failure from those time-dependent threats. The 'return period' concept is conservative overstating risk because it does not account for that changing environment, nor does it take into consideration the fact that future maintenance and repair will be undertaken to prevent failure.[465]

[464] Trans Mountain Reply Evidence, Section 23 – Pipeline Oil Spill Risk Assessment (August 20, 2015), 23-2 – 23-3.

[465] Trans Mountain Reply Evidence, Section 23 – Pipeline Oil Spill Risk Assessment (August 20, 2015), 23-2 – 23-3.

Therefore, in Trans Mountain's view, the request from the City of New Westminster and other intervenors to report failure likelihood or risk results reported as 'return periods' would provide no useful information to the Board, be misleading, difficult to interpret and fail to take into account relevant changes to the environment or pipeline.

Trans Mountain submits that it appropriately calculated risk results on a dynamic segment basis,[466] rather than as 'return periods'. A dynamic segment is a contiguous section of pipeline over which all attributes used in the calculation of risk are held constant. There are over 91,000 dynamic segments between Edmonton and Burnaby. As detailed in Trans Mountain's reply evidence, aggregating results over the entire length of the pipeline, for the purposes of reporting a 'return period' would involve removing all resolution from the analysis to the point where the results would do nothing to facilitate the risk-based design process that is the intention of the risk assessment.[467]

The facilities that are being proposed under this Application will be industry leading with respect to safety measures that are incorporated in their design and operation. The Pipeline Risk Assessment Report[468] prepared by Trans Mountain satisfied Annex B of the CSA Z662 Standard "Oil and Gas Pipeline Systems", which provides guidance for the performance of risk assessments on pipelines. In addition, Trans Mountain's risk-based design process for the Project goes beyond the minimum requirements of the CSA Z662 code. This is an industry-leading, world class design

[466] Exhibit B306-2 - Trans Mountain Pipeline ULC - Response to NEB IR No. 3.050a (February 3, 2015) (A4H1V2), 359.

[467] Trans Mountain Reply Evidence, Section 23 – Pipeline Oil Spill Risk Assessment (August 20, 2015), 23-2.

[468] Exhibit B248-18 – Trans Mountain Pipeline ULC Tech Update 1 Cons Update 2 Part 2 Risk Update Pt01 – (August 1, 2014) (A3Z8G1).

approach that will enable the design team to identify potential risks along the Project and pre-emptively adopt mitigation measures at the design phase to address these risks.[469]

Trans Mountain's risk assessment has informed its Project plans, for example, the Board requested additional information from Trans Mountain regarding how its evaluations informed valve placement in the event of an oil-pipeline release. The results of the risk assessment were incorporated into the design of the Project in a number of ways, for example:

(a) optimization of valve locations were based on an assessment of release magnitude and the potential for that release to reach a watercourse;[470]

(b) risk associated with the threat of third party damage were mitigated through increased depth of cover, increased wall thickness or enhanced damage prevention measures such as pipeline markers;[471]

(c) risk associated with geohazards were mitigated through threat avoidance;[472]

(d) risk associated with radiant heat exposure at Burnaby Terminal was mitigated through reconfiguration of two shared secondary containment areas to draw the 4.0 kW/m^2 contour further away from a neighbouring residential area to the south;[473] and

[469] Trans Mountain Reply Evidence, Section 23 – Pipeline Oil Spill Risk Assessment (August 20, 2015), 23-1.

[470] Exhibit B371-2 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB IR No. 4 – Request 4.18 (April 13, 2015) (A4K4W3), 89-92.

[471] Exhibit B316-34 – Trans Mountain Response to Province of B.C. IR No. 2.07(a) (February 18, 2015) (A4H8W6), 22-24.

[472] Exhibit B316-34 – Trans Mountain Response to Province of B.C. IR No. 2.07(a) (February 18, 2015) (A4H8W6), 22-24.

[473] B371-2 - Trans Mountain Pipeline ULC - Responses to National Energy Board Information Request No. 4.21 (April 13, 2015) (A4K4W3), 100-101.

(e) for the expanded terminals, the assessment uses the criteria in the MIACC "Risk Based Land Use Planning" guideline. The assessments consider the worst-case scenarios, without consideration for the impacts of mitigation measures. The risks, even without mitigation measures, are within the MIACC acceptability criteria, provided that appropriate design features and maintenance practices are employed to keep the probability and magnitude of releases low.

Burnaby asserted that Trans Mountain's risk assessment is based on an "arguable premise" that sufficiently low frequency risks can remain unmanaged regardless of the severity of the consequence. [474] Trans Mountain disagrees with Burnaby's assertion. Trans Mountain uses a risk matrix approach to review facility integrity hazards and to qualitatively assess the risk of hazards. The matrix also considers the prevention, detection and protection measures applied to control hazards at facilities. Each preventive control measure reduces the likelihood of a hazard, while each detective and/or protective control measure reduces the consequence.[475]

In summary, Trans Mountain has incorporated findings from its risk assessment in its Project plans and will continue development of its final risk assessment to effectively anticipate, prevent, manage and mitigate potential risks. Risks and mitigation are well understood. Trans Mountain will continue to refine and optimize through its risk assessments to enhance the safety of the pipeline. The more than 60 years of safe operation of the TMPL underscores the accuracy and correctness of Trans Mountain's risk assessment approach.

---

[474] Exhibit C69-44-2 - Burnaby Fire Department - Trans Mountain Tank Farm Tactical Risk Analysis - Part 1 - Report and Appendix A (A4L8F6) (May 27, 2015), 3, 10.

[475] Trans Mountain Reply Evidence, Section 24-Facility Risk Assessment (August 20, 2015), 24-15.

3.18 Environmental Protection Plans

Trans Mountain has developed EPPs for the pipeline, facilities and the Westridge Marine Terminal. Each EPP is designed to:

(a) identify mitigation measures to be implemented during pipeline and associated components construction activities;

(b) provide instructions for carrying out construction activities in a manner that will avoid or reduce adverse environmental effects; and

(c) serve as reference information for the environmental inspection staff to support decision-making and provides direction to more detailed information (such as resource-specific mitigation, management and contingency plans).[476]

Each of the EPPs provide mitigation strategies to help avoid or minimize environmental effects from construction.[477] Trans Mountain presented site-specific mitigation measures in the Environmental Alignment Sheets. The EPPs and Environmental Alignment Sheets will be used to guide environmental inspection and monitoring of the Project during construction.

Trans Mountain will implement its comprehensive, Project-specific EPPs throughout construction activities in order to ensure disturbance is mitigated and minimized.[478] The plans identify mitigation measures to be implemented during construction activities and provide measures and best practices for carrying out construction activities in a manner that will avoid or reduce adverse

[476] Exhibit B11-4 - V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3), 1-3.

[477] Exhibit B011 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 6A, 6B, 6C, 6D, 6E Part 1 (December 16, 2013) (A56013).

[478] Exhibit B316-2 – Trans Mountain Response to Langley IR No. 2 (February 18, 2015) (A4H8T4), 23-25.

environmental effects.[479] The EPPs will be refined and optimized on an ongoing basis to ensure continuous improvement.

During construction, Trans Mountain will ensure that compliance with environmental commitments, undertakings and conditions of authorization and applicable environmental regulations are strictly enforced. This will involve hiring Environmental Inspectors as part of the Trans Mountain's construction management team to ensure the measures set out in the EPP are communicated, complied with, monitored and documented throughout all phases of construction to ensure compliance to the EPP.[480] Through its EPPs, Trans Mountain will minimize the environmental impacts of Project-related construction activities and reasonably address the concerns of intervenors such as Metro Vancouver.

Yarrow Ecovillage[481] and the B.C. Wildlife Federation[482] raised concerns regarding spills during construction including contingency planning for spills and protection of habitat from spills during construction.

Regarding contingency planning for spills, Trans Mountain will implement management systems and industry best practices to protect and mitigate environmental impacts from spills and foreign material contamination throughout construction (as described in the EPPs). General and site specific protection measures of the EPP will be implemented by Trans Mountain during

---

[479] Exhibit B11-4 - V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3), 1-3.

[480] Exhibit B5-1 - V4B 1.0 TO 4.2.1.1 PROJ DES AND EXEC CONSTR (December 16, 2013) (A3S1K5), 4B-19 – 4B-20.

[481] Exhibit C394-2-1 - Yarrow Ecovillage Written submission (May 27, 2015) (A4Q1L3), 9.

[482] Exhibit C25-1-1 – B.C. Wildlife Federation - Written Evidence Submission (A4Q0W2), 13.

construction. These measures include the provision of emergency spill kits, appropriate for site conditions and activities to be available at all times. [483]

Regarding protection of habitat from spills during construction, all spill incidents, including minor and spot spills not reportable to the regulator, such as hydraulic hose failure, will be immediately reported to onsite supervisors, who will report the spill to the Environmental Inspector. Site-specific ERPs will include a contact list of the construction spread managers, including General Contractor and TMEP construction and environmental management.[484] In the event that an unforeseen environmental emergency occurs during construction, Trans Mountain will implement any site specific approved mitigation measures or contingency plans and its EMP. Following the initial response and containment, contamination will be assessed and remediation designed and implemented in accordance to the NEB Remediation Guide (NEB 2011).[485]

3.19 Reclamation Management Plan

Trans Mountain has developed a Reclamation Management Plan[486] that includes construction reclamation measures to be implemented prior to, during and following pipeline installation in order to stabilize and re-vegetate affected lands to in time achieve land productivity along the right-of-way that is functionally comparable to pre-disturbance conditions or adjacent conditions off the right-of-way. This plan will include Integrated Vegetation Management to control problem vegetation, and will be implemented in conjunction with Trans Mountain's Rare Ecological

[483] Trans Mountain Reply Evidence, Section 48 - Environmental Protection Planning (August 20, 2015), 48-1; Exhibit B11-4 - V6B 1 of 2 PIPELINE EPP (December 16, 2013) (A3S2S3), 1-1 – 1-10, 7-1 and 8-1 – 8-63.

[484] Exhibit B11-4 - V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3), 1-10.

[485] Trans Mountain Reply Evidence, Section 48 - Environmental Protection Planning (August 20, 2015), 48-1.

[486] Exhibit B11-7 - V6C 1of2 FACILITIES EPP (December 16, 2013) (A3S2S6), C-1.

Community and Rare Plant Population Management Plan. Following construction, Trans Mountain's post-construction monitoring program will evaluate the success of Trans Mountain's reclamation work and will identify the need for additional measures, as needed, to ensure that the goals of the Reclamation Management Plan are met.

As detailed in Section 7.3 - Follow-up and Monitoring Trans Mountain has proposed a comprehensive Post-Construction Environmental Monitoring ("PCEM") program. The goals of this program include determining whether the environment is on a successful trajectory towards pre-construction conditions and assessing the effectiveness of reclamation measures. The results of the program will be submitted to the NEB, including any unresolved environmental issues and the remedial measures planned by Trans Mountain to resolve these issues. Trans Mountain will conduct the PCEM program during a period up to the first five complete growing seasons (or during years one, three, and five) following commissioning of the Project or as per CPCN conditions. [487]

3.20 Project Design Conclusion

Trans Mountain has drawn on its extensive experience with the TMPL and the recently completed Anchor Loop Project to safely design the Project and mitigation measures. The company is uniquely qualified through decades of operational experience to give consideration to the range of terrain and environmental conditions that the TMEP will cross. The Project will be designed in accordance with the OPR and Trans Mountain has committed to complying with the CSA Z662-15 Standard, which was released in June 2015.[488] Trans Mountain's design process and

[487] Trans Mountain Reply Evidence, Section 50 – Post-Construction Monitoring (August 20, 2015), 50-2 to 50-6.

[488] Exhibit B413-1 - Trans Mountain Pipeline ULC Response to NEB IR No 6 (July 22 2015) (A4R6I4), 118.

engineering practices will ensure compliance with all applicable laws and regulations, as well as industry-accepted codes and standards, which are in place to protect the environment and safety of the public. The Association of Consulting Engineering Companies of British Columbia confirmed this view in its letters to the Board:

> The oversight, permitting and internal quality control measures associated with the project, along with Canada's prominence as an international leader in pipeline development, should give the NEB and the public confidence that the Trans Mountain Expansion Project can be built, operated and maintained in an environmentally responsible manner.[489]

Trans Mountain's iterative risk-based design process identified optimal risk-mitigation measures and will incorporate those risk mitigation measures into the final design. This design process was informed by a robust risk-assessment process to identify and mitigate high-risk portions of the design. Trans Mountain conducted an extensive stakeholder engagement process and worked diligently to address the concerns received, including by modifying designs and routing.

Trans Mountain's routing criteria has been applied to produce a corridor that effectively minimizes impacts on potentially affected parties and the environment. In its Project planning, Trans Mountain thoroughly considered reasonable alternative pipeline routing and Westridge Marine Terminal locations to identify the preferred option based on engineering, construction, environmental and socio-economic factors.

The use of existing pipeline segments and pump station locations as well as suitable watercourse crossing methods further reduced the environmental impacts of the Project. For terminal facilities, proven mitigation measures are proposed to ensure that there is adequate secondary containment and fire protection.

---

[489] Association of Consulting Engineering Companies of B.C. - Letter Of Comment (July 16, 2015) (A4R5G8).

Trans Mountain's plans for operations, maintenance inspection and environmental protection demonstrate that the Project will be constructed and operated in a safe, reliable and environmentally responsible manner.

4. EMERGENCY RESPONSE

4.1 Overview

Concerns have been raised regarding accidents or malfunctions in relation to the Project, and in particular Trans Mountain's ability to respond to terrestrial and marine oil spills.[490] Pursuant to regulatory requirements, Trans Mountain must implement management systems and protection programs to anticipate, prevent, manage and mitigate events that may adversely affect the safety and security of its pipelines, employees, the public, property and the environment.[491] Trans Mountain's primary objective is to prevent spills from occurring. To achieve this objective, incident prevention measures will be incorporated throughout the full Project lifecycle starting with formalized risk assessments of preliminary engineering designs through to pipeline construction, facility expansion and overall system operation and maintenance.[492]

Given the complex nature of activities associated with the construction, operation and maintenance of the Project, an accidental release or other unplanned event is possible. To address that reality, Trans Mountain developed an EMP for the existing TMPL and facility network that is premised on regulatory compliance, operational need, industry best practice and lessons learned through regular exercises and actual incidents. The enhanced EMP that is developed for the Project will improve on the current TMPL EMP in all respects.[493]

---

[490] Exhibit C363-21-18 - Upper Nicola Band Expert Report. Inland Oil Spill Response Logistics Analysis Part 1 of 4 (May 27, 2015) (A4Q1T3); Exhibit C363-21-19 - Upper Nicola Band Expert Report. Inland Oil Spill Response Logistics Analysis Part 2 of 4 (May 27, 2015) (A4Q1T4); Exhibit C363-21-20 - Upper Nicola Band Expert Report. Inland Oil Spill Response Logistics Analysis Part 3 of 4 (May 27, 2015) (A4Q1T5); Exhibit C363-21-21 - Upper Nicola Band Expert Report. Inland Oil Spill Response Logistics Analysis Part 4 of 4 (May 27, 2015) (A4Q1T6).

[491] OPR, s 6.1.

[492] Exhibit B18-1 - V7 1.0 TO 5.2.8.3 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5), 7-3.

[493] Exhibit B18-1 - V7 1.0 TO 5.2.8.3 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5), 7-3; Exhibit B11-7 - V6C 1 of 2 FACILITIES EPP(December 16, 2013) (A3S2S6), 55.

4.2 NEB Emergency Management Program Requirements

The NEB clearly delineated its requirements for EMPs in a letter to intervenors and Trans Mountain on April 16, 2014.[494] Specifically, the NEB stated that each NEB-regulated company must have an emergency management program that includes:

(a) the identification and analysis of potential hazards;

(b) the evaluation and management of risks associated with all hazards;

(c) an up-to-date emergency procedures manual that is filed with the Board;

(d) liaising with agencies that may be involved in an emergency situation;

(e) taking all reasonable steps to inform all persons who may be associated with an emergency response activity on the pipeline of the practices and procedures to be followed;

(f) having a continuing education program for the police, fire departments, medical facilities, other appropriate organizations and agencies and the public residing adjacent to the pipeline to inform them of the location of the pipeline, potential emergency situations and the safety procedures to be followed in case of an emergency;

(g) having procedures for the safe control or shutdown of the pipeline system in the event of an emergency;

(h) having sufficient response equipment;

(i) training to instruct employees on the emergency procedures and emergency equipment; and

[494] Exhibit A019 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8); Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

(j) having a verifiable capability to respond to an emergency demonstrated through emergency response exercises.[495]

To ensure that companies are fulfilling their obligations under the OPR, EMPs are subject to audit by the NEB. Board staff regularly conduct compliance verification activities, emergency response exercise evaluations and review emergency procedures manuals to verify that companies are prepared to manage emergency situations.

The KMC ERPs that form part of the current TMPL EMP have been written and organized to comply with NEB requirements. Federal and provincial regulatory personnel, as well as local first responder representatives, have attended KMC Emergency Response training exercises and actual spill responses and have had the opportunity to use the ERPs.[496] Each year, KMC conducts over 20 emergency response exercises across the TMPL system.[497] The public record makes clear that Trans Mountain's EMP has been designed to exceed the OPR requirements.[498]

4.3 Consultation Regarding the Emergency Management Program Documents

Trans Mountain has consulted with Aboriginal groups and stakeholders and engaged communities in discussions regarding the extent to which EMP documents should be made public to comply with the NEB's regulatory requirements, the public's interest in the plans and the protection of

[495] Exhibit A019 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 4; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[496] Trans Mountain Reply Evidence, Section 6.3 – Emergency Management Program (August 20, 2015), 63-11; Exhibit B32-2-Trans Mountain Response to NEB IR No. 1.69a (May 14, 2014) (A3W9H8).

[497] Exhibit B32-2-Trans Mountain Response to NEB IR No. 1.69a (May 14, 2014) (A3W9H8); Exhibit B 18-1-V 7 4.6.1 TO 4.6.2 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5) 7-35; Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-11.

[498] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 403-408.

2935 people, facilities and the environment. On October 17, 2014 Trans Mountain filed the EMP
2936 documents for the existing system in accordance with NEB Ruling No. 31.[499]

2937 The Board requires companies to provide relevant information consistent with that specified in
2938 EMP documents to first responders and all persons, including municipalities, that may be involved
2939 in an emergency response activity.[500] Trans Mountain made significant efforts to liaise with
2940 agencies that may be involved in an emergency situation, share information about the existing
2941 EMP and to seek input from emergency professionals. A prime example is the numerous
2942 Emergency Management Stakeholder Workshops that Trans Mountain organized for communities
2943 along the pipeline corridor. Presentations at the workshops provided information on a number of
2944 items the ERPs for the existing and proposed Trans Mountain pipeline system, the type and
2945 properties of products transported through the pipeline and how to respond safely in the event of
2946 a pipeline system emergency.[501] Trans Mountain's efforts ensure all feedback from those parties
2947 most familiar with successful emergency response is incorporated into the Project EMP.

2948 If a CPCN is issued and the Project proceeds, Trans Mountain will conduct a consultation program
2949 so that affected parties have the opportunity to provide input on the enhanced EMP as described
2950 in the NEB draft conditions related to emergency management.[502] Trans Mountain will also
2951 develop a plan describing how commitments made by the TMEP will be incorporated into the
2952 enhanced EMP. As part of this consultation program, KMC will periodically file reports with the

---

[499] Exhibit A079 - National Energy Board - Ruling No. 31 - Trans Mountain Pipeline ULC - Request to file Emergency Management Program documents confidentially (September 25, 2014) (A63036).

[500] Exhibit A155 - National Energy Board - Ruling No. 63 – Motions to compel full and adequate responses to the second round of intervenor information requests (April 27, 2015) (A69687).

[501] Exhibit B249-1-Trans Mountain Pipeline ULC Tech Update 1 Cons Update 2 Part 5 Update Stakeholder Engage Pt01 (August 1, 2014) (A3Z8J2), 41-2.

[502] Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-12.

NEB on progress of its EMP review, including summaries of the interested parties consulted and how their comments were considered in the development of the enhanced EMP.[503]

4.4 Pipeline and Facilities Spill Response

Shxw'ōwhámel and the Township of Langley expressed concerns related to aquifer protection after a release or incident. Trans Mountain takes responsibility for the oil it transports through its pipeline network regardless of who is determined to be the party responsible for causing an incident. The preferred method of protecting water, soil and groundwater aquifers is to prevent the product from entering those environments. The enhanced EMP will include the development of Geographic Response Plans ("GRPs") that will be tailored to the geographic setting in each region of the TMPL system. Each GRP will indicate whether a vulnerable aquifer is present and outline the spill response tactics will be designed to provide protection to the aquifer.[504] Through these plans, Trans Mountain will ensure that aquifers are protected after a release or incident.

The Province of B.C. raised concerns related to the availability of emergency response equipment.[505] Trans Mountain currently maintains and operates dedicated Oil Spill Containment and Response ("OSCAR") units at seven strategic points along the TMPL system corridor. In Alberta, the units are located in Stony Plain, Jasper, and Blue River. The B.C. units are located in Kamloops, Hope, Burnaby (which houses two units).[506] A detailed listing of the OSCAR contents

[503] Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-13.

[504] Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-21 – 63-22.

[505] Exhibit B150-1 – Trans Mountain Response to Province of B.C. IR No. 1 (June 18, 2014) (A3Y2Z1).

[506] Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-17.

at each location is available on the public record. [507] Development of the Project EMP will include review of the geographic locations and inventories of the OSCAR units.[508]

The Village of Belcarra expressed concerns regarding emergency response for the expanded Westridge Marine Terminal and the design technology for the proposed oil containment booms. Depending upon the size of the release, KMC, as operator, will implement some or all of the Westridge Marine Terminal ERP. Staff are always present during loading operations and will initiate an immediate shutdown of loading operations to limit the amount of product released. Prior to loading, tankers are completely encircled with boom. KMC staff at Westridge Marine Terminal are trained in oil spill response and have equipment ready on site for immediate deployment. For example, additional booms sufficient to double boom the ship in the event of an incident are stored at Westridge and can be deployed quickly by trained on-site personnel. Other activities that will take place in the event of a spill include the immediate notification of regulatory authorities such as WCMRC and use of the internal Emergency Response Line which notifies key incident management team members to assess and establish initial response objectives.[509] The Westridge Marine Terminal ERP, including spill response capacity, will be enhanced as part of the Project.[510]

4.5 Marine Spill Response

Certain intervenors raised concerns related to the effects associated with accidents and malfunctions in relation to the tankers calling at the Westridge Marine Terminal.[511] Adam Olsen,

---

[507] Exhibit B150-1 – Trans Mountain Response to Province of B.C. IR No. 1 (June 18, 2014) (A3Y2Z1).

[508] Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-17.

[509] Exhibit B96-1 – Trans Mountain Response to Belcarra IR No. 1 (June 4, 2014) (A3X6W1), 10.

[510] Exhibit B96-1 – Trans Mountain Response to Belcarra IR No. 1 (June 4, 2014) (A3X6W1), 10.

[511] Exhibit C73-6 - City of North Vancouver - Written Evidence (May 26, 2015) (A70223); Exhibit C74-10 - City of Port Moody – Evidence (May 26, 2015) (A70219); Exhibit C74-11 - City of Port Moody - Evidence (May 27,

2988 Cowichan Tribes, Elizabeth May, Makah Tribal Council, NS NOPE, Pacheedaht First Nation,

2989 Squamish Nation, Tsawwassen Nation and US Tribes raised concerns related to marine safety.[512]

2015) (A70255); Exhibit C74-12 - City of Port Moody – Evidence (May 27, 2015) (A70284); Exhibit C77-27 - City of Vancouver - Written Evidence - Part 1 (May 27, 2015) (A70261); Exhibit C77-27A - City of Vancouver - Written Evidence - Part 1A (May 27, 2015) (A70283); Exhibit C77-28 - City of Vancouver - Written Evidence - Part 2 (May 27, 2015) (A70254); Exhibit C77-29 City of Vancouver - Written Evidence - Part 3 (May 27, 2015) (A70260); Exhibit C77-30 - City of Vancouver - Written Evidence - Part 4 (May 27, 2015) (A70264); Exhibit C77-31 - City of Vancouver - Written Evidence - Part 5 (May 27, 2015) (A70285); Exhibit C84-2 - Corporation of the City of Victoria - City of Victoria Written Evidence Submission (May 27, 2015) (A70279); Exhibit C86-12 - Cowichan Tribes - Written Evidence (May 27, 2015) (A70297); Exhibit C106-08 - District of North Vancouver – Evidence (May 27, 2015) (A70300); Exhibit C107-10 - District of West Vancouver - Affidavit of Dorit Mason (May 26, 2015) (A70221); Exhibit C108-5 - Ditidaht First Nation - Written Evidence - Affidavit of Chief Thompson (May 25, 2015) (A70173); Exhibit C109-3 - Dorothy Doherty - Written Evidence of Intervenor Dorothy Doherty (May 27, 2015) (A70277); Exhibit C124-6 - David Farmer - Written evidence (May 27, 2015) (A70226); Exhibit C33-06 - Board for Friends of Ecological Reserves final evidence reports KM-TMX (May 28, 2015) (A70395); Exhibit C135-08 - Friends of the Earth US - FoE US Written Evidence 27 May 2015 (May 27, 2015) (A70295); Exhibit C138-2 - Georgia Strait Alliance - Georgia Strait Alliance Evidence (May 27, 2015) (A70327); Exhibit C214-18 - Ecojustice - Written Evidence of Living Oceans Society (May 27, 2015) (A70292); Exhibit C234-07 - Metro Vancouver - Written Evidence and Exhibits (May 27, 2015) (A70262); Exhibit C246-4 - Musqueam Indian Band - Written Evidence (May 27, 2015) (A70362); Exhibit C259-08 - NSNOPE Evidentiary Filings (May 26, 2015) (A70205); Exhibit C259-09 - NSNOPE Evidentiary Filings #2 (May 27, 2015) (A70290); Exhibit C269-18 - Pacheedaht First Nation - Written Evidence - Pacheedaht First Nation (May 26, 2015) (A70179); Exhibit C269-19 - Pacheedaht First Nation - Written Evidence (May 26, 2015) (A70191); Exhibit C269-20 - Pacheedaht First Nation - Written Evidence (May 26, 2015) (A70195); Exhibit C269-21 - Pacheedaht First Nation - Written Evidence - Pacheedaht First Nation (May 27, 2015) (A70241); Exhibit C269-22 - Pacheedaht First Nation - Written Evidence - Pacheedaht First Nation (May 27, 2015) (A70247); Exhibit C350-3 - Tofino-Long Beach Chamber of Commerce - 05-27-2015 Tofino-Long Beach Chamber of Commerce - Written Evidence (May 27, 2015) (A70363); Exhibit C350-2 - Tofino-Long Beach Chamber of Commerce - TLBCC Intervenor Written Submission #2 (January 8, 2015) (A65311); Exhibit C355-15 - Tsawout First Nation - Written Evidence (May 27, 2015) (A70322); Exhibit C358-13 - Tsleil-Waututh Nation - Written Evidence (May 26, 2015) (A70206); Exhibit C359-4 - T'Sou-ke Nation - Written Evidence (May 26, 2015) (A70201); Exhibit C336-7 - Swinomish, Tulalip, Suquamish, and Lummi Indian Nations - Written Evidence (May 27, 2015) (A70248); Exhibit C369-6 - Village of Belcarra - Written Evidence (May 26, 2015) (A70183); Exhibit C376-08 - Written Evidence from WSDOE (May 27, 2015) (A70339).

[512] Exhibit C267-6-2 - Written Evidence of Adam Olsen (May 27, 2015) (A4L6V3); Exhibit C86-12-1 - Written Evidence of Cowichan Tribes (May 27, 2015) (A4L9Y9); Exhibit C228-5-1 - Elizabeth May Written Evidence – (May 27, 2015) (A4L8Q9); Exhibit C223-3-1 – Makah KM-TM writ-evid 5-27-15 (May 27, 2015) (A4Q2A4); Exhibit C259-8-34 - NSNOPE written evidence (S Dickinson Pt 1) (May 26, 2015) (A4L5Y4); Exhibit C259-8-35 - NSNOPE written evidence (S Dickinson - Part 2) (May 26, 2015) (A4L5Y5); Exhibit C259-8-36 - NSNOPE written evidence (C Hartley) (May 26, 2015) (A4L5Y6); Exhibit C269-18-2 - Affidavit of Jeff Jones sworn 22 May 2015 (May 26, 2015) (A4L5F3); Exhibit C269-18-3 - Exhibit A to Affidavit of Jeff Jones (Pacheedaht) sworn May 22, 2015 (May 26, 2015) (A4L5F4); Exhibit C269-18-4 - Exhibit B of Affidavit of Jeff Jones (Pacheedaht) sworn May 22, 2015 (May 26, 2015) (A4L5F5); Exhibit C269-18-5 - Exhibit C of Affidavit of Jeff Jones (Pacheedaht) sworn May 22, 2015 (May 26, 2015) (A4L5F6); Exhibit C269-18-6 - Exhibit D of Affidavit of Jeff Jones (Pacheedaht) sworn May 22, 2015 (May 26, 2015) (A4L5F7); Exhibit C269-18-7 - Exhibit E of Affidavit of Jeff Jones (Pacheedaht) sworn May 22, 2015 (May 26, 2015) (A4L5F8); Exhibit C319-27-4 - 2. Potential Adverse Effects of Shipping On Squamish Interests - Increased Volume Effects on Travel Report (May 27, 2015) (A4L7E5); Exhibit C356-7-3 - TFN Written Submissions 27 May 2015 (May 27, 2015) (A4L7T2); Exhibit C336-7-7 - Written Evidence Appendix D (May 27, 2015) (A4L7G7).

KMC, as operator, only has an emergency response role if the spill originates from the Westridge Marine Terminal or a tanker that is docked at the terminal. Once a tanker has completed loading and leaves the Westridge Marine Terminal the cargo falls under the jurisdiction of the *Canada Shipping Act, 2001* and associated marine transport regulations.[513] In the unlikely event[514] that an oil spill occurs in the marine environment multiple organizations (e.g., WCMRC, Transport Canada, Environment Canada and the Canadian Coast Guard) will quickly take coordinated action to mitigate public and environmental impacts.[515]

Spill response for all commercial tankers and oil handling facilities along the B.C. Coast is provided under agreement by the WCMRC which is the only federally certified oil spill response organization and the designated response organization for the West Coast of Canada. As discussed in Section 2 - Legal Framework of this final argument, WCRMC's enhanced planning standards for marine spill response will result in a regime that is able to deliver 20,000 tonnes of capacity within 36 hours from dedicated resources staged within the study area. This response capacity is double, and the delivery time half of, the existing planning standards.[516]

In addition, the federal government announced that it will further strengthen Canada's tanker safety system with additional measures based on recommendations from the Tanker Safety Expert Panel and other studies. This objective has been achieved in part through amendments to the *Canada Shipping Act, 2001* which are designed to: (i) strengthen the current requirements for

[513] Trans Mountain Reply Evidence, Section 62 – Marine Emergency Preparedness and Response (August 20, 2015), 62-6.

[514] Trans Mountain Reply Evidence, Section 62 – Marine Emergency Preparedness and Response (August 20, 2015), 62-1.

[515] Exhibit B306 - Trans Mountain Pipeline ULC - Response to NEB IR No. 3 – Part 1 of 2 (February 3, 2015) (A4H1V2), 75.

[516] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-81.

pollution prevention and response at oil handling facilities; (ii) increase Transport Canada's oversight and enforcement capacity by equipping marine safety inspectors with the tools to enforce compliance; (iii) classify new offences to be considered as contraventions of the Act and extend financial penalties relating to pollution; and (iv) enhance response to oil spill incidents by removing legal barriers that could otherwise block agents of Canadian response organizations from participating in clean-up operations.[517] The enhancements to the *Canada Shipping Act, 2001* address intervenor concerns by improving Canada's system for ship-source oil spill preparedness and response in order to better protect the public and the environment.

4.6 Emergency Response Conclusion

The most critical emergency preparedness strategy is to prevent a spill from occurring. However, in the unlikely event of an accidental release or other incident related to the Project, Trans Mountain will be prepared to respond in an expeditious and effective manner. The EMP for the existing TMPL and facility network is premised on regulatory compliance, operational need, industry best practice and lessons learned through regular exercises and actual incidents. KMC, as operator, will draw from its extensive operational experience to design an enhanced EMP for the Project. Emergency preparedness and response is an adaptive and continuing process. Trans Mountain is committed to consulting with stakeholders and Aboriginal groups at every stage of the EMP development process and over the life of the Project. This ongoing review and revision process ensures that the KMC EMP is current and meets, or exceeds, regulatory and jurisdictional requirements.[518]

---

[517] Trans Mountain Reply Evidence, Section 59 – Marine Transportation (August 20, 2015), 59-6.

[518] Trans Mountain Reply Evidence, Section 63 – Emergency Management Program (August 20, 2015), 63-3.

5. PUBLIC PARTICIPATION

5.1 Overview

Trans Mountain has a comprehensive public consultation program which has resulted in ongoing consultation and conversations with thousands of individuals along the pipeline and marine corridors through in-person meetings, presentations, open house and workshops, online engagement (e.g., webinars), social media, interviews, phone inquiries, email correspondence and public media. For years Trans Mountain has conducted rigorous and comprehensive consultation with Aboriginal communities and other stakeholders. The purpose of the consultation undertaken by Trans Mountain is to both identify concerns important to Aboriginal communities and other stakeholders, and to develop and implement mitigation and enhancement measures. The concerns informed Trans Mountain's Project-planning efforts and, where possible, the issues were resolved. The Board can rely on Trans Mountain's consultation efforts which have enhanced the Project.

The following section provides an overview of Trans Mountain's public consultation program including a summary of all consultation that has occurred to date was well as future consultation Trans Mountain has committed to undertake.

5.2 Trans Mountain's Public Consultation Program

As part of the TMEP Trans Mountain has, and continues to, engage in comprehensive consultation with the public. The inclusiveness of the consultation process bears emphasizing—Trans Mountain's consultation efforts span the conceptual phase of the Project through to present day and will continue throughout the life of the Project.

To support its public consultation efforts, Trans Mountain developed the TMEP Stakeholder Engagement Program. In designing the program, Trans Mountain adopted KMC's Aboriginal and Community Relations philosophy which states:

> At KMC, we believe Aboriginal groups, our neighbours, governments and local communities play an important role in how we conduct our business. Our success depends on earning the trust, respect and cooperation of all community members. [519]

The Stakeholder Engagement Program is comprised of six phases. The first phase commenced when Trans Mountain first committed to pursue the TMEP. Since that time Trans Mountain has implemented phases two through five of the Stakeholder Engagement Program with the sixth phase to begin upon operation of the Project and continue through the life of the TMEP.[520] Feedback received in each phase has been incorporated into the TMEP planning and has influenced the design of subsequent phases of stakeholder engagement. The six phases of the Stakeholder Engagement Program are:

(a) Phase 1 Engagement - Stakeholder and issue identification, May 2012 to September 2012;

(b) Phase 2 Engagement - Public information and input gathering, October 2012 to January 2013;

(c) Phase 3 Engagement - Community conversations, February 2013 to July 2013;

(d) Phase 4 Engagement - Feedback to stakeholders and Application filing, August 2013 to December 2013;

(e) Phase 5 Engagement - Regulatory process to in-service, January 2013 to in-service; and

[519] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-2.

[520] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-4 – 3A-5.

(f) Phase 6 Engagement - Operational consultation.[521]

5.3 Public Information and Outreach Tools

Trans Mountain used a variety of methods to provide information to various audiences. These include: (i) maintaining a comprehensive website with information about various components of the Project and the industry; (ii) proactively distributing email updates to those who signed up for the mailing list; (iii) providing forums for people to ask questions, such as open house, workshops, face-to-face meetings, a toll-free phone line, email, a website question and answer forum (including the Talk Trans Mountain forum where the public can ask questions and respond to surveys), direct letters and Twitter question and answer sessions; (iv) maintaining a full media relations service that includes a dedicated media toll-free phone line, provides tours of TMPL facilities and submits information for publication; (v) using modest advertising campaigns, in multiple languages, designed to notify people about ways they could engage with members of the Project team, in person or online; and (vi) using advertising to alert the public of routing options where there were alternate routes being considered.[522]

Trans Mountain received public feedback through sources including public open houses (also referred to as information sessions), routing open houses, community workshops, environmental and socio-economic workshops, emergency management stakeholder workshops, environment protection plan workshops, socio-economic effects monitoring program sessions, feedback forms, one-on-one meetings, public presentations and panels, online discussion forums and comment forms (including the TMEP website online engagement portal), telephone town halls and social

[521] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-9.

[522] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-2, 3A-11.

media using such forums as Twitter, YouTube and SoundCloud and directly through mail, email and telephone contact.[523]

As discussed above, the Stakeholder Engagement Program is comprehensive and makes use of methods beyond those identified in the Filing Manual.[524] Specific details on how Trans Mountain has used these forms of communication and strategies are provided in the Application and four Consultation Updates.[525]

5.3.1 Public Consultation Activities

Trans Mountain's early engagement with the public shaped its subsequent engagement and communications activities. For example, Trans Mountain provided introductory information on the Project through 37 public open houses in the fall and winter of 2012 and hosted subsequent open houses between May 2013 and July 2013 based on the initial public feedback it received.[526] During the regulatory process, Trans Mountain consulted with thousands of individuals through 159 open houses or workshops along the pipeline and marine corridors and organized more than 1,700 meetings between Project team members and stakeholder groups. Trans Mountain has also responded to 954 media inquiries, provided 432 interviews and responded to approximately 553

---

[523] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-4 – 3A-5; Exhibit B1-9– V3A 1.5.6 TO 2.0 PUBLIC CONSULT Part 4 (December 16, 2013) (A3S0R5), 3A-131; Exhibit B306-12- Trans Mountain Response to NEB IR No. 3.005a – Attachment Part 1(February 3, 2015) (A4H1W2), 25.

[524] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-32.

[525] Exhibit B1-6, B1-7 , B1-8, B1-9– Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 3A, Public Consultation (December 16, 2013) (A3S0R2, A3S0R3, A3S0R4, A3S0R5 plus appendices); Exhibit B27 – Trans Mountain Pipeline ULC – Consultation Update No. 1 – Errata (March 20, 2014) (A59343); Exhibit B248, B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 and Consultation Update No. 2 – (August 1, 2014) (A62087 and A62088); Exhibit B306-12, B306-13, B306-14, B306-15, B306-16, B306-17, - Trans Mountain Pipeline ULC – Response to NEB IR No. 3.005a - Consultation Update No. 3 – (A4H1W2, A4H1W3, A4H1W4, A4H1W5, A4H1W6, A4H1W7); Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[526] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-5.

phone inquiries and 1,506 emails received from the public.[527] This information was and will continue to be considered for incorporation into Project planning and design, and guides the development and implementation of Project-related mitigation measures.

Trans Mountain made substantial efforts to provide stakeholders, Aboriginal groups and landowners with opportunities to participate in the planning of the Project. The feedback received by Trans Mountain informed Project planning in areas including routing, the scope of ESA, the identification of mitigation measures to reduce environmental and socio-economic impacts, emergency management, construction planning, Project-related benefits and routing alternatives. Trans Mountain has shared valuable information on issues related to pipeline integrity, safety and emergency response, environmental assessment and mitigation, economic impact, jobs, training and community opportunities.[528] Based on these interactions, and throughout the engagement process, Trans Mountain has been able to identify common areas of interest or concern among stakeholders including: (i) community capacity building; (ii) corporate policies; (iii) land based access; (iv) the engagement process; (v) nuisance complaints; (vi) operations and maintenance; (vii) regulatory; (viii) routing; (ix) safety; and (x) terrestrial and marine environmental and socio-economic effects. The most common areas of interest or concern discussed online include: (i) climate change; (ii) construction; (iii) current operations; (iv) diluted bitumen; (v) routing; (vi) economic benefits and impacts; (vii) employment and training (viii) environment; (ix) liability;

---

[527] Exhibit B27 – Trans Mountain Pipeline ULC – Consultation Update No. 1 – Errata (March 20, 2014) (A59343); Exhibit B248, B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 and Consultation Update No. 2 – (August 1, 2014) (A62087 and A62088); Exhibit B306-12, B306-13, B306-14, B306-15, B306-16, B306-17, - Trans Mountain Pipeline ULC – Response to NEB IR No. 3.005a - Consultation Update No. 3 – (A4H1W2, A4H1W3, A4H1W4, A4H1W5, A4H1W6, A4H1W7); Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[528] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-4, 3A-5; Exhibit B306 - Trans Mountain Response to NEB IR No. 3.005a Attachment 1 – Part 1 (February 3, 2015) (A4H1W2), 64.

and (x) safety.[529] These areas of interest or concern have been relayed to the appropriate Project team representatives to be considered and incorporated in the Application.[530] Information on all engagement activities, including specifics on what actions were taken, the response level and feedback are provided in the Application and consultation updates.[531]

Trans Mountain's public consultation process was a success. Based on the feedback Trans Mountain received, the company improved and optimized Project plans and mitigation measures based on the feedback it received.[532]

Parks Canada raised concern that there have been no focused discussions with tourism operators in the Jasper National Park Area regarding impacts of reactivation activities associated with the Project.[533] Trans Mountain's evidence is that impacts to the tourism industry in Jasper National Park will not be material as reactivation activities, currently estimated to commence in Q2/Q3 2016, are anticipated to be minimal. In addition, Trans Mountain notified stakeholders in Jasper about specific opportunities to provide their feedback online and in May 2015 delivered direct

---

[529] Exhibit B1-9– V3A 1.5.6 TO 2.0 PUBLIC CONSULT Part 4 (December 16, 2013) (A3S0R5), 3A-131.

[530] Exhibit B1-6 – B1-6-V3A 1.0 TO 1.4 1.11 PUBL CONSULT (December 16, 2013) (A3S0R2), 3A-4, 3A-28.

[531] Exhibits B1-6, B1-7 , B1-8, B1-9– Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Application, Volume 3A, Public Consultation (December 16, 2013) (A3S0R2, A3S0R3, A3S0R4, A3S0R5 plus appendices); Exhibit B27 – Trans Mountain Pipeline ULC – Consultation Update No. 1 – Errata (March 20, 2014) (A59343); Exhibit B248, B249 – Trans Mountain Pipeline ULC – Technical Update No. 1 and Consultation Update No. 2 – (August 1, 2014) (A62087 and A62088); Exhibit B306-12, B306-13, B306-14, B306-15, B306-16, B306-17, - Trans Mountain Pipeline ULC – Response to NEB IR No. 3.005a - Consultation Update No. 3 – (A4H1W2, A4H1W3, A4H1W4, A4H1W5, A4H1W6, A4H1W7); Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[532] Mitigation measures resulting from Trans Mountain's engagement efforts include re-routing the Westridge delivery pipelines in Burnaby, B.C., enhanced Tanker Acceptance Standards and the creation of Technical Team Working Groups by Trans Mountain to provide an ongoing opportunity for Trans Mountain's engineering, routing and construction planning teams to work directly with relevant local government staff to refine plans and address issues as they arise.

[533] Exhibit C347-1-1 - Parks Canada TMX Written Evidence – (May 26, 2015) (A4L5U9), 7.

mail postcards to 1,010 dwellings in the Municipality of Jasper. Discussions and engagement regarding potential impacts associated with the reactivation of the existing line within Jasper National Park are ongoing. In addition, Trans Mountain has committed to reach out to tourism operators in the Jasper National Park in Q2/Q3 2015 and involve them in engagement activities pertaining to the reactivation of the existing line. For example, on June 17, 2015 Trans Mountain invited tourism organizers to a Community Leadership Meeting in Jasper, Alberta. Trans Mountain intends to hold a similar event focused specifically on tourism in Q3/Q4 of 2015. Based on the foregoing, Trans Mountain submits that there has been, and will continue to be, focused discussions with tourism operators in the Jasper National Park Area.[534]

5.4 Landowner Consultation

Trans Mountain created a specific program, the Landowner Relations Program, for landowner consultation. The Landowner Relations Program was designed to mirror and complement the Stakeholder Engagement Program and is based on the same principles, goals and design.[535]

The Landowner Relations Program is specifically aimed at introducing the Project to, and fostering discussion with, landowners along the proposed pipeline corridor. Trans Mountain recognizes that achieving landowner acceptance and obtaining approval for survey, construction, restoration and operational activities by means of open communication as well as fair compensation and addressing non-monetary issues in a respectful manner offers the greatest likelihood of success. It is Trans Mountain's goal to maintain an open working relationship with each landowner throughout all phases of the Project. Over the long-term, the program objectives are to obtain

[534] Trans Mountain Reply Evidence, Section 6 – Stakeholder Engagement (August 20, 2015), 6-1 – 6-2.

[535] Exhibit B1-46– V3C LANDOWNER RELATIONS (December 16, 2013) (A3S0V2), 3C-2.

landowner understanding, acceptance and land rights for survey, construction, restoration and operations.[536]

Trans Mountain began implementing the Landowner Relations Program in April 2012. The phases of the program include landowner notification, consultation and survey consent, land acquisition and maintaining ongoing relations.[537] The Application contains a full description of the Landowner Relations Program, as well as a summary of its outcomes and landowner comments/concerns.[538] The majority of concerns raised by landowners have been resolved, and Trans Mountain will continue its work to resolve outstanding concerns.[539]

Certain intervenors submitted evidence regarding access control during construction.[540] Specifically, Yarrow Ecovillage expressed concerns regarding construction activities cutting off access to farm operations and requested clarification on how access will be maintained.[541] Trans Mountain and its contractors will work with landowners and land managers to acquire access rights as described in the Application.[542] Trans Mountain is committed to working with landowners and land managers in developing site specific access management plans and channels of

---

[536] Exhibit B1-46– V3C LANDOWNER RELATIONS (December 16, 2013) (A3S0V2), 3C-2.

[537] Exhibit B1-46– V3C LANDOWNER RELATIONS (December 16, 2013) (A3S0V2), 3C-3 – 3C-7; Exhibit B306-Trans Mountain Response to NEB IR No. 3.005a Attachment 1- Part 1 - (February 3, 2015) (A4H1W2), 3, 126, 157-165.

[538] Exhibit B1-46– Exhibit B1-46– V3C LANDOWNER RELATIONS (December 16, 2013) (A3S0V2), 3C-2.

[539] Exhibit B306 - 12 - Trans Mountain Response to NEB IR No. 3.005a – Attachment 1 – Part 1 (February 3, 2015) (A4H1W2).

[540] Exhibit C143-1-1 - Written Evidence (May 26, 2015) (A4L6I0).

[541] Exhibit C394-2-1 - Written submission (May 27, 2015) (A4Q1L3).+

[542] Exhibit B1-4 - V2 3of4 PROJ OVERVIEW (December 16, 2013) (A3S0R0); Exhibit B1-46 - V3C LANDOWNER RELATIONS (December 16, 2013) (A3S0V2).

communication that minimize disruption and addresses the concerns raised by these stakeholders for sufficient, effective and safe access across the construction footprint.[543]

Evidence filed by some intervenors referenced issues that have occurred respecting the existing TMPL.[544] Although these issues are not within the scope of this proceeding, Trans Mountain representatives attempted to meet with and address the concerns identified in each case. Trans Mountain is committed to the continued implementation of programs and activities designed to address landowner issues.[545]

5.4.1 Government Consultation

Since the Project was announced in 2012, Trans Mountain representatives have made themselves available to the community, including elected representatives from all levels of government, who contacted Trans Mountain to better understand the Project and convey information to their constituents.[546]

The NEB process also included notification to all relevant federal government departments and provincial agencies in Alberta and B.C.[547] There has been extensive engagement with the governments of Alberta and B.C. to exchange information between Trans Mountain, provincial governments and provincial regulatory bodies on matters of provincial interest. A concern raised

---

[543] Trans Mountain Reply Evidence, Section 48 – Environmental Protection Planning (August 20, 2015).

[544] Exhibit C311-1-2 - MRR Evidence (May 27, 2015) (A4L8S5); Exhibit C47-4-4 - Affidavit of Ian Cooke (May 26, 2015) (A4L5J5); Exhibit C47-4-2 - Affidavit of Brian Kingman (May 26, 2015) (A4L5J3); Exhibit C47-4-7 - Affidavit of Ron Omichinski (May 26, 2015) (A4L5J8); Exhibit C47-4-6 - Affidavit of Christina Kehler (May 26, 2015) (A4L5J7); Exhibit C47-4-5 - Affidavit of Pearl Singleton (May 26, 2015) (A4L5J6).

[545] Trans Mountain Reply Evidence, Section 8 – Landowner Relations (August 20, 2015), 8-1.

[546] Exhibit B306-13 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.005a – Consultation Update No. 3 (February 3, 2015) (A4H1W3), 157.

[547] Exhibit B1-9 – V3A 1.5.6 TO 2.0 PUB CONSULT – Part 4 (December 16, 2013) (A3S0R5), 3A-128.

by government relates to the impact of the Project on provincial transportation right-of-ways and infrastructure. Trans Mountain is working with provincial governments to address their concerns through Project planning.[548] In addition, Trans Mountain met with Alberta Environment and Parks to discuss: right-of-ways and deviations outside of the existing right-of-way; geotechnical studies on the Pembina River crossing; and Crown land crossed by the Project that is within the traditional territories of First Nations.[549]

In the lead up to the filing of the Project Description in May 2013 and the Application in December 2013, all levels of government (local, provincial and federal) where elected representatives and their constituents are potentially affected by the Project were engaged by Trans Mountain or provided an opportunity to obtain information about the Project. This occurred in accordance with the principles and goals of the Engagement Program.[550]

5.5 Future and Ongoing Consultation

Trans Mountain is committed to respectful, transparent and collaborative interactions with the public to develop long term effective relationships. Once the Project becomes operational, engagement opportunities will continue through hosting facility open houses, providing newsletters and Project updates, making safety and public awareness presentations, participating in community events, regulatory processes and ongoing informal meetings with stakeholders.

[548] Exhibit B306-13 – Trans Mountain Response to NEB IR No. 3.005a – Consultation Update No. 3 (February 3, 2015) (A4H1W3), 157.

[549] Exhibit B306-13 – Trans Mountain Response to NEB IR No. 3.005a – Consultation Update No. 3 (February 3, 2015) (A4H1W3), 159.

[550] Exhibit B1-9– V34 1.5.6 TO PUBL CONSULT Part 4 (December 16, 2013) (A3S0R5), 3A-128, 3A-129.

Engagement activities to be used during operations will be developed in the lead up to construction. Trans Mountain is committed to ongoing consultation in the communities in which it operates.[551]

Trans Mountain has a number of engagement activities planned for the remainder of 2015. These include: (i) continued discussions on Community Benefit Agreements; (ii) ongoing meetings and discussions for route optimization; (iii) engagement on emergency management; (iv) reclamation and environmental remediation workshops; (v) continued public information sessions; (vi) employment and procurement information sessions; (vii) ongoing municipal and regional government engagement; and, (viii) ongoing marine engagement.[552]

If the Project is approved, Trans Mountain has made a number of specific engagement commitments that extend from approval through the entire lifecycle of the Project. These commitments have been included in the TMEP Commitments Tracking Table, which lists the hundreds of commitments that Trans Mountain has made during the regulatory process.[553] Examples of such commitments relating to public consultation and stakeholder engagement include:

(a) Commitment # 74: Trans Mountain will develop a communication plan to facilitate a concise two-way information exchange between Project team members, corporate head office, contractors and regulatory authorities in order to effectively manage

[551] Exhibit B1-9– V34 1.5.6 TO PUBL CONSULT Part 4 (December 16, 2013) (A3S0R5), 3A-128.

[552] Exhibit B306 - 12 - Trans Mountain Response to NEB IR No. 3.005a – Attachment 1 – Part 1 (February 3, 2015) (A4H1W2), 4.

[553] Exhibit B413-3 – Trans Mountain Pipeline ULC – Trans Mountain Response to NEB No. 6.01 – Attachment 1 – (Commitments v3 July 2015) (July 22, 2015) (A4R6I5).

the Project. The communication will also summarize the notifications required to regulatory authorities and the public (prior to construction);[554]

(b) Commitment # 88: KMC, as the operator of the existing Trans Mountain Pipeline system and the future TMEP, will continue to provide emergency response and incident prevention training free of charge to the municipalities in which it operates (throughout the operation of the Project);[555]

(c) Commitment # 110: Trans Mountain will work with emergency services to ensure that there is sufficient capacity to respond to a fire during construction and operations (throughout the operation of the Project);[556]

(d) Commitment # 124: As part of a commitment to keep stakeholders informed of Project activities, Trans Mountain has continued to provide Project updates, maintain an active website, phone line and email address. Trans Mountain will continue to seek opportunities to build awareness of the digital engagement platform throughout the Project's development (prior to construction, during construction and post construction);[557]

(e) Commitment # 128: Trans Mountain will continue engagement activities through to the post-construction phase of the Project. Trans Mountain will continue to

[554] Exhibit B306-3 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.001A – Attachment 1 (Trans Mountain Expansion Project Commitments Tracking Table) (February 3, 2015) (A4H1V3), 5.

[555] Exhibit B306-3 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.001A – Attachment 1 (Trans Mountain Expansion Project Commitments Tracking Table) (February 3, 2015) (A4H1V3), 6.

[556] Exhibit B306-3 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.001A – Attachment 1 (Trans Mountain Expansion Project Commitments Tracking Table) (February 3, 2015) (A4H1V3), 7.

[557] Exhibit B306-3 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.001A – Attachment 1 (Trans Mountain Expansion Project Commitments Tracking Table) (February 3, 2015) (A4H1V3), 8.

engage regulatory agencies and government offices that have interest in the Project through to the post-construction phase of the Project (post-construction);[558] and

(f) Commitment # 152: Trans Mountain will determine final crossing procedures in consultation with Burnaby and B.C. Ministry of Transportation and Infrastructure during the detailed engineering and design phase of the Project (prior to construction).[559]

5.6 Conclusion

The Application filed with the NEB is the culmination of years of study and engagement. These efforts include ongoing consultation and conversations with thousands of individuals along the pipeline and marine corridors through in-person meetings, social media, interviews, phone inquiries, email correspondence and public media.

Trans Mountain's comprehensive public consultation program was designed to ensure that all stakeholders were given the opportunity to access relevant Project information, be aware of Project information, have the ability to provide input into project planning and affect the future project. The sharing of information was made possible through the implementation of innovative engagement programs tailored to the interests and needs of Aboriginal groups and stakeholders including landowners and the federal and provincial government. Trans Mountain's Consultation Updates demonstrate that Project-related concerns have been resolved in an effective manner and that the public has numerous opportunities to learn and provide feedback to Trans Mountain

[558] Exhibit B306-3 – Trans Mountain Pipeline ULC – Response to NEB IR No. 3.001A – Attachment 1 (Trans Mountain Expansion Project Commitments Tracking Table) (February 3, 2015) (A4H1V3), 8.

[559] Exhibit A19-1 – National Energy Board- Letter - Draft conditions and regulatory oversight – Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8); Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

regarding the Project. The public consultation process has and will continue to be a success. The Board can rely on the process and the positive impacts it has had on the Project, and as a result the Canadian public interest.

6. ABORIGINAL

6.1 Aboriginal Interests and Consultation with Aboriginal Groups

The Crown's duty to consult arises whenever the Crown has knowledge, real or constructive, of the potential existence of an Aboriginal or treaty right, and contemplates conduct, including making decisions, that may adversely affect that right.[560] Actual knowledge arises when a claim has been filed in court or advanced in the context of negotiations or when a treaty right may be impacted.[561] The duty to consult may also arise prior to the legal determination of specific Aboriginal rights, requiring the Crown to take contested or established rights into account before making a decision that may have an adverse impact on them.[562]

Where potential rights are claimed, the scope of consultation will need to be proportionate to the seriousness of the potential adverse impact of the proposed Crown conduct and the potential preliminary assessment of the strength of the potential Aboriginal right claimed.[563] The appropriate level of consultation falls along a spectrum which is reflective of the rights that have been established or are being claimed and the degree to which those rights may be impacted by the project.[564] This duty may be triggered where the Crown is being asked to issue regulatory and environmental approvals for major infrastructure projects, in which case the Crown may be required to consult with Aboriginal peoples prior to making its decision.

---

[560] *Haida Nation v British Columbia (Minister of Forests)*, 2004 SCC 73, para 35.

[561] *Mikisew Cree First Nation v Canada (Minister of Canadian Heritage)*, 2005 SCC 69, para 34.

[562] Woodward, *Native Law*, loose-leaf (consulted on 12 January 2014), (Carswell: Toronto), ch 5-49.

[563] Aboriginal Affairs and Northern Development Canada, "Aboriginal Consultation and Accommodation – Updated Guidelines for Federal Officials to Fulfill the Duty to Consult" (March 2011), online: <http://www.aadnc-aandc.gc.ca/eng/1100100014664/1100100014675>.

[564] *Haida Nation v British Columbia (Minister of Forests)*, 2004 SCC 73, para 25.

3277 The NEB is not responsible for fulfilling the duty to consult. Ultimately, the legal responsibility to
3278 meet the duty lies with the Crown. The Crown may, however, rely on the NEB process to satisfy
3279 the duty.[565] In August 2013, the MPMO indicated that the federal Crown would rely on the NEB's
3280 public regulatory process, to the extent possible, to fulfil any Crown duty to consult Aboriginal
3281 groups with respect to the proposed Project.[566] Trans Mountain submits that the courts have
3282 consistently affirmed that a regulatory process is a reasonable (and practical) means of undertaking
3283 consultation. The Crown may rely on a regulatory process to the extent possible to discharge the
3284 duty to consult. There is no duty on the Crown to engage in dialogue directly with an Aboriginal
3285 group or develop special consultation measures if an established statutory procedure will suffice.
3286 Rather, it is the Crown's duty to ensure that consultation occurs and is adequate prior to making a
3287 decision that may adversely affect potential Aboriginal rights or title.[567]

3288 The MPMO further indicated that the NEB process would be utilized to identify, consider and
3289 address the potential adverse impacts of the proposed Project on established or potential Aboriginal
3290 and treaty rights.[568] In early April 2014, the NEB released the list of 1,650 participants for its
3291 regulatory process for the Project, including intervenors and commenters. In total, 67 Aboriginal
3292 groups applied for, and were granted, intervenor status in the regulatory process for the Project.
3293 Three Aboriginal groups were granted commenter status.

---

[565] *Carrier Sekani Tribal Council v British Columbia (Utilities Commission),* 2010 SCC 43, para 56, citing *Haida Nation v British Columbia (Minister of Forests),* 2004 SCC 73, para 51.

[566] Exhibit A001 - NEB - Letters and Attachments to Aboriginal Groups with Description of the Trans Mountain Expansion Project (Filing 1 of 3) (August 13, 2013) (A53513).

[567] *Katlodeeche First Nation v Canada (Attorney General),* 2013 FC 458, paras 150-153; *Taku River Tlingit First Nation v British Columbia (Project Assessment Director),* 2004 SCC 74, paras 2, 22, 40; *Conseil des Innus de Ekuanitshit v Canada (Procureur général),* 2013 FC 418, para 113; *Brokenhead Ojibway Nation v Canada (Attorney General),* 2009 FC 484, paras 25-26, 42

[568] Exhibit A001 - NEB - Letters and Attachments to Aboriginal Groups with Description of the Trans Mountain Expansion Project (Filing 1 of 3) (August 13, 2013) (A53513).

Crown consultation for the Project occurs in four phases:

(a) Phase I: Initial engagement, from submission of Project description to the start of the NEB review process;

(b) Phase II: NEB hearings, from the start of the NEB review process to the close of the hearing record;

(c) Phase III: Post-NEB hearings, from the close of the hearing record to a Governor in Council decision on the Project; and

(d) Phase IV: Regulatory permitting, from the Governor in Council decision on the project to issuance of department regulatory approvals, if required.[569]

During the initial engagement phase, an information package containing a letter from the NEB and the MPMO was sent to each Aboriginal group whose rights might be adversely impacted by the Project. The letters notified Aboriginal groups that Trans Mountain filed a Project Description with the NEB; provided information regarding the NEB process and government decisions after the Application; extended an offer to provide additional information by phone or at a community meeting; indicated that the Crown would rely on the NEB process, to the extent possible, to fulfil the Crown's legal duty to consult; advised that concerns raised by Aboriginal groups during the review process and related mitigation and accommodation measures would be monitored by the Crown during the regulatory process; and stated that there would be opportunities for additional consultation with the Crown following the close of the NEB hearing record.[570] In advance of the NEB process, MPMO and NEB representatives held pre-hearing information sessions in response

[569] Exhibit C249-09 - NRCan - NRCan's Written Evidence (May 27, 2015) (A70313), 6.

[570] Exhibit C249-09 - NRCan – NRCan's Written Evidence (May 27, 2015) (A70313), 7.

to requests for meetings with potentially impacted groups. A total of 14 individual sessions, representing 31 Aboriginal groups, took place.[571]

The Board expects applicants to consult with potentially impacted Aboriginal groups early in the project planning and design phases.[572] Trans Mountain took this responsibility seriously and undertook extensive efforts to develop a clear understanding of Aboriginal interests, values, concerns, contemporary and historic activities, Aboriginal traditional knowledge and the important issues facing each potentially affected Aboriginal group. These efforts can be summarized as follows:

(a) First, Trans Mountain worked with Aboriginal Affairs and Northern Development Canada ("AANDC") to develop a province-specific identification method and attempted to familiarize each potentially affected Aboriginal group with the Project and potential Project-related environmental effects.

(b) Second, Trans Mountain provided opportunities for each Aboriginal group to inform Trans Mountain of any issues and concerns regarding the Project or of any traditional or contemporary land or resource uses that could be affected by the Project.

(c) Third, Trans Mountain proposed actions to address or mitigate those issues of concern, wherever such actions were appropriate.

Although project proponents do not owe the duty to consult, the Crown may delegate procedural aspects of this duty. The duty to consult does not require a project proponent to offer any particular

[571] Exhibit C249-09 - NRCan – NRCan's Written Evidence (May 27, 2015) (A70313), 7.

[572] NEB Filing Manual.

form of accommodation to Aboriginal groups, nor does it provide any Aboriginal group with an effective veto over a proposed project.[573] With respect to the Project, the Crown indicated that it did not delegate the duty to consult to Trans Mountain.[574]

Trans Mountain recognizes that it is best placed to provide information regarding the TMEP to, and receive information from, Aboriginal groups. The feedback received from Aboriginal groups as a result of Trans Mountain's consultation efforts has been a fundamental element of Project planning and design and continues to influence the planned operations for the TMEP. This open and responsive approach to addressing the interests and concerns of Aboriginal groups is reflected in how Trans Mountain operates the existing TMPL, Trans Mountain's existing relationships with Aboriginal groups and the organization's reliance on the KMC Aboriginal Relations Policy to guide best practices.[575] To date, Trans Mountain's approach for the Project has been equally open and responsive as supported by extensive evidence, letters of comment, Board decisions and other relevant documents filed on the public record.[576]

6.1.2 Identification Method

Identifying Aboriginal groups with an interest in, and who may be potentially affected by, the Project was no small feat. Nearly 450,000 First Nations and Métis peoples play an important role in the social, cultural and economic fabric of Alberta and B.C. In Alberta, the existing pipeline and

---

[573] *Haida Nation v British Columbia (Minister of Forests)*, 2004 SCC 73, paras 47-49.

[574] Exhibit C249-13-8 - 7. NRCan on behalf of Government of Canada Response to Pacheedaht First Nation IRs (July 14, 2015) (A4R4A0), 5.

[575] Exhibit B1-40 - V3B APPA TO APPB (December 16, 2013) (A3S0U6), B-1.

[576] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 44. Part 2, Aboriginal Engagement, which is attached to NEB IR No. 3.008a (NEB IR No. 3.008a – Attachment 1); Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

corridor crosses Treaty 6 territory, Treaty 8 territory and the Métis Nation of Alberta (Zone 4). In B.C, the existing TMPL system crosses 15 Indian Reserves and dozens of traditional territories.[577]

In 2011, almost two years before filing the Application, Trans Mountain began to identify Aboriginal groups for engagement regarding the proposed Project. In doing so, Trans Mountain took an expansive and inclusive approach. More than 100 Aboriginal groups were identified for engagement in five regions: Alberta, Kamloops, Hope, the Burnaby Terminal, Burrard Inlet and the marine corridor.[578]

Trans Mountain's engagement efforts were guided by input from the federal and provincial governments, as well as KMC's existing list of Aboriginal groups where relationships have been established as a result of the operating TMPL system.[579] For B.C, Trans Mountain reviewed AANDC asserted territory maps for Aboriginal groups who are negotiating treaties within the B.C. Treaty Commission process. Following the review, Trans Mountain identified all Aboriginal groups within 10 km of the pipeline corridor for engagement. For Aboriginal groups not currently engaged in the B.C. treaty process, Trans Mountain reviewed territory maps for each community, or maps of associations or tribal councils with which the community is affiliated, and identified groups within 10 km of the pipeline corridor. Due to the prevalence of numbered treaties in Alberta, a much wider buffer area of 100 km was applied to the pipeline corridor.[580] All groups within this buffer area were identified for engagement.

---

[577] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-1.

[578] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-5.

[579] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-6.

[580] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-5.

The identification process involved collaboration with federal and provincial ministries including the MPMO, AANDC, the NEB, the B.C. Ministry of Aboriginal Relations and Reconciliation, B.C. Oil and Gas Commission and the Alberta Ministry of Aboriginal Affairs. Trans Mountain also relied on the expertise of its consultants who have extensive experience working with Aboriginal groups in Alberta and B.C.[581]

The results of Trans Mountain's efforts to identify and engage with Aboriginal groups are significant. Since 2012, Trans Mountain has engaged with 133 Aboriginal groups in proximity to the pipeline and marine transportation corridor.[582] Trans Mountain is also engaging with the B.C. Métis Federation, the Métis Nation of B.C. and 11 Aboriginal associations, tribes and councils.[583]

6.1.3 Aboriginal Engagement Program Design

To ensure that all available information on each Aboriginal group's traditional use was collected, Trans Mountain developed a robust Aboriginal Engagement Program to facilitate an open and transparent engagement process.[584] The Program provides a platform for Trans Mountain to address the interests and concerns of those who have Aboriginal interests potentially affected by the Project, incorporate feedback into Project planning and execution and create opportunities to maximize Project benefits to Aboriginal groups.[585] These objectives are achieved in a variety of

---

[581] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-16.

[582] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[583] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 1.

[584] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B18-19 - V8A 1.0 TO 1.4.2.6 MAR TRANS ASSESS (December 17, 2013) (A3S4X3). Details about the Program including principles, goals and method are included in Volume 3B and Volume 8A, Section 3.2; Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-4; Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 39.

[585] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-1.

ways, including through the sharing of Project information, negotiating group and community-specific engagement agreements and protocols and discussing the adequacy of planned impact mitigation.[586]

The public record demonstrates that Trans Mountain provided Aboriginal groups who expressed an interest in Project an opportunity to engage in meaningful dialogue in the manner they choose, and in a way that meets their objectives and values.[587] A prime example is the discussions that have taken place between Trans Mountain and Aboriginal groups regarding the effects of increased marine shipping. Trans Mountain does not own the products that will shipped on the pipeline, nor is it responsible for the tankers that deliver the product to market. Nevertheless, it consulted with Aboriginal groups along the marine corridor on the south coast of B.C. and on the southern portion of Vancouver Island in recognition of potential environmental and socio-economic effects of increased marine shipping as a result of the Project.[588]

The KMC Aboriginal Policy forms the basis for Trans Mountain's commitment to working with Aboriginal groups in a spirit of cooperation and shared responsibility, and building and sustaining effective relationships based on mutual respect and trust to achieve respective environmental, business and community objectives. To meet this commitment, the actions of KMC and its employees are guided by the following principles:

(a) recognition of the inherent and constitutionally protected rights of Aboriginal peoples;

[586] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-11.

[587] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-11.

[588] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-1.

(b) respect for the traditional indigenous knowledge, values and beliefs of Aboriginal peoples;

(c) supporting fair and equal access to employment and business opportunities for Aboriginal groups; and

(d) encouraging Aboriginal awareness within its workforce and communities and is committed to educating employees to achieve a better understanding and appreciation of the traditional indigenous knowledge, values and beliefs of Aboriginal peoples in Canada.[589]

Trans Mountain understands that engagement is not a one-size-fits-all approach—proponents must continuously seek to further their understanding of the Aboriginal groups they engage with, and develop their engagement tools accordingly. To date, more than 24,000 engagement activities with Aboriginal groups have been carried out by Trans Mountain.[590] These activities include one-on-one meetings, community group discussions and the sharing of information through field studies. Detailed information on Trans Mountain's ongoing engagement activities with each Aboriginal group is provided in the consultation updates filed on the public record.[591]

6.1.4 Engagement Tools

In order to understand the interests of Aboriginal groups, and the potential impacts of the Project on these interests, Trans Mountain relied on a wide range of engagement tools[592] including

[589] Exhibit B1-40 - V3B APPA TO APPB (December 16, 2013) (A3S0U6), Appendix B.

[590] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015), 5.

[591] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2) 44; Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[592] As developed through the Stakeholder Engagement Program outlined in Section 1.4.1.11 of Volume 3A. See Exhibit B1-6 - V3A 1.0 TO 1.4.1.11 PUBL CONSULT (December 16, 2013) (A3S0R2).

capacity agreements, engagement meetings, Project newsletters, phone conversations, e-mail dialogue, public open houses, information sessions and the Project website. Aboriginal groups were also provided with opportunities to participate in TEK work and conduct TLRU and TMRU studies either independently or with Trans Mountain's consultants. Certain Aboriginal groups opted to participate in Cultural Use Assessments.[593] The results of these studies are incorporated in the Socio-Economic Effects Assessment of TLRU[594] and Cumulative Effects Assessment[595] contained in the Application. The opportunity to conduct both community-led and Trans Mountain-funded studies for the Project has been provided at the request of Aboriginal groups.[596]

To date, Trans Mountain has executed 94 agreements including Letters/Memorandums of Understanding (which include components for TEK and TLRU and TMRU studies), capacity funding and integrated cultural assessments with an aggregate total dollar commitment to date in excess of $36 million.[597] During the period of May 1, 2014 to December 14, 2014, with the exclusion of confidential agreements, 17 agreements were executed.[598] In addition, a total of 55 communities have participated in TLRU studies, 15 communities in TMRU studies and 57 communities in TEK.[599]

---

[593] Exhibit B10-3 - V5D TR 5D1 2of4 TRAD LAND RESOURCE (December 16, 2013) (A3S2G9).

[594] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7).

[595] Exhibit B5-41 - V5B ESA 16of16 SOCIOEC (December 16, 2013) (A3S1T0).

[596] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5).

[597] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 8; Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[598] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 8; Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[599] Trans Mountain Reply Evidence, Section 40 – Aboriginal Traditional Use (August 20, 2015); Trans Mountain Reply Evidence, Section 57 – Aboriginal Traditional Marine Use (August 20, 2015).

Trans Mountain has received 27 letters of support from Aboriginal groups including Malahat First Nation, Popkum First Nation, Canim Lake First Nation, B.C. Métis Federation, Ditidaht First Nation, Nakcowinewak Nation of Canada, Aseniwuche Winewak Nation of Canada, Paul First Nation, Métis Nation of B.C, Ermineskin First Nation, Ashcroft Indian Band, Semiahmoo First Nation, Union Bar First Nation, Whispering Pines, Alexis Nakota Sioux Nation, Beecher Bay First Nation, Esquimalt First Nation, Seabird Island First Nation, Halalt First Nation, Nicomen First Nation, Penelakut Tribe, Yale First Nation, Pauquachin First Nation, O'Chiese First Nation, Lake Cowichan First Nation, Hwlitsum First Nation and Kamloops Indian Band.[600] The letters indicate that each community formally expresses their support for the Project, does not object to the Project and/or is satisfied by the mitigation measures and the consultation provided with respect to the Project. Several of the communities also expressed their opinion that the Project will result in positive effects.[601]

6.1.5 Modifications to the Project as a Result of Engagement

Based on engagement with Aboriginal groups, Trans Mountain modified the Project in relation to the regulatory process, environmental impacts on the land and marine environment, routing and construction, socio-economic interests and engagement.[602] Where possible, Project-related impacts will be mitigated to the greatest extent possible. In some cases, reclamation strategies will be implemented to further reduce Project-related effects.[603] The ESA outlines the potential

[600] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015), 9; Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2).

[601] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2).

[602] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-23; Table 1.5.1 provides an overview of the Aboriginal interests and concerns identified by Trans Mountain to date. The results of engagement activities, as well as Trans Mountain's response to any issues raised through these activities, are detailed in Appendix A of this volume, and in Volumes 5 and 8 of the Application.

[603] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-16.

environmental and socio-economic effects of the Project on Aboriginal groups and the ways in which these effects can be minimized or avoided altogether.

6.1.6 Government of Canada's Consultation Process with Aboriginal Groups

Over 130 Aboriginal groups made submissions in relation to their Aboriginal interests during the regulatory process for the TMEP. The Crown's participation in the NEB process ensured that the issues and concerns raised by Aboriginal groups were understood and addressed. It is important to clarify the purpose of the Crown's consultation process with Aboriginal groups in relation to Aboriginal interests and title, as well as how this process has influenced Trans Mountain's Application.

Pursuant to the List of Issues, the Board will consider the potential impacts of the Project on Aboriginal interests. However, because the NEB is a quasi-judicial decision-making body distinct from the Crown and any of its agents,[604] the Board does not owe the Crown's constitutional duty to consult with Aboriginal groups—any duty to consult lies with the Crown.[605]

Throughout the Project review, the Crown uses Issues Tracking Tables to ensure that it has an accurate understanding of Aboriginal interests, concerns and the views of Aboriginal groups on the potential adverse impacts of the Project to potential or established Aboriginal and treaty rights. In the tables, the Crown identifies responses to potential impacts and concerns and indicates whether issues have been addressed in Trans Mountain's commitments, NEB conditions or other

[604] *Quebec (Attorney General) v Canada (National Energy Board)*, [1994] 1 SCR 159, para 184.

[605] *Standing Buffalo Dakota First Nation* v *Enbridge Pipelines Inc*, 2009 FCA 308, para 34.

forms of accommodation. The tables have been updated based on evidence submitted to the NEB and through the IR process.[606]

In addition, the Crown submitted an IR to 58 Aboriginal groups[607] seeking feedback on the Issues Tracking Table as to the completeness and accuracy of the concerns and issues raised, and their views on concerns and issues that may have not yet been addressed by proposed mitigation measures or Trans Mountain commitments at this point in the process. The Crown indicated that it intended to use the feedback to further refine its current understanding of the potential adverse impacts of the Project on their community's interests, including any adverse impacts the Project may have on potential or established Aboriginal and treaty rights.[608]

Trans Mountain carefully reviewed the additional information submitted by Aboriginal groups in the Issues Tracking Tables. Where outstanding issues remained or where new issues were raised, Trans Mountain responded to those issues in reply evidence, where appropriate.

---

[606] Exhibit C249-09 - NRCan – NRCan's Written Evidence May 27, 2015 (A70313), 8.

[607] The 58 Aboriginal groups are: Adams Lake Indian Band, Alexander First Nation, Alexis Nakota Sioux Nation, Ashcroft Indian Band, British Columbia Métis Federation, Cheam First Nation and Chawathil First Nation, Coldwater Indian Band, Cowichan Tribes, Ditidaht First Nation, Enoch Cree Nation, Ermineskine Cree Nation, Esquimalt Nation, Gunn Métis Local 55, Horse Lake First Nation, Katzie First Nation, Kwantlen First Nation, Kwikwetlem First Nation, Lake Cowichan First Nation, Lheidli T'enneh First Nation, Lower Nicola Indian Band, Lyackson First Nation, The First Nations of the Maa-nulth Treaty Society, Matsqui First Nation, Métis Nation of Alberta Region IV, Métis Nation of B.C., Montana First Nation, Musqueam Indian Band, Neskonlith Indian Band, Nooaitch Indian Band, O'Chiese First Nation, Okanagan Nation Alliance, Pacheedaht First Nation, Pauquachin First Nation, Penelakut Tribe, Peters Band, Popkum First Nation, Samson Cree Nation, Scia'new First Nation, Shackan Indian Band, Shxw'ōwhámel First Nation, Simpcw First Nation, Stk'emlupsemc te Secwepemc, Snuneymuxw First Nation, Squamish Nation, Stó:lō Collective, Stz'uminus First Nation, Sucker Creek First Nation, Sunchild First Nation, Tsartlip First Nation, Tsawout First Nation, Tsawwassen First Nation, Tseycum First Nation, Tsleil-Waututh Nation, T'Sou-ke First Nation, Upper Nicola Band, Whispering Pines/Clinton Indian Band, Whitefish (Goodfish) Lake First Nation and Williams Lake Indian Band.

[608] Exhibit C249-11 - Natural Resources Canada (MPMO) - Information Requests to Intervenors (Part 1/2) (June 22, 2015) (A70837); Exhibit C249-12 - Natural Resources Canada (MPMO) - Information Requests to Intervenors (Part 2/2) (June 22, 2015) (A70838).

From November 2015 to January 2016 Trans Mountain understands that the MPMO will coordinate consultation meetings between the Crown and Aboriginal groups for which the depth of consultation has been determined to be moderate or high. The purpose of these meetings is to facilitate a meaningful two-way dialogue to determine if there are any concerns related to the Project that have not been fully addressed by the NEB's draft conditions or Trans Mountain's commitments, and to consider proposals from Aboriginal groups for accommodation measures that could be considered by the Crown to further address outstanding issues or concerns.[609]

Trans Mountain understands that the MPMO will send correspondence to Aboriginal groups communicating the release of the NEB Report in early 2016 and, if applicable, how the findings in the NEB's Report, associated conditions, Trans Mountain's commitments and other related government initiatives address the concerns of Aboriginal groups raised through the consultation process. This phase begins with the Governor in Council decision on the Project and concludes with the issuance of departmental regulatory approvals, if the Project is approved.[610]

6.1.7 Aboriginal Oral Traditional Evidence Hearings

The NEB has recognized that Aboriginal groups have an oral tradition for sharing stories, lessons, and knowledge from generation to generation and that this information cannot always be shared adequately in writing. In late 2014 and early 2015 the NEB held Aboriginal oral traditional evidence hearings and Trans Mountain was present at each hearing session. In total, the NEB heard evidence from 39 Aboriginal intervenors in Edmonton, Chilliwack, Kamloops, Victoria and

[609] Exhibit C249-09 - NRCan – NRCan's Written Evidence (May 27, 2015) (A70313), 9.

[610] Exhibit C249-09 - NRCan – NRCan's Written Evidence May 27, 2015 (A70313), 10.

Calgary.[611] NEB funding was made available to Aboriginal groups who attended the hearings, and Aboriginal intervenors were provided an opportunity to file written evidence in addition to their oral traditional evidence.

The Board's role during the Aboriginal oral traditional evidence hearings was to ensure that Aboriginal groups had an opportunity explain the potential effects the Project may have on their rights. The evidence presented at the hearings clearly demonstrates that Aboriginal groups had the opportunity to do so. The information presented to the Board related to potential impacts of the proposed Project on potential or established Aboriginal and treaty rights throughout the lifecycle of the Project. The information also included specific harvesting locations and species used by Aboriginal groups for the activities outlined above, as well as specific sites that are of cultural or spiritual importance to potentially affected Aboriginal groups. Trans Mountain documented the Project-related interests and concerns raised over the course of the hearings.

During the hearings, Aboriginal groups expressed interests and concerns regarding Project-related impacts. Examples of common concerns raised by Aboriginal groups included Project-impacts on traditional practices, spill response and remediation in terrestrial and marine environments, the ability of Aboriginal groups to maintain their role as environmental stewards and Project-related impacts on species at risk. To addresses the concerns raised, Trans Mountain has proposed a suite of mitigation measures to be implemented during the pre-construction, construction and post-construction phases of the Project.

[611] Exhibit B306 - 12 - Trans Mountain Response to NEB IR No. 3.005a – Attachment 1 – Part 1(February 3, 2015) (A4H1W2), 5.

Following the hearings, Trans Mountain provided a response letter to each intervenor who presented evidence. The information contained in each letter was grouped together based on the interest or concern raised and the potential impact of the Project. The letters provided a response to the comments and concerns raised and included a description of the proposed mitigation measures.[612] Trans Mountain's efforts to engage with Aboriginal groups to share information regarding Project-related mitigation measures are ongoing.

Trans Mountain has developed a comprehensive suite of mitigation measures to protect the environment and ensure that Aboriginal groups will be able to continue with their cultural practices and subsistence lifestyle. The entire suite of mitigation measures can be found in the EPP for Pipelines,[613] Facilities[614] and the Westridge Marine Terminal.[615]

6.1.8 Interests, Concerns and Mitigations

Since April 2012, through the Aboriginal Engagement Program, Trans Mountain has engaged with Aboriginal groups to identify Project-related impacts on Aboriginal interests and traditional and cultural use of the land and marine environment. To minimize Project-related impacts on Aboriginal interests and traditional practices, Trans Mountain conducted environmental studies along the proposed pipeline corridor to gather data for the ESA. The assessment considered the potential environmental effects of the construction, operations and maintenance of the pipeline,

---

[612] Exhibit B306-21 - Trans Mountain Response to NEB IR No. 3.010a-Attachment 1 (February 3, 2015) (A4H1X1).

[613] Exhibit B11-4 - V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3); Exhibit B11-5 - V6B 2of2 PIPELINE EPP (December 16, 2013) (A3S2S4).

[614] Exhibit B11-7 - V6C 1of2 FACILITIES EPP (December 16, 2013) (A3S2S6); Exhibit B11-8 - V6C 2of2 FACILITIES EPP (December 16, 2013) (A3S2S7).

[615] Exhibit B11-10 - V6D WRIDGE EPP (December 16, 2013) (A3S2S9).

the ways in which these effects could be minimized or avoided altogether and mitigation and reclamation strategies that would further reduce these effects.[616]

The Matsqui First Nation filed evidence regarding the potential impacts of the Project on Matsqui First Nation.[617] EcoPlan, the Matsqui First Nation's consultant, conducted an assessment of the potential impacts of the Project on Matsqui First Nation. Specifically, Matsqui First Nation raised concerns regarding Trans Mountain's methodology for the environmental assessment. Trans Mountain has provided justification for the environmental assessment methodology in Section 7 - Environment of this final argument. In addition, Trans Mountain responded directly to issues and concerns raised by Matsqui First Nation's evidence in reply evidence.[618]

In their written evidence, the Tsleil-Waututh Nation ("TWN") noted that certain direct effects of activity at the Westridge Marine Terminal related to the Project may have consequences of loss of quiet and privacy.[619] Trans Mountain understands and acknowledges the importance to Aboriginal communities of engaging in traditional activities in quiet, undeveloped locations. Trans Mountain has taken steps to minimize its direct effects related to sensory disturbance and quality of users' experiences. For example, Trans Mountain will design lighting requirements at the Westridge Marine Terminal to meet the Canada Labour Code and Transport Canada — International Ship and Port Requirements and will use low level and low intensity lighting and reduce night lighting,

---

[616] Exhibit B306-2 - Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2).

[617] "An Assessment of Impacts from the Trans Mountain Expansion Project on Matsqui First Nation" prepared by EcoPlan International Inc. (the EcoPlan report) (See Exhibit C227-7-5 - Matsqui First Nation Impact Assessment (part1of2) (May 27, 2015) (A4L8J2), 11; Exhibit C227-7-6 - Matsqui First Nation Impact Assessment (part2of2) (May 27, 2015) (A4L8J3)).

[618] Trans Mountain Reply Evidence, Attachment 1.19 – Reply to Matsqui First Nation "An Assessment of Impacts from the Trans Mountain Expansion Project on Matsqui First Nation" (August 20, 2015).

[619] Exhibit C358-13-13 - Vol 4 Tab 4 TWN Assessment Part 6 of 7 (May 26, 2015) (A4L6A4); Exhibit C358-13-12 - Vol 4 Tab 4 TWN Assessment Part 5 of 7 (May 16, 2015) (A4L6A3).

when feasible. Trans Mountain will also communicate with marine and local fishing industry organizations, Aboriginal groups, marine recreation organizations and other affected stakeholders to provide Project information related to Project activities affecting marine use areas.[620]

Trans Mountain will circulate its EPPs to Aboriginal groups for comment and feedback in the fall of 2015. Following circulation of the EPPs, Trans Mountain plans to hold a series of workshops for Aboriginal groups to provide additional input and recommended changes to improve the EPPs. This input and recommended changes will be provided back to the Aboriginal groups and to the Board in a future consultation reports. Pursuant to NEB Draft Condition No. 29, the EPP filed with the NEB will include a summary of Trans Mountain's consultation with potentially affected Aboriginal groups, including any comments raised regarding the updated EPP and how Trans Mountain has addressed or responded to them. The process is designed to refine and optimize the work based on knowledge of the EPP mitigation measures to be implemented in the field.[621]

Through Trans Mountain's Environmental Education Program, all personnel working on the construction of the Project will be informed of the location of known TLRU sites. Sensitive resources identified in the Environmental Alignments Sheets[622] and environmental tables within the immediate vicinity or the right-of-way will be clearly marked before the start of clearing. In addition, Trans Mountain will:

---

[620] Trans Mountain Reply Evidence, Section 42 – Human Occupancy and Resource Use (August 20, 2015), 42-1.

[621] Exhibit A019 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 21; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[622] Exhibit B11-12 - V6E 001of306 ENV ALIGNMENT SHEETS (December 16, 2013) (A3S2T1).

(a) provide Aboriginal groups with the anticipated construction schedule and proposed pipeline corridor maps a minimum of two weeks prior to the start of construction in the vicinity of their respective communities;

(b) install signage notifying of construction activities in the area; and

(c) work with Aboriginal groups to develop strategies to effectively communicate the construction schedule and work areas to members.[623]

If additional TLRU sites are identified prior to Project construction, the sites will be assessed and appropriate mitigation measures will be determined and applied. Access will be managed, where required, along the Project where new temporary and permanent access is created for the construction and operation of the pipeline.[624] To mitigate environmental effects associated with increased access, Trans Mountain will manage access along portions of its right-of-way by implementing mitigation measures during the pre-construction, construction and post-construction phases.[625]

During Project construction, Aboriginal Monitors will be engaged as part of the onsite Environmental Inspection Teams to provide traditional knowledge to the construction program to ensure protection of the environment, discuss upcoming traditional and western science elements with the environmental inspectors to ensure the successful protection, mitigation and monitoring requirements set out in the EPPs.[626]

---

[623] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2).

[624] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2).

[625] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2).

[626] Exhibit B11-2 - V6A ENVIRO COMPLIANCE (December 16, 2013) (A3S2S1).

Further proposed mitigation measures are provided in the Traffic and Access Control Management Plan.[627] The Traffic and Access Control Management Plan addresses the management of pipeline construction traffic and access along the construction right-of-way and temporary access routes. The Plan also addresses the activities during pre-construction, construction (pipe installation) and construction clean-up and reclamation phases of the Project and provides guidelines for vehicular use on the construction right-of-way and associated access roads, as well as blocking and controlling access to previously inaccessible portions of the right-of-way following construction.[628]

Several Aboriginal groups have expressed concern in their written evidence that an oil spill, if one were to occur, could affect community health, either indirectly through impacts on cultural activities, sensitive sites, or food resources, or directly through increased stress, anxiety and the perception of contamination.[629] Trans Mountain acknowledges the concerns from Aboriginal groups, government and the public regarding spills. The Application confirmed that evidence from past spills demonstrates that Aboriginal peoples who rely on subsistence foods and natural resources are at greatest risk for adverse effects. Trans Mountain remains confident that accidents and malfunctions related to the pipeline and facilities and the increase in Project-related marine shipping activities have a low probability of occurrence.[630] These topics are addressed in detail in

[627] Exhibit B11-7 – V6C 1of2 FACILITIES EPP (December 16, 2013) (A3S2S6).

[628] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2).

[629] Exhibit C358-13-8 - Vol 4 Tab 4 TWN Assessment Part 1 of 7 (May 26, 2015) (A4L5Z9); Exhibit C187-13-2 - Affidavit #1 of Chief Susan Miller (May 26, 2015) (A4L5H8), Exhibit C400-8-1 - Evidence of Chief Peters - Vol. 1 (May 27, 2015) (A4Q2C6); Exhibit C78-10-2 - Coldwater Written Evidence (May 27, 2015) (A4Q0W6); Exhibit C217-5 -1- Written Evidence (June 19, 2015) (A4Q7H4).

[630] Trans Mountain Reply Evidence, Section 43 – Community Health (August 20, 2015), 43-1.

Section 7.2.1.13 – Accidents and Malfunctions (Pipeline and Facilities) and Section 7.2.2.9 - Oil Spills Resulting from Marine Incidents of this final argument.

As discussed in Section 4 - Emergency Response of this final argument, Trans Mountain has comprehensive spill response plans in place for the TMPL and associated facilities to protect the terrestrial and aquatic resources relied on by Aboriginal groups. These plans are updated at least annually and will be enhanced for the TMEP and the plans are regularly practiced through desktop, deployment, and worst-case scenario exercises. While the specific strategies used in response to a spill will vary depending on the circumstances, the primary objectives in all cases are to ensure safety and minimize environmental damage.[631] Upon completion of the response phase of an incident, site remediation, if required, is undertaken. Trans Mountain uses internal and external technical resources to plan and expedite the remediation.

To protect sensitive environmental areas (e.g., the Adams River) Trans Mountain has adopted measures such as strategically placed pipeline valves near waterways and trenchless river crossings at some locations. Crossing methods specific to each watercourse will be determined in consultation with engineering and environmental specialists, as well as applicable regulatory authorities. Crossings of wetlands and watercourses will be planned during suitable ground and weather conditions with consideration for sensitive fish and wildlife timing windows. Further, water quality will be monitored during all instream activity.[632]

---

[631] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 – (February 3, 2015) (A4H1V2).

[632] Exhibit B007 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 5C Part 2 (December 16, 2013) (A56007). A summary of the watercourse crossings for the Project are provided in the Fisheries (Alberta) Technical Report and the Fisheries (B.C.) Technical Report in Volume 5C; Exhibit B5-12 - V5A ESA 04of16 BIOPHYSICAL (December 16, 2013) (A3S1L6); Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9). Further discussion and mitigation measures to be implemented at watercourse crossings are mentioned under fish and fish habitat in Sections 5.7 and 7.2.7 of Volume 5A (Filing IDs A3S1L6 and A3S1Q9); Exhibit B11-7 - V6C 1of2 FACILITIES EPP (December 16, 2013) (A3S2S6); Exhibit B11 – 4

Trans Mountain will implement mitigation to avoid or reduce the Project's potential effects on species at risk. Field surveys were initiated in 2013 and supplemental field surveys have been ongoing within segments of the pipeline corridor to collect additional information on species of conservation concern and their habitat. This information, in addition to targeted, site-specific pre-construction field surveys, will be used to inform the design and implementation of mitigation.

During the ongoing Project planning and design phase, Trans Mountain has continued to consult with Environment Canada and provincial regulatory authorities regarding refined critical habitat mapping and attributes of critical habitat. In addition, field surveys have been ongoing to collect information at selected locations to inform the presence of biophysical attributes. This information will be used to determine overlap of the Project footprint with critical habitat, and allow for design modifications (e.g., micro-routing) to avoid or reduce Project impacts to critical habitat.[633]

The mitigation measures proposed incorporate industry best practices and regulatory guidelines, including avoidance of sensitive timing windows, to the extent feasible. Additional mitigation measures are being developed in species-specific mitigation plans for several species at risk that are likely to be affected by the Project, including southern mountain caribou, grizzly bear, Oregon forestsnail, Oregon spotted frog, Williamson's sapsucker, Pacific water shrew, Lewis's woodpecker, Townsend's mole, Coastal giant salamander, spotted owl, nooksack dace and salish sucker.[634] These plans are being developed in consideration of the regulatory guidance and

V6B 1 of 2 PIPELINE EPP (December 12, 2013 (A3S2S3); Exhibit B11 – 4 V6B 2 of 2 PIPELINE EPP (December 12, 2013) (A3S2S4).

[633] Exhibit B239-3 – Trans Mountain Follow-Up Response to GoC EC F-IR No. 1.023 (July 21, 2014) (A3Z4S9).

[634] Exhibit B112-2 – Trans Mountain Response to B.C. Nature Cda IR No. 1 (June 18, 2014) (A3Y2C5), 70; Exhibit B239-3 – Trans Mountain Follow-Up Response to GoC EC F-IR No. 1.023 (July 21, 2014) (A3Z4S9), 4; Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 57; Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 127-128, 133, 137, 139, 142.

conservation or recovery objectives, as well as feedback received in consultation with provincial and federal regulatory authorities.

In regards to the American badger (jeffersonii subspecies), Western barn owl and Western screech owl (macfarlanei and kennicottii subspecies), Trans Mountain does not contemplate preparing species-specific mitigation plans. Trans Mountain's evidence is that appropriate mitigation has been presented in the Application (e.g., mitigation measures in the Pipeline EPP) and critical habitat mapping for these species is incomplete and likely to change.[635] For the Great Basin gopher snake, Great Basin spadefoot and western rattlesnake, a federal Recovery Strategy has not been posted and any mapping is considered sensitive and is not publically available nor has it been shared with Trans Mountain. For terrestrial wildlife, Trans Mountain will update the mitigation presented in the Pipeline EPP[636] and Alignment Sheets. This mitigation, as well as Wildlife Contingency Plans, will address wildlife species and critical habitat that do not have a separate mitigation plan. Therefore, Trans Mountain submits that additional mitigation plans for these species are not warranted.

Trans Mountain completed an extensive assessment of potential residual and cumulative effects of the Project on terrestrial wildlife species at risk, and concluded that with implementation of the proposed mitigation, which may include offsets for species at risk or their critical habitat, the effects are not significant. Trans Mountain has taken appropriate steps to minimize adverse environmental effects to vegetation species at risk and their potential critical habitat, and with the

[635] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 53.

[636] Exhibit B11-3 - V6B COVER (December 16, 2013) (A3S2S2); Exhibit B11-4 - V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3); Exhibit B11-5 - V6B 2of2 PIPELINE EPP (December 16, 2013) (A3S2S4). Mitigation measures for wildlife and species at risk are outlined in the Pipeline EPP in Volume 6B (A3S2S2, A3S2S3and A3S2S4).

implementation of mitigation measures, residual environmental effects of pipeline construction and operations on vegetation species at risk will be not significant.[637]

With respect to fish species at risk, Trans Mountain has committed to constructing within the instream LRBW to the extent feasible and including additional site-specific mitigation measures in the final Pipeline EPP[638] to be filed with the NEB at least 90 days prior to construction in accordance with NEB Draft Condition No. 29.[639] These measures include methods specific to the salvage of nooksack dace and salish sucker from within isolated sections of channel, and measures specific to riparian vegetation at watercourses identified as proposed critical habitat for salish sucker. Trans Mountain is confident that the implementation of the proposed mitigation measures and Project plans will mitigate adverse effects on fish and fish habitat and will ensure there is no serious harm to fish that are part of a commercial, recreational or aboriginal fishery, or to fish that support such a fishery.

6.2 Aboriginal Procurement, Employment and Training

Trans Mountain is dedicated to working with interested Aboriginal groups to foster community economic development and share Project benefits. Using a pragmatic approach involving the collection of capacity information regarding the business and occupational interests and abilities of Aboriginal groups, Trans Mountain is able to align interests based on the business and occupational requirements of the Project.

---

[637] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-220.

[638] The site-specific mitigation measures proposed at the applicable watercourses are provided in Table 3.039c-1 in response to Trans Mountain Response to NEB IR No. 3 - 3.039 Nooksack dace and salish sucker critical habitat. See Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 320.

[639] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 327, 330.

Trans Mountain's efforts are guided by KMC Aboriginal Procurement Policy which states:

> Kinder Morgan Canada (KMC) promotes open and transparent consultation and communication and strives to build lasting relationships with Aboriginal communities and businesses. KMC is committed to ensuring these relationships are based on trust, mutual respect and the achievement of common goals. KMC will work with Aboriginal communities to promote economic development through the identification of opportunities that offer Aboriginal communities and businesses the ability to participate in the procurement of goods and services in support of KMC's operational and project requirements. [emphasis added][640]

To achieve the objectives set out in the Aboriginal Procurement Policy, Project staff work directly with Aboriginal groups to identify Aboriginal businesses that are interested in contracting opportunities. Trans Mountain has engaged with over 80 Aboriginal-owned businesses to date. Additionally, businesses have the opportunity to register and information is being collected through the Trans Mountain online procurement portal. The economic benefits realized by Aboriginal businesses during the Project construction phase will result in positive employment effects for years to come.

Through the Aboriginal Engagement Program, Trans Mountain shares employment opportunities with each Aboriginal group and maintains a capacity inventory for employment. The content of the capacity inventory will ensure that employment benefits for Aboriginal groups are realized during Project construction. The Trans Mountain Aboriginal Engagement Team will continue to communicate with Aboriginal groups regarding education, training, employment and procurement opportunities. This continued dialogue will allow Trans Mountain to:

(a) maximize the hiring of on-reserve and off-reserve Aboriginal community members;

(b) liaise with Aboriginal communities, contractors and relevant resources;

[640] Exhibit B1-45 - V3B_APPE_TO_APPH (December 16, 2013) (A3S0V1).

(c) develop a mentorship program for Aboriginal workers to encourage work site integration and retention; and

(d) evaluate contractors' recruitment and selection processes to ensure opportunities will be available to Aboriginal workers.

Trans Mountain is committed to maximizing opportunities for Aboriginal groups in Project-related employment, the majority of which will be through contracting opportunities related to Project construction. Where qualified Aboriginal community members are available, they will be identified and have the opportunity to gain employment related to pipeline or facilities construction. To date, Trans Mountain has worked with over 30 Aboriginal groups to conduct a workforce analysis. Additionally, Trans Mountain is collecting information about individuals interested in employment opportunities via Trans Mountain's online employment and skills portal.

Through collaboration with regional training providers, Trans Mountain will work to identify ongoing opportunities to facilitate, support or participate in delivery of training for Aboriginal groups. Specifically, Trans Mountain will provide information about the types of Project-related jobs that will be available and the required skills and qualifications to assist training providers in developing and implementing appropriate training. Trans Mountain will work with contractors and labour organizations to encourage contractors to provide training opportunities related to the work they perform. Contractors will be required to maximize employment and business opportunities for Aboriginal groups.[641]

More generally, Trans Mountain will focus on creating initiatives that increase the long-term capability for Aboriginal groups to participate in the economy and to share in the success of the

[641] Exhibit B5-26 - V5B ESA 01of16 SOCIOEC (December 16, 2013) (A3S1R5), 7-125.

Project. Through the creation of partnerships and shared goals between Trans Mountain and Aboriginal groups, economic development will take place and all parties can work towards achieving mutually-beneficial Project-based or long-term goals.[642]

With the creation of 60,800 person years of employment (full-time equivalent during construction and Project operation between 2013 and 2048), Trans Mountain recognizes there are opportunities for Aboriginal groups to secure employment as a result of the Project. Employment is a key component to community economic development, managed in combination with procurement, education, and training for interested communities.[643]

Trans Mountain's goal is to maximize employment opportunities for local, regional and Aboriginal groups along the proposed pipeline corridor. To achieve this goal, training and education initiatives are planned.[644] Trans Mountain's schedule for training and education initiatives with Aboriginal groups is currently underway and training will continue through the construction of the Project, if approved.[645] Local, regional and Aboriginal capacity inventory data will be provided to Trans Mountain's contractors for hiring purposes and each contractor will be required to report employment and training statistics[646] on a monthly basis. Additionally, contractors will be required to include a monthly count of the number of hires from the capacity inventory list and report

[642] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-18; Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A65693), 77.

[643] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 3B-20.

[644] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 146.

[645] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 146.

[646] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 157.

procurement statistics on a monthly basis.[647] These reporting initiatives will allow Trans Mountain to ensure that construction contracts include requirements to maximize employment for local, regional and Aboriginal groups.[648]

Where possible, Trans Mountain will work with all interested Aboriginal groups to facilitate community economic development and share Project benefits through education, training and community investment. To foster the creation of these opportunities, a training fund has been established to contribute to education and training initiatives that focus on pipeline construction and related transferable skills. Trans Mountain will continue to identify opportunities for education and training for Aboriginal Peoples to enhance access to employment opportunities through the pre-construction phase of Project planning.[649]

6.3 Future and Ongoing Consultation

Trans Mountain acknowledges that a number of Aboriginal groups continue to express interests and concerns regarding Project-related issues. Trans Mountain is committed to continued listening, learning and working with Aboriginal people to ensure that knowledge and advice is considered and incorporated in order to optimize the development of the Project—regardless of whether they oppose Project approval. Trans Mountain will build on its liaison with the Crown through the lifecycle of the Project and provide updates regarding Trans Mountain's engagement activities with Aboriginal groups.[650] Once the Project is in-service, engagement opportunities will continue

[647] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5); Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 142.

[648] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 142.

[649] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

[650] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 43.

through hosting facility open houses, providing newsletters and Project updates, making safety and public awareness presentations, participating in community events, regulatory processes and ongoing informal meetings with Aboriginal groups.[651] This is consistent with KMC's policies, the expectations of the NEB and guidance from the courts regarding the importance of reconciling Aboriginal rights with broader public interest considerations.

[651] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 43.

7. ENVIRONMENT

7.1 Overview

This section provides the Board with an overview of the purpose of an ESA, the methodology Trans Mountain applied to conduct an ESA for the Project, the conclusions of that ESA and mitigation measures that Trans Mountain has proposed to address the environmental effects of the Project, all of which will assist the Board in its decision-making process.

This section will discuss Project effects on the environment, and the effect the environment will have on the Project (including the engineering design and safety of the facilities). The section provides the Board with the information it requires to make a decision regarding issues relating to the environmental components (referred to as elements) within the ESA. The social and economic components of the Project are discussed below.

7.1.2 Purpose of EA

The EA[652] process is intended to evaluate a project's potential effects on the environment before the project is carried out.[653] By integrating environmental considerations into planning and decision-making, EAs are important tools for promoting sustainable development.

In *Friends of the Oldman River*, the Supreme Court of Canada outlined the general purpose of an EA as follows:

> Environmental impact assessment is, in its simplest form, a planning tool that is now generally regarded as an integral component of

[652] Note: A reference to EA in this final argument is a general reference to the practice of assessing the environmental effects of a project in Canada in accordance with the *Canadian Environmental Assessment Act, 2012* and its predecessor legislation. This may include EAs conducted by the NEB or other regulatory authorities such as a JRP. On the other hand, in this final argument ESA refers specifically to Trans Mountain's ESA for the Project which was guided by the Filing Manual.

[653] *CEAA 2012*, s 4.

> sound decision-making. Its fundamental purpose is summarized by R. Cotton and D.P. Emond in "Environmental Impact Assessment", in J. Swaigen, ed., Environmental Rights in Canada (1981), 245, at p. 247:
>
> > The basic concepts behind environmental assessment are simply stated: (1) early identification and evaluation of all potential environmental consequences of a proposed undertaking; (2) decision making that both guarantees the adequacy of this process and reconciles, to the greatest extent possible, the proponent's development desires with environmental protection and preservation.
> >
> > As a planning tool it has both an information-gathering and a decision-making component which provide the decision maker with an objective basis for granting or denying approval for a proposed development…In short, environmental impact assessment is simply descriptive of a process of decision-making.[654]

The objective of an EA is not to prevent development from occurring, but to balance that development against the unique ecological circumstances of the area in question.[655] In *Labrador Inuit Assn. v Newfoundland (Minister of Environment and Labour)*, the Newfoundland Court of Appeal stated that:

> As important as are environmental considerations, sight cannot be lost of the economic and social benefits that flow from the production of these resources. Legitimate concerns of meaningful employment and security for families are at stake. This is a reality that must also be taken into account along with environmental considerations. The importance of development of resources to the lives of people should not be understated. It, and the investment that brings it about, are essential to the well-being and progress of society. In this regard, it is essential that the time-tables of those managing investment be brought into the equation. Nevertheless, they cannot be allowed to control the agenda without regard to competing environmental interests.[656]

---

[654] *Friends of the Oldman River Society v Canada (Minister of Transport)*, [1992] 1 SCR 3, para 103.

[655] *Bow Valley Naturalists Society v Canada Minister of Canadian Heritage*, [1999] FCJ No 1422 (TD), para 25; aff'd [2001] 2 FC 461 (CA).

[656] *Labrador Inuit Assn. v Newfoundland (Minister of Environment and Labour)*, [1997] NJ No 223 (CA), para 7.

As a result, the purpose of an EA is to ensure that the environmental effects of a project are identified and considered along with its benefits before the project is allowed to proceed. EAs are not intended to predict all environmental impacts of a project with certainty, nor are they intended to completely eliminate the environmental effects of a project. Rather, the EA, and the conclusions drawn from the EA, are to be used by the Board as a planning tool to inform its decision on the project and whether it is in the overall Canadian public interest.

7.1.3 Methodology

7.1.3.1 Overview

Section 19 of the CEAA 2012 establishes the scope of the EA and identifies the factors which must be considered in every EA conducted under the CEAA 2012:

> 19. (1) The environmental assessment of a designated project must take into account the following factors:
>
> (*a*) the environmental effects of the designated project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project and 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;
>
> (*b*) the significance of the effects referred to in paragraph (*a*);
>
> (*c*) 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;
>
> (*d*) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;
>
> (*e*) the requirements of the follow-up program in respect of the designated project;
>
> (*f*) the purpose of the designated project;

> (*g*) alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means;
>
> (*h*) any change to the designated project that may be caused by the environment;
>
> (*i*) […]; and
>
> (*j*) 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.[657]

To meet these requirements, Trans Mountain first established the environmental elements that could be affected by the Project, along with Key Indicators ("KIs") for those components. Trans Mountain then established spatial and temporal boundaries to assess how the Project will affect each component and whether the Project is likely to result in significant adverse environmental effects. An ESA Approach Summary document was released to stakeholders, Aboriginal communities and potentially interested regulatory authorities in March 2013 by Trans Mountain. The elements, KIs and spatial and temporal boundaries were reviewed based on feedback received on the ESA Approach Summary document from participants of the ESA Workshops, consultation with regulatory authorities and engagement with Aboriginal communities. Methods, indicators and boundaries for many of the environmental and socio-economic elements were revised based on the comments received.[658]

The ESA considered and incorporated the factors listed in section 19 of CEAA 2012 as well as the Filing Manual, the List of Issues (including consideration of marine shipping) and pertinent issues and concerns identified through consultation and engagement with Aboriginal groups, landowners,

---

[657] *CEAA 2012*, s 19(1).

[658] Exhibit B1-43 - V3B APPD 01 OF 02 ENGAGE LETTERS (December 16, 2013) (A3S0U9), 48.

regulatory authorities, stakeholders and the general public.[659] The approach that was followed to assess Project effects is consistent with the CEA Agency's guidance and past EAs conducted for other NEB projects.[660]

In addition to assessing Project-specific effects, Trans Mountain conducted a cumulative environmental effects assessment. The cumulative environmental effects assessment considered the likely effects of the proposed Project that overlap with the effects of past, existing, and reasonably foreseeable future developments in the area that have been or will be constructed.[661] The approach to assessing cumulative effects was the same as that used for Project-specific effects described above. This approach is consistent with the CEA Agency's guidance, the List of Issues[662] and past EAs conducted for other NEB projects.[663]

7.1.3.2 Elements and Key Indicators

In accordance with standard EA practice in Canada the ESA for the Project focused on elements which are biophysical components of the environment that are valued by society. Elements can be indicators of environmental change and can assist in focusing the assessment on key issues.[664]

---

[659] Exhibit A15-3 - Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2), 18.

[660] See e.g. NEB – Report – NOVA Gas Transmission Ltd. – GH-001-2014 (April 2015); NEB – Reasons for Decisions – NOVA Gas Transmission Ltd. – GH-001-2012 (January 2013); NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-001-2011 (July 2012); NEB – Reasons for Decision – NOVA Gas Transmission Ltd – GH – 2 – 2011 (February 2012) – NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-2-2010 (January 2011).

[661] *CEAA 2012*, s 19(1)(a).

[662] Exhibit A15-3 - Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2), 18.

[663] See e.g. NEB – Report – NOVA Gas Transmission Ltd. – GH-001-2014 (April 2015); NEB – Reasons for Decisions – NOVA Gas Transmission Ltd. – GH-001-2012 (January 2013); NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-001-2011 (July 2012); NEB – Reasons for Decision – NOVA Gas Transmission Ltd – GH – 2 – 2011 (February 2012) – NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-2-2010 (January 2011).

[664] Exhibit B5-11 - V5A ESA 03of16 BIOPHYSICAL (December 16, 2013) (A3S1L5), 5-1.

Since it is impractical to fully assess every aspect of every element, KIs were chosen as representative indicators for certain potential Project effects. For example, since the potential effects pathways and likely responses to Project disturbances will be similar for many wildlife species, the ESA focused on indicator species and then inferred that similar results would occur for other species with similar ecological requirements.[665] This approach allowed Trans Mountain to fully assess potential effects of the Project on the environment, recognizing the practical impossibility of assessing each environmental component and individual species separately. At the request of Environment Canada and the National Energy Board, Trans Mountain also completed individual assessments for species at risk that may be affected by the Project.[666] No significant residual effects were predicted based on the outcome of the individual species at risk effects assessment.

Trans Mountain's use of elements and KIs for the ESA reflects accepted practice for EAs in Canada. For example, in the JRP's Report for the Enbridge Northern Gateway Project, the Panel stated that "[t]he purpose of valued ecosystem components and key indicator species in environmental assessment is not to be all inclusive, recognizing the practical impossibility of analyzing everything, but to look at potential project effects on representative components."[667] Trans Mountain notes that during consultation on the Project many stakeholders were supportive of the indicator approach to effects assessment for species at risk.[668]

---

[665] Exhibit B129-1 - Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 33.

[666] Exhibit B310-2 – Trans Mountain Response to GoC EC IR No. 2.035 (February 13, 2015) (A4H6A5), 123.

[667] Gateway JRP Report, 185. 13-12-19 National Energy Board - Joint Review Panel Report on the Enbridge Northern Gateway Project (December 19, 2013) (A56136), (within folder see Volume 2 - Considerations (December 19, 2013) (A3S7C6), 185).

[668] Exhibit B129-1 – Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 33.

Elements and KIs were selected for the Project based on the Filing Manual, other regulatory guidelines and experience gained during previous projects with similar conditions and potential issues. The selection process incorporated extensive feedback from Aboriginal groups, landowners, regulatory authorities, stakeholders and the general public and included public issues raised through media, available research literature and the professional judgment of the assessment team.[669] A list of the selected indicators for biophysical elements can be found in Table 5.0-1 of Volume 5A of the Application.[670]

Although several intervenors have raised concerns that specific species were not individually assessed as part of the ESA,[671] no credible evidence has been submitted during the regulatory process that shows any gap in Trans Mountain's ESA as a result of the elements or KIs that were chosen. As noted above, Trans Mountain conducted individual assessments for species at risk as part of the IR process. Trans Mountain is confident that the indicators presented in the Application are appropriate for assessing potential Project effects on the environment and allowing the Board to determine whether or not the Project is likely to result in significant adverse environmental effects.

In response to the Board's concerns regarding the need to assess additional wildlife and marine species at risk, Trans Mountain reiterated in NEB IR 2.040 that the wildlife and marine bird indicators presented in the Application, Volumes 5A and 8A, are appropriate, and in line with the methodology used in past projects for assessing potential Project effects on both species at risk

[669] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-3.

[670] Exhibit B5-11 - V5A ESA 03of16 BIOPHYSICAL (December 16, 2013) (A3S1L5), 5-2.

[671] See e.g. Exhibit B112-2 – Trans Mountain Response to B.C. Nature Cda IR No. 1 (June 18, 2014) (A3Y2C5), 49; Exhibit B116-1 – Trans Mountain Response to FER IR No. 1 (June 18, 2014) (A3Y2D7), 5; Exhibit B129-1 – Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 31.

and species not at risk. The use of indicators to assess potential Project effects on wildlife and other biotic elements is a commonly-employed method in environmental assessment. For example, several recent section 52 and section 58 applications to the NEB have used an indicator-based approach.[672] Based on these applications, Trans Mountain submits that the wildlife and marine bird indicators presented in the application are appropriate for assessing potential Project effects on both species at risk and species not at risk.

7.1.3.3 Spatial and Temporal Boundaries

Trans Mountain's ESA considered the potential effects of the Project on elements and KIs within defined spatial and temporal boundaries.

The spatial boundaries considered one or more of the following areas: a Footprint Study Area (the area where surveying, construction, clean-up and associated physical works and activities will occur), a Local Study Area (the area where Project-specific effects may occur outside the Footprint), a Regional Study Area ("RSA") (the area where the Project may measurably contribute to cumulative effects), a Provincial Area (the political boundaries of Alberta and B.C.), a National Area (the political boundaries of Canada) and an International Area (the area extending beyond Canada).[673] These spatial boundaries were dynamic for all elements and therefore varied depending on the issues and biophysical and socio-economic elements or interactions that were considered.[674]

---

[672] Enbridge Pipelines Inc. Edmonton to Hardisty Pipeline Project (OH-001-2013), the NOVA Gas Transmission Ltd. Northwest Mainline Natural Gas Pipeline Expansion Project, (GH-2-2011) and the NOVA Gas Transmission Ltd. Sunday Creek South Lateral Loop No. 3 Pipeline Project.

[673] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-3.

[674] Exhibit B5-9 -Trans Mountain Pipeline ULC - V5A ESA 01 of 16 BIOPHYSICAL (December 16, 2013) (A3S1L3), 48.

The temporal boundaries of the biophysical and socio-economic assessment of the Project include the planning, construction (including reactivation/modification), operation, decommissioning and abandonment phases of the Project. The ESA also considered residual and cumulative effects that are likely to result from the Project in combination with existing activities and reasonably foreseeable developments that have been or will be carried out.[675]

Intervenors argued that Trans Mountain should have used larger study areas.[676] With respect to the size of the study areas that were used in the ESA, the spatial extent of the RSA represents a trade-off between choosing too large an area that would mask Project effects, versus choosing an area too small where the effects on the population under consideration (for example, wildlife) might no longer be meaningful at a landscape scale. Trans Mountain acknowledges that while different practitioners may use different approaches to define RSAs, the ESA is based on methodologies that have been used and accepted by regulators across Canada (including the NEB) and provides sufficient information for the NEB to make informed predictions about the likely environmental effects of the Project and its contribution to cumulative effects in the region. Trans Mountain refined spatial boundaries in consultation with technical experts and regulatory agencies. For example, the Marine LSA and RSA were expanded from Burrard Inlet out to the 12 nautical mile limit based on early consultation and feedback.[677]

With respect to the temporal boundaries that were used in the ESA, Trans Mountain used the existing environment as a baseline to measure Project-related effects. This approach is consistent

[675] Exhibit B5-9 -Trans Mountain Pipeline ULC - V5A ESA 01 of 16 BIOPHYSICAL (December 16, 2013) (A3S1L3), 1-6.

[676] Exhibit B318-13 – Trans Mountain Response to Tsawout FN IR No. 2 (February 18, 2015) (A4H9H1), 182.

[677] Exhibit B1-1 - V1 SUMM (December 16, 2013) (A3S0Q7), 1-56.

with generally accepted ESA practice in Canada. For example, in the Final Report of the EUB-CEAA JRP for the Cheviot Coal Project, the Panel stated:

> In this case, the Panel notes that [the Proponent] used present conditions to describe the environmental "baseline" associated with the region. The Panel believes that this is an appropriate starting point for the Cheviot Project CEA and notes that the baseline includes current mining, logging, and oil and gas activities in the region. Since these activities have already received approval, the Panel believes that their inclusion as baseline conditions (as opposed to more pristine predevelopment conditions) is appropriate.[678]

Similarly, the JRP for the GSX Pipeline concluded:

> The Panel views baseline information as the foundation for evaluating environmental effects under the CEA Act. Baseline information allows for identification and characterization of the physical, biological and social conditions <u>at the time a project is proposed</u>. This provides the foundation for predicting project-related environmental effects.[679] [emphasis added]

As previously discussed, Trans Mountain acknowledges that different practitioners may use different approaches to define temporal boundaries. The ESA is based on standard and accepted ESA methodologies and provides sufficient information for the NEB to make informed predictions about the likely environmental effects of the Project and its contribution to cumulative effects in the region.

7.1.3.4 Environmental Effects Analysis and Significance Determination

Once the elements and KIs were selected and the spatial and temporal boundaries were determined, Trans Mountain reviewed the current state of the environment within the various study areas (i.e., the environmental setting) and assessed how the Project could affect those conditions.[680] The

[678] EUB Decision 2000-59, "Report of the EUB-CEAA Joint Review Panel for the Cheviot Coal Project" (August 2000), 38.

[679] Joint Review Panel for the GSX Canada Pipeline Project, Joint Review Panel Final Report (July 2003), 23.

[680] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL, (December 16, 2013) (A3S1Q9), 7-1.

assessment evaluated the environmental effects of the construction (including reactivation/modification), operations, decommissioning and abandonment phases of each component of the Project.[681] The ESA also considered any effects arising from potential accidents and malfunctions including hypothetical spill scenarios and changes to the Project caused by the environment.[682]

The key determination for the effects assessment was whether the Project is likely to result in significant adverse environmental effects which is widely recognized as the critical element of the federal EA process. Whatever methods are used, the focus of the EA always comes down to a decision about whether, after taking mitigation measures into consideration, the project is likely to cause significant adverse environmental effects.[683]

As provided in the CEA Agency's Adverse Effects Guide, significance is determined after taking into account any mitigation measures the responsible authority considers appropriate.[684] This approach makes sense because the likelihood of an event occurring depends on whether mitigation measures will be implemented to prevent the occurrence of that event, and whether those mitigation measures will be successful. This is consistent with section 52 of the CEAA 2012 which

---

[681] The assessment method includes the following steps: Describe the environmental setting; Identify key environmental elements that could be affected; Define the indicators and measurement endpoints to be used to assess each element; Determine spatial and temporal boundaries for each element; Identify potential environmental effects for each indicator; Develop appropriate technically and economically feasible site-specific mitigation and, where warranted, restitution measures that are technically and economically feasible; Predict anticipated residual effects; and Determine the significance of residual effects.

[682] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-3.

[683] CEA Agency, "Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects", (Ottawa: Federal Minister of Supply and Services Canada, 1994), online: <https://www.ceaa-acee.gc.ca/Content/D/2/1/D213D286-2512-47F4-B9C3-08B5C01E5005/Determining_Whether_a_Project_is_Likely_to_Cause_Significant_Adverse_Environmental_Effects.pdf> at 1 [*CEAA Reference Guide*].

[684] *CEAA Reference Guide*, s 3.

provides that the decision maker decides whether or not the project is likely to cause significant adverse environmental effects by taking into account the implementation of mitigation measures the decision maker considers appropriate:

> 52(1) For the purposes of sections 27, 36, 47 and 51, the decision maker referred to in those sections must decide if, taking into account the implementation of any mitigation measures that the decision maker considers appropriate, the designated project
>
> (a) is likely to cause significant adverse environmental effects referred to in subsection 5(1); and
>
> (b) is likely to cause significant adverse environmental effects referred to in subsection 5(2).[685] [emphasis added]

The Federal Court of Appeal in *Alberta Wilderness Assn. v Express Pipelines Ltd.* confirmed that there is no purpose in considering purely hypothetical environmental effects when it is known that such effects will be mitigated by appropriate measures.[686]

Based on the CEA Agency's guidance, Trans Mountain determined whether an effect was significant based on the magnitude of the effect, its geographic extent, the duration and frequency of the event causing the residual effect and the reversibility of the residual effect, the probability or likelihood of occurrence of the residual effect and the level of confidence or uncertainty.[687] For environmental elements, Trans Mountain defined "significant residual effect" to be an effect that: (i) has a high probability of occurrence; (ii) is permanent or reversible in the long-term; and (iii) is of high magnitude and cannot be technically or economically mitigated.[688] This definition is consistent with the conjunctive test for determining significance under the CEAA 2012.

---

[685] *CEAA 2012*, s 52.

[686] *Alberta Wilderness Assn. v Express Pipelines Ltd.* (1996), 137 DLR (4th) 177, para 13 (FCA).

[687] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-7.

[688] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL – (December 16, 2013) (A3S1Q9), 7-7

Separate criteria for determining the magnitude of an effect were created for each element or KI where appropriate. These criteria were based on guidance from the CEA Agency, applicable regulatory standards and requirements, previous EAs and the professional experience of the study team.[689] The criteria are identified and defined in Volume 7, Table 7.1-2 of the Application.[690]

While Trans Mountain does not dispute that certain Project effects may be perceived as significant to some intervenors, Trans Mountain determined significance on a broader ecosystem or socio-economic level. This is consistent with the conclusion of the JRP for the Mackenzie Gas Project that, "[t]here may well be impacts on individuals that, from an individual perspective, would be significant but which, again, the Panel might conclude would not be significant in the broader context."[691] Therefore, significance was determined in the regional context for the Project. Trans Mountain submits that its methodology for determining significance is consistent with the law, CEA Agency guidance and past EAs that have been approved by the Board.

7.1.3.5 Cumulative Effects Methodology

For all cases where the ESA found potential residual effects from the Project that were likely to occur for an indicator, Trans Mountain studied those residual effects of the Project in conjunction with other projects that have been or will be carried out to determine if there were any cumulative environmental effects. The approach to assessing cumulative effects was the same that was used

[689] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-7.

[690] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-7.

[691] CEAA-MVEIRB Joint Review Panel, Foundation for a Sustainable Northern Future, Report of the Joint Review Panel for the Mackenzie Gas Project (December 2009), 103.

for Project-specific effects described above. This approach is consistent with the CEA Agency's guidance and past EAs conducted for other NEB Projects.[692]

The JRP for the Express Pipeline Project (which included the NEB) set out a three-part test for assessing cumulative effects under the former CEAA which contained identical language regarding the need to assess cumulative effects as CEAA 2012. The Panel stated:

> First, there must be an environmental effect of the project being assessed.
>
> Second, that environmental effect must be demonstrated to operate cumulatively with the environmental effects from other projects or activities.
>
> Third, it must be known that the other projects or activities have been, or will be carried out and are not hypothetical.[693]

Therefore, in order for there to be cumulative effects, there must be overlap between the effects of the proposed project and other activities. If there is no overlap, there is no cumulative effect for the purposes of the CEAA 2012. Secondly, there must be some certainty that a future activity will in fact be carried out for it to be considered in a cumulative effects assessment. The Panel for the Express Pipelines Project described this as "some probability, rather than a mere possibility, that the cumulative environmental effect will occur".[694]

---

[692] See e.g. NEB – Report – NOVA Gas Transmission Ltd. – GH-001-2014 (April 2015); NEB – Reasons for Decisions – NOVA Gas Transmission Ltd. – GH-001-2012 (January 2013); NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-001-2011 (July 2012); NEB – Reasons for Decision – NOVA Gas Transmission Ltd – GH – 2 – 2011 (February 2012) – NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-2-2010 (January 2011).

[693] NEB-CEAA Joint Review Panel, Environmental Assessment of the Express Pipeline Project: Joint Review Panel Report OH-I-95, (May 1996), 187-88.

[694] NEB-CEAA Joint Review Panel, Environmental Assessment of the Express Pipeline Project: Joint Review Panel Report OH-I-95, (May 1996), 98.

The cumulative effects assessment that was undertaken for the Project followed the requirements of the CEAA 2012. First, the environmental effects of the Project were assessed.[695] Second, a spatial boundary was developed that was considered by discipline-specific experts to be the area in which the effects of the Project could overlap with the effects of other activities in a way that was non-trivial. Finally, the effects of the Project were considered in combination with the effects of other projects or activities within each spatial boundary that were either existing or reasonably foreseeable developments and activities. This methodology has been before the Board on numerous occasions and the Board has found it acceptable.[696]

7.2 Findings of Trans Mountain's ESA

7.2.1 Pipeline and Facilities

Trans Mountain and its consultants have extensive experience with oil pipelines and how these types of projects affect the environment. The ESA relied on Trans Mountain's experience with past projects, as well as the most current science on how these types of projects affect the environment. The mitigation measures proposed by Trans Mountain for the Project in the ESA and accompanying plans are not novel or untested; these measures have been developed from decades of experience constructing and operating oil pipelines and industry best management practices.

[695] If a physical, biological or socio-economic element or indicator evaluated in Trans Mountain's environmental effects assessment had no residual effects predicted or effects were not considered likely, then these elements or indicators were excluded from the cumulative effects assessment. Based on this, the cumulative effects assessment was limited to Project elements or indicators that were found to have residual effects that could act cumulatively with residual effects from other projects or activities. See Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-1.

[696] See e.g. NEB – Report – NOVA Gas Transmission Ltd. – GH-001-2014 (April 2015); NEB – Reasons for Decisions – NOVA Gas Transmission Ltd. – GH-001-2012 (January 2013); NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-001-2011 (July 2012); NEB – Reasons for Decision – NOVA Gas Transmission Ltd – GH – 2 – 2011 (February 2012) – NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-2-2010 (January 2011).

Trans Mountain's ESA provides the Board with a conservative and comprehensive assessment of the Project and its potential effects.

Trans Mountain's ESA is supported by detailed studies such as wildlife, fish, vegetation and geotechnical assessments and TLRU and TMRU studies which provide a thorough understanding of the current uses of land and resources for traditional purposes. The ESA also includes multiple EPPs[697] and Environmental Alignment Sheets which contain a comprehensive suite of well-understood and field-proven mitigation techniques to address potential issues that may arise.

7.2.1.1 Physical and Meteorological Environment

Trans Mountain is confident, and has provided evidence to the Board, that through proper routing and construction practices, and through implementation of accepted, proven effective mitigation, the severity of potential terrain instability has been reduced to a low level of magnitude.[698] The ESA concluded the residual environmental effects of pipeline construction and operations on the physical environment will be not significant.[699]

7.2.1.2 Soil and Soil Productivity

Stakeholders, including private land owners, government agencies and farm associations, expressed interest during the regulatory process regarding special procedures for soil handling. The information received by Trans Mountain from stakeholders was incorporated into the mitigation measures for the Project.

---

[697] Exhibit B11-4 - V6B 1 of 2 Pipeline EPP (December 16, 2013) (A3S2S3); Exhibit B11-5 - V6B 2 of 2 Pipeline EPP (December 16, 2013) (A3S2S4); Exhibit B11-7 - V6C 1 of 2 Facilities EPP (December 16, 2013) (A3S2S6); Exhibit B11-8 - V6C 2 of 2 Facilities EPP (December 16, 2013) (A3S2S7); Exhibit B11-10 - V6D Westridge EPP (December 16, 2013) (A3S2S9).

[698] Exhibit B154-1 – Trans Mountain Response to SIMPCW F N IR No. 1 (June 18, 2014) (A3Y3Q5), 75-76.

[699] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-21.

The Agricultural Management Plan ("AMP") is a comprehensive document that will provide special procedures for soil handling. The AMP is designed to prevent the introduction and/or spread of clubroot disease and potato cyst nematode as well as prevent health hazards associated with farming operations that are in line with prevention strategies being implemented by regulatory authorities, the counties/municipalities and landowners. In order to prevent the spread of clubroot disease and potato cyst nematode, Trans Mountain has committed in the AMP to ensure contaminated soil from one field is not transported to any other cultivated field. The mitigation is simple and effective; all construction equipment, including hand tools and footwear, will be cleaned using cleaning stations to ensure soil is not transported.[700] In regards to nursery operations, Trans Mountain has committed to providing ample pre-construction notice to nursery operators so that the nursery can prepare for possible disruptions in irrigation, drainage and water recycling systems.[701]

During construction, Trans Mountain will ensure biosecurity measures are implemented, access is restricted and equipment and footwear is washed and sterilized. Upon completion of construction activities, Trans Mountain has committed to re-establishing the nursery infrastructure to the pre-construction state, replacing potted or trenched-in dormant plants and re-establishing plant support structures, drip irrigation systems and drainage or recycling systems.[702] The AMP also contains comprehensive mitigation measures to be implemented during construction relating to organic farms, berry crops, dry natural grazing lands, sub-surface drains and irrigation.[703]

---

[700] Exhibit B11-4 - V6B 1of2 PIPELINE EPP – (December 16, 2013) (A3S2S3), C-7.

[701] Exhibit B11-4 - V6B 1of2 PIPELINE EPP – (December 16, 2013) (A3S2S3), C-9.

[702] Exhibit B11-4 - V6B 1of2 PIPELINE EPP – (December 16, 2013) (A3S2S3), C-10.

[703] See Agricultural Management Plan for a detailed mitigation measures; Exhibit B11-4 - Trans Mountain Pipeline ULC, V6B 1of2 PIPELINE EPP (December 16, 2013) (A3S2S3).

Trans Mountain is aware that during future negotiations for the acquisition of the right-of-way, some landowners and/or lessees may request further special procedures related to soil handling, health or productivity. Trans Mountain is committed to addressing any requests that may be brought forward by landowners and/or lessees as they arise. Trans Mountain has provided the Board with information regarding how it intends to manage these requests.[704]

The Collective Group of Landowners Affected by Pipeline ("CGLAP") raised concerns regarding soils and in particular, soil decompaction.[705] In response, Trans Mountain stated that it will employ an Agricultural Monitor—a Professional Agrologist or similarly qualified person—for the B.C. Lower Mainland who is familiar with soils, drainage and agricultural production to support the Lead Environmental Inspector. The Agricultural Monitor will work closely with landowners and the Lead Environmental Inspector to ensure that impacts on soil and agriculture production are minimized and that mitigation is implemented on agricultural lands as described in the AMP.[706] If the Agrologist has concerns about potential compaction he or she will have the authority to carry out compaction testing and recommend mitigation measures including subsoiling, ploughing, disking or other measures as deemed appropriate.[707] In addition, Trans Mountain committed in IR responses to implement the appropriate mitigation measures as specified throughout the Pipeline EPP to avoid or minimize the impacts to soils and crop yields on agricultural lands.[708] Trans

[704] Exhibit B239-13- Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 191.

[705] Exhibit B053 - Trans Mountain Pipeline ULC - 2014-06-04 Responses to Information Requests from Collaborative Group of Landowners Affected by Pipelines Round 1 (June 4, 2014) (A60796), 34.

[706] Exhibit B053-1 - Trans Mountain Response to CGLAP IR No.1 (June 4, 2014) (A3X6A7), 36-37.

[707] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 33-34.

[708] Exhibit B053 - Trans Mountain Pipeline ULC - 2014-06-04 Responses to Information Requests from Collaborative Group of Landowners Affected by Pipelines Round 1 (June 4, 2014) (A60796), 7.

Mountain is committed to ongoing engagement with CGLAP during the construction, development and operations phase to ensure these commitments are implemented cooperatively.

Yarrow Ecovillage raised concerns regarding agricultural lands. Specifically, Yarrow Ecovillage is concerned that pipeline construction will disrupt their irrigation system resulting in an inability to water crops. Trans Mountain will have procedures in place to ensure that irrigation water is not interrupted and has committed to working with Yarrow Ecovillage in advance of construction to develop a strategy to ensure that temporary irrigation lines are installed and permanent irrigation lines are re-established during and after construction. As a result of these mitigation measures, Trans Mountain submits that construction of the Project will not disrupt Yarrow Ecovillage irrigation system and ability to water crops.

Yarrow Ecovillage also raised concerns regarding impacts of pipeline construction on soil. As previously indicated, Trans Mountain will have a Professional Agrologist on site during construction to ensure appropriate soil handling protocols are implemented.[709] Trans Mountain has also committed to developing additional steps for the preservation of the topsoil on Yarrow Ecovillage's organic farm in cooperation with the landowners and land users as well as the Organic Certification Board.[710]

Metro Vancouver and the City of New Westminster raised concerns regarding potential contaminated soils along the pipeline right-of-way, particularly soil contamination from historical industrial activity along the shores of the Fraser and Brunette Rivers.[711] While Trans Mountain

[709] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 33-34.

[710] Trans Mountain Reply Evidence, Section 30 – Agricultural Lands (August 20, 2015), 30-3.

[711] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3); Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5).

agrees that many areas around the Brunette River are industrial or brownfield sites which are suspected to contain contaminated soils, Trans Mountain is prepared in the event that contamination is discovered during construction of the Project. Trans Mountain has committed to undertake a site assessment of the proposed Project footprint to ensure any suspected contaminated soils are discovered. Following this, if contaminated soils are discovered, Trans Mountain will implement the Contamination Discovery Contingency Plan and/or measures in the contamination management and monitoring program as well as the Waste Management Standards contained in the Pipeline EPP.

Concerns were also raised regarding the ability of contaminated soil to cause external corrosion to the pipeline.[712] Trans Mountain submits that external corrosion to the pipeline as a result of contaminated soil is very rare and unlikely based on advances in external coating systems. As stated in Trans Mountain's reply evidence, Trans Mountain is not aware of any past examples, incidents or studies that document a pipeline leak or rupture resulting from specific contaminates within the soil. Trans Mountain is confident that advances in external coating systems, such as fusion-bond epoxy and other higher performance coating in combination with the technological improvement in the delivery and surveillance of cathodic protection, will ensure the pipeline is reliable and protected. Trans Mountain's evidence shows that external corrosion is rarely found on a pipeline coated with fusion-bond epoxy if adequate cathodic protection is in place. Trans Mountain is also planning to use thicker pipe in high consequence areas within the Lower Mainland and for watercourse crossings. Based on Trans Mountain's world-class design approach and the risk mitigation strategies in place, Trans Mountain is confident that it has negated any risks to pipeline integrity as a result of existing contaminates.

[712] Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5), 20.

In addition to the inventory of potentially contaminated sites within the proposed pipeline corridor filed with the Application, Trans Mountain has committed to conducting more detailed contaminated site investigations to gather site-specific information. Depending on the results of the contaminated soil investigations, Trans Mountain will develop a contamination management and monitoring program to mitigate against risk to human health or the environment.[713]

In their evidence, Parks Canada submitted a similar proposed condition relating to soil contamination and specifically requested a Remediation Plan be submitted to Parks Canada in the event Trans Mountain discovers previously unidentified contamination.[714] Trans Mountain is committed to this recommendation by Parks Canada and plans to use this approach elsewhere along the proposed Project.[715]

The Board can be confident that Trans Mountain's commitment to implementing the AMP, along with other soil related mitigation discussed above, will ensure that impacts on soil and agriculture production are minimized.

Trans Mountain's evidence is that the residual environmental effects of pipeline construction and operations on soil and soil productivity will be not significant.[716]

---

[713] Trans Mountain Reply Evidence, Section 29 – Soil and Soil Productivity (August 20, 2015), 29-2.

[714] Exhibit C347-1-1 – Parks Canada TMX Written Evidence (May 26, 2015) (A4L5U9).

[715] Trans Mountain Reply Evidence, Section 29 – Soil and Soil Productivity (August 20, 2015), 29-3.

[716] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL - (December 16, 2013) (A3S1Q9), 7-46.

7.2.1.3 Groundwater Quality and Quantity

Burnaby raised concerns regarding groundwater quality and in particular, concerns regarding leakage from the Project facilities.[717]

Trans Mountain has provided evidence demonstrating that state of the art leak detection systems will be used throughout the Project facilities. For storage tanks, the first line of defence will be the tank design itself.[718] Trans Mountain employs leading edge technology and materials in the design of its tanks to ensure that the integrity of the tank is maintained. Storage tanks will utilize level transmitters (to prevent overfill), a leak detection system under each tank, secondary containment and hydrocarbon detection within the secondary containment to ensure groundwater is protected.[719] The pipeline will have a computational pipeline monitoring leak detection system in accordance with CSA Z662-15.[720] More discussion on the design of tanks and pipeline can be found in Section 3 - Project Design of this final argument.

In addition to designing advanced facilities, Trans Mountain has multiple well-established groundwater monitoring programs in place at select facilities, including the Burnaby Terminal and Westridge Marine Terminal, to detect impacts to groundwater. At these locations, Trans Mountain's monitoring wells are sampled semi-annually for a suite of hydrocarbon analysis. For expansions to facilities, such as the Burnaby Terminal and Westridge Marine Terminal, the

[717] Exhibit B118-1 – Trans Mountain Response to City Burnaby IR No. 1 (June 18, 2014) (A3Y2E6), 79.

[718] For example, all proposed storage tanks at Burnaby Terminal will be designed in accordance with American Petroleum Institute Standard 650, internally coated (on the floor and 1 m up the shell), and located within secondary containment designed in accordance with Canadian Standards Association Standard Z662 (which includes a limitation on permeability) and the National Fire Protection Association Code 30.

[719] Exhibit B118-1 – Trans Mountain Response to City Burnaby IR No. 1 (June 18, 2014) (A3Y2E6), 79.

[720] Exhibit B118-1 – Trans Mountain Response to City Burnaby IR No. 1 (June 18, 2014) (A3Y2E6), 79.

location and number of wells will be assessed prior to operation of the expanded facility and changes will be made as required to ensure satisfactory monitoring of groundwater quality in compliance with applicable regulatory criteria.[721]

Trans Mountain has a comprehensive plan in place in the unlikely event a release from the pipeline or facility occurs and groundwater impacts are suspected. Under these circumstances, Trans Mountain will immediately undertake a hydrogeological investigation to assess site conditions and the magnitude and extent of any impacts. Following the investigation, groundwater monitoring, risk management or groundwater remediation may be implemented to ensure that groundwater quality meets applicable standards. If necessary, Trans Mountain will continue remediation until the applicable regulatory authority indicates that the contamination has been resolved.[722]

A variety of intervenors have raised more specific concerns regarding the potential for pipeline activities to impact groundwater.[723] Specifically, their concerns relate to the security of groundwater supplies that source water from vulnerable shallow aquifers and the need for alternative water supplies in the event of pipeline-related impacts to groundwater systems. Taking into consideration the properties and behaviour of diluted bitumen in the subsurface and Trans Mountain's spill response plans, Trans Mountain has demonstrated that these risks are limited. Nonetheless, Trans Mountain acknowledges the potential risks for shallow highly vulnerable

[721] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 258.

[722] Exhibit B317-30 – Trans Mountain Response to SFN IR No. 2 (February 18, 2015) (A4H9C8), 10-18.

[723] Exhibit C78-10-5 - Appendix C - Part 1 of 2 Pages 1 to 171 – B.C. Groundwater Hydrogeologic Overview (May 27, 2015) (A4Q0W9); Exhibit C78-10-6 - Appendix C - Part 2 of 2 - Pages 172 to 148 (Appendix E to end of report) B.C. Groundwater Hydrogeologic Overview (May 27, 2015) (A4Q0X0); Exhibit C78-10-2 - Coldwater Written Evidence (May 27, 2015) (A4Q0W6); Exhibit C249-9-1 - NRCan Written Evidence Submission TMX 27May2015 (May 27, 2015) (A4Q0V2).

aquifer resources and has committed to providing alternative water supplies to communities or individuals affected by the Project, if necessary.[724]

Coldwater Indian Band raised multiple concerns regarding potential groundwater contamination and security of groundwater supply in its evidence and in the Coldwater B.C. Groundwater Report. Trans Mountain responded to these concerns and corrected inaccuracies in the Coldwater B.C. Groundwater Report in its reply evidence. Specifically, Trans Mountain provided evidence that it was unlikely that pyrene aromatic hydrocarbons reportedly detected in the groundwater could be associated with the existing pipeline but are more likely a result of another source such as coal, or resulted from a sampling quality assurance/quality control issue. Trans Mountain provided evidence that, in the event of an unlikely potential spill from the pipeline impacting Coldwater's drinking water supply, replacement water supplies are available other than the installation of wells in the Coldwater River floodplain.

Shxw'ōwhámel raised multiple groundwater concerns regarding the potential groundwater impacts that could result from a pipeline leak or rupture in the report entitled "Review of Trans Mountain Expansion Pipeline Project Groundwater Issues Associated with Ohamil IR 1 and Peters IR 1 and 2" ("Piteau Groundwater Report") filed as part of their evidence. The Piteau Groundwater Report discusses mitigation measures and key issues associated with groundwater concerns including pipeline wall thickness and/or double-walled pipe, leak detection, response time, routing, potential effects on groundwater, area of groundwater related concerns, quality of response plans, compensation plans and proportion of dense non-aqueous phase liquids in the hydrocarbon mixture. Trans Mountain responded to these concerns and corrected inaccuracies in the Piteau

[724] Exhibit B316-34 - Trans Mountain Pipeline ULC - Response to Province of B.C. Information Request No. 2 (February 18, 2015) (A4H8W6), 39.

Groundwater Report in its reply evidence. Trans Mountain submits that it has sufficiently addressed all groundwater issues raised by Coldwater and Shxw'ōwhámel in its reply evidence.[725]

In summary, Trans Mountain's extensive and state of the art groundwater monitoring programs and leak detection systems will ensure that the quality of groundwater along the Project route is protected.

7.2.1.4 Surface Water Quality and Quantity

Intervenors raised concerns regarding surface water quality. Specifically, these concerns related to impacts to water quality and quantity during pipeline construction at watercourse crossings[726] and surface water contamination in the event of an accident or spill.[727]

Metro Vancouver raised concerns regarding disturbance to riparian zones in their evidence.[728] While riparian areas within the pipeline easement will be altered during construction of the Project, Trans Mountain is confident that proper mitigation will reduce the potential to adversely affect water quality. Trans Mountain's proposed pipeline watercourse crossing methods and reclamation strategies provided in the Pipeline EPP were selected in consideration of the size and environmental sensitivities of the watercourses, the period of construction, the effectiveness of erosion control and sediment reduction measures and the ability to maintain flow at all times. Upon completion of construction, all riparian buffers will be revegetated.[729]

---

[725] Trans Mountain Reply Evidence, Section 32 - Groundwater Quality and Quantity (August 20, 2015)

[726] Exhibit B154-1 – Trans Mountain Response to SIMPCW F N IR No. 1 (June 18, 2014) (A3Y3Q5), 93; Exhibit B328-2 - Response to Adams Lake Indian Band IR No. 2 Notice of Motion (March 12, 2015) (A4J4Z9), 29; Exhibit B120-1 – Trans Mountain Response to CIB IR No. 1 (June 18, 2014) (A3Y2I0), 8.

[727] Exhibit B39-2 – Trans Mountain Response to ALIB IR No. 1 (June 4, 2014) (A3X5V6), 3.

[728] Trans Mountain Reply Evidence, Section 31 – Surface Water/Hydrology (August 20, 2015), 31-1.

[729] Trans Mountain Reply Evidence, Section 31 – Surface Water/Hydrology (August 20, 2015), 31-1.

With the implementation of the general and site-specific mitigation, monitoring and reclamation measures contained in the ESA and Pipeline EPP, Trans Mountain is confident that any adverse impacts to water quality (e.g., from increased turbidity) or quantity from trenched pipeline crossings and temporary vehicle crossing activities can be reduced to acceptable levels or avoided. Trans Mountain will include additional site-specific mitigation measures in the final Pipeline EPP to be filed with the NEB at least 90 days prior to construction in accordance with NEB Draft Condition No. 29.[730]

In addition to designing state of the art facilities, Trans Mountain has a comprehensive ERP in place in the unlikely event a release from the pipeline or facility occurs and surface water impacts are suspected.

Trans Mountain has surface water monitoring programs in place for the pipeline and facilities. For example, surface water discharged from the on-site retention pond at the Burnaby Terminal is tested monthly, or in the event any contamination is suspected, as per current permit requirements.[731] Trans Mountain has processes in place to conduct regular aerial and ground-based patrols that include observation for potential releases such as an oil sheen on surface waterbodies. Certain Trans Mountain personnel working regularly on the pipeline are trained to observe and respond to the potential indicators of a release.[732] Trans Mountain will conduct water quality monitoring as part of its ERP.[733]

---

[730] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 21; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[731] Exhibit B118-1 – Trans Mountain Response to City Burnaby IR No. 1 (June 18, 2014) (A3Y2E6), 391.

[732] Exhibit B134-1 – Trans Mountain Response to Jensen C IR No. 1 (June 18, 2014) (A3Y2S8), 23.

[733] Exhibit B154-1 – Trans Mountain Response to SIMPCW F N IR No. 1 (June 18, 2014) (A3Y3Q5), 44.

Trans Mountain is confident that the implementation of the proposed mitigation measures and reclamation strategies will mitigate adverse effects on surface water quality and quantity at watercourse crossings, in compliance with all applicable provincial regulatory requirements. Moreover, Trans Mountain's extensive and state of the art surface water monitoring programs and leak detection systems will ensure that the quality of surface water along the Project route is protected.

In summary, Trans Mountain's evidence is that the residual environmental effects of the Project on surface water quality and quantity will not be significant.[734]

7.2.1.5 Air Emissions

The ESA concluded that there were potential residual environmental effects on the air emissions indicator associated with the construction and operations of the pipeline.[735] However, the ESA concluded that there are no situations where there is a high probability of occurrence of a permanent or long-term residual environmental effect on air emissions indicators of high magnitude that cannot be technically or economically mitigated. Therefore, the residual environmental effects of pipeline construction and operations on air emissions will not be significant.[736] Trans Mountain is committed to voluntarily undertaking ambient monitoring during the construction and post-construction phases under NEB Draft Condition No. 21 – Air Emissions Management Plan for the Westridge Marine Terminal of the NEB's Letter – Draft Conditions and

[734] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-83.

[735] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-89.

[736] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-93.

Regulatory Oversight.[737] This condition requires methods and a schedule for ambient monitoring of air contaminants of potential concern such as particulate matter, carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), hydrogen sulphide (H_2S) and volatile organic compounds ("VOCs").

In its evidence, Metro Vancouver submitted that Trans Mountain's methodology to assess the residual effects of the Project on air equality should have been based on an absolute value as opposed to basing the assessment on the predicted relative (incremental) increase in concentration for its determination of Project-related effects on air quality.[738] Trans Mountain submits that the methodology used to assess the residual effects of the Project on air quality is correct.[739] Trans Mountain is committed to meeting applicable ambient air quality objectives. Summaries of maximum predicted concentrations from the combined effects of the Burnaby Terminal, Westridge Marine Terminal and marine transportation traffic for the base and application cases, including

[737] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 16; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[738] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3).

[739] Exhibit C234-3-2 - Summary of MV responses to TM responses to Notice of Motion (July 16, 2014) (A3Z3Y3), 21.

ambient background, was provided.[740] Additional discussion regarding one-hour SO_2 has been provided in Trans Mountain's reply evidence.[741]

Metro Vancouver submitted evidence that Trans Mountain's vapour collection efficiency of 99.9999 per cent is not commonly achieved and is likely under-conservative. The report submitted by Metro Vancouver recommends that more conservative collection efficiencies of 95 and 99 per cent be used to assess VOC-related air quality impacts. The report concludes that collection efficiencies lower than 99 per cent could result in exceedances of benzene concentrations surrounding the site and at the nearest sensitive receptors. Trans Mountain submits that Metro Vancouver's evidence does not accurately reflect the efficiency of Trans Mountain's proposed vapour collection devices. KMC previously performed testing on three oil tankers loading in Galena Park, Texas, U.S. and demonstrated typical VOC collection efficiencies during loading ranging from 99.865 per cent to 99.985 per cent.[742] Based on these field verified results and assuming a conservative estimate for collection efficiency of 99.5 per cent, Trans Mountain provided the maximum predicted benzene concentrations as evidence demonstrating that the

[740] Exhibit B310-25 – Trans Mountain Response to GoC EC IR No. 2.056a-Attachment 1 (February 13, 2015) (A4H6D8); Exhibit B310-26 – Trans Mountain Response to GoC EC IR No. 2.056a-Attachment 2 (February 13, 2015) (A4H6D9); Exhibit B310-27 – Trans Mountain Response to GoC EC IR No. 2.056a-Attachment 3 (February 13, 2015) (A4H6E0); Exhibit B310-28 – Trans Mountain Response to GoC EC IR No. 2.056b-Attachment 1 (February 13, 2015) (A4H6E1); Exhibit B310-29 – Trans Mountain Response to GoC EC IR No. 2.057a-Attachment 1 (February 13, 2015) (A4H6E2); Exhibit B310-30 – Trans Mountain Response to GoC EC IR No. 2.057b-Attachment 1 (February 13, 2015) (A4H6E3); Exhibit B310-31 – Trans Mountain Response to GoC EC IR No. 2.061-Attachment 1_Part1 (February 13, 2015) (A4H6E4); Exhibit B310-32 – Trans Mountain Response to GoC EC IR No. 2.061-Attachment 1 Part2 (February 13, 2015) (A4H6E5); Exhibit B310-33 – Trans Mountain Response to GoC EC IR No. 2.061-Attachment 1 Part3 (February 13, 2015) (A4H6E6); Exhibit B310-34 – Trans Mountain Response to GoC EC IR No. 2.063-Attachment 1 (February 13, 2015) (A4H6E7).

[741] Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015).

[742] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 15.

applicable ambient objectives will continue to be met in response to the Metro Vancouver intervenor evidence Sections 3.4 and 3.5.[743]

Metro Vancouver raised concerns regarding uncertainty in Trans Mountain's original photochemical modelling analysis due to: their assertion that omission of a proper meteorological model evaluation; the examination of only a single meteorological episode; and the use of an outdated set of emissions data for marine vessel emissions. Metro Vancouver submitted that the potential impacts of the Project, with respect to secondary formation of ozone, should be assessed in a more comprehensive manner than has been done to date. Moreover, Metro Vancouver submitted that Trans Mountain should be required to revise the assessment of the potential effect of VOC emissions from the Project on the secondary formation of ozone in the Lower Fraser Valley based on revised Community Multi-Scale Air Quality ("CMAQ") modelling. Trans Mountain committed to consult with the members of the Lower Fraser Valley Air Quality Coordination Committee ("LFVAQCC") and update the photochemical modelling (presented in the December 2013 submission)[744] of potential impacts of the TMEP on ozone, photochemical $PM_{2.5}$, and visibility in the Lower Fraser Valley for four historical episodes.[745] Trans Mountain submitted its draft Work Plan for the CMAQ Modelling Update for the Project to the LFVAQCC

[743] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3), 23 – 27; Trans Mountain Reply Evidence, 33 – Air Quality – Air Emissions (August 20, 2015), 33-1.

[744] Exhibit B6-12 - V5C TR 5C4 04of8 AIR GHG (December 16, 2013) (A3S1U3); Exhibit B6-13 - V5C TR 5C4 05of8 AIR GHG (December 16, 2013) (A3S1U4). See Appendix C "Community Multi-scale Air Quality (CMAQ) Modelling for Trans Mountain Expansion Pipeline Project".

[745] Exhibit B331 - Trans Mountain Pipeline ULC – Response to Fraser Valley Regional District Notice of Motion regarding IR Round 2 responses (March 12, 2015) (A68647); Exhibit B141-1 – Trans Mountain Response to Metro Vancouver IR No. 1 (June 18, 2014) (A3Y2V0), 95; Exhibit B344-1 - Trans Mountain Pipeline ULC - Response to Metro Vancouver Notice of Motion regarding IR Round 2 responses (March 12, 2015) (A4J5G8); Exhibit B129-1 – Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 169.

4336 members for their review and comments.[746] The revised CMAQ modeling addressed the additional
4337 meteorological episodes, used Environment Canada's Marine Emission Inventory Tool, used the
4338 most recent Project-related emissions, included additional emissions in the Lower Fraser Valley
4339 from larger projects announced after 2013 and included a more refined inner modeling domain
4340 (one km size). It should be noted that CMAQ photochemical modeling has never been done before
4341 in the Lower Fraser Valley by a proponent as it is a very complicated analysis typically completed
4342 for municipal land use planning purposes and far exceeds what is required for a project specific
4343 environmental assessment. Nonetheless, Trans Mountain undertook to have this photochemical
4344 modeling completed twice.[747] Trans Mountain submits that Metro Vancouver's evidence regarding
4345 Trans Mountain's photochemical modelling analysis is flawed based on the over conservative
4346 assumptions made by Environment Canada with respect to VOC collection efficiencies during
4347 tanker loading and marine tanker traffic. The Board can be confident that Trans Mountain's
4348 updated photochemical modelling analysis is correct and that the conclusions derived from the
4349 analysis are accurate and can be relied upon.[748]

4350 On September 26, 2014, the NEB denied both Environment Canada's and Metro Vancouver's
4351 motion to compel an update to the CMAQ modeling within the NEB's review process.[749] Despite
4352 the NEB's decision, Trans Mountain initiated contact with the LFVAQCC members and met face-
4353 to-face in the Metro Vancouver offices on September 25, 2014 to discuss the air quality issues

[746] Exhibit C234-7-24-Exhibit 19A Draft Work Plan – TMEP CMAQ Update v1 (May 27, 2015) (A4L8A5); Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015), 33-10.

[747] Trans Mountain Reply Evidence, Section 33 – Air Quality – (August 20, 2015), Appendix 33C – Updated Multi-scale Air Quality (CMAQ) Photochemical Modelling for the TMEP.

[748] Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015), Appendix 33C – Updated Multi-scale Air Quality (CMAQ) Photochemical Modelling for the TMEP.

[749] Exhibit A081 - National Energy Board - Ruling No. 33 - Motions to compel full and adequate responses to the first round of intervenor information requests (September 26, 2014) (A63066).

raised by the LFVAQCC. At this meeting, Trans Mountain and the LFVAQCC discussed a possible update to the CMAQ model for the Project. It was agreed that a work plan would be jointly updated but a timeline and roles and responsibilities were not discussed. A second face-to-face meeting was held on November 13, 2014 with the LFVAQCC and more technical issues were discussed and information was requested.[750] Trans Mountain provided substantive responses to LFVAQCC on air quality matters in letters dated November 24, 2014,[751] April 27, 2015 and May 26, 2015.[752] Trans Mountain's focus has been to address the LFVAQCC's concerns and answer questions related to the Project irrespective of whether it is required for the NEB's regulatory review process. Despite commitments from Trans Mountain to consult and review comments on the draft work plan for the updated CMAQ modelling, the LFVAQCC decided not to consult after all, and, therefore, the updated CMAQ modelling proceeded without their involvement.[753]

---

[750] Exhibit B291-28 – Part 12 Responses AQ HHRA Follow Up LFVAQCC (December 1, 2014) (A4F5C9).

[751] Exhibit B291-28 – Part 12 Responses AQ HHRA Follow Up LFVAQCC (December 1, 2014) (A4F5C9).

[752] Exhibit B291-28 - Part 12 Responses AQ HHRA Follow Up LFVAQCC (December 1, 2014) (A4F5C9); Exhibit B310-25 – Trans Mountain Response to GoC EC IR No. 2.056a-Attachment 1 (February 13, 2015) (A4H6D8); Exhibit B310-26 – Trans Mountain Response to GoC EC IR No. 2.056a-Attachment 2 (February 13, 2015) (A4H6D9); Exhibit B310-27 – Trans Mountain Response to GoC EC IR No. 2.056a-Attachment 3 (February 13, 2015) (A4H6E0); Exhibit B310-28 – Trans Mountain Response to GoC EC IR No. 2.056b-Attachment 1 (February 13, 2015) (A4H6E1); Exhibit B310-29 – Trans Mountain Response to GoC EC IR No. 2.057a-Attachment 1 (February 13, 2015) (A4H6E2); Exhibit B310-30 – Trans Mountain Response to GoC EC IR No. 2.057b-Attachment 1 (February 13, 2015) (A4H6E3); Exhibit B310-31 – Trans Mountain Response to GoC EC IR No. 2.061-Attachment 1 Part1 (February 13, 2015) (A4H6E4); Exhibit B310-32 – Trans Mountain Response to GoC EC IR No. 2.061-Attachment 1 Part2 (February 13, 2015) (A4H6E5); Exhibit B310-33 – Trans Mountain Response to GoC EC IR No. 2.061-Attachment 1 Part3 (February 13, 2015) (A4H6E6); Exhibit B310-34 – Trans Mountain Response to GoC EC IR No. 2.063-Attachment 1 (February 13, 2015) (A4H6E7); Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015), Appendix 33B – Letter to Metro Vancouver – May 26, 2015.

[753] More details of the consultation process between the LFVAQCC and Trans Mountain are provided in their correspondence as Attachments 1 and 2 of Section 40.2 of the Reply Evidence. The updated CMAQ modelling report is Attachment 3 of Section 40.2 of Reply Evidence. See Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015), Appendix 33B – Letter to Metro Vancouver – May 26, 2015. Appendix 33C – Updated Community Multi-scale Air Quality (CMAQ) Photochemical Modelling for the TMEP.

Metro Vancouver has raised concerns regarding Trans Mountain's assessment of Particulate matter ("PM") emissions from the Vapour Combustion Unit ("VCU"). Metro Vancouver submitted that there should be a requirement for Trans Mountain to conduct comprehensive monitoring of the PM emissions from the VCU once it has been commissioned and on a regular basis thereafter. Trans Mountain submits that its assessment of PM emissions from the VCU is reasonable and based on standard industry engineering practices.[754] After the final design is complete, Trans Mountain has committed to undertake another round of dispersion modelling to inform design engineering and prepare a more detailed dispersion modeling in 2016 for PMV in support of its permitting process.[755] Trans Mountain is supportive of NEB Draft Condition No. 21 which requires Trans Mountain to file an Air Emissions Management Plan for the Westridge Marine Terminal that includes, among other things, a PM management plan that will monitor PM emissions.[756]

In its evidence, Metro Vancouver submitted that the dispersion modeling was based on inappropriate land use. This assertion is incorrect. The dispersion modeling followed the Guidelines for Air Quality Dispersion Modelling in B.C.[757] ("Guidelines"), which recommends using one of two land use datasets. Both data sets have perceived strengths and weaknesses. No preference is given in the Guidelines, nor are there any recommendations or requirements to manually manipulate the land use. It was therefore decided to follow regulatory guidance and leave

[754] Alberta Energy Regulator, Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting (August 15, 2014): online, < https://www.aer.ca/documents/directives/Directive060.pdf >.

[755] Exhibit B316-33 – Trans Mountain Response to PMV IR No. 2 (February 18, 2015) (A4H8W5).

[756] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 16; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[757] Exhibit C234-7-9 - Exhibit 04, Guidelines for Air Quality Dispersion Modelling B.C. (May 27, 2015) (A4L7Z0).

the land use characterization unchanged as presented in the Guidelines. Metro Vancouver's assertions are questionable given the fact that Trans Mountain's expert, RWDI, created a work plan that was co-approved by Metro Vancouver and the B.C. Ministry of Environment.[758] It is not expected to materially affect the predicted results; however, Trans Mountain commits to updating the defined land use areas for the updated dispersion modelling to inform engineering design in support of Project approval.

Metro Vancouver asserts that although Metro Vancouver operates a comprehensive network of air quality monitoring stations throughout the Lower Fraser Valley airshed, the network currently lacks the ability to measure and assess the specific impacts to air quality resulting from the Project. This assertion is incorrect. First, Trans Mountain submits that the existing Burmount station, which is located beside the Burnaby Terminal, has the ability to adequately monitor and assess air quality resulting from the current operations and the Project. Trans Mountain currently provides financial support to operate the Burmount station. Second, Trans Mountain has installed an ambient monitoring station at the Westridge Marine Terminal and is supportive of NEB Draft Condition 21 which includes construction of a new monitoring station at the Westridge Marine Terminal for ambient monitoring of additional contaminants of potential concern in air such as PM, CO, NO_2, SO_2, H_2S and VOCs.[759] The condition requires consultation with the Lower Fraser Valley regulators on the work plan for monitoring emissions and ambient monitoring. Trans Mountain's evidence is that air quality will be adequately monitored at the Westridge Marine Terminal through existing and potential future monitoring stations.

---

[758] Exhibit B11-24 -V6E 013of306 ENV ALIGNMENT SHEETS (December 16, 2013) (A3S2U3). See Appendix B: Detailed Model Plan, Air Quality and Greenhouse Gas Technical Report for the Trans Mountain Pipeline ULC.

[759] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 16; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

Metro Vancouver has provided evidence that Trans Mountain has predicted exceedances of Metro Vancouver's newly adopted interim ambient air quality objective for SO_2 at resident locations centered near the Queensbury neighbourhood of North Vancouver. This issue was eliminated for the Cumulative Case Assessment (after 2015) which takes into account that the maximum sulphur content in fuel oils within the North American Emission Control Area ("ECA")[760] decreased to 0.1 per cent starting January 1, 2015. More details, along with the concentration contour plot for the maximum one-hour SO_2, was provided in response to Metro Vancouver Intervenor Evidence No. 3.9.1.3.[761] As the updated modeling has demonstrated compliance with the new Metro Vancouver interim air quality objective for SO_2, there is no reason for Trans Mountain to operate a new monitoring station in the Queensbury neighbourhood. This conclusion is in line with the Metro Vancouver intentions paper on the interim SO_2 objective which noted, "[p]reliminary dispersion modelling results indicate that ambient SO2 concentrations will decrease significantly within the Burrard Inlet Area. However, the model predicts that the proposed interim 1-hour average objective will still be exceeded from time to time in a small area near the refinery—Metro Vancouver will be consulting with refinery representatives."[762] The Queensbury neighbourhood is several km away from the refinery so it would not address the stated Metro Vancouver concern.

Metro Vancouver has provided evidence that continuous hourly monitoring of benzene, toluene, ethyl benzene and xylenes is necessary. Trans Mountain is supportive of NEB Draft Condition No. 21 which includes construction of a new monitoring station at the Westridge Marine Terminal for

---

[760] Vancouver is within the North American Emissions Control Area (as are Seattle, San Francisco and Los Angeles) which applies stringent engine emission standards and fuel sulphur limits to all ships entering or plying within 200 miles of the B.C. coast. Mandated further improvement in fuel standards take effect in 2012, 2015 and 2016, which period straddles the Project's 2018 coming into operation schedule.

[761] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3), 39.

[762] Exhibit C234-7-29 - Exhibit 28, Interim Sulphur Dioxide Objective for Metro Vancouver (May 27, 2015) (A4L8C0).

ambient monitoring of contaminants of potential concern in air such as PM, CO, NO_2, SO_2, H_2S and VOCs. This draft condition requires consultation with the Lower Fraser Valley regulators on the work plan for the ambient monitoring so details of the monitored parameters will be addressed in the consultation process.[763]

Metro Vancouver raised concerns with Trans Mountain's assessment of cancer risks associated with Project-related diesel particulate matter ("DPM"). Metro Vancouver's evidence is that Trans Mountain should be required, as a condition of approval, to monitor black carbon particulate via continuous aethalometers as well as speciated particulate filter sampling of $PM_{2.5}$ in accordance with the methodologies employed by the Environment Canada National Air Pollution Surveillance Program. As stated earlier, Trans Mountain is supportive of NEB Draft Condition 21 which includes construction of a new station at the Westridge Marine Terminal for ambient monitoring of contaminants of potential concern in air such as particulate matter, CO, NO_2, SO_2, H_2S and VOCs. This draft condition requires consultation with the LFVAQCC on the work plan so details of the monitored parameters will be addressed in the consultation process.[764]

Environment Canada raised concerns that boiler emissions were excluded from the final estimates of marine-source pollutant emissions and inputs to air quality dispersion modelling. Environment Canada's evidence states that "boiler emissions can account for approximately 10-30 per cent of the emissions from Westridge tankers in the region close to port, depending on the pollutant." In response to Environment Canada IR 2.067, Trans Mountain stated that revised dispersion

[763] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 16; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[764] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 16; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

modelling is not required as boilers do not operate on tankers most of the time. As such, any emissions are released infrequently, limited to outer operating areas well outside Burrard Inlet and are small in magnitude. Trans Mountain assessed the boiler emissions at berths in the response to the Government of Canada Intervenor Evidence Section 3.2.2.1[765] and demonstrated that the applicable ambient air quality objectives will be met.

In response to an NEB IR regarding boiler emissions, PMV stated that "[t]hese rates [the 2005-2006 B.C. Ocean Going Vessel Emissions Inventory published by the B.C. Chamber of Shipping] are not negligible and, in the absence of appropriate references to support alternative boiler emission rates for tankers calling at Westridge Terminal, it is PMV's view that emissions from boilers should not be excluded from Trans Mountain's marine air emissions assessment."[766] Trans Mountain submits that PMV statement regarding an "absence of appropriate references" is misleading. Trans Mountain has provided references to support alternative boiler emission rates for tankers calling at the Westridge Marine Terminal.[767]

In their evidence, Environment Canada recommends that Trans Mountain develop an Air Quality Monitoring, Reporting, and Mitigation Plan in conjunction with the LFVAQCC. Trans Mountain has committed to discussing monitoring parameters and reporting requirements with the LFVAQCC and will address these issues in the work plan for the Westridge Marine Terminal.[768]

---

[765] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 85-88.

[766] Exhibit C365-9-2 - Responses to NEB Information Request #1 (July 27, 2015) (A4R7L3), 1.c.

[767] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 2, 2015) (A4R6I4), 10-14; Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015), 33-30-33-31.

[768] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 16; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

Living Oceans Society submitted, with respect to existing emissions, that the uncertainty of each measurement or calculation that was used in the Application or Report should have been critically evaluated and quantified. Trans Mountain agrees that knowledge of the accuracy of the ambient monitoring data is of interest; however, it is not Trans Mountain's responsibility to audit the Metro Vancouver data. In fact, Metro Vancouver does not make public the results of their internal audits of their monitoring network. Ambient background concentrations were calculated in accordance with the B.C. modelling guideline and the model work plan which was approved by B.C. Ministry of the Environment and Metro Vancouver.[769] Trans Mountain agrees that ambient background concentrations vary in time and space. To evaluate Project effects, elevated background values are calculated to assist with developing a reasonable maximum operating and effects scenario.

Trans Mountain, as required by NEB Draft Condition No. 21, will develop an Air Emissions Management plan for the Westridge Marine Terminal. Trans Mountain has committed to consulting with Fraser Valley Regional District ("FVRD") and other local governments on this plan.[770] In addition, Trans Mountain has committed to installing a new ambient monitoring station at the Westridge Marine Terminal in 2015 to monitor contaminants of potential concern in air including PM, CO, NO_2, SO_2, H_2S and VOCs.[771] Collectively, these measures will ensure that the air emissions from the Westridge Marine Terminal do not exceed applicable air quality standards and guidelines.

---

[769] Exhibit C234-7-9 - Exhibit 04, Guidelines for Air Quality Dispersion Modelling B.C. (May 27, 2015) (A4L7Z0); Exhibit B11-24 -V6E 013of306 ENV ALIGNMENT SHEETS (December 16, 2013) (A3S2U3). See Appendix B: Detailed Model Plan, Air Quality and Greenhouse Gas Technical Report for the Trans Mountain Pipeline ULC.

[770] Exhibit B128 - Trans Mountain Pipeline ULC - Response to Information Requests from Fraser Valley Regional District Round 1 Part 2 (June 18, 2014) (A61133), 27-29.

[771] Exhibit B122-1 – Trans Mountain Response to Del Ponte IR No. 1 (June 18, 2014) (A3Y2J0), 10.

7.2.1.6 Greenhouse Gas Emissions

Concerns were raised regarding increased GHG emissions (carbon dioxide, methane and nitrous oxide) associated with the construction and operation of the Project facilities.[772]

Trans Mountain has expended significant resources to ensure that GHG emissions are mitigated to the greatest extent possible. Emissions management is embedded in the design of the Project. Although a modest increase in GHG emissions will result from the construction and operation of the proposed pipeline and related facilities, through upgrading technology at existing facilities, Trans Mountain will achieve a reduction in GHG emissions at the Westridge Marine Terminal as a result of the Project by 3.8 kT CO_2e annually. This change in technology at Westridge Marine Terminal is predicted to contribute to a reduction of 0.006 per cent of B.C.'s total annual GHG emissions.[773] As a member of Green Marine, which is an audit-based environmental certification program for the North American marine industry that includes a far-reaching environmental program aimed to reduce its environmental footprint by undertaking concrete and measurable actions, Trans Mountain has committed to continuously improving the environmental performance of the Westridge Marine Terminal. Trans Mountain achieved a Green Marine Level 3 rating in all categories applicable to terminal operators for the 2013 operating year including GHG emissions. Level 3 integrates best practices into an adopted management plan and quantifiable understanding of environmental impacts.[774] Furthermore, Trans Mountain has committed to implementing standard and well accepted energy pipeline industry practices to minimize direct GHG emissions

[772] Exhibit C337-1 - Syme, Neil - IR1 - Trans Mountain Expansion Project (May 9, 2014) (A60231), 5.

[773] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 173-178.

[774] Exhibit B316-33 – Trans Mountain Response to PMV IR No. 2 (February 18, 2014) (A4H8W5), 48.

during construction and operation of the pipeline.[775] Trans Mountain will monitor GHG emissions in Alberta and B.C. during the operation of the pipeline once construction has been completed. Trans Mountain will, in compliance with federal and provincial GHG reporting requirements, report the direct annual operating GHG emissions from the facilities which meet or exceed the reporting thresholds.[776]

To ensure that GHG emissions are at the lowest possible levels, Trans Mountain has committed to continuously improving GHG emissions over the life of the Project through the following actions:

(a) Land clearing (removal of vegetative waste, site preparation) along the pipeline right-of-way and at facility locations such as terminals and pump stations will account for over 80 per cent of all estimated construction GHG emissions due in large part to burning of vegetative waste.[777] In the Lower Fraser Valley where air quality is an issue, Trans Mountain will avoid burning slash. Instead, mulching will be performed in place or slash will be transported to an approved disposal location.[778] A pre-construction timber cruise will be completed to determine the economically operable and merchantable timber volume for the construction right-of-way.[779] Trans Mountain will meet with the governments, industry and local Aboriginal communities with respect to the use of merchantable timber.[780]

---

[775] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 193.

[776] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 173-177.

[777] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 28-31.

[778] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 195.

[779] Exhibit B66-1– Trans Mountain Response to Government of Canada National Resources Canada IR No. 1.9.1 (June 4, 2014) (A3X6G0), 59.

[780] Exhibit B5-20 – Trans Mountain Application to NEB Volume 5B (December 16, 2013) (A3S1Q9), 7-92.

(b) Lesser sources of GHG emissions during Project construction will be addressed through Trans Mountain's contract specifications.[781]

(c) KMC will continue to explore opportunities to reduce GHG and other air emissions during the operation of its facilities including the Project.[782]

Parents from Cameron Elementary School Burnaby and the City of Vancouver requested that the List of Issues be expanded to include environmental and socio-economic effects associated with upstream activities, including development of the oil sands (upstream effects) and the downstream use of the oil intended to be shipped on the pipeline (downstream effects). Specifically, Parents from Cameron Elementary School and the City of Vancouver focused on the effects of GHG emissions from the production of oil sourced from the oil sands that would be shipped by the Project and from the end use of that oil.[783]

In response to the motion, Trans Mountain cited[784] the NEB's decisions regarding the List of Issues for both the Enbridge Line 9B Reversal and the Line 9 Reversal Phase I Project in which the Board held:

> [T]he Board confirms that its assessment will include consideration of the environmental effects of GHG emissions associated with the Project, as outlined by Table A-2 in the NEB's Filing Manual. Some submissions requested that the Board consider federal and provincial GHG policy and legislation, and international commitments. Any detailed consideration of such policies, legislation, and commitments, beyond their direct impact on the

[781] Note: Several examples are provided in the response to NEB IR No. 1.31 (e.g., ensuring equipment is well-maintained during construction to minimize air emissions and unnecessary noise). See Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 183.

[782] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 183.

[783] Exhibit A63-1 – NEB - Ruling No. 25 (June 12, 2015) (A3Z5I4).

[784] Exhibit B036 - Trans Mountain Pipeline ULC - 2014-05-26 Letter to NEB re Response to City of Vancouver Notice of Motion (May 16, 2014) (A60578).

> Project and its environmental effects, is outside the appropriate scope of the present review.[785]

In Ruling No. 25, the Board held that in the circumstances of the current proceeding, upstream and downstream effects, including those of GHG emissions, were not relevant. In holding that a full environmental and socio-economic assessment of upstream and downstream effects is not required or relevant, the Board stated:

> The Board acknowledges that the environmental and socio-economic effects of GHG emissions are different from other effects because they are less dependent on the particular location or timing of the activity that produces them. However, considering those effects without also considering all other effects, both positive and negative, would suffer the same problem raised in the motions and some letters of support; that is, considering one cost or benefit of upstream or downstream activities in isolation of other costs and benefits.[786]

Trans Mountain has historically been at the forefront of emissions reduction by consistently upgrading technology at its existing facilities to address direct GHG emissions created during operations. Trans Mountain has similarly committed to continuously identifying and integrating design changes over the life of the Project to improve operating efficiency while reducing GHG and other emissions.[787] Based on the above, the Board can be confident that Trans Mountain has reduced GHG emissions to the extent reasonable and will take appropriate steps during operations to further reduce GHG emissions. Trans Mountain submits the Board should accept its evidence

---

[785] NEB, Line 9B Reversal and Line 9 Capacity Expansion Project, "Procedural Update No.1 – List of Issues and Application to Participate form" (4 April 2013), 5; NEB, Line 9 Reversal Phase I Project, "Procedural Update No.1 – Procedural Update No. 1, List of Issues, and Scope of the Environmental Assessment" (1 February 2012), 4.

[786] Exhibit A063 - National Energy Board - Ruling No. 25 - Motions requesting that the Board include in the List of Issues the environmental and socio-economic effects associated with upstream activities and downstream use (July 23, 2014) (A61912), 6.

[787] Exhibit B89-1 - Syme, Neil - IR1.3 - Trans Mountain Expansion Project (June 4, 2014) (A3X6U3).

that the residual environmental effects of Project construction and operation on GHG emissions will not be significant.[788]

7.2.1.7 Acoustic Environment

The operation of the pump stations, storage tank facilities and Westridge Marine Terminal will result in an increase in continuous sound levels—this is a fact of operating the Project and cannot be avoided. The effect of an increase in sound will extend over the life of the facilities and will cease when the facilities are decommissioned.[789] In order to directly deal with acoustic emissions and mitigate the adverse effects that may occur, Trans Mountain will monitor noise at the Sumas and Burnaby Terminals and at the Westridge Marine Terminal per NEB Draft Condition No. 57 (Post-construction noise surveys) as part of the Post-Construction Environmental Monitoring Program. Monitoring will also be conducted at select facilities within one year of the commencement of operation of the Project, or as per NEB certificate conditions, to ensure the facilities are operating within noise objectives.[790] Should compliance issues be identified, Trans Mountain has committed to repeating the monitoring on the site once appropriate controls are put in place to reduce acoustic emissions.[791]

In addition to Trans Mountain's post-construction noise monitoring,[792] Trans Mountain has committed to providing company contact information to those potentially affected by noise in the

[788] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-103.

[789] Exhibit B239-13 - Trans Mountain - Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 173-174.

[790] Exhibit B239-13 - Trans Mountain - Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 178.

[791] Exhibit B239-13 - Trans Mountain - Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 259.

[792] Trans Mountain has committed to filing its post-construction noise monitoring results with the NEB within 6 months of conducting the initial measurements, or as per NEB certificate conditions. See Exhibit B239-13 - Trans Mountain - Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 261.

event there are noise concerns related to operation of the pipeline system, including residents, land users and Aboriginal groups.[793] For any noise complaints that are received, Trans Mountain will investigate, and if requested by the resident, follow up with the affected resident.

Trans Mountain will develop noise management plans for the Project construction which will incorporate the components of NEB Draft Condition No. 29, No. 32 (HDD construction noise management plan) and No. 33 (Noise Management Plan for pump stations, tank terminals and the Westridge Marine Terminal) with the goal of limiting the effect of noise at sensitive receptors and include a monitoring component to verify effectiveness of controls.[794]

Intervenors raised concerns that tanker noise has not been adequately addressed. Trans Mountain submits that it has adequately addressed tanker noise at the Westridge Marine Terminal as well as various anchorages controlled by PMV. Trans Mountain conducted an operations noise assessment in the Terrestrial Noise and Vibration Technical Report.[795] In addition, Trans Mountain addressed noise from tankers at anchor in Burrard Inlet in response to IRs.[796] Trans Mountain found that noise from tankers at anchorage would occur but found that noise levels at homes are within acceptable levels as defined in the B.C. Oil and Gas Commission Noise Control Guidelines (2009).[797] Trans Mountain has committed to preparing an updated Westridge Marine Terminal EPP, a Noise Management Plan, and to conducting post-construction noise surveys as per NEB

[793] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 135-136.

[794] Exhibit B83-1 – Trans Mountain Response to Cameron School Parents IR No. 1 (June 4, 2014) (A3X6T0), 4.

[795] Exhibit B6-6 - V5C TR 5C3 01of3 TERR NOISE VIBR (December 16, 2013) (A3S1T7); Exhibit B6-7 - V5C TR 5C3 02of3 TERR NOISE VIBR (December 16, 2013) (A3S1T8); Exhibit B6-8 - V5C TR 5C3 03of3 TERR NOISE VIBR (December 16, 2013) (A3S1T9).

[796] Exhibit B80-1 – Trans Mountain Response to Miller B IR No. 1 (June 4, 2014) (A3X6R9), 4-6; Exhibit B316-18 – Trans Mountain Response to Miller B IR No. 2 (February 18, 2015) (A4H8V0), 7-10.

[797] Trans Mountain Reply Evidence, Section 34 – Acoustic Environment/Noise (August 20, 2015), 34-2.

Draft Condition Nos. 31, 33 and 57.[798] Based on the foregoing, Trans Mountain submits that noise from tankers has been adequately addressed.

Trans Mountain is confident that any noise emissions from the Project facilities will comply with applicable noise objectives. As a result, the ESA concluded that the residual environmental effects of pipeline construction and operations on the acoustic environment will be not significant.

7.2.1.8 Fish and Fish Habitat

During the Project review, concerns were raised by intervenors and the Board regarding fish and fish habitat and, specifically, the proposed crossing methods for watercourses.[799] It is also important to note that evidence submitted by a number of intervenors (e.g., Cowichan Tribes[800] and the City of Coquitlam[801]) was often based solely on technical information contained within the initial 2013 application and appears to have not considered Trans Mountain's February 2015 technical update.[802] This resulted in a number of intervenors continuing to reference crossing numbers contained in the initial fish and fish habitat technical information.[803]

In response to concerns regarding the proposed crossing methods for watercourses, Trans Mountain advised the Board that it has selected vehicle and pipeline crossing methods that reduce Project-specific effects in consideration of presence and use by all fish, particularly those

---

[798] Trans Mountain Reply Evidence, Section 34 – Acoustic Environment/Noise (August 20, 2015), 34-2.

[799] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 313.

[800] Exhibit C86-18-1 - Appendix F Part1 (June 12, 2015) (A4Q0U9).

[801] Exhibit C70-3 - City of Coquitlam Written Evidence (May 27, 2015) (A70304).

[802] Trans Mountain Reply Evidence, Section 35 – Fish and Fish Habitat (August 20, 2015), 35-1. Note: The February 2015 technical update included revised watercourse crossing summary tables and atlases, and included additional information that addressed site-specific mitigation and *Species at Risk Act* listed species.

[803] Trans Mountain Reply Evidence, Section 35 – Fish and Fish Habitat (August 20, 2015), 35-2.

comprising part of commercial, recreational or Aboriginal fisheries. Based on this, Trans Mountain's proposed pipeline crossing methods for fish-bearing watercourses are trenchless, isolated trenched (i.e., if water is present at the time of construction) or open cut without flow isolation (i.e., if dry or frozen to bottom) as listed in the Watercourse Summary Table.[804]

Trans Mountain undertook extensive investigation of fish and fish habitat potential in the watercourses crossed by the Project. Watercourses were assigned a High sensitivity ranking for fish and fish habitat where they were found to contain species that were part of a commercial, recreational or Aboriginal fishery, where species of management concern were found, where the habitat potential was rated moderate-high or high for two or more of the following life history stages: spawning, wintering or rearing, or if critical habitat was identified.[805] All watercourses that were determined to be of high habitat sensitivity and containing species of management concern were considered in more detail before assigning a crossing method.

Based on this process, trenchless pipeline construction methods were proposed, if feasible, for several larger fish-bearing watercourses that were determined to have high sensitivity and/or generally contain species of management concern (namely, the North Saskatchewan and McLeod rivers in Alberta, the North Thompson, Thompson and Lower Fraser rivers in B.C.).[806]

For all other watercourses with a High sensitivity, Trans Mountain investigated the use of trenched pipeline construction methods. For isolated trenched crossing methods, Trans Mountain's goal is to time construction so as to occur within the proposed LRBW in order to minimize impacts to

[804] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-157.

[805] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 315.

[806] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 315.

fish and fish habitat. However, if flows during the LRBW preclude the use of an isolated trenched crossing method, then construction during periods of low flow and outside the LRBW were examined. The preference was always to isolate flows outside the LRBW, rather than use an open-cut (without flow isolation).[807] However, it is important to note that where federally-listed species are concerned (e.g., green sturgeon, nooksack dace, salish sucker, etc.), Trans Mountain intends to use an isolated trenched crossing method inside the LRBW or a trenchless method (e.g., horizontal directional drill).[808]

In the event an isolated crossing is utilized outside of the LRBW, due to feasibility concerns, Trans Mountain is committed to implementing additional site-specific mitigation measures to protect fish and fish habitat. For example, Trans Mountain has committed to conducting spawning surveys for species with a moderate-high or high potential for spawning at the right-of-way or within the immediate zone-of-influence ("ZOI"), in the year preceding trenched construction. The results of these surveys will inform Trans Mountain and assist in the refinement of construction scheduling or development and implementation of any further mitigation measures (e.g., placement of snow-fence or other matting over spawning substrate to deter spawning) not already proposed. This supplemental information will provide the Environmental Inspectors and Trans Mountain with a current and site-specific understanding of the potential for spawning activity at and near the crossings. Based on this, Trans Mountain will be able to augment construction timing, sequencing for the Project and implement any additional or enhanced mitigation measures to address instream disturbance of spawning.[809]

---

[807] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 315.

[808] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 318.

[809] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 317.

In response to recent Board IRs, Trans Mountain committed to further mitigation measures including: implementing additional instream enhancement using naturally available materials at each of the 28 sites with a high risk of residual effect (where the opportunity to do so is available); reducing the disturbance within old growth riparian habitat at high sensitivity fish-bearing watercourses (where possible during construction); and, if further enhancement is not feasible, developing a Riparian Vegetation Offset Plan in the event post-construction monitoring results indicate riparian habitat did not return to a similar or greater value than pre-construction conditions at high sensitivity fish-bearing watercourses.[810]

Trans Mountain has also committed to including additional site-specific mitigation measures in the final Pipeline EPP,[811] including measures specific to watercourses identified as critical salish sucker habitat, to be filed with the NEB at least 90 days prior to construction in accordance with NEB Draft Condition No. 29.[812]

As stated above, Trans Mountain is proposing to deter potential spawning from within the ZOI[813] of select watercourse crossings where spawning has previously been documented or is documented during the pre-construction spawning surveys and is expected to coincide with instream construction activities. Deterring spawning within the ZOI of these crossings means that effects on eggs, embryos and resulting fry can be avoided.[814]

---

[810] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 71 - 72.

[811] Note: The site-specific mitigation measures proposed at the applicable watercourses are provided in Table 3.039c-1 in response to Trans Mountain Response to NEB IR No. 3 - 3.039 Nooksack dace and salish sucker critical habitat. See Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 320.

[812] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 324, 330.

[813] Exhibit B7-1 - V5C TR 5C6 01of31 FISH AB (December 16, 2013) (A3S1W6).

[814] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 317.

Environment Canada recommended that Trans Mountain demonstrate how the NEB review process outcomes related to protection of the marine environment (e.g., marine fish and fish habitat) will be respected, taking into account concerns identified by Aboriginal groups and other users of the sea. Trans Mountain has committed to implementing a number of mitigation measures during construction of the Westridge Marine Terminal to protect marine fish and fish habitat.[815] Mitigation measures specific to dredging include:

(a) commitment that dredging, should it be required, be done during DFO least risk work window for Burrard Inlet (August 16 to February 28);

(b) use of silt curtains to contain the spread of sediment during dredging; and

(c) habitat offsetting for marine fish habitat lost due to dredging and infilling at the Westridge Marine Terminal.[816]

In their evidence, the Salmon River Enhancement Society ("SRES") identified the need for a post-construction monitoring program for the life of the Project that will be sufficient to determine the effectiveness of instream restoration, stream bank reclamation and riparian vegetation.[817] Trans Mountain has committed to post-construction monitoring; however, as with other equivalent linear development projects, an initial post-construction monitoring period of five years is typical and anticipated by Trans Mountain. While intensive environmental post-construction monitoring beyond five years has not been proposed by Trans Mountain, it is important to note that ongoing operational inspection of the line is intended for the life of the Project, as requested by SRES.

---

[815] Exhibit B5-21 - V5A ESA 13of16 BIOPHYSICAL (December 16, 2013) (A3S1R0), 7-429 – 7-31, 7-439 – 7-445; Exhibit B5-22 - V5A ESA 14of16 BIOPHYSICAL (December 16, 2013) (A3S1R1), 8-34.

[816] Trans Mountain Reply Evidence, Section 53 – Marine Sediment and Water Quality (August 20, 2015), 53--1-53-2. See also the Exhibit B291-24 – Part 10 Fisheries Act Self-Assessment Serious Harm Marine Report (December 1, 2014) (A4F5C5).

[817] Exhibit C301-05 - Salmon River Enhancement Society - SRES Evidence Report (May 28, 2015) (A70370).

Therefore, Trans Mountain submits that there is no need for a post-construction monitoring program for the life of the Project.[818]

Cowichan Tribes' evidence raised questions regarding the selected spatial boundaries in the Application, in particular, that individual local study areas ("LSA") were not provided for each watercourse.[819] Trans Mountain's evidence is that due to the number of proposed watercourse crossings and differences in the downstream length of the respective Fish and Fish Habitat LSA, based on the estimated ZOI, it was not feasible to map the Fish and Fish Habitat LSA for each individual crossing location and, therefore, Trans Mountain submits that the selected spatial boundaries in the Application were appropriate and adequate for an effects assessment.[820]

Multiple intervenors raised concerns with the proposed pipeline corridor route through the Brunette River Conservation Area. Particular concerns included species at risk (e.g., nooksack dace), riparian setbacks, proposed crossing methods, potential data gaps and potential for spills into the Brunette River.[821] It is important to note that the proposed pipeline corridor parallels but does not cross the Brunette River. Trans Mountain is acutely aware of the species within and habitat sensitivity of the Brunette River and its tributaries, including nooksack dace, brassy minnow and abundant salmonoids. In order to fully document fish and fish habitat in the Brunette

---

[818] Trans Mountain Reply Evidence, Section 35 – Fish and Fish Habitat (August 20, 2015), 35-10.

[819] Exhibit C86-18-1 - Appendix F Part1 (June 12, 2015) (A4Q0U9).

[820] Trans Mountain Reply Evidence, Section 35 – Fish and Fish Habitat (August 20, 2015), 35-5.

[821] Exhibit C309-1 – Geoffrey Senichenko Intervenor Written Evidence (May 27, 2015) (A4L6Q9); C309-1-5 – Appendix E Recovery Strategy Nooksack Dace (May 27, 2015) (A4L6R4); Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5); Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3); Exhibit C234-11-2 – Revised Exhibit 30, Support of Environmental Evidence Zoetica 2015 (June 24, 2015) (A4Q9L9); Exhibit C70-3-02 – City of Coquitlam Summary of Evidence (May 27, 2015) (A4Q0I9); Exhibit C70-3-26 – Appendix J – Part 2 of 3 (May 27, 2015) (A4Q0S1); Exhibit C70-3-27 – Appendix J – Part 3 of 3 (May 27, 2015) (A4Q0S2).

River and tributaries, Trans Mountain has conducted extensive consultation with various public groups, DFO and a local provincial expert with respect to the Project and its potential effects. In addition, Trans Mountain investigated the potential for nooksack dace and overall fish habitat value in Brunette tributaries crossed by the proposed pipeline and conducted multiple seasons of fish sampling to determine the presence or absence of fish. Trans Mountain has committed to flow isolation at non-fish-bearing crossings (where required) and general mitigation measures outlined in the Pipeline EPP to reduce the impacts to downstream watercourses during construction. In addition, Trans Mountain will adopt appropriate mitigation and reclamation measures to prevent serious harm at all fish-bearing watercourse crossings, including the downstream ZOI which may extend into the Brunette River (e.g., avoidance of key spawning periods for nooksack dace and Pacific salmon). Site-specific mitigation measures have also been provided for watercourse crossings that are considered to be proposed critical habitat or potential habitat for nooksack dace. Based on the following, Trans Mountain submits that the proposed pipeline corridor route through the Brunette River Conservation Area has been adequately assessed, there are no data gaps and Trans Mountain has proposed extensive mitigation measures to ensure fish and fish habitat is not compromised.[822]

In their evidence, many intervenors submitted detailed concerns regarding species of conservation concern (e.g., SARA-listed species, provincially-listed species and other species of management

[822] Trans Mountain Reply Evidence, Section 35 – Fish and Fish Habitat (August 20, 2015), 35-16-35-18.

concern and conservation units).[823] Trans Mountain responded to, and addressed, these concerns in detail in its reply evidence.[824]

With the implementation of the proposed mitigation measures contained in the ESA, including compliance with applicable DFO Measures to Avoid Causing Harm, the Alberta Environment Codes of Practice, and various other provincial and industry guidelines (e.g., B.C. Oil and Gas Commission Environmental Protection and Management Guide, Canadian Association of Petroleum Producers Pipeline Associated Watercourse Crossings) Trans Mountain is confident that the potential for serious harm to fish or any permanent alteration to, or destruction of, fish habitat as a result of trenched pipeline crossings and temporary vehicle crossings can be avoided. Trans Mountain's view is confirmed in DFO's responses to NEB IRs wherein DFO stated that it "is of the view that the mitigation measures proposed by Trans Mountain are standard mitigation measures, that if implemented appropriately, will likely mitigate residual effects on the Nooksack dace and Salish sucker for the watercourses where a trenched pipeline crossing method is proposed."[825] DFO further concluded that "[a]t this time, DFO is not aware of additional mitigation measures that the Proponent could implement beyond those already proposed to mitigate effects on fish and fish habitat at the referenced watercourse crossings. Trenchless pipeline crossing methods (i.e., aerial crossings and HDD) are preferred methods for reducing potential impacts on fish and fish habitat; however, these methods may not always be technically or economically

[823] Exhibit C309-1 – Geoffrey Senichenko Intervenor Written Evidence (May 27, 2015) (A4L6Q9); Exhibit C309-1-5 – Appendix E Recovery Strategy NooksackDace (May 27, 2015) (A4L6R4); Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5); Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3); Exhibit C234-11-2 – Revised Exhibit 30, Support of Environmental Evidence Zoetica 2015 (June 24, 2015) (A4Q9L9); Exhibit C86-18-1 - Appendix F Part1 (June 12, 2015) (A4Q0U9); Exhibit C231-2-1 - MNBC TMX Submission Final (May 28, 2015) (A4Q2H2).

[824] Trans Mountain Reply Evidence, Section 35 – Fish and Fish Habitat (August 20, 2015), 35-10 - 35-16.

[825] Exhibit C97-3-2 - Fisheries and Oceans Canada Responses to Information Requests from the National Energy Board (July 27, 2015) (A4R7Q1), 2.

feasible."[826] Finally, DFO stated that "the implementation of habitat enhancement measures proposed by Trans Mountain … during restoration works at the watercourse crossings may effectively mitigate potential localized effects on aquatic productivity; enhancement of the specific habitat features and functions that benefit the Nooksack dace and Salish sucker may assist in furthering the recovery of these species."[827]

Trans Mountain has provided the results of its Self-Assessment of the Potential for Serious Harm to Fish and Fish Habitat to the Board and is of the opinion that with appropriate mitigation and crossing methodology for each of the primary crossing methods proposed, there are no watercourse crossings that will result in serious harm to fish and fish habitat. As such, there should be no requirement for a section 35 Authorization ("*Fisheries Act* Authorization"). Notwithstanding this, if the Board finds that a *Fisheries Act* Authorization is required (i.e., that there is a potential for serious harm), Trans Mountain will apply for a *Fisheries Act* Authorization from DFO and will prepare an offsetting plan to address any serious harm that is identified.

As a precautionary measure, Trans Mountain has initiated conceptual planning for a potential offsetting plan, should this be required to support an application for a *Fisheries Act* Authorization.[828] If required, the Project's final Fish and Fish Habitat Offset Plan would be designed in consultation with regulators, fisheries managers, Aboriginal groups and other stakeholders, and with specific consideration for the guiding principles outlined in DFO's Fisheries

---

[826] Exhibit C97-3-2 - Fisheries and Oceans Canada Responses to Information Requests from the National Energy Board (July 27, 2015) (A4R7Q1), 2.

[827] Exhibit C97-3-2 - Fisheries and Oceans Canada Responses to Information Requests from the National Energy Board (July 27, 2015) (A4R7Q1), 2.

[828] Exhibit B323-3 - Self Assessment Potential for Serious Harm to Fish and Fish Habitat Part 1 of 7 (February 27, 2015) (A4I6C1), 1-2.

Productivity Investment Policy: A Proponents Guide to Offsetting.[829] As required by DFO, this plan will be developed with the goal of maintaining or improving the productivity of commercial, recreational or Aboriginal fisheries.[830]

In the event the Board determines that Trans Mountain requires a *Fisheries Act* Authorization, in order to avoid the risks of delay associated with Trans Mountain and the Board having different interpretations of which crossings require authorizations, Trans Mountain requests guidance from the Board in its decision with respect to its review of the potential for serious harm.

Trans Mountain is confident that the implementation of the proposed mitigation measures and Project plans will mitigate adverse effects on fish and fish habitat and will ensure there is no serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. As a result, Trans Mountain's evidence is that the residual environmental effects of the Project on fish and fish habitat will not be significant.[831]

7.2.1.9 Wetland Loss and Alteration

Environment Canada raised concerns that, to date, not all wetlands that the Project would potentially impact have been assessed through field surveys due to land access issues. Environment Canada noted, however, that Trans Mountain has committed to conducting ground surveys for all wetlands that the Project would encounter prior to construction. Based on this, Environment Canada has recommended that Trans Mountain conduct a detailed assessment of baseline wetland

---

[829] DFO, *Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting*, online: < http://www.dfo-mpo.gc.ca/pnw-ppe/offsetting-guide-compensation/index-eng.html>.

[830] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 2.

[831] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-165.

functions prior to the start of construction for all wetlands that the Project would directly impact and for any wetland(s) that are hydrologically connected to those wetlands.[832] Trans Mountain conducted an extensive field program to collect pre-construction information on wetlands that will potentially be encountered by the Project in 2012, 2013 and 2014 (i.e., ground-based wetland surveys at all wetlands where access was available, combined with aerial surveys through helicopter reconnaissance. A review of an overflight video and review of high resolution satellite imagery of the proposed pipeline corridor provided a visual documentation of the wetlands encountered by the Project.[833] Supplementary wetland field surveys will be conducted during the 2015 field program.[834] Guidance for survey intensity level in B.C. suggests that for the wetlands study area, 25-50 per cent of identified wetlands should be ground surveyed. Trans Mountain has gone over and above this recommendation. Trans Mountain submits that the expected number of wetlands to be ground-surveyed (i.e., all wetlands that are accessible on the ground and all wetlands through helicopter reconnaissance) has already exceeded recommendations for Survey Intensity Level 3.[835]

Based on the *Federal Policy on Wetland Conservation* goal of "no net loss" of wetland function on federal lands and waters, Trans Mountain committed to, where feasible, route the pipeline corridor to reduce potential effects on wetlands by implementing a routing decision framework that takes into consideration the following:

---

[832] Exhibit C121-3-1 - EC written evidence (May 27, 2015) (A4L8Y6), 44.

[833] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 14.

[834] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 14.

[835] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 14.

(a) avoiding wetlands, where feasible;

(b) minimizing length traversing environmentally sensitive areas such as protected areas, or areas containing vegetation and wildlife habitat for species with special conservation status;

(c) where practical, following existing linear infrastructure (e.g., pipelines, power lines, roads);

(d) using the shortest route practical;

(e) where avoidance is not technically or economically feasible, implementing construction and reclamation mitigation measures; and

(f) monitoring wetland function and recovery post-construction.[836]

Through a series of route revisions since the submission of the Application, the number of wetlands encountered by the Project has been reduced from a potential 638 wetlands to 538 wetlands and is anticipated to be reduced further once the final pipeline route has been determined. Based on this, approximately 100 wetlands have been avoided by the Project. Furthermore, in an effort to reduce the effects of pipeline construction on the wetlands that will be crossed, discussions have been initiated between the engineers, Environmental Inspection Teams and Wetland Specialists to identify areas where the proposed pipeline construction right-of-way and extra temporary workspace could either be narrowed or moved out of wetland areas.[837] Trans Mountain has extensive experience with wetlands through, among others, the award-winning KMC TMX – Anchor Loop Project. Based on the experience gained from past projects, Trans Mountain will employ mitigation measures proven to reduce adverse effects for wetlands crossed using a trenched

[836] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-173.

[837] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 12.

method. While the majority of wetlands along the proposed pipeline route will be crossed using a trenched method, to ensure the best method is chosen, a site-specific, case-by-case assessment will be used to determine the site crossing method.[838] Trans Mountain's response to NEB IR 2.050 provides a list of specific information that will be required to assist in choosing the appropriate crossing method.[839]

Trans Mountain will consider recommended mitigation from other biophysical disciplines (i.e., vegetation, aquatics and wildlife) when selecting the crossing method for wetlands that have demonstrated special features such as Red or Blue-listed wetlands in B.C., rare plants or ecological communities, wildlife species of concern or sensitive aquatic habitat.[840] Trans Mountain is reviewing Project scheduling, and will avoid the nesting period and post-breeding dispersal of migratory birds, including completing clearing/construction outside of the nesting period. If this is not feasible the Project footprint will be pre-cleared or mowed prior to the nesting period.

Trans Mountain is committed to ensuring the protection and proliferation of wetlands along the Project corridor. At this point in time permanent disturbance to wetlands requiring compensatory measures is not anticipated as pipeline construction through wetlands is considered to be a temporary disturbance. To ensure wetlands return to their pre-construction conditions following construction of the Project, Trans Mountain's Wetland Function Post-Construction Monitoring Program ("Wetland Function PCM Program") will collect and monitor post-construction data for wetlands crossed during pipeline construction. If a wetland is not determined as having at least the same functional conditions as documented during the pre-construction assessment, Trans

[838] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 210.

[839] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 210.

[840] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 211.

Mountain will continue to monitor those specific wetlands in years three and five after construction. If necessary, additional remedial measures will be implemented to assist wetlands in returning to full pre-construction functional condition.[841] If a wetland is determined to not be on the trajectory to returning to pre-construction functional condition at the end of the Wetland Function PCM Program (i.e., post-construction functional condition category is less than the preconstruction category), Trans Mountain will discuss next steps with Environment Canada to achieve the goal of "no net loss" of wetland function.[842]

Environment Canada's evidence recommends that the Wetland Function PCM Program be designed in such a way as to ensure that the type and amount of each wetland function would be considered individually in determining recovery success and that each wetland function would be recovered to at least the same type and amount of function as assessed during baseline. Setting compensation objectives in the form of a quantitative "range" for each function as a benchmark is recommended.[843] Trans Mountain's wetland landscape functional assessment is intended to address key selected functional components that inform a wetlands' overall functional condition. Although individual wetlands may vary in the types of functions they provide, the selected components apply to most wetlands encountered. This assessment is meant as a generalized tool for assessing key biophysical functions. Each wetland function will be determined for each functional category. Trans Mountain's evidence is that "no net loss" of wetland function is still being achieved by using functional condition categories rather than exact pre-construction scores within the categories.

---

[841] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 219.

[842] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 214.

[843] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 48.

4847 In their evidence, Environment Canada recommends that Trans Mountain develop and file a
4848 Wetland Compensation Plan.[844] Although permanent loss of wetland function is not anticipated at
4849 wetlands crossed by the Project, Trans Mountain has developed and filed a Preliminary Wetland
4850 Compensation Plan[845] to address the NEB Draft Condition No. 23 as well as Government of
4851 Canada, Environment Canada IRs 1.040a to 1.040h[846] and NEB IRs 2.052a to 2.052d.[847] Trans
4852 Mountain is committed to working with Environment Canada to develop a finalized Wetland
4853 Compensation Plan. The Preliminary Wetland Compensation Plan will be updated as part of the
4854 Pre-construction Wetland Survey and Mitigation Plan. Environment Canada has recommended
4855 that the Pre-construction Wetland Survey and Mitigation Plan be submitted to the Board at least
4856 four months prior to the commencement of construction.[848] Trans Mountain is committed to
4857 submitting a Pre-construction Wetland Survey and Mitigation Plan to meet the objective of NEB
4858 Draft Condition No. 23.[849] However, in order to provide the Pre-construction Wetland Survey and
4859 Mitigation Plan 120 days prior to construction, it would require submission prior to issuance of
4860 the CPCN. Therefore, Trans Mountain is asking for consideration of submission of the Wetland
4861 Survey and Mitigation Plan 90 days prior to commencement of construction.[850]

---

[844] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 49.

[845] Exhibit B239-27 – Trans Mountain Response to NEB IR No.2.052a-Attachment 1 (July 21, 2014) (A3Z4V3).

[846] Exhibit B129-1 – Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 88-89.

[847] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 220-222.

[848] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 46.

[849] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 17; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[850] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 15.

Based on the above commitments, the ESA concluded that the residual environmental effects of pipeline construction and operations on wetland loss or alteration will be not significant.[851]

7.2.1.10 Vegetation

In order to combat effects of pipeline construction on vegetation, Trans Mountain has committed to conducting a vegetation survey prior to construction to identify if any species that require special consideration before, during or after construction are present along the construction right-of-way.[852] In addition, Trans Mountain developed the Rare Ecological Community and Rare Plant Population Management Plan, which includes potential mitigation measures that generally fall into three categories: avoidance, (e.g., realignment, change of work side, narrowing), reducing disturbance (e.g., narrowing, adjusting workspaces, ramping/matting over) and alternative construction/reclamation techniques (e.g., salvaging seed or sod, plant propagation, transplanting, separate topsoil/root zone material salvage, delay clearing, access management).

In the event that rare species or communities are observed within the final Project footprint, complete avoidance will be adopted, where practical, as the preferred mitigation method for rare species ranked S1 or S1S2[853] or species that are provincially or federally protected.[854] For example, Trans Mountain has committed to avoiding toothcup critical habitat by implementing a trenchless crossing of the North Thompson River. The Project footprint, workspace and right-of-way maintenance activities will avoid habitat attributes for toothcup and critical habitat will be

[851] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL - (December 16, 2013) (A3S1Q9), 7-179.

[852] Exhibit B39-2 – Trans Mountain Response to ALIB IR No. 1 (June 4, 2014) (A3X5V6), 85.

[853] Plant species listed as S1 or S1S2 are categorized in B.C. into a Red List. The Red List means the plant species are candidates for extirpated, endangered or threatened status.

[854] Exhibit B239-13 - Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 201.

considered during vegetation re-establishment and maintenance activities. Furthermore, the Project will avoid disturbance of shoreline habitat for known toothcup populations at Mission Plats, and the proposed mitigation to avoid the introduction and spread of weeds will ensure that the Recovery Strategy objectives are not impacted. Trans Mountain will continue to consult with Environment Canada to identify whitebark pine candidate regeneration critical habitat areas within the Project footprint, and discuss mitigation measures as needed.[855]

Furthermore, where PCEM is recommended (as part of the site specific mitigation measures developed after the Project footprint has been defined), vegetation specialists will revisit the locations documented during pre-construction surveys at intervals over a five-year period (e.g., years one, three and five following completion of reclamation, until the issue has been considered to be resolved), and during biologically appropriate times. For rare plant occurrences, abundance, distribution, plant health and phenology will be documented.[856] Trans Mountain's objective for vegetation under the PCEM will be to determine the effectiveness of mitigation measures and, if needed, correct measures.

Trans Mountain has also committed to continuous consultation with Environment Canada regarding recommendations and site-specific mitigation for SARA listed vegetation species that exist along the Project footprint.[857]

Metro Vancouver submitted evidence that the Project will negatively impact sensitive ecosystems in the region and that routing and construction methods fail to avoid impacting critical habitat or

[855] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 4-5.

[856] Exhibit B239-13 - Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 201.

[857] Exhibit B129-1 – Trans Mountain Response to GoC EC IR No. 1 (June 18, 2014) (A3Y2K9), 100 - 101.

areas of high importance to Species of Conservation Concern.[858] This is incorrect. Vegetation species and ecological communities of concern have been observed along the pipeline corridor and their extent has been documented. Trans Mountain has also identified mitigation measures to avoid or reduce disturbance to the vegetation features. Furthermore, Trans Mountain has conducted surveys where land access has been granted, following appropriate provincial and federal guidelines, to account for potential Species of Conservation Concern if there are vegetation or ecological communities of concern listed by the B.C. Conservation Data Center, Identified Wildlife Management Strategy, *SARA*, or the Committee of the Status of Endangered Wildlife in Canada known to occur along the proposed pipeline corridor.[859] Site-specific mitigation measures for occurrence found within the construction footprint will be developed in the EPP and will be provided on the Environmental Alignment Sheets for construction planning.[860] Moreover, Trans Mountain is committed to substantially reducing the right-of-way and work space areas to minimize impacts on environmentally sensitive areas and parks.[861]

Metro Vancouver stated in their evidence that Trans Mountain should commit to a no net loss of habitat. Trans Mountain submits that the concept of “no net loss” for Regional Parks is not a commitment by Trans Mountain, nor is this a standard industry recognized mitigation mechanism. Areas of temporary workspace during construction will be reclaimed and replanted after construction, therefore only 0.0137 ha of sensitive ecosystems has the potential to be permanently lost.

---

[858] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3).

[859] Trans Mountain Reply Evidence, Section 37 – Vegetation (August 20, 2015), 37-2.

[860] Trans Mountain Reply Evidence, Section 37 – Vegetation (August 20, 2015), 37-5.

[861] Trans Mountain Reply Evidence, Section 37 – Vegetation (August 20, 2015), 37-3.

Several municipalities expressed concern related to tree loss and replacement within urban areas. In response to this, Trans Mountain has committed to engage a qualified arborist to develop a tree plan specific to municipal lands directly impacted by pipeline construction and will be used to develop a reclamation plan for replacement of trees in consultation with the affected city and landowners.[862]

Based on the mitigation measures and PCEM plans Trans Mountain has proposed, the Board can be confident that Trans Mountain has taken appropriate steps to minimize adverse environmental effects to vegetation and should accept Trans Mountain's evidence that the residual environmental effects of pipeline construction and operations on vegetation will be not significant.[863]

7.2.1.11 Wildlife and Wildlife Habitat

Wildlife field surveys were initiated in 2013 and supplemental field surveys have been ongoing to collect additional information on species of conservation concern. This information, in addition to targeted site specific pre-construction field surveys will be used to inform Project planning and mitigation.

Trans Mountain has committed to preparing and filing mitigation plans for the following species at risk: southern mountain caribou, grizzly bear, Oregon forestsnail, Oregon spotted frog,[864]

[862] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 56.

[863] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-220.

[864] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 57.

Williamson's sapsucker,[865] Pacific water shrew,[866] Lewis's woodpecker,[867] Townsend's mole,[868] Coastal giant salamander[869] and spotted owl.[870] For those wildlife species that will not have a stand-alone mitigation plan, Trans Mountain will update the mitigation measures presented in the Pipeline EPP, as well as wildlife-related contingency plans. The mitigation measures for wildlife and wildlife habitat are also accounted for and provided on the Environmental Alignment Sheets prepared for the Project. Trans Mountain will develop beneficial management practices to avoid impacts to migratory birds, and attention will be given to areas identified as having particularly high habitat value for migratory birds such as the Douglas Lake Plateau Important Bird Area.

Trans Mountain is committed to working with federal and provincial regulatory authorities and other stakeholders to refine and optimize mitigation measures, as well as monitoring programs for select species. Trans Mountain has committed to collaborate with federal and provincial regulatory authorities, Aboriginal communities, non-governmental environmental organizations and universities to support programs to monitor and conserve species at risk that could be affected by Project activities, conduct construction and operations monitoring for agreed to species at risk, including monitoring of activity levels in known and predicted high quality habitat, using the appropriate survey methods, and where the effectiveness of proposed mitigation or compensation is uncertain, commit to a monitoring program to evaluate the effectiveness of the implemented measures.

---

[865] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 139.

[866] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 127.

[867] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 133.

[868] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 128.

[869] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 142.

[870] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 137.

At the Westridge Marine Terminal, Trans Mountain has committed to implementing the following mitigation measures to reduce potential effects from artificial lighting on marine birds:

(a) 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.

(b) Report during construction all bird strikes/collisions "that occur during construction" immediately to Trans Mountain's Lead Activity Inspector and the Environmental Inspector. Bird strikes/collisions during operations will be reported to KMC Operations Supervisor.[871]

Intervenors raised concerns about the potential effects of the Project on species at risk and their habitat.[872] Trans Mountain is committed to implementing mitigation to avoid or reduce the Project's potential effects. Trans Mountain will use the information gathered during field studies, along with targeted, site-specific pre-construction field studies, to inform the design and implementation of mitigation. In addition, during the ongoing Project planning and design phase, Trans Mountain has continued to consult with Environment Canada and provincial regulatory authorities regarding refined critical habitat mapping and attributes of critical habitat. This information, along with field survey information, will be used to determine overlap of the Project

[871] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 241.

[872] Exhibit C74-11-4 - Evidence of Elaine Golds Port Moody (May 27, 2015) (A4L7Q7); Exhibit C70-3-2 - City of Coquitlam Summary of Evidence (May 27, 2015) (A4Q0I9); Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5); Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3); Exhibit C231-2-1 - MNBC TMX Submission Final (May 28, 2015) (A4Q2H2); Exhibit C288-16-1 - TMX3 Written evidence from Pro Information Pro Environment United People Network (May 27, 2015) (A4Q0Q5).

Footprint with critical habitat and allow for design modifications (e.g., micro-routing) to avoid or reduce Project impacts to critical habitat.[873]

The City of New Westminster and Metro Vancouver raised concerns regarding the potential adverse effects of noise disturbance on wildlife, specifically noise from the proposed HDD around the Brunette River section of the Project.[874] Trans Mountain has committed to implementing mitigation to comply with appropriate regulatory guidelines related to noise during construction and operation of facilities, and avoiding sensitive timing windows for wildlife, to the extent feasible. Trans Mountain is planning to schedule construction activities outside of sensitive timing windows for wildlife and other environmental and social elements. Furthermore, as construction planning for the Project progresses, noise modelling maps are being developed to depict noise levels and noise attenuation from Project construction into surrounding residential, recreational (including the Brunette River watershed) and business areas. The Noise Management Plan will use the result of the noise modelling to identify noise reduction requirements and measures at specific locations. The Noise Management Plan will also incorporate the components of NEB Draft Condition No. 29 (Pipeline EPP) and No. 32 (Horizontal Directional Drilling Nosie Management Plan). Trans Mountain is confident that the effects of noise at sensitive receptors will be limited to the greatest extent possible and that its monitoring will verify the effectiveness of the controls and allow for augmentation of the controls if necessary.[875]

---

[873] Trans Mountain Reply Evidence, Section 48 – Wildlife and Wildlife Habitat (August 20, 2015), 38-1.

[874] Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5); Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3).

[875] Trans Mountain Reply Evidence, Section 38 – Wildlife and Wildlife Habitat (August 20, 2015), 38-2 - 38-3.

LNIB raised concerns regarding the sustainability of mule deer and moose populations in the Nicola River valley. In the Application, Trans Mountain described the potential effects of the Project on ungulates and in particular moose, which was identified as an indicator to focus the assessment.[876] Trans Mountain's evidence is that the proposed pipeline corridor in the LNIB traditional territory is located primarily in areas that are affected by urban and rural settlements, agriculture, forestry, and transportation activities. The proposed pipeline corridor crosses the Ungulate Winter Range u-3-003 for approximately 39.2 km, of which approximately 26 km (66 per cent) parallels the existing TMPL and other existing pipeline right-of-ways. Portions of the remaining 13.2 km parallel other existing disturbances (e.g., roads and highways). As a result, the Project avoids the larger, more intact patches of habitat delineated within Ungulate Winter Range u-3-003. Trans Mountain submits that routing the Project within and adjacent to existing corridors and disturbances reduces the Project's effects on ungulates.[877]

The Métis Nation of B.C. and Environment Canada raised concerns about the lack of information provided for bats.[878] Trans Mountain is completing work to identify rock features (e.g., cliffs, crevices, caves) within the pipeline corridor that have the potential to support bats. In the event that disturbance to a rock feature with the potential to support bats is identified, Trans Mountain will contact the appropriate regulatory agency to discuss whether further survey work is needed. Trans Mountain has committed to searching for bat roost trees during the period when maternity

[876] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-220 – 7-221.

[877] Trans Mountain Reply Evidence, Section 38 – Wildlife and Wildlife Habitat (August 20, 2015), 38-4.

[878] Exhibit C231-2-1 - MNBC TMX Submission Final (May 28, 2015) (A4Q2H2); Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 14.

5006 roosts are active. In the event an active roost tree is found, a protective buffer will be implemented
5007 based on consultation with provincial regulators.[879]

5008 Environment Canada recommended that specific surveys for swifts and swallows be completed
5009 prior to clearing activity in areas where construction would coincide with high suitability habitat
5010 for these species.[880] Trans Mountain has previously stated that in the event an active colony/nest
5011 is found, it will be subject to site-specific mitigation measures that may include a protective buffer
5012 and/or non-intrusive monitoring. Trans Mountain has committed to reviewing and identifying
5013 active colonies that may be affected by construction activities in areas with high suitability habitat
5014 for swifts and swallows to ensure appropriate mitigation is implemented.[881]

5015 In its evidence, Environment Canada raised concerns regarding habitat
5016 loss/alteration/fragmentation and disturbance to migratory birds arising from construction
5017 operation activities in the Douglas Lake Plateau and Burrard Inlet Important Bird Areas ("IBA"),
5018 as well as other areas (e.g., Lac Du Bois Grasslands Protected Areas).[882] Trans Mountain submits
5019 that it is reviewing Project scheduling and acknowledges the importance of priority habitat areas
5020 for migratory birds such as the Douglas Lake Plateau IBA. Trans Mountain is committed to
5021 scheduling clearing and construction to avoid sensitive time periods for migratory birds,

[879] Trans Mountain Reply Evidence, Section 38 – Wildlife and Wildlife Habitat (August 20, 2015), 38-4; Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada Section 2.0: Species at Risk, Migratory Birds and Wetlands (August 20, 2015), 3.

[880] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 34.

[881] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 8.

[882] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 35.

specifically in priority habitat areas. In the event this cannot be achieved (e.g., given the duration of construction activity), pre-clearing outside of sensitive periods will be completed.[883]

Environment Canada recommended in its evidence that pre and post construction surveys within priority habitat areas (such as IBAs) be completed in order to establish a robust baseline for predicting potential impacts, verifying the accuracy of predicted impacts, managing potential cumulative effects and applying the results in support of mitigation and monitoring.[884] Trans Mountain has conducted numerous baseline surveys to date for migratory birds within the Douglas Lake Plateau IBA.[885] Trans Mountain submits that the baseline data collected within the Douglas Lake Plateau IBA to date is sufficient to inform appropriate mitigation design and implementation. In addition, select surveys for migratory birds and bird habitat features will be incorporated into the PCEM Program, using methods similar to those used for the baseline surveys. Surveys will be completed at select locations identified as priority locations by regulatory authorities, or locations identified as having high species diversity or density. Post-construction migratory bird surveys will also be completed in conjunction with the PCEM Program to evaluate wetland habitat function to determine the success of wetland mitigation and reclamation. Trans Mountain submits that the baseline and post-construction surveys proposed will ensure the Project-specific residual effects and contribution to cumulative effects are appropriately managed.[886]

---

[883] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 9.

[884] Exhibit C121-3-1 – EC written evidence (May 27, 2015) (A4L8Y6), 36.

[885] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada (August 20, 2015), Section 2.0: Species at Risk, Migratory Birds and Wetlands, 9.

[886] Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada Section 2.0: Species at Risk, Migratory Birds and Wetlands (August 20, 2015), 10.

The residual environmental effects of Project construction and operations on wildlife and wildlife habitat indicators are concluded to be not significant.[887]

7.2.1.11.2 Marine Mammals

For harbour seals, only one residual effect of high probability was identified (i.e., sensory disturbance of harbour seals or other marine mammals due to underwater noise produced during pile driving or dredging).[888] Therefore, the combined potential residual effects from Westridge Marine Terminal construction and operations on harbour seals were determined to be not significant.[889]

Intervenors questioned the potential for implementing construction-related mitigation measures for Project related effects on marine mammals.[890] Trans Mountain outlined its framework mitigation plan for marine mammals during construction of the Westridge Marine Terminal in its MMPP.[891] DFO's written evidence was supportive of the proposed mitigation measures. It stated: "DFO is of the view that the implementation of mitigation measures specific to pile driving activities, e.g., deployment of bubble curtains and acoustic monitoring via hydrophone, will largely mitigate the residual effects of construction-related underwater noise on marine mammals. The use of trained marine mammal observers to halt works in the event that acoustically sensitive marine mammals are observed should further reduce the potential residual effects on marine mammals. The construction-related mitigation measures proposed in the MMMP framework are

[887] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-314.

[888] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 234.

[889] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 234-235.

[890] Exhibit C231-2-1 – MNBC TMX Submission Final (May 28, 2015) (A4Q2H2).

[891] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8).

standard measures that are technically feasible and have successfully been implemented previously in other marine development projects."[892]

7.2.1.12 Accidents and Malfunctions (Pipelines and Facilities)

Oil sands derived products have been safely transported via the TMPL for decades and accidents and malfunctions are predicted to be unlikely for the Project. Nonetheless, Trans Mountain recognizes the necessity in evaluating the potential consequences of a spill so that emergency response and contingency planning can be completed to mitigate the risk.

Trans Mountain completed a Pipeline Ecological Risk Assessment ("Pipeline ERA") to assess the spill-related environmental effects that could result from a large oil spill at almost any location along the proposed corridor, including those that could affect smaller streams.[893] The information provided in the Pipeline ERA is based on effects and documents from past spills and credible worst-case pipeline spill scenarios modelled to provide a detailed evaluation of potential ecological and human health consequences.

Metro Vancouver asserted that Trans Mountain's risk assessment approach was "largely subjective and poorly validated."[894] Despite Metro Vancouver's assertion, the risk assessment approach used by Trans Mountain followed Environment Canada's standard risk assessment methodology and:

(a) provides detailed chemical characterization of a representative diluted bitumen product;

[892] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4).

[893] Exhibit B18-2 – V7 5.2.8.3 F5.2.5 TO 10.0 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V6).

[894] Exhibit C234-11-2 - Revised - Exhibit 30, Support of Environmental Evidence Zoetica 2015 (June 24, 2015) (A4Q9L9).

(b) develops a rationale for the selection of representative hypothetical spill locations and scenarios, with descriptions of those locations including information on seasonal variability;

(c) describes a wide range of potential ecological receptors and resources that could be at risk in the event of an oil spill;

(d) identifies credible exposure pathways and a conceptual site model for exposure of ecological receptors to spilled crude oil;

(e) reviews the fate and behaviour of spilled oil in freshwater environments, including the potential for oil-mineral aggregate formation;

(f) describes nine individual case studies of actual crude oil spills into relevant freshwater and riparian environments; and

(g) describes the fate of spilled crude oils, including diluted bitumen and synthetic oil from Alberta sources, and modelling studies carried out for the Enbridge Northern Gateway project.[895]

Trans Mountain determined that the most-credible worst-case scenario involves a full-bore rupture, followed by drain-down to the fullest extent possible, given the elevation profile and valve configuration.[896] A series of multi-layered conservative assumptions are included in this type of spill scenario, including a ten minute period before pump shutdown occurs. Trans Mountain did not account for any potential response or intervention, or of any attenuation of volumes prior to reaching a high consequence area, such as a large river that subsequently transports oil

[895] Trans Mountain Reply Evidence, Section 46 – Ecological Risk Assessment (August 20, 2015), 46-15-46-16.

[896] Trans Mountain Reply Evidence - Tsleil – Waututh Nation, Tsawout First Nation, Upper Nicola Indian Band "An Assessment of Oil Spill Risks for the Trans Mountain Expansion Project" (August 20, 2015), 33.

downstream.[897] In this respect, the volumes modelled are extremely conservative to ensure that effects are not understated.

Trans Mountain commissioned an independent outflow analysis based on preliminary valve spacing to quantify the oil volume that would be released in the event of a spill incident at four representative locations (Athabasca River, North Thompson River, Lower Fraser River and Lower Fraser River-Port Mann Bridge). These locations were selected to:

(a) reflect areas of expressed concern by Aboriginal groups or the general public;

(b) support evaluation of potential effects to traditional use, other human use or infrastructure;

(c) support evaluation of potential effects to environmentally sensitive resources (e.g., salmon spawning grounds);

(d) be close to a large river so that a large spill volume could credibly enter the river; and

(e) represent the range of watercourse types found along the pipeline corridor.[898]

The outflow analysis was used as input into overland and stream models to predict overland spill trajectories, which in turn were used to assess the ecological effects of the four representative hypothetical pipeline spill scenarios.[899]

---

[897] Trans Mountain Reply Evidence, Attachment 1.07 –Tsleil – Waututh Nation, Tsawout First Nation, Upper Nicola Indian Band, "An Assessment of Oil Spill Risks for the Trans Mountain Expansion Project" (August 20, 2015), 33.

[898] Trans Mountain Reply Evidence, Section 28 – Environmental Assessment Methods (August 20, 2015), 28-4.

[899] Trans Mountain Reply Evidence, Attachment 1.07 –Tsleil – Waututh Nation, Tsawout First Nation, Upper Nicola Indian Band "An Assessment of Oil Spill Risks for the Trans Mountain Expansion Project" (August 20, 2015), 9.

The Gunton and Broadbent Report concludes that Trans Mountain's scientific modelling and assessment of ecological risks does not comply with environmental assessment and risk assessment standards of practice or legal requirements.[900] This is incorrect. Trans Mountain submits that the Pipeline ERA meets standard risk assessment practice and legal requirements. In addition, the Gunton and Broadbent Report either discounts or ignores the various updates and refinements provided to the public domain resulting from the extensive process undertaken through the NEB review process.[901]

Trans Mountain recognizes that assessment practitioners and intervenors may favour alternative risk assessment methodologies but maintains that its assessment of pipeline accident and malfunctions follows the NEB's guidance on the issue, meets the legal and regulatory requirements of CEAA 2012 and provides a conservative assessment of the real risks associated with a spill.

The Pipeline ERA evaluated potential acute and chronic environmental effects to different groups of ecological receptors that might be exposed to spilled oil as a result of their habitats and life cycles.[902] This includes various aquatic organisms and wildlife over the range of watercourses and flow conditions traversed by the Project.

Contrary to the assertions of intervenors, studies that focus on individually assessing every receptor that may be potentially affected by a hypothetical spill are not practical or necessary.[903]

---

[900] Exhibit C355-15-27 – Tsawout First Nation Expert Report. An Assessment of Spill Risk for the TMEP (May 27, 2015) (A4Q1G5); Exhibit C358-13-15 – Vol 15 Tab 4A Appendix 1 Assessment of Spill Risk Report (May 26, 2015) (A4L6A6); Exhibit C363-21-22 – Upper Nicola Band Expert Report. An Assessment of Spill Risk for the TMEP (00250905 x C6E53) (May 27, 2015) (A4Q1T7)

[901] Trans Mountain Reply Evidence, Section 60 – Marine Risk Assessment (August 20, 2015), 60-27.

[902] Trans Mountain Reply Evidence, Section 46 – Ecological Risk Assessment (August 20, 2015), 46-15.

[903] Exhibit C309-1 – Geoffrey Senichenko Intervenor Written Evidence (May 27, 2015) (A4L6Q9); Exhibit C72-5-2 - City of New Westminster Written Evidence (May 27, 2015) (A4Q0L5).

Trans Mountain's evaluation of spill-related effects on broad habitat and sensitive species groups was reasonable because it focused on ecological receptors that are more sensitive to hydrocarbon exposure and are representative of the potential effects to other groups.[904] The Pipeline ERA concluded that credible worst-case spills could have medium to high magnitude ecological effects, but that these effects would be reversible. Evidence from actual case studies showed that freshwater ecosystems recover from oil spills, often within relatively short periods of time. A smaller spill confined to land would be unlikely to result in negative effects on Aboriginal and recreational fisheries.

Squamish Nation submitted evidence related to the uncertainty of the fate and behaviour of crude oil spills in freshwater.[905] Much of this argument relies on the intervenor's own assessment of knowledge gaps and uncertainty, including the potential for diluted bitumen to sink, the physical and chemical differences between diluted bitumen and conventional oil, and resultant toxic effects to fish and other aquatic biota.[906] Trans Mountain addresses this expressed uncertainty about the fate and behaviour of diluted bitumen at length in Section 7.2.2.9 - Oil Spills Resulting from Marine Incidents of this final argument.[907] Recent studies have added to the growing body of evidence that identifies how the physical and chemical properties of diluted bitumen are similar to those of heavy conventional crude oils, which do not readily disperse into the water column.[908]

---

[904] Trans Mountain Reply Evidence, Section 45 – Ecological Risk Assessment (August 20, 2015), 46-15.

[905] Exhibit C319-26-6 – 4. Potential Effects of Diluted Bitumen Spills on Salmonid Species Report (May 27, 2015) (A4L7E7).

[906] Trans Mountain Reply Evidence, Section 46 – Ecological Risk Assessment (August 20, 2015), 46-16.

[907] See section 7.2.2.10.3- Risk Modelling- Probability and Credible Worst Case Scenario and section 7.2.2.10- Oil Spills Resulting from Marine Accidents.

[908] Trans Mountain Reply Evidence, Section 46 – Ecological Risk Assessment (August 20, 2015), 46-5 – 46-8.

The discussion in the Mark West Report surrounding the potential health effects that could be experienced by individuals in the unlikely event of an oil spill near their communities is deficient in several respects. The report: (i) models hypothetical vapour plumes on land using a program designed to simulate spills on water surfaces; (ii) discusses the fate and behaviour of products that are less likely to be transported by Line 2; (iii) does not consider the nature and extent of health effects according to dosage and individual exposure; (iv) does not distinguish between short and long term effects; and (v) identifies effects associated with chronic exposure to benzene or THC vapours despite their quick dispersion rates. [909] Due to these weaknesses, the report provides no clear indication of the potential health effects that could be experienced in the unlikely event of an oil spill.

In comparison, the Human Health Risk Assessment of Pipeline Spill Scenarios Technical Report[910] ("Pipeline HHRA") filed by Trans Mountain is a more complete, picture of the nature and extent to which the health of First Nation members and the general public may be affected by an oil spill.[911] Accounting for varying exposures to both spilled oil and vapours, the Pipeline HHRA concludes that there is no obvious indication that the health of First Nations or the general public would be seriously affected by acute inhalation exposure to the chemical vapours released by pooled oil during the early stages of a spill.[912] Though discomforting and annoying, health effects that could be experienced by people in the area would be confined to minor, transient sensory

[909] Trans Mountain Reply Evidence, Attachment 1.15 - Reply to Shxw'ōwhámel First Nation "Mark West Spill Risk Assessment Report" (August 20, 2015), 1, 4-6, 20-21.

[910] Exhibit B88-2 – Trans Mountain Response to Surrey Teachers IR No. 1.5a Attachment 1 (June 4, 2014) (A3X6U1).

[911] Trans Mountain Reply Evidence, Attachment 1.15 – Reply to Shxw'ōwhámel First Nation "Mark West Spill Risk Assessment Report" (August 20, 2015), 9.

[912] Exhibit B88-2 – Trans Mountain Response to Surrey Teachers IR No. 1.5a Attachment 1 (June 4, 2014) (A3X6U1).

and/or non-sensory effects.[913] The arrival of first responders and the implementation of the emergency response measures discussed in Section 4 - Emergency Response of this final argument will serve to minimize transient health effects.

Trans Mountain submits that the spill-related environmental effects that could result from a large oil spill at almost any location along the proposed corridor have been adequately assessed. Based on the findings of the ESA, the probability of a significant residual environmental effect arising from accidents and malfunctions as a result of the construction and operations of the Project is low.

7.2.1.13 Summary of Environmental Effects of the Pipeline and Facilities

Trans Mountain has demonstrated in the ESA that the potential adverse environmental effects of the pipeline and other Project facilities will be reduced or eliminated by way of general and site-specific mitigation measures based upon current industry-accepted standards, consultation with regulatory authorities, interested groups and individuals, engagement with Aboriginal groups and the professional judgment of the assessment team.

The ESA concluded that the proposed pipeline and associated facilities (e.g., pump stations, terminals, Westridge Marine Terminal) will not likely result in significant adverse environmental effects on any element or indicator.[914] None of the intervenors have filed evidence that affects that conclusion.

---

[913] Trans Mountain Reply Evidence, Section 1.15 – Reply to Shxw'ōwhámel First Nation "Mark West Spill Risk Assessment Report" (August 20, 2015), 10.

[914] Exhibit B5-21 - V5A ESA 13of16 BIOPHYSICAL - (December 16, 2013) (A3S1R0), 7-542 – 7-588.

7.2.2 Increased Marine Shipping to and from the Westridge Marine Terminal

Following the release of the List of Issues[915] the Board made it clear that although the increased marine shipping to and from the Westridge Marine Terminal is not part of the Project, the potential environmental and socio-economic effects of those marine shipping activities, including the potential effects of accidents or malfunctions that may occur, are relevant to the Board's consideration of the Application.[916] As a result, the Board provided a detailed list of filing requirements that it directed Trans Mountain to include with the Application relating to the potential environmental and socio-economic effects of increased marine shipping activities.[917]

Based on the Board's direction, Trans Mountain completed an extensive and comprehensive marine ESA in order to provide the Board and all stakeholders with a better understanding of the potential effects of Project-related increases in marine traffic.[918] The marine ESA provides the Board with the information necessary to understand the environmental and socio-economic effects resulting from the Project-related increase in marine traffic from the geographic area extending between the Westridge Marine Terminal and a location known as "Buoy J" (i.e., the 12 mile nautical territorial limit) at the entrance to the Strait of Juan de Fuca, covering the internationally established shipping lanes and the waters and lands closely adjoining these lanes.[919]

---

[915] Exhibit A15-3 - Hearing Order OH-001-2014 (April 3, 2014) (A3V6I2), 18.

[916] NEB - Letter and Filing Requirements to Trans Mountain Pipeline ULC - Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities - Trans Mountain Expansion Project (September 10, 2013) (A53984).

[917] NEB Letter and filing requirements to Trans Mountain - Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities - Trans Mountain Expansion Project (September 10, 2013) (A53984).

[918] Trans Mountain's marine ESA is largely supported by, and relies on, Volume 8B of the Application which contains the Technical Reports developed in support of the ESA and Volume 8C of the Application which contains the TERMPOL Study Reports and all of the technical reports prepared in support of the TERMPOL process.

[919] Exhibit B18-19 - V8A 1.0 TO 1.4.2.6 MAR TRANS ASSESS (December 17, 2013) (A3S4X3), 8A-34-8A-35.

It should be noted that marine shipping is ultimately regulated by both PMV within its geographic jurisdiction and by Transport Canada, not the NEB. Although the Filing Manual does not provide guidance for assessing marine transportation effects downstream of a pipeline, the general outline of the marine ESA followed the guidance set out in the Filing Manual for project-specific effects assessments to maintain consistency with the terrestrial ESA.[920] Trans Mountain's marine ESA employed the same methodology as the terrestrial ESA to meet the requirements of both the NEB Filing Manual and section 19(1) of the CEAA 2012.

For each element in the marine ESA, environmental or socio-economic boundaries were individually determined by the distribution, movement patterns and potential zones of interaction between an element and the Project.[921] Within the marine ESA, two main spatial boundaries were considered: (i) the Marine LSA which includes the inbound and outbound marine shipping lanes, the area between the shipping lanes, where it exists, and a two km buffer extending from the outermost edge of each shipping lane; and (ii) the Marine RSA which is comprised of a large portion of the Salish Sea, including the inland marine waters of the southern Strait of Georgia and Juan de Fuca Strait and their connecting channels, passes and straits. Individual spatial boundaries were established for marine birds (Marine Birds LSA, a one km buffer around the shipping lanes), marine air quality (Marine Air Quality RSA, a 150 km x 150 km area; and Lower Fraser Valley Photochemical Model Domain, a 412 km × 688 km area) and human health (Human Health Risk Assessment LSA, a 5 km buffer around the shipping lanes).[922]

---

[920] Exhibit B18-21 - V8A 4.1.1 F4.1.1 TO T4.2.1.2 MAR TRANS ASSESS (December 17, 2013) (A3S4X5), 8A-92.

[921] Exhibit B18-21 - V8A 4.1.1 F4.1.1 TO T4.2.1.2 MAR TRANS ASSESS (December 17, 2013) (A3S4X5), 8A-94.

[922] Exhibit B18-21 - V8A 4.1.1 F4.1.1 TO T4.2.1.2 MAR TRANS ASSESS (December 17, 2013) (A3S4X5), 8A-98 – 8A – 99.

7.2.2.1 Marine Sediment and Water Quality

There are two main ways contaminants associated with routine marine vessel transportation can be released into the marine environment: release of bilge water and erosion of marine paints.[923] Bilge water and marine paints are well-known historical sources of contaminants. In response, the federal government has taken steps to mitigate any adverse effects related to these marine contaminates; through, the *Vessel Pollution and Dangerous Chemicals Regulations*.[924] These regulations, together with pollution prevention provisions of the *Canada Shipping Act, 2001* and the International Convention for the Prevention of Pollution from Ships[925] ("MARPOL"), restrict harmful effects on marine water and sediment quality by Project-related marine vessels during marine transportation operations. While Trans Mountain has no authority over these vessels once they have departed the Westridge Marine Terminal, the responsible regulatory authorities have broad powers to ensure that all applicable marine laws and regulations are being complied with.

The Board can be confident that based on the legislation governing potential sources of contaminants from marine vessels, the effects of Project-related marine vessel traffic on marine water and sediment quality will be minimal.

7.2.2.2 Marine Air Emissions

Marine air emissions can be linked to two aspects of the Project. The first source of marine air emissions comes from the combustion of fuel in the tanker engines. When the vessel combusts fuel to power the engines, Criteria Air Contaminants ("CACs") are released into the environment.

---

[923] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-247.

[924] See *Vessel Pollution and Dangerous Chemicals Regulations*, SOR/2012-69.

[925] International Maritime Organization, *International Convention for the Prevention of Pollution from Ships (MARPOL)*. Note: In Canada, MARPOL is enforced through the Vessel Pollution and Dangerous Chemicals Regulations (annexed to the *Canada Shipping Act, 2001*).

The second source of marine air emissions is VOCs that may be released into the atmosphere from evaporative losses of product from tanker holds and incomplete combustion of fuel.[926] These emissions are inherent in the operation of marine vessels and will occur as a result of the Project.

Several intervenors raised concerns that the release of CACs and VOCs will have a negative impact on the ambient air quality. In addition, marine air emissions could reduce visibility within the shipping channel.[927] Trans Mountain thoroughly assessed emissions of CACs and VOCs [928] and concluded that, even though marine emissions are expected to change ambient concentrations intermittently when tankers and tugs travel through the Marine Air Quality RSA, the maximum predicted concentrations did not exceed any applicable ambient air quality objectives due to the Project contribution. Trans Mountain committed to update the photochemical modelling (presented in the December 2013 submission)[929] of potential impacts of the Project on ozone, photochemical $PM_{2.5}$ and visibility in the Lower Fraser Valley and filed the results of the updated modelling.[930]

On March 26, 2010 the International Maritime Organization officially designated the North American Emission Control Area, bringing in stricter requirements to control ship emissions.

---

[926] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-249.

[927] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-253.

[928] Exhibit B290-45 – Part 3 Marine AQ Supp Technical Report 2 Pt01 (December 1, 2014) (A4F5H8), iii.

[929] Exhibit B6-12 - V5C TR 5C4 04of8 AIR GHG (December 16, 2013) (A3S1U3); Exhibit B6-13 - V5C TR 5C4 05of8 AIR GHG (December 16, 2013) (A3S1U4).

[930] Exhibit B331 - Trans Mountain Pipeline ULC – Response to Fraser Valley Regional District Notice of Motion regarding IR Round 2 responses (March 12, 2015) (A68647); Exhibit B141-1 – Trans Mountain Response to Metro Vancouver IR No 1 (June 18, 2014) (A3Y2V0), 95; Exhibit B344-2 - Response to Metro Vancouver IR No. 2 Notice of Motion (March 12, 2015) (A4J5G9); Exhibit B129 – Trans Mountain Pipeline ULC – 2014-06-18 Response to Information Request from Government of Canada – Environment Canada Round 1 Part 2 (June 16, 2014) (A61134); Trans Mountain Reply Evidence, Section 33 – Air Quality (August 20, 2015), Appendix 33C Updated Community Multi-scale Air Quality (CMAQ) Photochemical Modelling for the TMEP.

Under this legislation, emissions of nitrogen oxides (NOx) and sulphur oxides (SOx and $PM_{2.5}$) are expected to decrease within the ECA, which extends approximately 200 nautical miles off the Pacific Coast. Specifically, the maximum sulphur content in fuel oils within ECA decreased to 0.1 per cent starting January 1, 2015. For non-large vessels (less than or equal to 30,000 cc), the maximum sulphur content in fuel oils within ECA was set to 0.0015 per cent starting from June 1, 2012.

Benefits of coming into force of future regulations such as International Maritime Organization NO_X Tier III regulations and programs and initiatives such as the Energy Efficiency Design Index and the Ship Energy Efficiency Management Plan will take a phased in approach and will be on top of any mitigation measures that were accounted for in the modelling. All new vessels will be required to meet all applicable local and international regulations. The predicted NO_X results, for example, are expected to be less than the Project-related results reported as the benefits of Energy Efficiency Design Index and Ship Energy Efficiency Management Plan would be felt.

While, Trans Mountain is not responsible for vessel operations, all marine vessels will need to meet regulatory standards established by the International Maritime Organization as part of the North American Emission Control Area.[931] The Board can be confident that there are no further mitigation measures warranted for the marine air emissions element.[932]

[931] Vancouver is within the North American Emissions Control Area (as are Seattle, San Francisco and Los Angeles) which applies stringent engine emission standards and fuel sulfur limits to all ships entering or plying within 200 miles of the B.C. coast. Mandated further improvement in fuel standards take effect in 2012, 2015 and 2016, which period straddles the Project's 2018 coming into operation schedule.

[932] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-252.

The ESA concluded that the residual environmental effects of increased Project-related marine vessel traffic on marine air emissions will be not significant.[933]

7.2.2.3 Marine GHG Emissions

While Trans Mountain does not own or operate the marine vessels associated with existing or proposed operations, Trans Mountain has committed to enforcing its tanker acceptance criteria. The tanker acceptance criteria require tankers and barges to be equipped and maintained in accordance with international and federal regulations and operated to best practices. The tanker acceptance criteria also require Project-related tankers and barges to carry an International Air Pollution Prevention Certificate as well as Ship Energy Efficiency Management Plan. The International Air Pollution Certificate ensures that vessels meet requirements set by MARPOL Annex VI with respect to reducing possible sources of air pollution. The Ship Energy Efficiency Management Plan will instruct the vessel operators on how to operate in the most energy efficient manner, which will result in a reduction of emissions.[934]

In addition to Trans Mountain's tanker acceptance criteria, all vessels will have to adhere to stringent federal requirements regarding vessel pollution and diesel fuel regulations.[935] Vessels constructed after June 30, 2013 will also have to meet the International Maritime Organization's new energy efficiency standards.[936]

---

[933] Exhibit B290-45 – Part 3 Marine AQ Supp Technical Report 2 Pt01 (December 1, 2014) (A4F5H8), 2.

[934] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 – (May 14, 2014) (A3W9H8), 221.

[935] See *Vessel Pollution and Dangerous Chemicals Regulations* SOR/2012-69; and *Sulphur in Diesel Fuel Regulations*, SOR/2002 - 254.

[936] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-266.

Trans Mountain is confident that the mechanisms already in force, coupled with the mitigation discussed above, will ensure that marine GHG emissions will meet acceptable levels. The Board can rely on the strict federal and international laws and regulations governing GHG emissions for marine vessels as the vessel operators must follow these laws.

The ESA concluded that the residual environmental effects of increased Project-related marine vessel traffic on marine GHG emissions will not be significant.[937]

7.2.2.4 Marine Acoustic Environment (Atmosphere)

Trans Mountain considered the potential for sound levels in the atmospheric acoustic environment to change due to increased Project-related marine vessel traffic. [938] The Project will result in an increase in mooring and departure at the Westridge Marine Terminal, which will create engine noise that may affect some people onshore. In addition, there is the potential for increased noise related to horns used in specific weather conditions or as part of normal navigation.

To manage the increase in atmospheric sound levels, Trans Mountain has committed to ensuring that all Project-related tankers and tugboats are fitted with exhaust silencers similar to those already in place. This will limit the sound emitted by all vessels passing through the Marine RSA and calling at the Westridge Marine Terminal.[939] While Trans Mountain cannot eliminate sound from singular events such as horns, Trans Mountain will encourage vessel operators to follow best practices that consider nuisance effects from such activities and attempt to reduce or eliminate those nuisance effects to the greatest extent possible.

---

[937] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-271; Exhibit B290-44 – Part 3 Cover Letter Marine AQ (December 1, 2014) (A4F5H7).

[938] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-272.

[939] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-274.

Based on these commitments, the ESA concluded that the residual environmental effects of operation activities associated with increased Project-related marine vessel traffic on marine acoustic environment will be not significant.[940]

7.2.2.5 Marine Fish and Fish Habitat

Trans Mountain understands that marine fish have high ecological, economic and cultural importance in B.C. For this reason, Trans Mountain undertook discussions with federal government agencies, including DFO and PMV to better understand the key issues faced by marine fish and fish habitat and to minimize or avoid potential effects of the Project in these areas.[941]

Trans Mountain also undertook numerous Aboriginal engagement and public consultation activities to obtain feedback on issues related to the Project. These included public open houses, Marine ESA Workshops and one-on-one meetings.[942] Feedback raised through these engagement and consultation activities contributed to the scoping of the marine fish and fish habitat assessment and to the development of mitigation measures.

Based on these discussions, Trans Mountain identified three key issues for marine fish and fish habitat related to marine transportation activities: the potential introduction of invasive species during discharge of ballast water; the potential for accidental release of contaminated bilge water; and the potential effects of vessel wake on shoreline habitats and associated biota.[943]

---

[940] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-280.

[941] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-280.

[942] Exhibit B19-2 - V8B TR 8B1 MAR RESOURCE (December 17, 2013) (A3S4J5), 2.1.

[943] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-280.

Regarding the first issue, the *Ballast Water Control and Management Regulations* ("Ballast Water Regulations") under the *Canada Shipping Act, 2001* strictly regulates the release of ballast water in Canadian waters for all vessels. The purpose of the Ballast Water Regulations is to protect waters under Canadian jurisdiction from non-indigenous aquatic organisms and pathogens that can be harmful to ecosystems by minimizing the probability of introductions of harmful aquatic organisms and pathogens from ships' ballast water. The Ballast Water Regulations outline a set of mandatory procedures for ballast water exchange or treatment prior to discharge in waters under Canadian jurisdiction. These procedures are based on International Maritime Organization Guidelines for Ballast Water Management and Development of Ballast Water Management Plans and the IMO Guidelines for Ballast Water Exchange. All ships entering Canadian waters are required to exchange ballast water outside the 200 nautical mile limit of Canada's exclusive economic zone. Exchange of ballast water in deep ocean areas or open seas lowers the probability that harmful aquatic organisms and pathogens be transferred in ships' ballast water. Ships can choose to treat ballast water before entering Canadian waters instead of exchanging it. Under the Ballast Water Regulations, treated ballast water must meet the Ballast Water Performance Standard specified in Regulation D-2 of the International Maritime Organization Regulations for the Control and Management of Ships' Ballast Water and Sediments.

All tankers calling on the Westridge Marine Terminal are required to comply with all federal laws and legislation regarding ballast water management, including the *Canada Shipping Act, 2001* and the Ballast Water Regulations. Compliance with the Ballast Water Regulations will reduce the likelihood that aquatic invasive species will be introduced during ballast water exchange. This was confirmed in DFO's written evidence: "[a]lthough Trans Mountain does not own or operate the vessels that will be calling at the Westridge Marine Terminal these vessels will be required to comply with the *Canada Shipping Act, 2001* and the Ballast Water Regulations. Compliance with

these regulations will reduce the risk of introduction of harmful aquatic organisms or pathogens during ballast water exchanges as is currently the case with commercial shipping vessels berthing at Canadian ports on the west coast."[944]

Cowichan Tribes submitted a report in its evidence claiming that the Application does not provide an adequate assessment of the environmental effects of potential ballast water introductions of marine aquatic invasive species.[945] This is incorrect. The potential effects of accidental introductions of aquatic invasive species from ballast water discharges along with an overview of the federal laws and legislation that are in place to reduce the risk of aquatic invasive species introductions were discussed in detail in the Application.[946]

Regarding the second concern, the release of contaminated bilge water is illegal in Canadian waters by any vessel. The vessels calling on the Westridge Marine Terminal are required by law to follow the *Vessel Pollution and Dangerous Chemicals Regulations* made under the *Canada Shipping Act, 2001*. The only way in which contaminated bilge water could be released in Canadian waters is through an accident or malfunction.[947] Trans Mountain will accept reputable operators and encourage compliance with bilge water regulations; however, monitoring and enforcement will be the responsibility of the responsible authority, Transport Canada.[948] At the Westridge Marine Terminal, Transport Canada will ensure that all tankers will comply with the *Canada Shipping Act, 2001*.

---

[944] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 24.

[945] Exhibit C86-18-1 - Appendix F Part1 (June 12, 2015) (A4Q0U9).

[946] Trans Mountain Reply Evidence, Section 54 – Marine Fish and Fish Habitat (August 20, 2015), 54-1.

[947] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-281.

[948] Exhibit C353-5-2 -TC Evidence Submission (May 27, 2015) (A4L7K1), 6.

Furthermore, Trans Mountain, as part of its Tanker Acceptance Standard, will require Project vessels to not discharge any bilge water while within the territorial waters of Canada (the Marine RSA).[949] All tankers nominated to call on the Westridge Marine Terminal will be screened by Trans Mountain personnel to ensure that they do not have any malfunctions to pollution prevention equipment or history of non-adherence to provisions of the *Canada Shipping Act, 2001* and MARPOL.[950] Trans Mountain is confident that the stringent regulations under the *Canada Shipping Act, 2001*, and vessel compliance with the Tanker Acceptance Standards, will ensure that a release of contaminated bilge and ballast water will not occur in Canadian waters.

Regarding the third issue, vessel wake associated with the transit of Project-related tankers and tugs has the potential to affect shoreline habitats and associated biota. However, Trans Mountain found that the predicted wave heights from vessel wake are not expected to be detectable from existing wave conditions along most of the shoreline in the Marine RSA. Specifically, Trans Mountain's evidence is that wake waves generated by Project-related tankers and tugs transiting the shipping lanes are predicted to be less than 0.1 m in height at the shoreline—well within the range of natural wave conditions.[951] As a result, Trans Mountain determined that no measures are necessary to mitigate the effects of vessel wake on marine fish and fish habitat.[952] Regarding vessel wake, DFO concluded in its evidence that potential effects on intertidal fish habitat from Project-related vessel wake are unlikely to differ substantially from current conditions in the Marine RSA.

---

[949] Exhibit B112-2 - Trans Mountain Response to B.C. Nature Nature Cda (June 18, 2014) (A3Y2C5), 39.

[950] Exhibit B112-2 – Trans Mountain Response to B.C. Nature Cda IR No. 1 (June 18, 2014) (A3Y2C5), 39.

[951] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 246-248

[952] Exhibit B18-29 - V8A4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-285.

Therefore, DFO considered the likelihood and magnitude of such occurrences to be of low risk to intertidal habitat and associated biota.[953]

In its written evidence, the Raincoast Conservation Foundation ("Raincoast") raised concerns that the Application lacks relevant information regarding fish responses to underwater noise, and that this may have served to "minimize potential project-related effects."[954] Trans Mountain disagrees with this assertion. The potential effects of underwater noise from Project-related vessels on marine fish and invertebrates found within the Marine RSA were discussed in the Application.[955] Trans Mountain provided additional information on the effects of vessel noise on marine fish in the response to GOC IR No. 2.081.[956] As stated in the Application, there are few available studies that have investigated the effects of underwater noise from vessel traffic on marine fish, particularly for those species that occur within the Marine RSA. The general consensus in the literature is that the number and context of the studies is too limited for extrapolation. Due to this limitation, the potential effects of vessel noise on marine fish were discussed in the Application, but were not carried forward for detailed assessment. In its written evidence, DFO agreed with this approach by stating that: "it would be difficult for the Proponent to conduct a detailed effects assessment on the potential effects of underwater noise on marine fish and invertebrates," given that "limited information is available on species-specific behavioural responses of marine fish and

[953] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 26.

[954] Exhibit C291-1-2 - Attachment A to written evidence of Raincoast - Evaluation of impacts on Pacific herring and other forage fish - Dr Fox (May 27, 2015) (A4L9F3).

[955] Exhibit B18-29 - V8A4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-284.

[956] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5).

invertebrates to marine vessel noise in the Marine RSA" and that "no Canadian standards or thresholds have been established for assessing such effects."[957]

Based on the above, Trans Mountain's evidence is that the residual environmental effects of operation activities associated with increased Project-related marine vessel traffic on marine fish and fish habitat will not be significant.[958]

7.2.2.6 Marine Mammals

The southern resident killer whale, humpback whale, and Steller sea lion were selected as indicators to assess the potential effects of the increase in Project-related marine transportation on marine mammals. All three species are listed under Schedule 1 of SARA.[959]; southern resident killer whales are listed as Endangered[960], humpback whales are listed as Threatened[961] and Steller sea lions are listed as Special Concern. A large portion of the Marine RSA has been designated as critical habitat under SARA for the southern resident killer whales and a small western portion of the Marine RSA has been identified by DFO as critical habitat for humpback whales.[962] The southern resident killer whale, humpback whale and Steller sea lion are each discussed separately below.

---

[957] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 16 – 17.

[958] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-296.

[959] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-320, 8A-325, 8A-331.

[960] Note: Under SARA, an "endangered species" means a wildlife species that is facing imminent extirpation or extinction.

[961] Note: Under SARA, a "threatened species" means a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.

[962] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-320, 8A-325.

Southern Resident Killer Whale

Trans Mountain understands the need to protect the southern resident killer whale. The population size of 81 individuals, and the fact that members of this population consistently occupy the Marine RSA during every month of the year,[963] means that all reasonable efforts must be made to ensure that any effects on southern resident killer whales are mitigated to the greatest extent possible.

Trans Mountain found in the ESA that the increase in Project-related marine vessel traffic will contribute to additional underwater noise to the already existing adverse acoustic conditions in the Marine RSA. Modelling suggests that this noise will be detectable by marine mammals over distance and may cause sensory disturbance within four to seven km of the shipping lanes. One of the primary concerns associated with the effects of acoustic disturbance is that it can interfere with an animal's ability to communicate and reduce the efficiency and amount of time spent feeding.[964]

The ESA concluded that, given the small size, unstable population trends, Endangered status and relative importance of this area (i.e., critical habitat) to the southern resident killer whale population, residual effects associated with increased Project-related marine vessel traffic—while small on their own—on southern resident killer whales as well as associated traditional use of the population are considered to be significant.[965]

As stated above, tankers calling at Westridge Marine Terminal will use the already established, well-defined, internationally recognised, federally-regulated major traffic route between the PMV

[963] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A - 321.

[964] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A - 322.

[965] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-323 – 8A-325.

area and the Pacific Ocean—the Project will not result in a new marine transportation route.[966] The tankers calling at Westridge will increase from approximately five partly laden tankers per month up to 34 per month.[967] This equates to 6.6 per cent of total large commercial vessel traffic volume, compared to 1.1 per cent currently calling at the Westridge Marine Terminal.[968] Project-related marine vessels will contribute a proportionately small component of the overall marine transportation sources of underwater noise.

DFO, through the document entitled *Recovery Strategy for Northern and Southern Resident Killer Whale*, and COSEWIC through its *Assessment and Update Status Report on the Killer Whale*, have determined that the key threats to the southern resident killer whale population include chemical and biological contaminants, reductions in the availability or quality of prey (primarily Chinook and chum salmon), and physical and acoustic disturbance.[969] Among the sources of acoustic disturbance identified by DFO are "chronic sources such as vessel traffic."[970] A challenge facing resource managers, regulatory authorities, and those in the maritime community is that the stressors enumerated above can interact and the relative contribution of each stressor is not clear.[971] There are currently no quantitative Canadian thresholds with respect to assessing sensory disturbance for marine mammals associated with underwater noise, nor are there recommended

[966] Exhibit B018 – 20 – V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-67.

[967] Exhibit B018 - – 20 – V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-68.

[968] Exhibit B018 -– 20 – V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-69.

[969] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-321.

[970] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-321.

[971] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-321.

Canadian standards or guidelines with respect to what are appropriate ambient sound levels for southern resident killer whale critical habitat.[972]

The stressors affecting the southern resident killer whale population will continue to exist with or without the Project. If the Project proceeds, vessels calling at the Westridge Marine Terminal will continue to represent a comparatively small proportion of total marine transportation activity in the Salish Sea. For these reasons, Trans Mountain is not proposing unilateral measures to mitigate the effects of acoustic disturbance on southern resident killer whales.[973] Nonetheless, Trans Mountain is dedicated to working cooperatively with other interested parties and stakeholders to find solutions to address the adverse effects on southern resident killer whales.

As stated in response to NEB IR 2,[974] Trans Mountain was not able to identify any technically and economically feasible mitigation or compensation measures that would offset Project-specific residual effects of underwater noise from marine vessel traffic on the endangered southern resident killer whale population, or the associated traditional use of this population. Since the existing cumulative effects on these indicators are already significant and any further residual effect will also be significant, Project approval for these two residual effects will require justification under CEAA 2012. It is important to note that such justification will have to reflect the fact that (i) neither Trans Mountain nor the NEB has direct control over marine vessel activity within the southern resident killer whale critical habitat; (ii) the Project will only slightly increase existing levels of marine shipping in this area; (iii) the shipping lanes that will be used by Project-related vessels already exist, are well utilized and are subject to strict regulation by federal authorities; (iv) the

[972] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-324.

[973] Exhibit B32-1 – Trans Mountain Letter NEB IR No. 1 May 1 2014 (May 14, 2014) (A3W9H7), 8A-322.

[974] Exhibit B239-2 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 154.

shipping lanes will continue to host marine vessel traffic with or without the Project; (v) the impact will continue to be significant with or without the project; and (vi) there is no clear solution that has been identified to alleviate the residual adverse effects mentioned above. Any justification decision should consider Trans Mountain's commitment to work collaboratively with all interested parties and stakeholders, including existing shippers, to find solutions to adverse effects on the southern resident killer whale.[975]

Parties using the existing shipping lanes and involved in the regulation of marine shipping are currently working towards solutions addressing effects of marine shipping on southern resident killer whales. In furtherance of these goals, Trans Mountain has committed to developing a MMPP,[976] which, during the operations phases of the Project, will focus on supporting three of the recovery strategies identified by DFO in their southern resident killer whale Action Plan.[977]

The first recovery strategy identified in DFO's southern resident killer whale Action Plan is to ensure that resident killer whales have an adequate and accessible food supply to allow recovery of the species.[978] To assist in achieving this goal, Trans Mountain will work with stakeholders, Aboriginal communities, and regulatory authorities such as DFO and the NEB to protect, preserve and, where possible, enhance the freshwater habitat of Fraser River salmon stocks. The primary way Trans Mountain will contribute is by implementing the various comprehensive measures proposed in the Application to mitigate environmental effects during construction of the Project, including for the 116 salmon-bearing crossings within the B.C. portion of the proposed pipeline

[975] Exhibit B239-2- - Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 154.

[976] Exhibit B32-2 - Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 329.

[977] Exhibit B32-2 - Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 326.

[978] Exhibit B32-2 - T Trans Mountain Response to NEB IR No. 1 (May 14, 2014) (A3W9H8), 326.

corridor. Trans Mountain has committed to consulting with DFO to determine whether contributions to the Pacific Salmon Foundation "Salish Sea Marine Survival Project" would be a useful recovery measure for resident killer whales. The multi-year comprehensive SSMSP will focus on salmon production and the management actions needed to restore sustainable fisheries in these waters, with a goal to restoring an adequate and accessible food supply.[979] Trans Mountain will consult with DFO to determine whether this initiative can also be considered to be a scientifically defensible and useful recovery measure for resident killer whales by restoring an adequate and accessible food supply.

The second recovery strategy that Trans Mountain will support aims to ensure that chemical and biological pollutants do not prevent the recovery of resident killer whale populations.[980] This strategy will dovetail with Trans Mountain's enhancements to marine safety with a goal of reducing the risk that chemical releases will be introduced into southern resident killer whale habitat from existing and future shipping activity.[981]

The third recovery strategy that Trans Mountain will incorporate into its MMPP aims to ensure that disturbance from human activities does not prevent the recovery of southern resident killer whales. This strategy is designed to deal directly with the issue of ship-associated underwater noise. Trans Mountain is currently engaging with various organizations regarding initiatives related to the study of marine mammals in the Salish Sea. This engagement includes Ocean Networks (based at the University of Victoria), which is participating in the International Quiet Ocean Experiment to learn what noise levels large mammals can tolerate and how marine noise

[979] Exhibit B32-2 - Trans Mountain Response to NEB IR No. 1 (May 14, 2014) (A3W9H8), 327.

[980] Exhibit B32-2 - Trans Mountain Response to NEB IR No. 1 (May 14, 2014) (A3W9H8), 327 - 328.

[981] Exhibit B32-2 - Trans Mountain Response to NEB IR No. 1 (May 14, 2014) (A3W9H8), 328.

affects their behaviour.[982] Availability of this type of information would allow Trans Mountain and other parties to work together towards developing mitigation measures that will have a positive effect on the southern resident killer whale population. Trans Mountain has entered into a funding agreement with Vancouver Fraser Port Authority, wherein Trans Mountain has agreed to contribute $1.6 million to PMV's ECHO Program, which seeks to better understand and manage potential effects on cetaceans (i.e., whales, porpoises, and dolphins) resulting from commercial vessel activities throughout the southern coast of B.C.[983] Through the ECHO program, PMV will work in collaboration with government agencies, First Nations, marine industry users (including Trans Mountain), non-government organizations and scientific experts to examine threats to at-risk cetaceans in the region. Under the umbrella of the ECHO Program, a series of individual short-term projects, scientific studies and education initiatives are being considered to better understand potential threats associated with commercial vessel related activities. As discussed in Trans Mountain's evidence,[984] multiple projects are currently under consideration by the ECHO Program relating to underwater noise and vessel strikes.

Trans Mountain submits that multi-party solutions are the most appropriate approach to managing effects on southern resident killer whale critical habitat and any associated effects on traditional use of the population. For this reason, the MMPP identifies and integrates multi-party solutions.[985]

Trans Mountain intends that the MMPP will be a living document that will be updated and amended throughout the life of the Project and will be adapted to manage and monitor Project

[982] Exhibit B32-2 - Trans Mountain Response to NEB IR No. 1 (May 14, 2014) (A3W9H8), 328.

[983] Trans Mountain Reply Evidence, Section 51 – Environmental Monitoring (August 20 ,2015), 51-1.

[984] Trans Mountain Reply Evidence, Section 55 – Marine Mammals (August 20, 2015), 55-11 to 55-12.

[985] Exhibit B239-13 - Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 154.

effects.[986] It is Trans Mountain's position that the MMPP will extend beneficial effects well beyond the Project. The results of the various initiatives undertaken as a result of the MMPP will be of great value to other organizations and proponents and will be used to support the recovery strategies and action plans for species of conservation concern.[987] The Board can be confident that Trans Mountain's southern resident killer whale recovery strategies will ensure impacts to the whale population are being studied so that any Project related effects can be mitigated. These types of projects will provide a better understanding of vessel–related cumulative regional threats, with the aim of informing potential mitigation options and developing innovative solutions to reduce underwater noise levels in the region. Trans Mountain intends to review all the results of the ECHO Program studies with a view to incorporating the resulting recommendations in the MMPP.

In their evidence, DFO acknowledged that Trans Mountain has limited control over the tankers and escort tugs that will be calling at the Terminal, and recognized that the actions/measures identified above are likely the most feasible actions that Trans Mountain can engage in to minimize potential effects from the Project on marine mammals.[988]

DFO's evidence recommended Trans Mountain explore[989] the potential for having trained marine mammal observers on-board Project-related shipping vessels that have undergone training to help them identify risks to marine mammals and make appropriate vessel navigation alterations to

[986] Exhibit B239-13 - Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 254.

[987] Exhibit B239-13 - Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 254.

[988] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 34.

[989] Exhibit C97-3-2 - Fisheries and Oceans Canada Responses to Information Requests from the National Energy Board (July 27, 2015) (A4R7Q1), 3.

reduce effects on marine mammals species.[990] In response to NEB IR 6.06, Trans Mountain provided the Board with its views regarding the use of on-board marine mammal observers on project-related marine vessels as mitigation to reduce impacts to marine mammals. Trans Mountain stated that the ECHO Program would be the ideal forum to coordinate, develop and pursue this type of educational/training measure in a manner that best supports marine mammals across the entire marine transportation community. Trans Mountain reached out to others in the maritime shipping community to gauge support for such a collaborative initiative and found that companies such as local tug operators strongly support having their tug crew participate in a marine mammal observation training program. In addition, Trans Mountain submitted that, as ambassadors for marine safety and environmental protection, coastal pilots might also be good resources in any such regional initiative. Should such a marine mammal observation training program be undertaken, Trans Mountain submits that it should be done across the maritime shipping industry as a whole, and that the training of pilots and local tug crew is the most logistically viable option.[991]

Trans Mountain will implement any additional technically and economically feasible mitigation measures that are identified in the future for southern resident killer whales. Trans Mountain is going well beyond any requirements of the CEAA 2012, NEB or DFO to ensure the southern resident killer whale population continues to recover and thrive through the implementation of proper mitigation measures in the Salish Sea.

[990] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 34.

[991] Exhibit B413-2 – Trans Mountain Response to NEB IR No. 6 (July 22, 2015) (A4R6I4), 20-25.

Humpback Whale

DFO raised concerns that in making their significance conclusions, Trans Mountain may not have considered the strong long-term site fidelity exhibited by individual humpback whales to particular feeding areas in the Marine RSA[992] (i.e., they return to the same site to feed year after year). DFO suggests the residual effect on humpback whales from underwater noise generated by Project-related vessel traffic may be greater than Trans Mountain identified.[993] Trans Mountain maintains that its assessment of effects on humpback whales and subsequent significance determination accurately considered the localized areas of high humpback whale densities that occur within the marine RSA.

As evidenced by the sightings of humpback whales reported to the B.C. Cetacean Sightings Network and presented by Trans Mountain in the Application[994], humpback whales have been observed throughout most of the Marine RSA; however, their distribution is not uniform. Most humpback whale sightings have been reported off Victoria and Race Rocks Ecological Reserve, in the Gulf and San Juan Islands and west of Cape Flattery. Trans Mountain understands that humpback whales show high site fidelity to localized foraging areas.[995] Based largely on DFO's boundaries for critical habitat as the area around Swiftsure Bank,[996] it is Trans Mountain's

[992] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada - (May 27, 2015) (A4L7D4), 29.

[993] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada - (May 27, 2015) (A4L7D4), 29.

[994] Exhibit B19-2 – V8B TR 8B1 MAR RESOURCE (December 17, 2013) (A3S4J5), 4.83.

[995] Exhibit B18-29 - Table 4.3.7.1 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3); Trans Mountain Reply Evidence, Section 55 – Marine Mammals (August 20, 2015), 55-4 – 55-5.

[996] As identified by Trans Mountain on Exhibit B18-25 – V8A 4.2.6.5.2 to F4.2.26 MAR TRANS ASSESS (December 17, 2013) (A3S4X9), Figure 4.2.22.

expectation that relative to other areas of the Marine RSA, the highest numbers of humpback whales would be found in Juan de Fuca Strait, in the westernmost portion of the Marine RSA, and primarily in the summer and fall.[997]

DFO submits that because of the potentially high densities of humpback whales showing strong site fidelity in the Marine RSA, individual whales have the potential for repeated exposure to Project-related shipping noise at levels that could result in behavioural disturbance. This conclusion is in keeping with that presented in the Application. Trans Mountain's assessment of underwater noise concluded that there would be residual effects from the increase in Project-related marine traffic on humpback whales.[998]

Based on the U.S. National Oceanic and Atmospheric Association's ("NOAA") behavioural disruption threshold and acoustic modelling done for the Project, Trans Mountain concluded that there is a high probability that Project-related underwater noise within the Marine RSA will exceed NOAA's regulatory standards for sensory disturbance. While there are no Canadian regulatory standards with respect to this effect, the NOAA thresholds are used as commonly-applied environmental standards. This approach has been accepted by DFO.[999] Trans Mountain further concluded that humpback whales within four to seven km of the shipping lanes are expected to be disturbed by vessel traffic, that this noise would likely be detectable over much greater distances and that humpback whales will experience some degree of Project-related sensory disturbance while in the Marine RSA. Despite this predicted residual effect, and the higher density area in the

[997] Exhibit B18-29 - Section 4.3.13 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3).

[998] Exhibit B18-29 - Section 4.3.7.6.2 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3).

[999] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 29.

western-most region, Trans Mountain also recognized that the Marine RSA overlaps only a small portion of the identified Canadian critical habitat for this species. Furthermore, the predicted residual effects will affect a relatively small, localized component of the much larger North Pacific humpback whale population and only during periods of the year that they are present within the Marine RSA. For these population status reasons, the magnitude of the predicted residual effect was rated as medium. In making its determination of significance for humpback whales, Trans Mountain also recognized that, although a *SARA* Threatened species, the North Pacific (and Canadian) humpback whale population is large and increasing. As a result of these considerations, effects of increased Project-related marine vessel traffic on humpback whales were deemed to have a negative impact balance, but are not considered significant.

Trans Mountain recognizes the importance of protecting *SARA*-listed marine mammals and in taking measures to support DFO's recovery strategies and action plans. For these reasons, Trans Mountain is contributing to regional monitoring efforts for cumulative impacts on marine mammals, including efforts that monitor marine noise (see discussion of DFO Action Plan strategies and support of ECHO Program.

Steller Sea Lion

Cowichan Tribes expressed concerns regarding whether the assessment of effects on Steller sea lion could adequately capture potential effects on other pinniped species such as harbor seals. In addition to the rationale for selection of marine mammal indicators found in the Application,[1000] Trans Mountain submits that all pinnipeds belong to the same functional hearing group and effects of sensory disturbance to the Steller sea lion indicator are expected to be comparable to effects on

[1000] B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-297 – 8A-300.

all pinniped species found within the Marine RSA, including harbour seals. Trans Mountain's evidence is that the Steller sea lion is a reasonable indicator to represent effects to other pinniped species in the Marine RSA.[1001]

In their evidence, DFO agreed with the findings of Trans Mountain's ESA that Project-related effects on Steller sea lions in the Marine RSA are considered to be not significant.[1002] DFO's evidence concluded that "the residual effect of underwater noise from increased Project-related marine vessel traffic on Steller sea lions has been accurately characterized in the Application. DFO's assessment supports its conclusion that potential residual effects would be negligible for this species."[1003]

Marine Mammal Vessel Strikes

The NEB and intervenors expressed concern over the possibility of marine mammal vessel strikes.[1004] In its evidence, DFO stated that "[a]lthough the risk to Southern Resident Killer Whales and Steller Sea Lions from Project-related vessel collisions may [be] extremely low or negligible, this may not be the case for Humpback Whales."[1005] This evidence supports Trans Mountain's conclusion of 'not significant' with respect to potential effects of vessel strikes on southern

[1001] Trans Mountain Reply Evidence, Section 55 – Marine Mammals (August 20, 2015), 55-3 to 55-5.

[1002] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A–332.

[1003] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 29.

[1004] Exhibit C269-18-2 - Affidavit of Jeff Jones sworn 22 May 2015 (May 26, 2015) (A4L5F3); Exhibit C359-4-2 - T Sou-ke Nation - Sworn Affidavit of Chief Gordon Planes (May 26, 2015) (A4L5T0); Exhibit C219-6-2 - Written Evidence of Lyackson First Nation (May 27, 2015) (A4Q0H9).

[1005] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 30.

resident killer whales and Steller sea lions.[1006] With respect to humpback whales, DFO submitted that the risk is greater due to their higher density in the Juan de Fuca Strait and the western entrance of the Marine RSA. Trans Mountain reached a similar conclusion, and found that on a relative scale (by species), humpback whales would be at higher risk.[1007]

Part of DFO's concern over the humpback whale assessment arose from uncertainties regarding whether Trans Mountain had considered humpback whale foraging site fidelity.[1008] Trans Mountain maintains that its assessment of effects on humpback whales and subsequent significance determination accurately considered the localized areas of high humpback whale densities that occur within the marine RSA. Strike risk is concentrated along the shipping lanes and areas of higher relative risk occur where shipping traffic overlaps with higher density areas for marine mammals. Based on DFO's boundaries of critical habitat, it is Trans Mountain's expectation that relative to other areas of the Marine RSA, the highest numbers of humpback whales (and the highest strike risk for this species) would be found in the western portion of this region, primarily in the summer and fall.[1009]

Trans Mountain's initial Application presented a qualitative vessel strike assessment that determined that the potential effect of accidental physical injury or mortality of an individual marine mammal (including humpback whales) due to a vessel strike was not significant due to the low probability of the event.[1010] In a follow-up response to NEB IR No. 4.72, Trans Mountain filed

---

[1006] Exhibit B18-29 - Section 4.3.13 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3).

[1007] Exhibit B18-29 - Section 4.3.13 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3).

[1008] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 30.

[1009] Exhibit B18-29 - Section 4.3.13 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3).

[1010] Exhibit B18-29 - Section 4.3.13 of Volume 8A (Marine Transportation) (December 17, 2013) (A3S4Y3).

a quantitative vessel strike risk analysis that was available to intervenors for comment.[1011] Many of the concerns that DFO identified during their IRs and evidence were addressed in this new vessel strike risk analysis.[1012] Trans Mountain therefore considers that DFO's comments relating to the original qualitative assessment have been superceded and/or met by the filing of this quantitative study.[1013] Similar to the qualitative conclusions presented in the Application, the quantitative study concluded that the overall probability of a Project-related vessel encountering a marine mammal in the Marine RSA is very low.[1014] While encounter risk was predicted to be higher for humpback whales (as suggested by DFO) and killer whales compared to the other species considered, this is largely a factor of the much higher densities of humpback whales and killer whales in the study area, and the number of encounters was still predicted to be infrequent. This relationship remains true with or without the addition of the Project.

Raincoast expressed concern that the strike analysis relies on occurrence data, primarily collected from whale watchers. Raincoast also stated that the uncertainty of the estimates was not quantified. Based on this, Raincoast stated the assessment is "possibly wrong."[1015] Trans Mountain's assessment is not wrong. Trans Mountain relied on data collected by Raincoast, other published sources and data from B.C. Cetacean Sightings Network. In addition, confidence intervals are

[1011] Exhibit B378-3 - Follow-Up Response to NEB F-IR No. 4.72-Attachment1 (April 27, 2015) (A4K8Q0).

[1012] Exhibit C97-2-2 - Attachment 1 - Written Evidence of Fisheries and Oceans Canada (May 27, 2015) (A4L7D4), 30.

[1013] Trans Mountain Reply Evidence, Section 55 – Marine Mammals (August 20, 2015), 55-3 – 55-6.

[1014] As defined in the quantitative vessel strike analysis, encounter risk refers to the probability that a whale and vessel share the same physical space at the same time. It does not predict whether actual contact between the whale and vessel is made. See Exhibit B378-3 - Follow-Up Response to NEB F-IR No. 4.72-Attachment1 (April 27, 2015) (A4K8Q0), 14.

[1015] Exhibit C291-1-1 Statement of Written Evidence of Raincoast Conservation Foundation (May 27, 2015) (A4L9F2), 38.

presented on Figure 8 of the study and a sensitivity analysis (which is the same method used by Raincoast in their filed evidence) was conducted and presented in Section 4.2 of the report.[1016]

There are two primary mitigation measures relevant to the Salish Sea that could potentially be used to reduce the risk of marine mammal vessel strikes: (i) altering the shipping lanes to avoid sensitive habitat; and (ii) setting speed restrictions.[1017] Regarding the first measure, the shipping lanes are set by Transport Canada. The established marine traffic route through the Salish Sea runs through an adequate yet relatively narrow water body (approximately 1.5 nautical miles wide) and there is no option for using a completely separate route through this area. Due to this limitation, while small adjustments to the internationally-mandated shipping lanes may be possible, major deviations to the shipping lanes are not. Furthermore, even if minor shipping lane adjustments were considered by Transport Canada, there are no potential alternative routings through the Marine RSA that would avoid the designated critical habitat for the southern resident killer whale.[1018] Transport Canada could also, at its discretion, set speed restrictions for the shipping lanes. PMV has established the ECHO Program, which seeks to better understand and manage potential effects on cetaceans (i.e., whales, porpoises and dolphins) resulting from commercial vessel activities throughout the southern coast of B.C. The ECHO Program's long term goal is to develop mitigation measures that will lead to a quantifiable reduction in potential threats to whales as a result of shipping activities.[1019] It is important to note that in response to an NEB IR, Transport Canada stated that it "is not currently contemplating alternative shipping lanes or vessel speed

[1016] Trans Mountain Reply Evidence, Section 55 – Marine Mammals (August 20, 2015), 55-3 – 55-6.

[1017] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 253.

[1018] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 254.

[1019] Exhibit C234-11-2 – Revised Exhibit 30, Support of Environmental Evidence Zoetica 2015 (June 24, 2015) (A4Q9L9).

restrictions for the purpose of reducing impacts on marine mammals from marine Shipping in British Columbia; however, Transport Canada is participating in the ECHO program … as an Advisory working group member."[1020]

Trans Mountain has little direct control over the operating practices of the tankers or tugs as Project-related marine vessels are owned and operated by a third party. As detailed above, Trans Mountain executed a $1.6 million funding agreement for the ECHO Program.

Trans Mountain understands that the ECHO Program—a program which intends to study and identify local areas of whale concentration so that appropriate mitigation measures may be considered—is exploring the utility of real-time whale detection technologies that may provide a means to reduce ship strikes (e.g., the use of hydrophones to track real time-location of marine mammals) while simultaneously allowing maritime commerce and other activities to proceed with limited biological and economic impact.[1021] The ECHO Program also intends to research the feasibility of providing such information to mariners in real-time so that they are then able to undertake appropriate measures to avoid the whales.[1022] Future mitigation measures proposed by the ECHO Program may include the following recommendations to Transport Canada:

(a) propose small adjustments to the internationally-mandated existing shipping lanes;

(b) develop vessel traffic management practices so as to reduce the effect of passing ships;

[1020] Exhibit C353-6-2 - Transport Canada Responses to NEB Information Requests received July 15, 2015 (July 27, 2015) (A4R7L6), 5.

[1021] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 236.

[1022] Exhibit B371-2 - Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 236.

(c) consider possible deviations by vessels within the shipping lanes to avoid locations of known whale aggregation areas;

(d) evaluate possible speed adjustment for vessels; and

(e) consider any other mitigation options that the Program studies may identify.[1023]

As an industry leader, Trans Mountain has committed to providing active support to the ECHO Program for all of the above studies and research. Upon completion of those studies, Trans Mountain will include the results and recommendations as part of its MMPP, which will be a first class protection program.[1024] The results of the ECHO Program are intended to assist in identifying mitigations measures to reduce marine transportation effects on marine mammals not only from Project-related vessels but from all vessel traffic along the marine corridor.

Tankers are expected to report marine mammal distress incidents to regional whale/marine mammal emergency hotlines or Coast Guard radio channels.[1025] To ensure these events are reported, Trans Mountain committed to amending its Tanker Acceptance Standards to clarify that all vessels calling on the Westridge Marine Terminal must comply with relevant local and international laws and regulations, which includes the requirement to report marine mammal distress incidents. Trans Mountain will include guidance for reporting marine mammal vessel strikes and sightings of marine mammals in distress in its Port Information and Terminal Operations Manual, which will be supplied to all vessels in advance of their call at Westridge Marine Terminal.[1026] These programs underline Trans Mountain's commitment to gather

[1023] Exhibit B371-2 - Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 236-237.

[1024] Exhibit B371-2 - Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 236.

[1025] Exhibit B371-2 - Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 49.

[1026] Exhibit B371-2 - Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 50.

important data regarding marine mammal vessel strikes. Trans Mountain will continue to support the efforts of regulators and other initiatives (such as the ECHO Program) to address this issue.

7.2.2.7 Marine Birds

Marine vessel traffic has the potential to cause visual, acoustic and physical disturbance to marine birds.

To mitigate these potential adverse effects, Trans Mountain will comply with the relevant legislation[1027] with respect to harassment, harm or the mortality of birds or bird nesting areas and provincial and local policies related to biodiversity and wildlife habitat conservation. However, because the wake from Project-related vessels will not normally be detectable from existing marine conditions along the shoreline, Trans Mountain's evidence is that marine birds are unlikely to be disturbed to any substantial extent by wake from Project-related vessels.[1028]

Intervenors raised concerns regarding marine bird strike/collision reporting. In response, Trans Mountain has committed to including a section on marine birds in its future Port and Terminal Book, which will be submitted to the TERMPOL Review Committee a minimum of six months prior to the commencement of Project operations. The section will request that all vessel operators report any bird strikes/collisions to Marine Communication and Traffic Services.[1029] While Trans Mountain will not own or operate the vessels calling at the Westridge Marine Terminal, this

[1027] *B.C. Wildlife Act*, CEAA, SARA, and the *Migratory Birds Convention Act*. For example, the *Migratory Birds Convention Act* prohibits a vessel from depositing a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

[1028] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-339.

[1029] Exhibit B371-2 - Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 59.

commitment demonstrates that Trans Mountain has attempted to address this issue to the best of its ability.

Concerns were also raised regarding vessel bird strikes. In response to these concerns, Trans Mountain committed to implementing the following mitigation measures to reduce potential effects from Project-related vessel traffic:

(a) 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.

(b) Inform all operators of Project-related vessels of the hazards regarding bird strikes occurring at night because of deck lighting.[1030]

Trans Mountain is supportive of a collaborative approach to long-term monitoring for marine birds and has committed to meet with regulatory authorities, including Environment Canada, to discuss the potential for development of a long-term monitoring program as a partnership with others.[1031]

In addition, Trans Mountain has sponsored a study by Bird Studies Canada to map bird populations in the Burrard Inlet to quantify and map seasonal bird populations. The maps will be made publicly available so that local stakeholders (e.g., industry, government and environmental organizations) can use the information in planning for the appropriate conservation and protection of marine birds as Burrard Inlet continues to develop.[1032] In January 2015 Trans Mountain contributed $50,000 to the Pacific Salmon Foundation in response to stakeholder feedback and input from Aboriginal groups identifying salmon habitat as a priority for Burrard Inlet. The funding will be used for

[1030] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 241.

[1031] Exhibit B112-2 – Trans Mountain Response to B.C. Nature Cda IR No. 1 (June 18, 2014) (A3Y2C5), 48.

[1032] Exhibit B310-2 - Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 232.

salmon habitat enhancement in Burrard Inlet, which is expected to improve foraging opportunities for piscivorous marine birds inhabiting Burrard Inlet.[1033]

Intervenors raised concerns regarding the sufficiency of baseline data used by Trans Mountain to support the assessment of Project effects on marine birds in the Application.[1034] Specifically, B.C. Nature and Nature Canada, the City of Port Moody, and Environment Canada noted that inadequate baseline data on annual and seasonal marine bird abundance and distribution prevent Trans Mountain from properly evaluating the effects from an oil spill,[1035] thereby limiting Trans Mountain's ability to develop appropriate response plans and other recovery initiatives. In response to B.C. Nature and Nature Canada IR No. 1.03, Trans Mountain described the limitations of data available to characterize abundance and distribution of species expected to occur in offshore habitats.[1036] Trans Mountain recognizes that the collection of additional baseline marine bird data can contribute to coordinated planning initiatives. Trans Mountain has therefore provided support to several initiatives to collect additional marine bird data in the Marine Transportation RSA; as detailed in response to GoC IR No. 2.047a.[1037] Trans Mountain is also exploring additional options to contribute towards the collection of long-term monitoring data for marine

[1033] Exhibit B310-2 - Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5), 232; Trans Mountain Reply Evidence, Attachment 1.20 – Reply to Environment Canada, Section 2.0: Species at Risk, Migratory Birds and Wetlands (August 20, 2015), 21.

[1034] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3).

[1035] Exhibit B19-14 - V8B TR 8B7 01 OF 24 ERA MAR SPILL (December 17, 2013) (A3S4K7).

[1036] Exhibit B112-2 – Trans Mountain Response to B.C. Nature Cda IR No. 1 (June 18, 2014) (A3Y2C5), 9 – 14.

[1037] Exhibit B310-2 – Trans Mountain Response to GoC EC IR No. 2 (February 13, 2015) (A4H6A5), 123 – 185.

birds that may be affected by the Project and other industrial activities, in cooperation with regulatory authorities, industry, local communities, Aboriginal groups and other stakeholders.[1038]

The written evidence submitted by B.C. Nature and Nature Canada[1039] and Friends of Ecological Reserves[1040] identified concerns regarding the rationale for selection of marine bird indicator species used to represent Project-related effects from vessel traffic in the Marine Transportation RSA. Intervenors contended that the indicator species presented in the Westridge Marine Terminal and Marine Transportation assessments do not adequately reflect the extent of marine bird species and habitat usage in the Marine Transportation RSA or best support an assessment of Project effects. This is incorrect. In the ESA, Trans Mountain provided detailed descriptions of the rationale used for selection of marine bird indicator species.[1041] Trans Mountain submits that the final suite of marine bird indicator species chosen represent a group of birds with different ecological niches that were selected to represent the effects to a broad range of marine bird species, consistent with standard environmental practice.[1042] Additional rationale for the selection of indicators used in the Westridge Marine Terminal and Marine Transportation assessments has been detailed in several IR responses. A thorough review of the appropriateness of indicator species was provided in response to B.C. Nature and Nature Canada IR No. 1.01 and 1.02 for the marine transportation and Westridge Marine Terminal assessments, respectively.[1043] Further evidence on

---

[1038] See Trans Mountain Reply Evidence, Attachment 1.20 - Reply to Environment Canada, Section 2.0: Species at Risk, Migratory Birds and Wetlands (August 20, 2015), 21; Trans Mountain Reply Evidence, Section 56 – Marine Birds (August 20, 2015), 56-1 – 56-2.

[1039] Exhibit C24-12-2 – B.C. Nature and Nature Canada Written Evidence (May 27, 2015) (A4L8K8).

[1040] Exhibit C33-6-1 - Friends of Ecological Reserves Evidence KM TMX for NEB Report (May 28, 2015) (A4Q2T7).

[1041] Exhibit B5-21 - V5A ESA 13of16 BIOPHYSICAL (A3S1R0) (December 16, 2013), 7-472 – 7-475; Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-333 – 8A-336.

[1042] Trans Mountain Reply Evidence, Section 56 – Marine Birds (August 20, 2015), 56-3.

[1043] Exhibit B112-2 – Trans Mountain Response to B.C. Nature Cda IR No. 1 (June 18, 2014) (A3Y2C5).

the representativeness of selected indicators for waterbirds (including ducks, alcids, and shorebirds) was provided in response to Mr. John Black IR No. 1.1.2d, e and f[1044] and B.C. Nature and Nature Canada IR 2 (e.g., 2.05a, 2.06a.1, 2.11a, 2.25b).[1045] Evidence supporting the selection of shorebird indicator species was presented in response to Environment Canada Pre-Hearing Order IR No. 20,[1046] NEB IR No. 1.58b[1047] and Friends of Ecological Reserves IR No. 1.04.6.[1048] With respect to species at risk, Trans Mountain completed additional assessments on a per species basis, in response to GoC IR No. 2.035.[1049] Based on the approach applied in the Application and subsequent assessment of species at risk completed in response to GoC IR No. 2.035, Trans Mountain submits that it has provided an accurate characterization of residual Project effects and significance determinations for marine bird species at risk. Based on the foregoing, Trans Mountain submits that the KIs chosen for marine bird species adequately reflect the extent of marine bird species and habitat usage in the Marine Transportation RSA.[1050]

Intervenors expressed concerns over the variation in response to sensory disturbance by different marine bird species and in particular that some species are expected to be more sensitive and/or unlikely to habituate to sensory disturbances caused by activities at the Westridge Marine Terminal and/or marine vessel traffic.[1051] Trans Mountain submits that ships will be travelling at reduced

---

[1044] Exhibit B114-1 – Trans Mountain Response to Black J IR No. 1 (June 18, 2014) (A3Y2D1).

[1045] Exhibit B333-2 - Response to B.C. Nature IR No 2 Notice of Motion (March 12, 2015) (A4J5C4).

[1046] Exhibit B129-2 – Trans Mountain Response to GoC EC IR No. 1.001-Attachment1 (June 18, 2014) (A3Y2L0).

[1047] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8).

[1048] Exhibit B116-1 – Trans Mountain Response to FER IR No. 1 (June 18, 2014) (A3Y2D7).

[1049] Exhibit B310-2 – Trans Mountain Response to GoC IR No. 2 (February 13, 2015) (A4H6A5).

[1050] Trans Mountain Reply Evidence, Section 56 – Marine Birds (August 20, 2015), 56-3 – 56-4.

[1051] Exhibit C24-12-2 – B.C. Nature and Nature Canada Written Evidence (May 27, 2015) (A4L8K8); Exhibit C231-2-1 - MNBC TMX Submission Final (May 28, 2015) (A4Q2H2).

speeds as they approach the Westridge Marine Terminal and using pilots and tug assistance, in addition to mandatory compliance with safe shipping practices under *Canada Shipping Act, 2001* regulations. Trans Mountain is also committed to the mitigation measures for sensory disturbance and injury or mortality to marine birds at the Westridge Marine Terminal.[1052] Trans Mountain is confident that the Project will not contribute significantly toward residual cumulative effects of sensory disturbance to marine birds.[1053]

Given Trans Mountain's proposed mitigation measures and other commitments combined with relevant legislation and government policies, no significant effects on marine birds are expected as a result of the Project.[1054]

7.2.2.8 Accidents and Malfunctions

The likelihood of accidents and malfunctions in the Project area from equipment failure on tankers, human error or natural perils such as floods, hurricanes or earthquakes, ranges between low and rare. Trans Mountain assessed the potential consequences of these accidents and malfunctions so that emergency response and contingency planning can be identified to ensure the risk is further mitigated.[1055]

[1052] Exhibit B5-21 - V5A ESA 13of16 BIOPHYSICAL (December 16, 2013) (A3S1R0), 7-480 – 7-482.

[1053] Trans Mountain Reply Evidence, Section 56 – Marine Birds (August 20, 2015), 56-5.

[1054] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3).

[1055] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-426. The ESA concluded that the residual effects arising from an accident or malfunction during the operation of the increased Project related marine vessel traffic will be not significant.

7.2.2.9 Oil Spills Resulting from Marine Incidents

Marine incidents may result from equipment and human failure on tankers, including grounding of a loaded tanker or collisions between a loaded tanker and another vessel; however, not all incidents will lead to an oil spill accident. The comprehensive marine and navigation risk study conducted for the Project by DNV provides evidence that a major oil spill will remain a low likelihood event in the region. An oil spill incident involving a Project tanker caused by a natural peril such as flood, hurricane or earthquake, is considered to be of very low likelihood. Through the work completed by DNV and others, Trans Mountain has assessed the potential likelihood and consequences of a marine oil spill in accordance with NEB and other federal guidance for emergency response and contingency planning and proposed extraordinary additional risk control measures to ensure that incremental risks are mitigated. Through various comparisons, Trans Mountain has shown that the quantitative risk assessment completed by DNV is based on conservative assumptions and the results of the risk assessment are realistic and conservative.[1056]

Marine spill prevention, response and mitigation are paramount concerns for Trans Mountain and will remain a priority indefinitely. In the unlikely event of a spill or release during loading at the Westridge Marine Terminal, Trans Mountain will respond immediately in accordance with its Westridge Marine Terminal ERP. Once a tanker has completed loading and leaves the Westridge loading facility and terminal, the responsibility for the ship and its cargo fall under the jurisdiction of the *Canada Shipping Act, 2001* and associated marine transport regulations. Marine oil spill incidents are responded to by WCMRC under its mandate as a certified Response Organization

[1056] Trans Mountain Reply Evidence, Section 60 – Marine Risk Assessment (August 20, 2015), 60-5.

under the *Canada Shipping Act, 2001*. Trans Mountain will always provide necessary support and assistance to limit the effects of an incident.[1057]

The regulation of marine oil spill response is primarily defined in the *Canada Shipping Act, 2001* and administered by Transport Canada. The Act requires that: (i) oil spill Response Organizations be certified by the Minister; (ii) all large vessels and oil handling facilities must have an arrangement with a certified Response Organization as a condition of operating in Canadian waters; and (iii) that the Response Organization meets or exceeds the planning standards that define minimum levels of capacity as set by regulations.[1058]

WCMRC is the Response Organization for the West Coast of Canada. Current planning standards require a minimum capacity to respond to oil spills of up to 10,000 tonnes in up to 72 hours plus travel time. WCMRC currently maintains capacity significantly in excess of the minimum planning standard requirement. With support of WCMRC, Trans Mountain has proposed an enhanced response regime that will be capable of delivering 20,000 tonnes of capacity within 36 hours from dedicated resources staged within the Project area. The WCMRC report[1059] is available as a supplementary report supporting the TERMPOL submission and a summary of the proposed regime is available in Volume 8A of the Application.[1060]

In the unlikely event of a spill into the marine environment, the responsible party (i.e., Trans Mountain for a pipeline spill, the tanker owner for a tanker spill) would work with WCMRC and

---

[1057] Exhibit B18-19 – V8A 1.0 TO 1.4.2.6 MAR TRANS ASSESS (December 17, 2013) (A3S4X3), 8A-49.

[1058] Exhibit B18-19 – V8A 1.0 TO 1.4.2.6 MAR TRANS ASSESS (December 17, 2013) (A3S4X3), 8A-37-8A-38

[1059] Exhibit B24-7 –V8C TR 8C 12 TR S12 OIL SPILL RESP (December 17, 2013) (A3S5I9).

[1060] Exhibit B18-19 – Trans Mountain Pipeline ULC – Volume 8A: Marine Transportation - Effects Assessment and Spill Scenarios, (December 17, 2013) (A3S4Y6), Table 5.5.3.

regulatory agencies in a Unified Command to determine both response and remediation strategies appropriate for the specific circumstances of the event.[1061] To ensure efficient response, the responders would focus on:

(a) controlling the source of the spill;

(b) preventing oil from entering or encroaching on a water body or sensitive area;

(c) containing, intercepting and promptly removing oil from the water surface; and

(d) removing stranded oil that could be remobilized from the shoreline.

In addition to the Pipeline Ecological Risk Assessment ("ERA"), Trans Mountain submitted two ERA reports to extensively examine the potential effects from marine transportation spills[1062] and Westridge Marine Terminal spills ("Westridge ERA").[1063] These reports focused on the evaluation of the potential negative environmental effects to marine ecological receptors and supporting habitats that could result from a hypothetical crude oil spill during: (i) marine transportation between the PMV and international waters west of Juan de Fuca Strait; and (ii) marine vessel loading at the Westridge Marine Terminal. These reports are further supplemented by a Detailed Quantitative Ecological Risk Assessment for Loading Accidents and Marine Spills ("DQERA"), which evaluates the toxicologically-induced changes in health of ecological receptors, such as those that may potentially be exposed to chemicals of potential concern in the event of a spill at the Westridge Marine Terminal and Arachne Reef.[1064]

[1061] Exhibit B18-1 – V7 1.0 to 5.2.8.3 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5), 7-27

[1062] Exhibit B19-14 to B19-37 – Trans Mountain Pipeline ULC –Technical Report 8B-7, Ecological Risk Assessment of Marine Transportation Spills (December 17, 2013) (A3S4K7; A3S4K8; A3S4K9; A3S4L0; A3S4L1; A3S4L2; A3S4L3; A3S4L4; A3S4L5; A3S4L6; A3S4L7; A3S4L8; A3S4L9; A3S4Q0; A3S4Q1; A3S4Q2; A3S4Q3; A3S4Q4; A3S4Q5; A3S4Q6; A3S4Q7; A3S4Q8; A3S4Q9; A3S4R0).

[1063] Exhibit B18-17 – V7 TR ERA WESTRIDGE (December 17, 2013) (A3S4X1).

[1064] Exhibit B32-25 to B32-33 – Trans Mountain Response to NEB_IR No. 1.62d - Attachment (May 14, 2014) (A3W9K1, A3W9K2, A3W9K3, A3W9K4, A3W9K5, A3W9K6, A3W9K7, A3W9K8, A3W9K9).

It is important to note that Trans Mountain does not own or operate vessels calling at the Westridge Marine Terminal. Although Trans Mountain is not directly responsible for the operation of tankers and barges calling at the Westridge Marine Terminal, it is an active member in the maritime community and works with maritime agencies to promote best practices and facilitate improvements focusing on the safety, efficiency and environmental standards of tanker traffic in the Salish Sea.[1065] Spills resulting from the Project facilities (i.e., the pipeline and terminals) are discussed in Section 7.2.1.12 - Accidents and Malfunctions (Pipeline and Facilities) of this final argument**.**

Several intervenors questioned or disagreed with the methodology applied by Trans Mountain to evaluate the potential effects of accidents and malfunctions, particularly worst-case and smaller tanker spills.[1066] While Trans Mountain acknowledges the concerns of Aboriginal groups, governments and stakeholders regarding spills, Trans Mountain submits that its assessment of accidents and malfunctions based on risk follows NEB guidance on this issue and meets the legal requirements of CEAA 2012.

Trans Mountain's assessment of marine incidents is based on a comprehensive evaluation that includes a quantitative navigation risk assessment together with determining credible worst-case oil spill volume for a Project tanker. Stochastic modelling of crude oil spills was undertaken

---

[1065] Exhibit B18-29 – V8A 4.2.12.2 to T5.2.2 Mar Trans Assess (December 17, 2013) (A3S4Y3), 516.

[1066] Exhibit C234-7-6 – Metro Vancouver – Exhibit 02B, Genwest Report-Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project (May 27, 2015) (A4L7Y7); Exhibit C358-13-16 – Tsleil-Waututh Nation – Oil Spill Trajectory Modeling Report (May 26, 2015) (A4L6A7); Exhibit C77-28-10 – City of Vancouver – Appendix 56 (May 27, 2015) (A4L7L5); C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7); C214-18-3 – Living Oceans Society – Attachment B to written evidence of Living Oceans - Fate and effect of oil spills - Dr Short (May 27, 2015) (A4L9R8); C358-13-23 – Tsleil-Waututh Nation – Vol 9 Tab 4E to 04I Appendix 5 to 9 Air Quality Dispersion Modelling Report Levelton (May 26, 2015) (A4L6C4).

originating at several locations in the Burrard Inlet, Strait of Georgia in an area near the Fraser River Estuary, Gulf Islands and Juan de Fuca Straight together with detailed deterministic spill modelling. The scope and methods used in the Marine ERA were based on additional application filing requirements as outlined in correspondence from the NEB to Trans Mountain in a letter dated September 10, 2013, as presented below:

> The assessment of accidents and malfunctions related to the increase in marine shipping activities must include an assessment of potential accidents and malfunctions at the Terminal and at representative locations along the marine shipping routes. Selection of locations should be risk informed considering both probability and consequence. The assessment must include a description of:
>
> - measures to reduce the potential for accidents and malfunctions to occur, including an overview of relevant regulatory regimes;
> - <u>credible worst case spill scenarios</u> and smaller spill scenarios;
> - <u>the</u> fate and behaviour of any hydrocarbons that may be spilled;
> - <u>potential</u> environmental and socio-economic effects of <u>credible worst case spill scenarios</u> and of smaller spill scenarios, taking into account the season-specific behaviour, trajectory, and fate of hydrocarbons spilled, as well as the range of weather and marine conditions that could prevail during the spill event;
> - <u>ecological</u> and human health risk assessments for <u>credible worst case spill scenarios</u> and smaller spill scenarios, including justification of the methodologies used; and
> - <u>preparedness</u> and response planning and measures, including an overview of the relevant regulatory regimes.[1067] [Emphasis added.]

[1067] Correspondence from the NEB to Trans Mountain in a letter dated September 10, 2013.

Risk Modelling – Location Selection

TWN, the City of Vancouver and the Living Oceans Society stated that Trans Mountain selected modelling locations based only on an assessment of the probability of an oil spill, resulting in locations that are neither representative nor typical of the surrounding areas.[1068] Many of these concerns appear to be based on a partial reading of Trans Mountain's evidence focus on highest consequence spill events while disregarding the hazards required to cause such events and the likelihood of the event, as well as the engineering controls, safety management systems and mitigation plans in place to avoid such events. Risk assessments of spills that do not consider likelihood are subjective and cannot be relied on. For example, several intervenors rely on reports on the fate and effects of oil spills by Dr. Jeffrey Short that, in Dr. Short's own words, are based on a review of "parts of the Trans Mountain application, especially Volume 8."[1069] It is important to point out that Volume 8 of Trans Mountain's application does not include the Pipeline ERA, Westridge ERA nor the DQERA (which was submitted at a later date). As such, Dr. Short's sole reference to the Marine ERA[1070] diminishes his critique of Trans Mountain's risk-based approach as it discounts, or ignores, extensive additional field marine spill studies that would be relevant, and extremely important, to his analysis and conclusions.

The numerous technical marine impact reports filed by Trans Mountain provide evidence that the hypothetical spill site locations were selected after due consideration of marine shipping risks as

[1068] Exhibit C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7), 6.

[1069] Exhibit C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7), 18.

[1070] Exhibit C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7), 19.

5943 determined through the TERMPOL process, and supporting work conducted by a leading
5944 classification society and expert advisor for the maritime industry (DNV).[1071] Contrary to the
5945 assertions of Dr. Short, Trans Mountain did not fail to select locations informed by the potential
5946 consequences of oil spills.[1072]

5947 From eight hypothetical spill locations, stochastic modelling results indicated that three locations
5948 (one each in the Southern Strait of Georgia, at Arachne Reef, off Race Rocks in Juan de Fuca
5949 Strait) were most likely to affect areas of high biological diversity, high human use or concern or
5950 known ecological sensitivity.[1073] Each location is also representative of their ecodistrict along or
5951 adjacent to the marine shipping route (more specifically, Roberts Bank and the Fraser River Delta,
5952 the Gulf and San Juan Islands, Race Rocks and Puget Sound).[1074] The three locations bracket the
5953 critical habitat for southern resident killer whale and capture major breeding and feeding habitats
5954 for marine birds and other important ecological receptors. The Strait of Georgia hypothetical spill
5955 location is, in fact, most proximal to both the Fraser River Delta and Boundary Bay intertidal
5956 habitats that are of great importance to shore birds and migratory birds.[1075]

[1071] Exhibit B21-1 V8C TR 8C 12 01 OF 03 TERMPOL 3.15 RISK ANAL (December 17, 2013) (A3S5F4); Exhibit B21-2 V8C TR 8C 12 02 OF 03 TERMPOL 3.15 RISK ANAL (December 17, 2013) (A3S5F6); Exhibit B21-3 V8C TR 8C 12 03 OF 03 TERMPOL 3.15 RISK ANAL (December 17, 2013) (A3S5F8)

[1072] Exhibit C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7),6 and 23.

[1073] Trans Mountain Reply Evidence, Attachment 1.08 – Reply to - "Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project", Genwest System Inc. Edmonds, Washington, USA 98020 (Genwest Report) (August 20, 2015), 8.

[1074] Trans Mountain Reply Evidence, Attachment 1.08 – Reply to - "Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project", Genwest System Inc. Edmonds, Washington, USA 98020 (Genwest Report) (August 20, 2015), 8.

[1075] Trans Mountain Reply Evidence, Attachment 1.09 – Reply to City of Vancouver, Tsleil-Waututh Nation, Living Oceans Society "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in Burrard Inlet and the Fraser River Estuary" and "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in the Gulf Islands, Strait of Juan de Fuca, and Fraser River" (August 20, 2015), 18-19.

The extensive stochastic modelling that was undertaken for these three locations, representing spill behaviour, trajectories and fate under realistic combinations of weather and tides in all four seasons, provides Trans Mountain with ample scope to explore the potential distribution of spilled oil in the Georgia Basin Marine Ecoregion and the potential scope of environmental effects that could be incurred in the event of a spill.[1076] While the probability contours generated through stochastic modelling cannot be used to determine the outcome of any single event, they are valuable for informing the likelihood of an area being affected by a particular spill from a particular location. They also provide a transparent and defensible basis for describing the range of effects that could result from a spill along the marine shipping route.

Risk Modelling – Probability and Credible Worst-Case Scenario

Trans Mountain has diligently sought to conform to the NEB's direction from September 10, 2013, and submits that the key component of the overall direction lies in the determination of what is a credible worst-case scenario.

Risk is commonly defined as being the product of two terms: the probability (likelihood) of a failure and the consequences of that failure. It is the failure (in this case, vessel collision or grounding) that is the initiating event, and the probability of such an event must be the principal consideration in selecting potential locations for accidents and malfunctions. For example, vessels can only ground if they enter waters that are of keel depth or less and a loss of containment implies striking a sufficiently solid substrate with sufficient kinetic energy to result in damage to both outer and inner hulls. Similarly, collisions can only occur when the courses of two vessels intersect in

[1076] Trans Mountain Reply Evidence, Attachment 1.08 – Reply to - "Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project", Genwest System Inc. Edmonds, Washington, USA 98020 (Genwest Report) (August 20, 2015), 20.

both space and time. A loss of containment can only occur from a collision if the incident involves a second vessel having sufficient kinetic energy (a function of vessel mass and the intersecting velocities of the two vessels) and vector to result in damage to both outer and inner hulls of the tanker. In this context, the probability of crude oil spills is not uniformly or randomly distributed throughout the Strait of Georgia and the Juan de Fuca Strait, but varies from low, (but finite) values, to exceedingly low values, depending upon location.[1077]

The three representative sites selected by Trans Mountain properly consider both probability and consequence of marine accidents or malfunctions to provide the foundation for a credible worst-case scenario. The Strait of Georgia and Race Rocks represent hypothetical collision accidents sites, while Arachne Reef represents a potential power grounding accident location.[1078]

The absence of objective discussion of risks in the reports relied on by TWN, the City of Vancouver, Metro Vancouver, Burnaby and Living Oceans Society negates the credibility and usefulness of their evidence. The consequences estimated in their reports are speculative. As part of their evidence, the intervenors also relied upon oil spill trajectory modelling by Genwest Systems Inc. ("Genwest") to demonstrate the impact of major oil spills occurring at four locations in Burrard Inlet:

(a) an oil spill of 8,000 m^3 at the Westridge Marine Terminal;

[1077] Trans Mountain Reply Evidence, Attachment 1.09 - Reply to City of Vancouver, Tsleil-Waututh Nation , Living Oceans Society "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in Burrard Inlet and the Fraser River Estuary" and "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in the Gulf Islands, Strait of Juan de Fuca, and Fraser River" (August 20, 2015), 17.

[1078] Trans Mountain Reply Evidence, Attachment 1.09 - Reply to City of Vancouver, Tsleil – Waututh Nation, Living Oceans Society "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in Burrard Inlet and the Fraser River Estuary" and "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in the Gulf Islands, Strait of Juan de Fuca, and Fraser River" (August 20, 2015), 17-18.

(b) an oil spill of 16,000 m^3 at Second Narrows under the Canadian National Railway Bridge;

(c) an oil spill of 16,000 m^3 at First Narrows; and

(d) an oil spill of 16,000 m^3 in the Outer Harbour at Anchorage #8.[1079]

There is no justification for why Genwest modelled these precise locations as potential accident locations.[1080] The Nuka Report (relied on by Genwest as conclusive evidence of volumes spilled) also describes the spill scenarios as "worst-case" but not as "credible worst-case".[1081] For reasons described earlier, the volume of oil spilled during an accident is directly related to the severity of the incident and the type and extent of damage caused. The probability of a very large oil volume to be released during a tanker incident may only be assessed after first considering the probability of the selected location to host such a severe incident.[1082] It is concerning to note that this type of logic has been ignored in the intervenors' approach to selection of these spill locations.

Several intervenors rely on a report by Levelton Consultants Ltd. ("Levelton Report") to demonstrate the health consequences associated with a marine spill.[1083] The Levelton Report

---

[1079] Exhibit C234-7-6 – Metro Vancouver – Exhibit 02B, Genwest Report-Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project (May 27, 2015) (A4L7Y7), 10.

[1080] Exhibit C234-7-6 – Metro Vancouver – Exhibit 02B, Genwest Report-Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project (May 27, 2015) (A4L7Y7); Trans Mountain Reply Evidence, Attachment 1.08 - Reply to "Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project", Genwest Systems Inc. Edmonds, Washington, USA 92020 (Genwest Report) (August 20, 2015), 10.

[1081] Exhibit C234-7-6 – Metro Vancouver – Exhibit 02B, Genwest Report-Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project (May 27, 2015) (A4L7Y7), 10; Exhibit C234-7-5 – Exhibit 02A Nuka Report – Oil Spill Response – (May 27, 2015) (A4L7Y6), 39.

[1082] Trans Mountain Reply Evidence, Attachment 1.08 – Reply to "Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project" Genwest Systems Inc. Edmonds, Washington, USA 98020 (Genwest Report) (August 20, 2015), 4 to 5.

[1083] Exhibit C358-13-23 – Tsleil-Waututh Nation – Vol 9 Tab 4E to 04I Appendix 5 to 9 Air Quality Dispersion Modelling Report Levelton (May 26, 2015) (A4L6C4).

undertook air dispersion modelling at these very sites. Metro Vancouver filed the Levelton Report on May 27, 2015.[1084] Aside from many technical and procedural errors in the work carried out by Levelton, submission of this flawed evidence has increased the amount of misleading information introduced into the NEB regulatory process.

The conclusions related to potential spill consequences in the Levelton Report on the fate and effects of oil spills are also misleading because the opinions on the range of effects consistently lean towards the worst imaginable case without limitation or qualification as to likelihood of occurrence, or the spatial extent over which such worst possible conditions might occur.[1085] At the same time, these reports do not make any allowance for spill response, especially given the enhanced oil spill response regime proposed in the Application. In essence, this removes any potential benchmark for determining whether the risks associated with an event or occurrence can be credibly likened to the activities contemplated in the Application. The same critique applies to Dr. Short's report.[1086] Accordingly, Trans Mountain submits that evidence in the Genwest report, Dr. Short's reports and the Levelton Report does not represent credible worst-case scenarios.

Fate and Behaviour of Hydrocarbons in an Accident – Diluted Bitumen

To assess the consequences of a spill, a number of intervenors have presented evidence on the similarities and differences in the physical and chemical properties of diluted bitumen,

[1084] Exhibit C234-7-7 - Exhibit 03, Air Quality Impacts from Simulated Oil Spills in Burrard Inlet and English Bay – (May 27, 2015) (A4L7Y8).

[1085] Exhibit C358-13-23 – Tsleil-Waututh Nation – Vol 9 Tab 4E to 04I Appendix 5 to 9 Air Quality Dispersion Modelling Report Levelton (May 26, 2015) (A4L6C4).

[1086] Exhibit C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7).

conventional oil and refined heavy oils which affect fate, transport and toxicity.[1087] The various statements and opinions advanced by intervenors include the following:

(a) properties of diluted bitumen are qualitatively different from crude oil and thus behaviour will be different;

(b) the Application should discuss potential differences between diluted bitumen and conventional crude oil;

(c) heavy fuel oil (HFO) is not a good model for effects of diluted bitumen behaviour, or toxicity;

(d) HFO is a good indicator of the effects of diluted bitumen; and

(e) no information has been presented on the effects of exposure of fish to diluted bitumen.

Trans Mountain's position on the physical and chemical properties of diluted bitumen as well as its fate, transport and toxicity in the case of a spill to a marine environment is based on its own research (Gainford) corroborated by a growing body of evidence regarding the environmental fate and behaviour of diluted bitumen.[1088] Recent simulations and studies[1089] have corroborated the findings of earlier studies,[1090] as well as the findings of the NEB in the Review for Enbridge

---

[1087] Exhibit C319-26-6 – Potential Effects of Diluted Bitumen Spills on Salmonid Species Report (May 27, 2015) (A4L7E7); Exhibit C214-18-3 – Living Oceans Society – Attachment B to written evidence of Living Oceans - Fate and effect of oil spills - Dr Short (May 27, 2015) (A4L9R8); Exhibit C246-4-1, Prelim Report MIB Evidence for TMPE (May 27, 2015) (A4Q2F9); Exhibit C86-18-2 – Appendix F Par 2 to Written Evidence of Cowichan Tribes (May 27, 2015) (A4Q0V0); Exhibit C291-1-3 – Attachment B to written evidence of Raincoast – Potential effects on salmon of an oil spill into the Lower Fraser River – Logan et al. (May 27, 2015) (A4L9F4).

[1088] Exhibit B18-2 – V7 5.2.8.3 F5.2.5 TO 10.0 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V6), 7-65.

[1089] Trans Mountain Reply Evidence, Attachment 1.09 – Reply to City of Vancouver, Tsleil-Waututh Nation, Living Oceans Society "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in Burrard Inlet and the Fraser River Estuary" and "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in the Gulf Islands, Strait of Juan de Fuca, and Fraser River" (August 20, 2015), 13, 21.

[1090] Exhibits B21-5, B21-6, B21-7 – Trans Mountain Pipeline ULC – Trans Mountain Expansion Project Volume 8C – TERMPOL Reports, TR 8C-12 S7 – A study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters

6041 Northern Gateway, that the physical and chemical properties of diluted bitumen are similar to those
6042 of heavy conventional crude oils.[1091] Together, the studies support the assertion that higher
6043 viscosity oils such as diluted bitumen do not readily disperse as fine droplets into the water column,
6044 and are less likely to form oil mineral aggregates than light conventional crude oils. This is a
6045 difference that facilitates rather than hinders oil recovery in the unlikely event of spill.

6046 In many cases intervenors did not consider research studies available on the properties, fate and
6047 behaviour of diluted bitumen and have drawn conclusions from unsubstantiated or inappropriate
6048 material properties, or from historic oil spills that are not relevant to the Project.[1092] The criticism
6049 that Trans Mountain's ERA fails to assess the possibility of organisms being exposed to submerged
6050 oil is based upon allegations of flaws in the experimental studies done to evaluate the susceptibility
6051 of diluted bitumen to achieve a density greater than that of the ambient water by weathering
6052 alone.[1093] Rather than the rapid weathering scenario advanced by the intervenors, more recent
6053 literature points to the important role of viscosity in the environmental behaviour of diluted
6054 bitumen.[1094] In summary, the oil must first become dispersed into the water column. This implies

(December 17, 2013) (A3S5G2, A3S5G4, and A3S5G5); Exhibit C121-3-1-EC written evidence (May 27, 2015) (A4L8Y6); 123-124.

[1091] Enbridge Gateway Joint Review Panel Report (December 2013), Volume 2, 99.

[1092] Exhibit C234-7-6 – Metro Vancouver – Exhibit 02B, Genwest Report-Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project (May 27, 2015) (A4L7Y7); C214-18-2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7).

[1093] Exhibit 2 – Living Oceans Society – Attachment A to written evidence of Living Oceans - Fate and effect of oil spills in Burrard Inlet and Fraser River Estuary - Dr Short (May 27, 2015) (A4L9R7), 5; Exhibit C77-27-04 – Appendix 3 (May 27, 2015) (A4L7W1); Trans Mountain Reply Evidence, Attachment 1.09 – Reply to City of Vancouver, Tsleil-Waututh Nation, Living Oceans Society "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in Burrard Inlet and the Fraser River Estuary" and "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in the Gulf Islands, Strait of Juan de Fuca, and Fraser River", (August 20, 2015), 21.

[1094] Trans Mountain Reply Evidence, Attachment 1.09 – Reply to City of Vancouver, Tsleil-Waututh Nation, Living Oceans Society "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in Burrard Inlet and

that a sufficient level of energy is being provided by wind and waves. After dispersion has occurred, there must be a sufficient concentration of suitable suspended sediment already in the water in order for oil – mineral aggregates to form. Recent studies show that due to the tendency for the viscosity of spilled diluted bitumen to rapidly increase after release, the formation and dispersion of small droplets in the water column is mitigated making interactions between diluted bitumen and suspended sediment less likely to occur than may be the case for conventional crude oils.[1095]

Fate and Behaviour of Hydrocarbons in an Accident – Shoreline Interaction

Trans Mountain recognizes that, in the unlikely event of a significant spill to water, diluted bitumen (relatively fresh to weathered) may contact the shoreline. Volume 8C of Trans Mountain's Application describes the thorough approach taken to model oil-shoreline interaction using the B.C. Government Shoreline database, which contains shore type, and specific studies of oil retention by various shore types for diluted bitumen.[1096] The potential for oil to penetrate and persist on beaches within study areas was evaluated based on a report prepared by Coastal and Ocean Resources that takes into account the thickness of gravel layers, depth to the impermeable layer and fluid characteristics into account.[1097]

---

the Fraser River Estuary" and "Fate and Effects of Oil Spills from the Trans Mountain Expansion Project in the Gulf Islands, Strait of Juan de Fuca, and Fraser River" (August 20, 2015), 21.

[1095] Trans Mountain Reply Evidence, Section 25 – Fate and Behaviour of Oil (August 20, 2015), 25-5-25-6; Exhibit B21-5 to B21-7 – Trans Mountain Pipeline ULC – Study of Fate and Behaviour of Diluted Bitumen Oils in Marine Waters (December 17, 2013) (A3S5G2, A3S5G4, A3S5G5).

[1096] Exhibit B21-16-V8C TR 8C 12 TR S9 08 OF 09 MODEL MAR SPILLS (December 17, 2012) (A3S5I0); Exhibit B21-17-V8C TR 8C 12 TR 59 09 OF MODEL MAR SPILLS (December 17, 2013) (A355I1).

[1097] Exhibit B24-6 – V8C TR 8C 12 TR S11 ESTIMAT SHORELINE RETEN (December 17, 2013) (A3S5I8).

The evidence submitted by intervenors on oil-shoreline interactions fails to take into account these fundamental variables. For example, the alternative approach to shoreline retention in the Genwest report assumes that the shore retains oil regardless of the oil type and the shoreline type (i.e., sandy beach behaves the same in this model as man-made structures) and that all oil ashore refloats with an arbitrary half-life of 18 hours, regardless of viscosity and weathering state.[1098] This ignores the fact that oil retention along different shorelines is a function of the type of pore space and effective permeability, which, in turn, is a function of pore geometry and fluid (oil) characteristics.[1099] Trans Mountain does not dispute that small amounts of oil can became sequestered and remain in deep, porous beach deposits, or brackish marshes following an oil spill.[1100] However, the shortcomings identified in intervenor evidence raises serious concerns about the usefulness of their evidence in assessing shoreline impacts.

Fate and Behaviour Effects of Hydrocarbons in an Accident – Air Quality and Human Health

To supplement prior reports with more detailed analysis of potential health effects in the events of a credible worst-case (and smaller) sized spill, Trans Mountain conducted a specific HHRA to evaluate the human health effects associated with a representative and credible marine spill scenario ("Marine HHRA").[1101] Deterministic 3D modelling of spill fate and behaviour was completed at various hypothetical scenario locations based on the conservative and unrealistic

[1098] Exhibit C234-7-6 – Metro Vancouver – Exhibit 02B, Genwest Report-Oil Spill Trajectory Modeling Report in Burrard Inlet for the Trans Mountain Expansion Project (May 27, 2015) (A4L7Y7), 23; Trans Mountain Reply Evidence, Section 52 – Marine Spill Modeling (August 20, 2015), 52-53.

[1099] Trans Mountain Reply Evidence, Section 25 – Fate and Behaviour of Oil (August 20, 2015), 25-6.

[1100] Trans Mountain Reply Evidence, Section 46 – Ecological Risk Assessment (August 20, 2015), 46-22.

[1101] Exhibit B106-1 – Trans Mountain Pipeline UYLC HHRA Facility Spill Scenarios Part 1 (June 16, 2014) (A3Y1E9).

assumption that no spill response measures would be implemented.[1102] Additional, comprehensive deterministic and stochastic simulations were undertaken to narrow in on the Westridge Marine Terminal as the site to predict the potential health risks for people and organisms from a credible worst-case scenario. The HHRA estimated the level of exposure based on the hourly average contaminant airborne concentrations provided in Trans Mountain's Technical Report on Modeling the Fate and Behaviour of Marine Oil Spills.[1103]

The results of this assessment identified that there is no obvious indication that people's health would be seriously affected by acute inhalation exposure to the chemical vapours released during the early stages of a spill. The Marine HHRA also concluded that any health effects that could be experienced by people in the area close to an oil spill, though discomforting and annoying, would likely be confined to mild, transient sensory and/or non-sensory effects attributable largely to the irritant and central nervous system depressant properties of the chemicals.[1104] Regardless, these effects are not acceptable and Trans Mountain fully acknowledges and proposes timely and effective emergency response to limit any opportunities for public exposure to chemical vapours from a spill.[1105]

[1102] Trans Mountain Reply Evidence, Attachment 1.13 – Reply to City of Vancouver, Tsleil – Waututh Nation, Metro Vancouver - 'Air Quality Impacts from Simulated Oil Spills in Burrard Inlet and English Bay", (August 20, 2015) 9.

[1103] Exhibits B21-9 to B21-17 – Trans Mountain Pipeline ULC – Volume 8C; Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Project (December 17, 2013) (A3S5G9, A3S5H1, A3S5H3, A3S5H4, A3S5H7, A3S5H8, A3S5H9, A3S5I0, A3S5I1).

[1104] Exhibit B106-1 – Trans Mountain Pipeline UYLC HHRA Facility Spill Scenarios Part 1 (June 16, 2014) (A3Y1E9).

[1105] Trans Mountain Reply Evidence Attachment 1.13 – Reply to City of Vancouver, Tsleil – Waututh Nation, Metro Vancouver, Reply to 'Air Quality Impacts from Simulated Oil Spills in Burrard Inlet and English Bay", (August 20, 2015), 29.

Several intervenors rely on the Levelton Report to demonstrate the health consequences associated with a marine spill. With some exceptions, the overall approach used by Levelton to assess whether, and to what extent, people's health might be affected by exposure to vapours was similar to that of Trans Mountain's Marine HHRA.[1106] The significantly different conclusions are almost wholly attributable to problematic issues with Levelton's assessment:

(a) analysis of unrealistic spill locations and scenarios;

(b) exaggerated premise that an accident or malfunction will result in an instantaneous loss of the entire contents of a tank; and

(c) misstated and misleading estimates about vapour concentrations (specifically, benzene) that are available for evaporation that maybe encountered by people in the area .[1107]

Because of the limitations and weaknesses, Trans Mountain submits that Levelton's findings and conclusions respecting the potential human health impacts that could result from an oil spill should be considered highly tenuous and little confidence should be assigned to them.

In summary, through the work completed by DNV and others, Trans Mountain has assessed the potential likelihood and consequences of a marine oil spill in accordance with NEB and other federal guidance for emergency response and contingency planning and proposed extraordinary additional measures to ensure that incremental risks are mitigated. An oil spill incident involving

[1106] Exhibit B18-18 V7 TR 73 QHHRA WESTRIDGE (December 17, 2013) (A3S4X2); Exhibit B19-39 – V8B TR 8B9 QHHRA MAR SPILL (December 17, 2013) (A3S4R2); Exhibit B106-1 – Trans Mountain Pipeline UYLC HHRA Facility Spill Scenarios Part 1 (June 16, 2014) (A3Y1E9); Exhibit B 106-2 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 2 (June 16, 2014) (A3Y1F0); Exhibit B 106-3 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 3 (June 16, 2014) (A3Y1F1) Exhibit B 106-4 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 4 (June 16, 2014) (A3Y1F0); (A3Y1F2).

[1107] Trans Mountain Reply Evidence, Section 60 – Marine Risk Assessment (August 20, 2015), 60-27-60-28.

a Project tanker within the Project area caused by a natural peril such as flood, hurricane or earthquake is considered of very low likelihood.

Marine spill prevention, response and mitigation are paramount concerns for Trans Mountain and will remain a priority indefinitely. As detailed in Section 4 - Emergency Response of this final argument, in the unlikely event of a spill or release during loading at the Westridge Marine Terminal, Trans Mountain will respond immediately under the Terminal ERP.

Furthermore, as discussed in Section 9 - Economic of this final argument, the assumptions and approaches that Trans Mountain has relied on for assessing spill costs are conservative and reasonable. They suit the purpose (estimating potential liability), the location (as defined by the Application) and the circumstances (that the Application is an expansion of existing operations that have been ongoing for 60 years). Significant evidence has already been placed on the record through the Application and supplemental filings, Trans Mountain's responses to IRs, and independently prepared material (e.g., TERMPOL Review Process Report on the Trans Mountain Expansion Project). This evidence illustrates that adequate financial resources are available to meet claims in event of a spill.[1108]

Trans Mountain is confident that it has adequately assessed the potential consequences of a marine oil spill in accordance with NEB and other federal guidance for emergency response and contingency planning to ensure that risks are mitigated.

[1108] Trans Mountain Reply Evidence, Section 61- Marine Spill Liability Compensation (August 20, 2015), 61-5; Exhibit C353-4-3-TMEP TERMPOL Report (December 11, 2014) (A4F8Z4).

7.2.3 Cumulative Effects Assessment

The Board included the potential environmental and socio-economic effects of the proposed Project, including any cumulative environmental and socio-economic effects that are likely to result from the Project in the List of Issues.[1109]

In addition to assessing Project-specific effects, Trans Mountain conducted a rigorous assessment of the cumulative effects of the Project that satisfies all legal requirements. Following the findings of the Project-specific effects assessment, Trans Mountain conducted an assessment of the likely cumulative effects of the Project based on the requirements of the CEAA 2012 and guidance documents published by the CEA Agency. These documents require that all ESAs conducted under the CEAA 2012 consider the likely effects of the proposed project that overlap with the effects of past, existing, and reasonably foreseeable future developments in the area that have been or will be constructed.[1110]

The JRP for the Express Pipelines Project (which included the NEB) set out a three-part test for assessing cumulative effects under the former CEAA which contained identical language regarding the need to assess cumulative effects as CEAA 2012. The Panel stated that:

> First, there must be an environmental effect of the project being assessed.
>
> Second, that environmental effect must be demonstrated to operate cumulatively with the environmental effects from other projects or activities.

[1109] Exhibit A015 - National Energy Board - Letter and Hearing Order OH-001-2014 - Application for Trans Mountain Expansion Project (April 3, 2014) (A59503) 18.

[1110] CEAA, s 19(1)(a).

> Third, it must be known that the other projects or activities have been, or will be carried out and are not hypothetical.[1111]

Therefore, in order for there to be cumulative effects, there must be overlap between the effects of the proposed project and other activities. If there is no overlap, there is no cumulative effect for the purposes of the CEAA 2012. Secondly, there must be some certainty that a future activity will in fact be carried out for it to be considered in a cumulative effects assessment. The Panel for the Express Pipelines Project described this as "some probability, rather than a mere possibility, that the cumulative environmental effect will occur".[1112]

The cumulative effects assessment that was undertaken for the Project followed the requirements of the CEAA 2012. First, the environmental effects of the Project were assessed.[1113] Second, a spatial boundary was developed that was considered by discipline-specific experts to be the area in which the effects of the Project could overlap with the effects of other activities in a way that was non-trivial. Finally, the effects of the Project were considered within each spatial boundary in combination with the effects of other projects or activities that were either existing or reasonably foreseeable developments and activities. This methodology has been before the Board on numerous occasions and the Board has found it acceptable.[1114]

[1111] NEB-CEAA Joint Review Panel, Environmental Assessment of the Express Pipeline Project: Joint Review Panel Report OH-I-95, (May 1996), 187-88.

[1112] NEB-CEAA Joint Review Panel, Environmental Assessment of the Express Pipeline Project: Joint Review Panel Report OH-I-95, (May 1996), 98.

[1113] If a physical, biological or socio-economic element or indicator evaluated in Trans Mountain's environmental effects assessment had no residual effects predicted or effects were not considered likely, then these elements or indicators were excluded from the cumulative effects assessment. Based on this, the cumulative effects assessment was limited to Project elements or indicators that were found to have residual effects that could act cumulatively with residual effects from other projects or activities. See Exhibit B5-22 - V5A ESA 14of16 BIOPHYSICAL (December 16, 2013) (A3S1R1), 8-2.

[1114] See e.g. NEB – Report – NOVA Gas Transmission Ltd. – GH-001-2014 (April 2015); NEB – Reasons for Decisions – NOVA Gas Transmission Ltd. – GH-001-2012 (January 2013); NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-001-2011 (July 2012); NEB – Reasons for Decision – NOVA Gas

For each element and indicator, with the exception of the southern resident killer whale, the ESA concluded that the Project contribution to environmental and socio-economic cumulative effects will not be significant. In other words, for each element and indicator, the residual effects of the Project in conjunction with other projects that have been or will be carried out were not found to be significant, based on the definitions of significance for each indicator.

With respect to the southern resident killer whale, the cumulative effects assessment concluded that the population is currently experiencing significant cumulative effects. The Project will contribute to the existing adverse underwater acoustic conditions in the Marine RSA; however, the Project's additional contribution will be very small compared to other marine transportation sources for underwater noise—vessels calling on Westridge Marine Terminal as a result of the Project will only make up 6.6 per cent of total marine traffic volume within the Juan de Fuca Strait, compared to 1.1 per cent currently.[1115] The current stressors affecting the southern resident killer whale populations (i.e., environmental contamination, reductions in the availability or quality of prey, and both physical and acoustic disturbance) will continue to affect this population with or without the Project. As discussed above in Section 7.2.2.7, Trans Mountain has committed to developing the MMPP.

Trans Mountain has little direct control over the operating practices of the tankers or tugs, as Project-related marine vessels are owned and operated by a third-party. Through the ECHO Program, PMV will work in collaboration with government agencies, Aboriginal groups, marine industry users (including Trans Mountain), non-government organizations and scientific experts,

---

Transmission Ltd – GH – 2 – 2011 (February 2012) – NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-2-2010 (January 2011).

[1115] Exhibit B18-20 - V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A–69.

to examine threats to at-risk cetaceans in the region. These threats, as identified by DFO in relevant Recovery Strategies and/or Action Plans, will broadly encompass the four primary concerns that were raised by intervenors and that were considered by Trans Mountain in the Application (i.e., physical disturbance vessel strikes, acoustic disturbance underwater noise, environmental contaminants and reduced prey availability).

These types of projects will provide a better understanding of vessel–related cumulative regional threats, with the aim of informing potential mitigation options and developing innovative solutions to reduce underwater noise levels in the region. Trans Mountain intends to review the results of the ECHO Program studies with a view to incorporating the resulting recommendations in the MMPP.

LNIB raised concerns with the cumulative effects assessment methodology. Specifically that the Project scoped out evaluating the cumulative impact of residual effects that were determined unlikely to affect the viability or sustainability of a resource.[1116] However, Trans Mountain's evidence is that all likely residual Project effects, whether or not they were determined to be significant, were carried through the cumulative effects assessment for the Project. The approach adhered to the requirements of the NEB Filing Manual and is consistent, with current cumulative effects practice.

LNIB also expressed concern that the wildlife RSA is not large enough to understand cumulative effects at the population scale.[1117] Trans Mountain submits that the wildlife RSA was delineated to assess the area within which the Project has a reasonable potential to interact with other

[1116] Exhibit C217-5 -1- Written Evidence (June 19, 2015) (A4Q7H4).

[1117] Exhibit C217-5 -1- Written Evidence (June 19, 2015) (A4Q7H4).

developments that affect wildlife. The spatial extent of the study area represents a balance between an expansive study area that would dilute the apparent effects of the Project, and a small area that may be too small to capture cumulative impacts of other disturbance or to reflect the ecology of the wildlife indicator. Trans Mountain's wildlife RSA is consistent with the regional study area delineation approach used in recent assessments of federally and provincially regulated pipeline projects in B.C. and Alberta.[1118]

7.3 Follow-up and Monitoring

The Application describes the Environmental Compliance Program which will implement the EPPs for each component of the Project. Trans Mountain will engage qualified personnel to fill the roles and responsibilities described in the Environmental Compliance Program. Trans Mountain's Construction Management Team will ensure that measures of the EPP are communicated and understood by personnel and applied to all construction activities.[1119] The Environmental Compliance process is open to inspection by the NEB.[1120]

Trans Mountain has proposed a comprehensive PCEM program that is similar to recently approved PCEM programs on recent NEB projects. The objective of PCEM is to determine whether the environment is on a successful trajectory towards pre-construction conditions or acceptable operational conditions. PCEM can also help determine the effectiveness of reclamation measures conducted. The results of the PCEM Program will be submitted to the NEB after each year of monitoring. The PCEM Program will document post-construction environmental issues identified

[1118] Trans Mountain Reply Evidence Section 48 – Wildlife and Wildlife Habitat (August 20, 2015), 48-5.

[1119] Trans Mountain Reply Evidence, Section 31 – Environmental Compliance Program (August 20, 2015), 31-1.

[1120] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8); Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

for the Project. Issues that have been successfully mitigated will be listed as resolved. The program will also identify any locations with unresolved environmental issues and the remedial measures planned by Trans Mountain to resolve these issues.[1121]

Follow-up programs are mandatory for all EAs under the CEAA 2012. Under section 53 of the CEAA 2012, if the decision maker decides that the designated project is not likely to cause significant adverse environmental effects or if the Governor in Council decides that the adverse environmental effects are justified, the decision maker must establish conditions which the proponent of the designated project must comply with. These conditions include the mitigation measures that were taken into account in reaching the significance determination as well as the implementation of a follow-up program.[1122]

Under the CEAA 2012, and as described in the Filing Manual, a follow-up program is defined as a program to verify the accuracy of the ESA of a designated project, and to determine the effectiveness of any mitigation measures.[1123] The purpose of follow-up programs is to address the uncertainties that are inherent in EAs so that the actual effects of a project are monitored and adaptive management programs can be implemented if the actual effects differ from those predicted in the EA. Follow-up programs are particularly useful when:

(a) the project involves a new or unproven technology;

(b) the project involves new or unproven mitigation measures;

(c) an otherwise familiar or routine project is proposed for a new or unfamiliar environmental setting;

[1121] Trans Mountain Reply Evidence Section 24 – Post-construction Monitoring (August 20, 2015), 24-6.

[1122] CEAA 2012, s 53(4)(b).

[1123] CEAA 2012, 2(1).

(d) the assessment's analysis was based on a new assessment technique or model, or there is otherwise some uncertainty about the conclusions;

(e) project scheduling is subject to change such that environmental effects could result;

(f) the project may result in adverse environmental effects that were not addressed in the assessment; or

(g) the scientific knowledge used to predict the environmental effects of the proposed project is limited.[1124]

Trans Mountain has committed to extensive monitoring as well as follow-up for the Project. The objective of each follow-up program will be to test the accuracy of the predictions made in the ESA for a given biophysical or socio-economic component and to verify the effectiveness of mitigation measures.

Based on Project knowledge and comprehensive field studies to date, the need for follow-up programs have been identified for select wildlife species at risk.[1125] Trans Mountain continues to have ongoing discussions with Environment Canada, PMV and DFO as well as the appropriate provincial agencies on species at risk.[1126] The need for, and specifics of, follow-up programs will be defined as Project details become more refined and spatially-explicit information on critical habitat for species at risk becomes available. Trans Mountain will:

[1124] CEA Agency, "Operational Policy Statement: Follow-up Programs under the Canadian Environmental Assessment Act", (Updated December 2011) online: < https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=499F0D58-1>, 3.

[1125] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 84-86.

[1126] Exhibit B5-9 - V5A ESA 01of16 BIOPHYSICAL (December 16, 2013) (A3S1L3), vii.

(a) collaborate with federal and provincial wildlife authorities, Aboriginal groups, non-governmental environmental organizations and universities to support programs to monitor and conserve species at risk that could be affected by Project activities;

(b) conduct construction, post-construction and operations monitoring for agreed to species at risk, including monitoring of activity levels in known and predicted high quality habitat, using the appropriate survey methods; and

(c) where the effectiveness of proposed mitigation or compensation is uncertain, commit to a follow-up program to monitor and assess the effectiveness of its EPP, including the access management plan and specific mitigation measures proposed for each of the species at risk as outlined in Appendix "C" of the Management Plans.[1127]

Trans Mountain stated in response to NEB IR 2.032 that it is committed to NEB Draft Condition No. 10 for a Caribou Habitat Restoration Plan. For those species at risk that warrant monitoring and follow-up, a similar process and plan will be prepared to include:

(a) clear objectives for each species at risk;

(b) a list of criteria used to identify potential site-specific SARA listed species habitat;

(c) a description of how Trans Mountain has taken available and applicable Aboriginal traditional knowledge studies into consideration in identifying site specific habitat;

(d) a conceptual decision process used to identify any mitigation or restoration measures to be applied at different sites;

(e) quantifiable targets and performance measures that will be used to evaluate the extent of predicted residual effects, mitigation and restoration effectiveness, the

[1127] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 84.

extent to which the objectives have been met, and need for further measures to offset unavoidable and residual effects on habitat;

(f) a schedule indicating when mitigation measures will be implemented; and

(g) a summary of Trans Mountain's consultation with appropriate regulatory agencies and any potentially affected Aboriginal groups regarding the plan.[1128]

Trans Mountain has also committed to meeting NEB Draft Condition No. 11 which requires Trans Mountain to develop a Socio-Economic Effects Monitoring Plan.[1129]

At this stage, Trans Mountain's proposed monitoring and follow-up programs are preliminary. NEB approved conditions will incorporate input from this regulatory process, as well as the detailed Project plans that will be developed once the process is complete and a decision is made to proceed with the Project. Trans Mountain will meet the requirements of the NEB and CEA Agency guidance on follow-up and monitoring for all follow-up programs that are implemented for the Project.[1130]

The Board of Friends of Ecological Reserves ("FER") submitted written evidence regarding environmental monitoring and suggested several conditions, including the creation of a Marine Environmental Research and Monitoring Endowment Funds of $450,000.[1131] FER contends Trans Mountain has not collected adequate marine environmental data in the vicinity of the international

---

[1128] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (July 21, 2014) (A3Z4T9), 85.

[1129] Exhibit A019-1 - National Energy Board - Letter - Draft conditions and regulatory oversight - Trans Mountain Pipeline Expansion Project (April 16, 2014) (A3V8Z8), 11; Trans Mountain Reply Evidence, Appendix 1A - Comments on Updated Draft Conditions (August 20, 2015).

[1130] CEA Agency, *Follow-up Programs under the Canadian Environmental Assessment Act*, (December, 2011) Online: <https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=499F0D58-1>; NEB Filing Manual, A.2.8 Inspection, Monitoring, and Follow-up.

[1131] Exhibit C33-6-1 - Friends of Ecological Reserves Evidence KM TMX for NEB Report (May 28, 2015) (A4Q2T7).

shipping lanes and has not accurately predicted effects from Project-related marine transportation. These assertions are incorrect. Trans Mountain conducted the marine transportation effects assessment based on up to date research and does not believe that additional data collection would affect the conclusions presented in the Application. Trans Mountain submits that the conclusions presented in the Application and effects assessment are complete and accurate. To date, Trans Mountain has contributed to a number of collaborative initiatives that involve the collection of marine environmental data within the marine RSA as detailed in Trans Mountain's reply evidence.[1132]

Parks Canada recommends a condition that relates to post-construction monitoring through Management Objectives/Desired End Results ("MO/DERs"). In the past, these MO/DERs have been related to the ecological integrity, commemorative integrity and visitor experience of Jasper National Park and preservation of the Yellowhead Pass National Historic Site. Trans Mountain has agreed to work with Parks Canada to develop a set of MO/DERs with appropriate and applicable monitoring and performance criteria for the proposed reactivation activities. Trans Mountain supports Parks Canada's recommended condition[1133] and believes it is consistent with proposed Draft Condition No. 21.[1134]

7.4 Environment Conclusion

The Board can be confident that the construction and operation of the Project, subject to the Board's conditions, and the extensive regulatory regime that is currently in place, can be carried

[1132] Trans Mountain Reply Evidence Section 33 – Environmental Monitoring (August 20, 2015), 33-1.

[1133] Exhibit C347-1-1 - Parks Canada TMX Written Evidence (May 26, 2015) (A4L5U9), 11.

[1134] Trans Mountain Reply Evidence Section 24 – Post-construction Monitoring (August 20, 2015), 24-1.

out in a manner that will have no unacceptable environmental or socio-economic impacts. Where significant adverse environmental effects exist for the southern resident killer whale, Trans Mountain submits that multi-party solutions are the most appropriate approach to managing effects on critical habitat and any associated effects on traditional use of the population. The MMPP identifies and integrates multi-party solutions for this reason.[1135] Through the ECHO program, PMV will work in collaboration with government agencies, Aboriginal groups, marine industry users (including Trans Mountain), non-government organizations and scientific experts to examine threats to at-risk cetaceans in the region. These threats, as identified by DFO in relevant Recovery Strategies and/or Action Plans, will broadly encompass the four primary concerns that were raised by intervenors and that were considered by Trans Mountain in the Application (i.e., physical disturbance - vessel strikes, acoustic disturbance - underwater noise, environmental contaminants, and reduced prey availability).

[1135] Exhibit B239-13 – Trans Mountain Response to NEB IR No. 2 (September 21, 2014) (A3Z4T9), 154.

8. SOCIAL

8.1 Overview

This section discusses social elements of the Project including public participation, the NEB process and the potential Project-related effects on individuals, groups, communities and society. Trans Mountain's examination of social effects is based on extensive baseline data collection from published sources, technical discussions with informed sources, the guidance and requirements in local and regional land use and development policies and plans, feedback and information received through the Project's comprehensive stakeholder and Aboriginal engagement program, knowledge from traditional use and cultural studies conducted for the Project by and with Aboriginal communities and the professional experience of the assessment team.

Trans Mountain's commitment to the socio-economic aspects of sustainable development goes well beyond the economic benefits that will result from Project development and operations (e.g., job creation, job-related training opportunities and increased tax revenues). This commitment is reflected in Trans Mountain's decision not to rely solely on the NEB process to inform stakeholders about the Project. Instead, Trans Mountain designed its own process to ensure that all stakeholders had the opportunity to understand how the Project might impact them, have input into the Project and to participate in the regulatory process. Through consultation and conversations with tens of thousands of individuals, Trans Mountain made significant efforts to improve and optimize the Project. These efforts are ongoing.[1136]

[1136] Exhibit B1-6 - V3A 1.0 TO 1.4.1.11 PUBL CONSULT (December 16, 2013) (A3S0R2).

8.2 Social Aspects of Pipeline and Facilities ESA

Social[1137] elements potentially interacting with the Project include heritage resources, traditional land and resource use traditional marine resource use, social and cultural well-being, human occupancy and resource use (including marine commercial, recreational and tourism use), infrastructure and services, navigation and navigation safety, community health and human health risk.[1138]

Similar to the environmental elements, the indicators for each social element have been identified based on the Filing Manual and other regulatory guidelines, experience gained during previous projects with similar conditions/potential issues, feedback from Aboriginal groups, landowners, regulatory authorities, stakeholders and the general public, public issues raised through media, available research literature and the professional judgment of the assessment team.[1139]

The socio-economic effects assessment considers the potential effects of the Project on the social or human environment in the context of defined spatial and temporal boundaries. These boundaries vary with the issues and socio-economic elements or interactions to be considered, and reflect:

(a) the construction, operations, and decommissioning and abandonment phases of the proposed physical works and physical activities;

(b) the natural variation of a population or socio-economic indicator;

(c) the time required for an effect to become evident;

[1137] The Application refers to socio-economic elements, as per the NEB Filing Requirements; social and economic elements have been separated for the purposes of the final argument. The employment and economy indicator of the ESA is summarized in Section 8.2.3 of the final argument.

[1138] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-2.

[1139] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-3.

(d) the time required for a population or socio-economic indicator to recover from an effect and return to a natural condition;

(e) the area directly affected by proposed physical works and physical activities; and

(f) the area in which a population or socio-economic indicator functions and within which a Project effect may be experienced.[1140]

8.2.1 Heritage Resources

In May 2013, Trans Mountain commenced a Historical Resources Impact Assessment ("HRIA") for the Alberta portion of the proposed pipeline. In June 2013, Trans Mountain commenced an Archaeological Impact Assessment ("AIA") for the B.C. portion of the proposed pipeline corridor. Fieldwork for both the Alberta HRIA and the B.C. AIA are ongoing through the 2015 fieldwork season. To date, a total of 32 previously unknown archaeological sites and a potential of approximately 50 previously unknown historic sites have been identified in Alberta, along with 55 previously unknown archaeological sites in B.C. Based on both assessments, Trans Mountain committed to implementing the recommendations of Alberta Culture and the B.C. Archaeology Branch, respectively.[1141]

The selected indicators for heritage resources included archaeological, historic and palaeontological sites.[1142]

Trans Mountain reduced the potential for encountering heritage resources by aligning the proposed pipeline corridor to parallel the existing TMPL right-of-way to the extent feasible. In addition,

[1140] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-3, 7-4.

[1141] Exhibit B5-20 - V5A ESA 12of16 BIOPHYSICAL (December 16, 2013) (A3S1Q9), 7-10.

[1142] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-9.

Trans Mountain committed to implementing recommendations from Alberta Culture and the B.C. Archaeology Branch.[1143]

During the regulatory process, the Board raised concerns regarding palaeontological resources in B.C. because palaeontological resources do not have protection as heritage resources under the B.C. *Heritage Conservation Act*.[1144] Trans Mountain, through qualified palaeontologists, conducted an overview palaeontological assessment of the entire proposed pipeline corridor in B.C. Based on this assessment, Trans Mountain developed mitigation measures to address issues associated with palaeontological resources in B.C. that may arise during Project construction.[1145]

By implementing the mitigation measures for the heritage resources indicators and adhering to governmental legislation, the Project gives communities the opportunity to promote their heritage.[1146] The ESA found that with the implementation of industry standard and provincially regulated mitigation measures during the pre-construction and construction phases of the Project, there are no residual effects of the Project on heritage resources.

8.2.2 Traditional Land and Resources Use

The ESA concluded that there were potential residual socio-economic effects on TLRU indicators associated with the construction and operations of the Project.[1147] However, Trans Mountain's ESA concluded that there are no situations for TLRU that would result in a significant adverse

[1143] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-10.

[1144] RSBC 1996, c187.

[1145] Exhibit B032-2- Trans Mountain Response to NEB IR No. 1, 1 of 2 (May 14, 2014) (A3W9H8), 134.

[1146] Exhibit B5-40 - V5B ESA 15of16 SOCIOEC (December 16, 2013) (A3S1S9), 7-316.

[1147] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-30.

residual socio-economic effect. This indicates that the socio-economic effects of the pipeline and facilities component of the Project on TLRU indicators will be not significant.[1148]

Trans Mountain assessed potential Project effects on land and resource use on the basis of effects on hunting, trapping, fishing, plant gathering, trails and travelways, habitation sites, gathering places and sacred areas. This was done through extensive consultation beginning in April 2012 with over 85 Aboriginal groups engaged on the Project.[1149] Trans Mountain provided funding to Aboriginal groups to conduct land and resource use studies, and performed a thorough review of literature and relevant government data for publically available current TLRU information.[1150] Project-specific TLRU studies were completed by 52 Aboriginal communities and two non-Project specific TLRU studies were provided to Trans Mountain for baseline information on TLRU. In addition Aboriginal communities participated in the Aboriginal field program accompanying biophysical surveys.

Trans Mountain reviewed all TLRU information that it received and results were incorporated into the Application. Four public supplemental TLRU reports and one confidential TLRU report were filed with the NEB.[1151] The results of TLRU studies were used to inform the assessment by identifying TLRU sites potentially affected by the Project, identifying potential Project effects on TLRU indicators and contributing to the development of mitigation measures to address these effects. A letter updating the assessment conclusion based on new information obtained from the

---

[1148] Exhibit B5-40 - V5B ESA 15of16 SOCIOEC (December 16, 2013) (A3S1S9), 7-318.

[1149] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-15.

[1150] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-16.

[1151] Exhibit B241-3 – Trans Mountain Pipeline ULC Traditional Land Use Part 1 of 4 (July 21, 2014) (A3Z4Z2); Exhibit B291-30 – Part 13 Traditional Land Resource Use Supplemental Report (December 1, 2014) (A4F5D1); Exhibit B306-20 – Trans Mountain Response to NEB IR No. 3.008a-Attachment 1 (February 3, 2015) (A4H1X0).

TLRU studies accompanies each supplemental report filed.[1152] The results of the TLRU studies are also integrated into the Aboriginal Engagement Program, and are used to facilitate the planning and design of mitigation measures as appropriate and available.[1153]

8.2.3 Social and Cultural Well-Being

The ESA concluded that there were potential residual socio-economic effects on social and cultural well-being indicators.[1154] However, Trans Mountain's ESA concluded that there are no situations for social and cultural well-being indicators that would result in a significant residual socio-economic effect. Therefore, the residual socio-economic effects of Project construction and operations on social and cultural well-being indicators will be not significant.[1155]

Regarding income patterns, Trans Mountain found that a wide range of employment opportunities are anticipated in relation to the Project, particularly during construction. For example, there is evidence to suggest that the levels of income experienced by those involved in direct Project-related employment during construction may be notably higher than existing average incomes in the socio-economic RSA.[1156] Furthermore, the ESA found that the overall Project effect on income levels and distribution is anticipated to be positive.[1157]

[1152] Exhibit B251-3 – TLRU Supplemental Letter Aug 11 (August 13, 2014) (A4A0W2); Exhibit B291-29 – Part 13 Cover Letter Traditional Use Studies (December 1, 2014) (A4F5D0); Exhibit B306-1 - Trans Mountain Pipeline ULC NEB IR No. 3 Cover Letter Feb 3 2015 (February 3, 2015) (A4H1V1).

[1153] Exhibit B249-30 – Trans Mountain Pipeline ULC Tech Update 1 Cons Update 2 Part 6 Update Aboriginal Engage Pt01 (August 1, 2014) (A3Z8Q1), 9. Note: a detailed summary of Trans Mountain's engagement activities with each potentially affected Aboriginal community is provided in Volume 3B and Appendix A of Volume 3B of the Application.

[1154] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-45.

[1155] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-59.

[1156] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-52.

[1157] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-54.

8.2.4 Human Occupancy and Resource Use

The ESA concluded that there were potential residual socio-economic effects on human occupancy and resource use indicators associated with the construction and operations of the Project. However, Trans Mountain's ESA found that there are no situations for human occupancy and resource use indicators that would result in a significant residual socio-economic effect. Therefore, the residual socio-economic effects of Project construction and operations on human occupancy and resource use indicators will not be significant.

To ensure issues raised by holders of forest Management Areas in Alberta, tenure holders of Mineral Placers or claims in B.C. and trappers in both Alberta and B.C. were considered in the assessment of human occupancy and resource use, Trans Mountain made information available to the stakeholders through the Stakeholder Engagement Program and through mail-outs.[1158]

8.2.5 Infrastructure and Services

Based on the findings in Trans Mountain's ESA, there are no situations for infrastructure and services indicators that would result in a significant residual socio-economic effect. Therefore, the residual socioeconomic effects of Project construction and operations on infrastructure and services indicators will not be significant.[1159]

8.2.6 Navigation and Navigation Safety

The proposed pipeline corridor crosses multiple watercourses considered navigable or potentially navigable in Alberta and B.C., as well as several potentially navigable wetlands. In the Pipeline EPP, Trans Mountain provided a summary of the watercourse crossings, including a determination

[1158] Exhibit B306-2 – Trans Mountain Response to NEB IR No. 3 (February 3, 2015) (A4H1V2), 30.

[1159] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-157.

of navigability for each watercourse, which will continue to be refined as required as the route is finalized.[1160] Construction through watercourses will utilize a number of appropriate pipeline watercourse crossing methods selected in consideration of the size, environmental sensitivities of each watercourse and the season/timeframe of the construction period of each particular crossing. Trans Mountain has committed to a number of mitigation measures to minimize the impact of the Project on navigation and navigation safety including marine navigation and navigation safety in Burrard Inlet related to the expanded Westridge Marine Terminal.

The ESA concluded that there were potential residual socio-economic effects on navigation and navigation safety associated with the construction and operations of the Project.[1161] However, based on the results of the ESA, there are no situations for navigation and navigation safety that would result in a significant socio-economic residual effect. Therefore, the residual socio-economic effects of Project construction and routine operations on navigation and navigation safety will not be significant.[1162]

8.2.7 Community Health

The ESA concluded that there were potential residual socio-economic effects on community health indicators associated with the construction and operations of the Project.[1163] However, as stated in Trans Mountain's ESA, there are no situations for community health indicators that would result

[1160] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-152.

[1161] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-155.

[1162] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-157.

[1163] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-206.

in a significant residual socio-economic effect. Therefore, the residual socio-economic effects of Project construction and operations on community health indicators will not be significant.[1164]

Several Aboriginal communities expressed concerns in written evidence that changes in surface water quality could occur that would reduce the availability or quality of drinking water.[1165] The Project is unlikely to have a significant adverse effect on drinking water quality. Planned mitigation measures include: prohibiting the use of herbicides within 30 m of a watercourse or waterbody; monitoring water quality during construction and post-construction; grading away from watercourses to reduce the risk of introduction of soil and organic debris; reducing potential for soil erosion; and other mitigation measures as described in the EPPs.[1166] Trans Mountain submits that its mitigation measures are sufficient to minimize any impacts of the Project on surface water quality and availability for Aboriginal communities.

8.3 Social Aspects of Marine Shipping ESA

8.3.1 Traditional Marine Resource Use

Trans Mountain understands that many Aboriginal communities have historically used or presently use the Marine RSA to maintain a traditional lifestyle and continue to use resources for a variety of purposes including fish, shell-fish, mammal and bird harvesting, aquatic plant gathering and spiritual/cultural pursuits as well as through the use of navigable waters within the Marine RSA to access subsistence resources, neighboring communities and coastal settlements.[1167]

[1164] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-230.

[1165] Exhibit C78-10-2 - Coldwater Written Evidence (May 27, 2015) (A4Q0W6); Exhibit C333-3-2 - Documents (May 27, 2015) (A4L8L3); Exhibit C333-3-3 - Traditional Land Use Study (May 27, 2015) (A4L8L4).

[1166] Trans Mountain Reply Evidence, Section 75.5 – Drinking water quality (August 20, 2015), 75-4.

[1167] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-364.

Trans Mountain assessed potential Project effects on TMRU on the basis of effects on travelways, plant gathering sites, hunting, fishing, gathering places and sacred areas. This was done through extensive consultation beginning in April 2012 with over 85 Aboriginal groups.[1168] Trans Mountain also provided funding to Aboriginal groups to conduct TMRU studies, and performed a thorough review of literature and relevant government data for publically available current TMRU information.[1169] Project-specific TMRU studies were completed by 16 Aboriginal communities with interests in the marine RSA and two non-Project specific TMRU studies were provided to Trans Mountain for baseline information on TMRU.

Trans Mountain reviewed all TMRU information received and results were incorporated into the Application. Three public supplemental TMRU technical reports were filed with the NEB and one confidential TLRU report was filed with the NEB.[1170] The results of TMRU studies were used to inform the assessment by identifying TMRU sites potentially affected by the Project, identifying potential Project effects on TMRU indicators and contributing to the development of mitigation measures to address these effects. Accompanying each filing of supplemental reports was a letter updating the assessment conclusions based on new information obtained from the TMRU studies.[1171] The results of the TMRU studies are also integrated into the Aboriginal Engagement Program.[1172]

[1168] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-15.

[1169] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-16.

[1170] Exhibit B241-3 – Trans Mountain Pipeline ULC Traditional Land Use Part 1 of_4 (July 21, 2014) (A3Z4Z2); Exhibit B291-31 – Part 13 Traditional Marine Resource Use Supplemental Report (December 1, 2014) (A4F5D2); Exhibit B306-20 – Trans Mountain Response to NEB IR No. 3.008a-Attachment 1 (February 3, 2015) (A4H1X0).

[1171] Exhibit B251-3 – TLRU Supplemental Letter Aug 11 (August 13, 2014) (A4A0W2); Exhibit B291-31 – Part 13 Traditional Marine Resource Use Supplemental Report (December 1, 2014) (A4F5D2).

[1172] Exhibit B249-30 – Trans Mountain Pipeline ULC Tech Update 1 Cons Update 2 Part 6 Update Aboriginal Engage Pt01 (August 1, 2014) (A3Z8Q1), 9. Note: a detailed summary of Trans Mountain's engagement activities with

To mitigate potential effects from increased marine shipping as a result of the Project, all vessels in Canadian waters are required to follow Transport Canada rules in order to avoid conflict when passing and possible collision.[1173]

In their evidence, the Canadian Coast Guard provided a summary of navigational aids that provide valuable information to vessels in the marine shipping lanes to ensure the safety of all vessels navigating in close proximity to each other:

> Ships of 300 gross tonnes or more engaged on an international voyage and domestic ships of 500 gross tonnes or more (other than fishing vessels) must be fitted with AIS. This system automatically provides information, including the ship's identity, type, position, course, speed, navigational status and other safety-related information, to AIS-equipped shore stations, vessels and aircraft. AIS improves situational awareness and greatly enhances the traffic-monitoring capabilities for MCTS centres. With radar also in place throughout the zone, there is no requirement for additional sensors. Radio reception is sufficient for the entire route from the entrance to Juan de Fuca Strait to Vancouver Harbour. MCTS officers monitor ship traffic within the zone providing information to vessels to help make on-board navigational decisions.[1174]

As noted by Transport Canada in their evidence, the *Collision Regulations*[1175] provide uniform measures in regard to the safe conduct of vessels. The regulations describe rules of general conduct specific to the navigational, steering and sailing rules; navigational lights and shapes to be displayed; and the sound and light signals to be used by every vessel and pleasure craft in Canadian waters.[1176]

---

each potentially affected Aboriginal community is provided in Volume 3B and Appendix A of Volume 3B of the Application.

[1173] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-364.

[1174] Exhibit C97-2-3 - Attachment 2 - Written Evidence of the Canadian Coast Guard (May 27, 2015) (A4L7D5), 9.

[1175] CRC, c 1416.

[1176] Exhibit C353-5-2 -TC Evidence Submission (May 27, 2015) (A4L7K1), A-12-A-13.

Trans Mountain has voluntarily committed to requiring a tug to accompany Project-related tankers for their entire transit through the Strait of Georgia and between Race Rocks and the 12 nautical mile marker to assist with navigation. The tug escort commitment is an enhancement to existing tug requirements and goes above and beyond any current regulatory requirements, including Transport Canada's rules. The tug can be tethered for extra navigational assistance if needed.[1177]

Based on this mitigation, the ESA concluded that the residual effects associated with increased Project-related marine vessel traffic on TMRU are considered not significant, with the exception of the expected residual effects on the southern resident killer whale population as well as associated traditional use of the population, which are considered to be significant, as discussed in Section 7 - Environment.[1178] It is important to note that existing cumulative effects on this species are already significant. Presently, there are no technically or economically feasible mitigation measures to address the Project's contribution to these effects.

8.3.2 Marine Commercial, Recreational and Tourism Use

Trans Mountain recognizes that a variety of marine commercial, recreational, and tourism use activities occur in the PMV and the shipping lanes. Trans Mountain provided a comprehensive review of existing commercial fisheries and aquaculture, marine transportation, marine recreation and marine tourism use in the Marine RSA in the Application.[1179] Similar to TMRU, potential effects on increased marine vessel traffic on marine commercial, recreational and tourism use will

[1177] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-364.

[1178] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-377.

[1179] Exhibit B19-11 - V8B TR 8B6 01 OF 03 1 to 3.3 MAR COMM REC TOUR (December 17, 2013) (A3S4K4); Exhibit B19-12 - V8B TR 8B6 02 OF 03 3.4 to F4.2-6 MAR COMM REC TOUR (December 17, 2013) (A3S4K5); Exhibit B19-13 - V8B TR 8B6 03 OF 03 4.2 to 7.3 MAR COMM REC TOUR (December 17. 2013) (A3S4K6).

be mitigated through Trans Mountain's commitment to use tug escorts to act as navigational aids for Project-related vessels in the shipping channel. Trans Mountain has committed to providing other marine users with timely information regarding Project-related shipping so that marine users are aware of all Project-related vessels utilizing the shipping lanes. Trans Mountain has also considered marine access and movement and sensory disturbance in Burrard Inlet during the construction and operation of the Westridge Marine Terminal. Trans Mountain is confident the proposed mitigation will ensure any potential impacts to marine commercial, recreational and tourism use are minimized and not significant.

A number of marine-based Aboriginal groups raised concerns regarding Project-related impacts on marine commercial activities. TWN are partial owners of a commercial fishing company involved in commercial salmon and other fisheries.[1180] TWN submitted that increased tanker traffic has the potential to result in harm to local ecology and may affect TWN fishing activities.[1181]

Shxw'ōwhámel and Peters Band submitted evidence that a marine spill in the Salish Sea has the potential to contaminate fish migrating up the Fraser River. This would greatly diminish or eliminate the ability of First Nations' members to harvest salmon, lamprey and eulachon from the Fraser River.[1182] Other issues raised by Aboriginal communities included risk of vessel

[1180] Exhibit C358-13-6 - Vol 2 Tab 2 REDACTED TWN History Culture and Aboriginal Interest Report Morin Part 4 of 4 (May 26, 2015) (A4L5Z7), 360.

[1181] Exhibit C358-13-6 - Vol 2 Tab 2 REDACTED TWN History Culture and Aboriginal Interest Report Morin Part 4 of 4 (May 26, 2015) (A4L5Z7), 406.

[1182] Exhibit C312-8-3 - Collier Impacts of Freshwater or Marine Spill of Aquatic Resources Report (May 27, 2015) (A4Q1A1), 39.

collisions,[1183] damage to fishing vessels and/or gear,[1184] disruption of access to fishing areas[1185] and effects on tourism operations (related to hazards and sensory effects).[1186]

Other intervenors emphasized the social and economic importance of commercial fisheries to Aboriginal and non-Aboriginal communities. Trans Mountain recognizes the overall value that commercial fishing has to many communities and individuals located in coastal B.C. and the importance of assessing and minimizing any Project-related interactions with all commercial fishing activities and other marine users.[1187] Trans Mountain identified and addressed all such potential effects on marine commercial, recreational and tourism use that were noted by intervenors.

With respect to the marine fish resources that underpin commercial fishing, Trans Mountain examined potential effects of Project-related marine vessels on marine fish and fish habitat.[1188]

[1183] Exhibit C411-1-1- Written Evidence of the Maa-nulth Nations (May 26, 2015) (A4L6D5), 9; Exhibit C219-6-5 - Appendix C - LFN Firelight Desktop Study TMEP Socio-Economic Impacts (May 27, 2015) (A4Q0I4); Exhibit C246-4-1 - Prelim Report MIB Evidence for TMEP (May 27, 2015) (A4Q2F9), 32; Exhibit C336-7-2 - Written Evidence Appendix A (May 27, 2015) (A4L7G2); Exhibit C336-7-3 - Written Evidence Appendix B part 1 (May 27, 2015) (A4L7G3).

[1184] Exhibit C411-1-1- Written Evidence of the Maa-nulth Nations (May 26, 2015) (A4L6D5), 9; Exhibit C267-6-2 - Written Evidence of Adam Olsen (May 27, 2015) (A4L6V3), 5; Exhibit C359-4-2 - T Sou-ke Nation - Sworn Affidavit of Chief Gordon Planes (May 26, 2015) (A4L5T0), 13; Exhibit C336-7-2 - Written Evidence Appendix A (May 27, 2015) (A4L7G2), 11; Exhibit C336-7-3 - Written Evidence Appendix B part 1 (May 27, 2015) (A4L7G3), 51-53; Exhibit C336-7-5 - Written Evidence Appendix C part 1 (May 27, 2015) (A4L7G5), 15; Exhibit C336-7-7 - Written Evidence Appendix D (May 27, 2015) (A4L7G7), 3.

[1185] Exhibit C411-1-1- Written Evidence of the Maa-nulth Nations (May 26, 2015) (A4L6D5), 9; Exhibit C267-6-2 - Written Evidence of Adam Olsen (May 27, 2015) (A4L6V3), 5; Exhibit C359-4-2 - T Sou-ke Nation - Sworn Affidavit of Chief Gordon Planes (May 26, 2015) (A4L5T0), 13; Exhibit C86-12-1 - Written Evidence of Cowichan Tribes (May 27, 2015) (A4L9Y9), 5; Exhibit C246-4-1 - Prelim Report MIB Evidence for TMPE (May 27, 2015) (A4Q2F9), 2-4; Exhibit C336-7-8 - Written Evidence Appendix E (May 27, 2015) (A4L7G8), 2.

[1186] Exhibit C358-13-13 - Vol 4 Tab 4 TWN Assessment Part 6 of 7 (May 26, 2015) (A4L6A4), 78; Exhibit C219-6-2 - Written Evidence of Lyackson First Nation (May 27, 2015) (A4Q0H9), 6.

[1187] Trans Mountain Reply Evidence, Section 60.1 – Economic Importance of Commercial Fisheries and Marine Tourism (August 20, 2015), 60-1.

[1188] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-280 – 8A-281.

Trans Mountain has committed to a number of measures to limit the effects of the expanded Westridge Marine Terminal on marine commercial, recreational and tourism use in Burrard Inlet. To minimize incremental hazards and effects on marine access, the expanded dock complex has been designed to ensure marine movement will not be impeded. The shortest distance that will occur between a tanker docked at Westridge Marine Terminal and the navigation beacon at Roche Point will be approximately 850 m; the high tide line at the boat launch at Cates Park will be approximately 1020 m; and the southeast corner of the dock at Cates Park will be approximately 1000 m.[1189] Trans Mountain will undertake a variety of measures to reduce lighting and noise during the construction and operation phases of the Westridge Marine Terminal. The residual environmental effects of operation activities associated with increased Project-related marine vessel traffic on marine fish and fish habitat will not be significant.

Certain intervenors raised concerns that the increase in Project-related tankers and tugs in the shipping lanes may further restrict the times and locations in which commercial fishing activities can take place and may obstruct or otherwise impede the ability of fishers to travel to and access fishing areas.[1190]

[1189] Exhibit B316-26 – Trans Mountain Response to NS NOPE IR No. 2 (February 18, 2015) (A4H8V8).

[1190] Exhibit C267-6-2 - Written Evidence of Adam Olsen (June 12, 2015) (A4L6V3); Exhibit C86-12-1 - Written Evidence of Cowichan Tribes (May 27, 2015) (A4L9Y9); Exhibit C219-6-2 - Written Evidence of Lyackson First Nation (May 27, 2015) (A4Q0H9); Exhibit C411-1-1- Written Evidence of the Maa-nulth Nations (May 26, 2015) (A4L6D5); Exhibit C246-4-1 - Prelim Report MIB Evidence for TMPE (May 27, 2015) (A4Q2F9); Exhibit C355-15-2 - Tsawout First Nation Affidavit of Harvey Underwood (May 27, 2015) (A4Q1D4); Exhibit C359-4-2 - T Sou-ke Nation - Sworn Affidavit of Chief Gordon Planes (May 26, 2015) (A4L5T0); Exhibit C362-4-2 - Unifor Evidence TMX (May 26, 2015) (A4L6C6); Exhibit C336-7-2 - Written Evidence Appendix A (May 27, 2015) (A4L7G2); Exhibit C336-7-3 - Written Evidence Appendix B part 1 (May 27, 2015) (A4L7G3); Exhibit C336-7-5 - Written Evidence Appendix C part 1 (May 27, 2015) (A4L7G5); Exhibit C336-7-7 - Written Evidence Appendix D (May 27, 2015) (A4L7G7); Exhibit C336-7-8 - Written Evidence Appendix E (May 27, 2015) (A4L7G8).

The potential for Project tankers to disrupt Aboriginal and non-Aboriginal fishing vessels while in transit to fishing areas or actively engaged in fishing activities is discussed in the Application.[1191] Trans Mountain will provide regular, updated information on Project-related marine vessel traffic to industry organizations, Aboriginal communities and other affected stakeholders, and will initiate a public outreach program prior to the Project operations phase. It is important to note that Project-related tankers will represent an incremental addition to existing large-vessel commercial traffic in the PMV and the established shipping lanes. Disruptions to fishing activities are equally likely to occur in relation to all large vessels currently using the shipping lanes, and Project-related marine vessels will make up a small portion of total marine traffic.[1192]

Trans Mountain recognizes that a variety of commercial, recreational, tourism and traditional use activities occur in PMV and the shipping lanes. That is why Trans Mountain provided a comprehensive review of existing commercial fisheries and aquaculture, marine transportation, marine recreation and marine tourism use in the Marine RSA in the Application.[1193]

KMC's Tanker Acceptance Standard states that "all vessels shall conduct operations within Canada, specifically PMV, in accordance with any additional guidance provided by the Terminal, and always respectful of the rights of the residents in surrounding neighbourhoods to not be unnecessarily disturbed by noise, odours and health or other concerns from vessel operations."[1194]

[1191] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 8A-377, 8A-378.

[1192] Trans Mountain Reply Evidence, Section 60.2 – Disruption of Fishing Activities and Access to Commercial Fishing Areas (August 20, 2015), 60-2.

[1193] Exhibit B19-11 - V8B TR 8B6 01 OF 03 1 to 3.3 MAR COMM REC TOUR (December 17, 2013) (A3S4K4); Exhibit B19-12 - V8B TR 8B6 02 OF 03 3.4 to F4.2-6 MAR COMM REC TOUR (December 17, 2013) (A3S4K5); Exhibit B19-13 - V8B TR 8B6 03 OF 03 4.2 to 7.3 MAR COMM REC TOUR (December 17. 2013) (A3S4K6).

[1194] Exhibit B96-2 – Trans Mountain Response to Belcarra IR No. 1.9 Attachment1 (June 4, 2014) (A3X6W2).

Trans Mountain will operate the Westridge Marine Terminal in a manner that reduces the time vessels bound for the terminal spend at designated anchorages in Burrard Inlet.[1195] Trans Mountain worked extensively with PMV to develop guidance for the vessels to minimize the effects of light and noise on residents around the Port.[1196] Trans Mountain's commitment to on-going communication regarding increased shipping activities at the terminal is reflected in the fact that Trans Mountain will:

(a) provide information updates on Project-related marine vessel traffic to fishing industry organizations, Aboriginal communities, and other affected stakeholders; and

(b) where possible, initiate a public outreach program prior to the Project operations phase through the Chamber of Shipping of B.C. and other applicable agencies.

A range of possible interactions between Project-related marine vessels and other commercial, recreational and tourism marine users were identified and considered in the Marine Transportation ESA including commercial fisheries and aquaculture. No significant adverse residual effects are identified with respect to routine operations of Project-related marine vessels on marine commercial, recreational and tourism use by Aboriginal and non-Aboriginal users in the marine local study area or marine RSA.[1197]

8.3.3 Human Health Risk Assessment

To identify and understand the nature and extent to which people's health could be affected from exposure to the chemicals emitted from the Project and Project-related marine traffic, Trans

[1195] Exhibit B96-2 – Trans Mountain Response to Belcarra IR No. 1.9 Attachment1 (June 4, 2014) (A3X6W2).

[1196] Exhibit B96-1 - Trans_Mountain_Response_to_Belcarra_IR_No._1 (June 4, 2014) (A3X6W1), 19.

[1197] Exhibit B18-20 - V8A 1.4.2.7 TO T4.1.1.1 MAR TRANS ASSESS (December 17, 2013) (A3S4X4), 8A-89.

Mountain conducted HHRAs. The HHRAs examined the potential health impacts that could result from both routine, planned operations, for which the chemical exposures could be anticipated and addressed on the basis of known or reasonably well-defined exposure scenarios, as well as accidents and malfunctions, involving chemical exposures that may potentially be experienced under a number of simulated oil spill scenarios.

8.3.3.1 Routine Operations

Trans Mountain conducted four HHRAs to assess the potential impacts of chemicals emitted from the Project and Project-related marine traffic on human health under routine operating conditions:

(a) Screening Level Human Health Risk Assessment of Pipeline and Facilities Technical Report;[1198]

(b) Screening Level Human Health Risk Assessment of Marine Transportation Technical Report;[1199]

(c) Human Health Risk Assessment of Westridge Marine Terminal Technical Report;[1200] and

(d) Human Health Risk Assessment of Marine Transportation Technical Report.[1201]

[1198] Exhibit B5-7 - V4C 1.0 TO APPB PROJ DES AND EXEC-OP AND MAINT (December 16, 2013) (A3S1L1); Exhibit B5-8 - V5A COVER (December 16, 2013) (A3S1L2); Exhibit B5-11 - V5A ESA 03of16 BIOPHYSICAL (December 16, 2013) (A3S1L5); Exhibit B5-13 - V5A ESA 05of16 BIOPHYSICAL (December 16, 2013) (A3S1L7).

[1199] Exhibit B5-22 - V5A ESA 14of16 BIOPHYSICAL (December 16, 2013) (A3S1R1).

[1200] Exhibit B107-1 – Trans Mountain Pipeline ULC HHRA Westridge Marine Terminal Part 1 (June 16, 2014) (A3Y1F4); Exhibit B107-2 – Trans Mountain Pipeline ULC HHRA Westridge Marine Terminal Part 2 (June 16, 2014) (A3Y1F5).

[1201] Exhibit B108-1 – Trans Mountain Pipeline ULC HHRA Marine Transportation Part 1 (June 16, 2014) (A3Y1F7); Exhibit B108-2 – Trans Mountain Pipeline ULC HHRA Marine Transportation Part 2 (June 16, 2014) (A3Y1F8).

The overall approach to assessing the potential human health risks associated with the Project and Project-related marine vessel traffic proceeded step-wise, beginning with an initial screening-level human health risk assessment ("SLHHRA"). The SLHHRAs represented a preliminary examination of the potential health effects that might be experienced under the routine operation of the Project and Project-related marine vessel traffic by members of the general public. The assessment was conducted as a screening-level exercise to understand the overall likelihood, nature and extent to which people's health might be affected, with the findings used to determine if elevated health risks exist, and if so, the need for further, more detailed investigation of these risks.[1202]

The SLHHRAs, by convention, embraced a high degree of conservatism through the use of assumptions intentionally selected to represent worst-case or near worst-case conditions. For example, people were assumed to be found on both a short-term and long-term basis at the location within the LSA[1203] corresponding to the maximum point of impingement ("MPOI") of the chemical emissions (i.e., the location where the highest concentrations of the chemical emissions were predicted to occur and where the highest chemical exposures could potentially be experienced by the general public), regardless of whether or not people would reasonably be expected to reside at or frequent this location.[1204]

[1202] Trans Mountain Reply Evidence, Section 62.1 – Routine Operations (August 20, 2015), 62-1.

[1203] The LSAs for the Edmonton, Sumas, and Burnaby terminals as well as the Westridge Marine Terminal were defined as the area within a 5-km radius of the terminal. For marine transportation, the LSA was defined as the area within a 5-km buffer of the marine shipping lanes for the Project-related marine vessel traffic, extending from the Westridge Marine Terminal in Burnaby, through Burrard Inlet, south through the southern part of the Strait of Georgia, the Gulf Islands and Haro Strait, then westward past Victoria and through the Juan de Fuca Strait out to the 12 nautical mile limit of Canada's territorial sea.

[1204] Trans Mountain Reply Evidence, Section 62.1 – Routine Operations (August 20, 2015), 62-2. Note: MPOI refers to the location at which the highest air concentrations of each of the chemicals of potential concern would be expected to occur, and at which the chemical exposures received by the people within the area would be greatest.

The goal of the HHRAs was to identify and understand the potential health risks presented to people associated with short-term and long-term exposure to the chemicals emitted from the Project, with a focus on the chemicals emitted from the Edmonton, Sumas and Burnaby terminals and the Westridge Marine Terminal, and Project-related marine vessel traffic.[1205] The HHRAs were completed following a standard risk assessment approach which offered a "tried and true" method for assessing the potential health risks related to chemical exposure. This approach has been developed by leading regulatory agencies such as Health Canada, the United States Environmental Protection Agency ("US EPA") and the World Health Organization.

In the HHRAs close attention was given to: identifying the people who could be at greatest risk; the chemicals of potential concern ("COPC") to which these people could be exposed; and, the pathways by which exposure could occur. Allowance was made for the fact that the people may practice different lifestyles that could affect their opportunities for exposure to the COPC. In this regard, the HHRAs examined the potential health risks that could be presented to residents of local Aboriginal and non-Aboriginal communities, with allowance made for the possibility that these Aboriginal peoples may practice a traditional lifestyle. Allowance also was made for the fact that the people exposed to the chemical emissions could include sub-populations who may show heightened sensitivity to chemical exposures, such as infants and young children, the elderly and people with compromised health. The HHRAs characterized the potential health risks for an extensive list of chemicals, including those identified to be of particular concern by intervenors (e.g., benzene, nitrogen dioxide, sulphur dioxide and particulate matter). In addition to the health risks associated with exposure to the individual COPC, the HHRAs followed Health Canada

[1205] Exhibit B10-25 - V5D TR 5D7 1of4 SCREEN HUMAN HEALTH (December 16, 2013) (A3S2L1); Exhibit B19-38 - V8B TR B8 SLHHRA MAR (December 17, 2013) (A3S4R1); Exhibit B107-1 – Trans Mountain Pipeline ULC HHRA Westridge Marine Terminal Part 1 (June 16, 2014) (A3Y1F4); Exhibit B108-1 – Trans Mountain Pipeline ULC HHRA Marine Transportation Part 1 (June 16, 2014) (A3Y1F7).

guidance by assessing the health risks of multiple chemicals acting in combination with each other (i.e., chemical mixtures).[1206]

The exposure pathways examined in the HHRAs included not only the primary inhalation pathway, but also secondary pathways such as the consumption of locally-grown and/or harvested foodstuffs. In the absence of consumption patterns for Aboriginal and non-Aboriginal peoples (referred to as urban dwellers) within the LSA, reliance was placed on the *First Nations Food Nutrition and Environment Survey* for B.C.[1207] and guidance provided by Health Canada[1208] to characterize the consumption patterns of people living in the LSA.

Contrary to the assertions of intervenors, the HHRAs offered detailed and comprehensive analyses of the potential health risks that could result from either short-term or long-term exposure to the COPC emitted from the Project and the Project-related marine vessel traffic for all relevant routes of exposure. As indicated above, the assessments proceeded step-wise, beginning with the SLHHRA in which the potential health risks that could be presented to the general public were examined in the context of a "worst-case exposure scenario" which assumed human exposure to the maximum ground-level air concentrations of the COPC at the MPOI. Subsequent, more refined analyses involving more realistic exposure scenarios were then performed to better understand any potential health risks that could be presented to people, with examination of locations extending beyond the MPOI, including discrete receptor locations near the Westridge Marine Terminal and on land along Burrard Inlet. The HHRAs revealed that, notwithstanding the conservative

---

[1206] Exhibit B19-38 - V8B TR B8 SLHHRA MAR (December 17, 2013) (A3S4R1), 3-32.

[1207] Trans Mountain Reply Evidence, Section 45.1.5 Human Health Risk Assessment (August 20, 2015).

[1208] Exhibit B107-1 – Trans Mountain Pipeline ULC HHRA Westridge Marine Terminal Part 1 (June 16, 2014) (A3Y1F4); Exhibit B108-1 – Trans Mountain Pipeline ULC HHRA Marine Transportation Part 1 (June 16, 2014) (A3Y1F7).

assumptions employed, the maximum predicted levels of exposure to the COPC remained below the levels of exposure that would be expected to cause health effects for even the most sensitive individuals in the population.

Trans Mountain has a high level of confidence in the conclusion that serious adverse human health effects are not expected as a result of the chemical emissions from the Edmonton, Sumas and Burnaby terminals, the Westridge Marine Terminal and the Project-related marine vessel traffic under routine operating conditions. This is primarily due to the: (i) conservative assumptions used in the air quality assessment; (ii) conservative assumptions used in the HHRAs; and (iii) conservative exposure limits used in the HHRAs that are developed by leading scientific and government authorities charged with the protection of public health, including sensitive or susceptible individuals (e.g., infants and children, pregnant women, the elderly, individuals with compromised health).[1209] Trans Mountain's HHRAs illustrate that it is highly unlikely that people will experience health effects from the potential increase in chemical exposures associated with emissions from the Project or the increase in Project-related marine vessel traffic.[1210]

Health Canada expressed concern regarding the uncertainties in the predicted ground-level air concentrations of the COPC that served as the basis of the predicted health risks.[1211] Although Trans Mountain acknowledges that uncertainty can surround any predictions, regardless of whether the predictions relate to air quality or health risks, it is Trans Mountain's position that these uncertainties were accommodated through the use of assumptions that were both reasonable and conservative. Further, Trans Mountain has committed to design each terminal such that the

[1209] Exhibit B115-1 – Trans Mountain Response to BROKE IR No. 1 (June 18, 2014) (A3Y2D3), 36.

[1210] Exhibit B18-29 - V8A 4.2.12.2 TO T5.2.2 MAR TRANS ASSESS (December 17, 2013) (A3S4Y3), 426.

[1211] Health Canada – Letter of Comment (August 11, 2015) (A4S0Z6).

ground-level air concentrations of the COPC, including those chemicals identified to be of particular concern by intervenors and Health Canada[1212] (e.g., benzene, nitrogen dioxide, sulphur dioxide and particulate matter) are below the lowest applicable ambient air quality objectives established in B.C., or Alberta.[1213] To ensure that these objectives are met, Trans Mountain has also agreed to update its assessment of air quality as the Project's engineering design nears or reaches completion,[1214] and to conduct ambient air quality monitoring and reporting at a new station to be installed at the Westridge Marine Terminal. It is Trans Mountain's opinion that the findings and conclusions of the HHRAs remain valid and accurately reflect the manner and extent to which people's health could be affected by exposure to the chemical emissions associated with Project and Project-related marine vessel traffic. Based on the weight-of-evidence, it is Trans Mountain position that the potential health risks that could be presented to the general public from exposure to the emissions would be negligible and no adverse health effects would be anticipated. Nonetheless, Trans Mountain has committed to update its HHRA of the Westridge Marine Terminal should the updated air quality assessment reveal increases in the predicted ground-level air concentrations of the COPC under the Base, Application or Cumulative cases.[1215]

A number of parties expressed concerns related to the potential effects of DPM on health. Specifically, FVRD, Metro Vancouver, Health Canada and Dr. Brahm Miller expressed concerns regarding the potential carcinogenic risks associated with exposure to DPM emitted from the

[1212] Trans Mountain Reply Evidence, Section 45 - Human Health Risk Assessment (August 20, 2015).

[1213] NEB IR No. 3.019b (Filing ID A4H1V2)

[1214] PMV IR No. 2.25 (Filing ID A4H8W5).

[1215] B384-18 - Trans Mountain Responses to GoC F-IR No. 2 – (A4L0A5).

Project-related marine vessel traffic.[1216] According to Metro Vancouver and the FVRD, Trans Mountain inaccurately characterized the evidence supporting DPM cancer risks; dismissed the California Office of Environmental Health Hazard Assessment ("OEHHA") guideline for DPM; inappropriately characterized the cancer risks by using DPM concentrations averaged over the air quality study area; and failed to account for the notion that existing DPM concentrations along the shores of Burrard Inlet already present an unacceptably high level of risk to the area residents.

Contrary to these assertions, Trans Mountain maintains that its assessment of potential health risk associated with DPM was appropriate and that the conclusions with respect to the Project-related cancer risks remain valid.[1217] Trans Mountain provided a comprehensive assessment of the potential carcinogenicity of DPM in its response to FVRD IR No. 2.12.[1218] This response described how the weight-of-evidence currently does not support the use of a cancer-based exposure limit for assessing the health risks associated with DPM. In order to explicitly address FVRD's concern, the response to FVRD IR No. 2.12 presented the cancer risks using the same OEHHA unit risk value that was used to characterize the DPM cancer risks in Exhibits 17 and 18 of the Metro Vancouver submission.[1219] Trans Mountain fully recognizes that there is general consensus among regulatory agencies that diesel exhaust, including DPM, is carcinogenic. However, considerable uncertainty exists with respect to the actual dose-response relationship of DPM, thereby limiting the ability of regulators to develop a proper cancer-based exposure limit. In light of this

[1216] Exhibit C132-9-11 - Affidavit of Rebecca Abernethy (May 27, 2015) (A4L8W6); Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3); Exhibit C240-4-1 - B. Miller - Trans Mountain written evidence (May 27, 2015) (A4L8L6); Health Canada – Letter of Comment (August 11, 2015) (A4S0Z6).

[1217] Trans Mountain Reply Evidence, Section 62.1.1.3 – Diesel Particulate Matter (August 20, 2015), 62-14.

[1218] Exhibit B315-44 – Trans Mountain Response to FVRD IR No. 2 (February 18, 2015) (A4H8S0).

[1219] Exhibit C234-7-22 - Exhibit 17, Levelton 2007 Air Toxics Emission Inventory - Health Risk Assessment (May 27, 2015) (A4L8A3); Exhibit C234-7-23 - Exhibit 18, Sonoma Technology 2015 Toxic Air Pollutants Risk Assessment (May 27, 2015) (A4L8A4).

uncertainty, neither Health Canada nor the US EPA has developed a cancer-based exposure limit (or unit risk value) for DPM. In its evidence, Metro Vancouver[1220] contends that "an appropriately conservative risk assessment approach would be to use the OEHHA's cancer unit risk in the Trans Mountain assessment, while acknowledging the inherent uncertainty raised by the US EPA and others."[1221]

Trans Mountain did not dismiss the OEHHA guideline for DPM. In fact, Trans Mountain carefully reviewed and weighed the basis of the OEHHA guideline. In light of the US EPA's assessment of DPM, Trans Mountain maintains that the low confidence of the OEHHA guideline limits its usefulness when assessing the potential risks to health associated with DPM. In spite of this, Trans Mountain estimated the DPM cancer risks using the OEHHA guideline in its response to FVRD IR No. 2.12.[1222] It did so by using predicted DPM air concentrations averaged over a five km radius centered on the Westridge Marine Terminal in order to remain consistent with the approach taken in the two referenced health risk assessment reports referenced by FVRD and Metro Vancouver.[1223] Instead of presenting risks at discrete receptor locations, use of average DPM concentrations allowed for a more meaningful estimate of population-level risks.[1224]

Trans Mountain acknowledges that, when using the OEHHA guideline, the calculated excess cancer risks could marginally exceed 1 in 100,000 at certain locations along the shores of Burrard Inlet. However, these cancer risk estimates need to be interpreted with a degree of caution. The

---

[1220] Exhibit C234-7-2 - MV Evidence Submission Final (May 27, 2015) (A4L7Y3).

[1221] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-15.

[1222] Exhibit B315-44 – Trans Mountain Response to FVRD IR No. 2 (February 18, 2015) (A4H8S0).

[1223] Exhibit C132-9-23 - Exhibit M to R. Abernethy Affidavit (May 27, 2015) (A4L8X8); Exhibit C234-7-23 - Exhibit 18, Sonoma Technology 2015 Toxic Air Pollutants Risk Assessment (May 27, 2015) (A4L8A4).

[1224] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-16.

need for caution is principally due to the uncertainty associated with the use of the OEHHA guideline.

Further, when compared to cancer statistics for the Fraser Health and Vancouver Coastal Health regions, the existing lung cancer risk estimates presented by Metro Vancouver and FVRD appear to significantly overstate the actual risk of DPM-related lung cancer in the region.[1225] For example, evidence submitted by the FVRD and Metro Vancouver indicate that existing DPM concentrations in the region may be responsible for 22.4 to 37.2 cases of lung cancer per 100,000 people. In the B.C. Cancer Agency's 2011 Regional Cancer Report, age-standardized incidence rates of lung cancer for the Fraser Health and Vancouver Coastal Health regions were reported to be 46.82 per 100,000 and 41.64 per 100,000, respectively. It is well known that the dominant risk factor for lung cancer is exposure to tobacco smoke. The B.C. Lung Association indicates that more than 90 per cent of lung cancers in men and at least 70 per cent in women are directly caused by cigarette smoking. This is supported by the B.C. Cancer Agency, which suggests that "about 85-90 per cent of lung cancer patients are smokers, former smokers or people exposed to long-term to second-hand smoke."[1226]

Using the Fraser Health statistic of 46.8 per 100,000 as an example, between 39.8 and 42.1 cases of lung cancer per 100,000 people are likely due to smoking (i.e., 85-90 per cent of the overall rate). This suggests that other risk factors may be responsible for approximately 4.7 to 7.0 cases of lung cancer per 100,000 (i.e., 10-15 per cent of the overall rate in the Fraser Health region). These numbers are in stark contrast to the cancer risks presented in the evidence submitted by the

[1225] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-17.

[1226] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-20.

FVRD and Metro Vancouver, where the risk of lung cancer associated with existing levels of DPM was estimated to range between 22.4 and 37.2 per 100,000. In all likelihood, the use of the OEHHA unit risk value in the FVRD and Metro Vancouver evidence for the estimation of the cancer risks associated with DPM results in exaggeration of the actual risks to the DPM-related cancer risks in the region and thus should not be relied on.[1227]

In response to the concerns raised by FVRD, Metro Vancouver and Dr. Brahm Miller with respect to DPM, Trans Mountain has presented extensive and compelling evidence that:

(a) it used a scientifically defensible approach for assessing the potential health risks for DPM;

(b) there is low confidence in the OEHHA guideline that FVRD and Metro Vancouver used to characterize the potential carcinogenic risks associated with DPM; and

(c) as discussed above, the excess lung cancer risks presented in the FVRD and Metro Vancouver submissions are unrealistic estimates of what the actual DPM-related risks are for lung cancer in the region.[1228]

The fact is that Trans Mountain used the OEHHA cancer unit risk in its assessment of DPM and in doing so described in detail the "inherent uncertainty raised by the US EPA" in its response to FVRD IR No. 2.12. Trans Mountain maintains that the low confidence of the OEHHA cancer unit risk limits its usefulness when attempting to assess the potential risks to health associated with DPM exposure.[1229]

[1227] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-21.

[1228] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-21.

[1229] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-15.

Based on the above evidence, Trans Mountain maintains that chemical emissions, including DPM, from the Project and the Project-related marine vessel traffic are not expected to adversely affect health in the region.

8.3.3.2 Accidents and Malfunctions

To assess the potential impacts of an accident or malfunction involving a pipeline spill, facility or marine vessel associated with the Project on human health, Trans Mountain conducted HHRAs, including:

(a) Qualitative Human Health Risk Assessment of Westridge Marine Terminal Spills Technical Report;[1230]

(b) Qualitative Human Health Risk Assessment of Marine Transportation Spills Technical Report;[1231]

(c) Human Health Risk Assessment of Pipeline Spill Scenarios Technical Report;[1232] and

(d) Human Health Risk Assessment of Facility and Marine Spill Scenarios Technical Report.[1233]

The overall approach to assessing the potential health effects that could occur among people present in the area of an oil spill associated with the Project and Project-related marine vessel traffic proceeded step-wise, beginning with a preliminary qualitative human health risk assessment

[1230] Exhibit B18-18 - V7 TR 73 QHHRA WESTRIDGE (December 17, 2013) (A3S4X2).

[1231] Exhibit B19-39 - V8B TR 8B9 QHHRA MAR SPILL (December 17, 2013) (A3S4R2).

[1232] Exhibit B88-2 – Trans Mountain Response to Surrey Teachers IR No. 1.5a-Attachment1 (June 4, 2014) (A3X6U1).

[1233] Exhibit B106-1 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 1 (June 16, 2014) (A3Y1E9);
Exhibit B106-2 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 2 (June 16, 2014) (A3Y1F0);
Exhibit B106-3 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 3 (June 16, 2014) (A3Y1F1);
Exhibit B106-4 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 4 (June 16, 2014) (A3Y1F2).

("QHHRA"). The results of the preliminary QHHRAs were then used to determine the need for a more comprehensive assessment to better determine the prospect for people's health to be affected and to better define the nature and extent of any health effects that they might experience.[1234]

The approach followed for the QHHRAs of the various spill scenarios differed from that routinely adopted for the assessment of the potential health risks associated with chemical exposures, including the HHRAs of the routine operations. Unlike routine operations, which consist of planned activities for which chemical exposures and any associated health risks can be anticipated and assessed on the basis of known or reasonably well-defined exposure scenarios, spills represent low probability, unpredictable events for which the exposures and risks must necessarily be forecast on the basis of strictly hypothetical scenarios. Accordingly, rather than following a conventional HHRA paradigm with an emphasis on quantifying the potential risks involved, the QHHRAs of the various spill scenarios were designed to provide an indication of the prospect for people's health to be affected under different hypothetical spill scenarios, together with an indication of the types of health effects, if any, that might be experienced, with both elements addressed from a qualitative perspective.

The overall approach followed for the QHHRAs included consideration of: the type and volume of oil spilled; the types of chemicals contained in the spilled oil to which people could be exposed; the extent to which people could be exposed based on predictions of how the spilled oil and the chemicals would likely behave in the environment; the manner and pathways by which people might be exposed to the chemicals; the types of health effects known to be caused by the chemicals as a function of the amount and duration of exposure; the responsiveness and sensitivity of the

[1234] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-43.

6864 people who potentially could be exposed to the chemicals; and, the emergency response measures
6865 that will quickly be taken by Trans Mountain and other spill response authorities to limit people's
6866 exposure to the chemicals in the unlikely event of a spill.[1235]

6867 In their written evidence, Adams Lake Indian Band,[1236] Burnaby,[1237] the City of Vancouver,[1238]
6868 Coldwater Indian Band,[1239] Living Oceans Society,[1240] LNIB,[1241] NS NOPE,[1242]
6869 Shxw'ōwhámel[1243] and Upper Nicola Band[1244] expressed concerns over the possible effects that a
6870 pipeline or facility oil spill might have on human health via exposures other than inhalation. In
6871 most cases, the concerns raised were associated with a pipeline spill.

6872 The prospect for and extent to which the general public might be exposed to either the spilled oil
6873 itself and/or chemicals originating from the spilled oil through exposure pathways other than
6874 inhalation were determined to be low to very low, and adverse health effects would not be

---

[1235] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-43 – 45-44.

[1236] Exhibit C3-14-2 - ALIB Response to MPMO IR #1 (June 14, 2015) (A4R4D0).

[1237] Exhibit C69-44-22 - Health Impacts - Guidance to Metro Vancouver and Fraser Valley Municipalities to Assist in Reviewing the Trans Mountain Pipeline Expansion Project from Public Health Perspective (May 27, 2015) (A4L8H6).

[1238] Exhibit C77-28-4 - Appendix 50 (May 27, 2015) (A4L7K9); Exhibit C77-27-1 - Written Evidence (May 27, 2015) (A4L7V8).

[1239] Exhibit C78-13-2 - Coldwater Response to Information Request of Natural Resources Canada (July 14, 2015) (A4R4H0).

[1240] Exhibit C214-18-5 - Attachment D to written evidence of Living Oceans - Health Risks - Dr Batterman (May 27, 2015) (A4L9S0).

[1241] Exhibit C217-5 -1- Written Evidence (June 19, 2015) (A4Q7H4).

[1242] Exhibit C259-9-6 - NSNOPE written evidence (R. Ott) (May 27, 2015) (A4L9R2).

[1243] Exhibit C312-7-2 - Sworn Affidavit of Alfred James Shxw'ōwhámel First Nation (May 27, 2015) (A4L9U9); Exhibit C312-8-4 - Mark West Spill Risk Assessment Report (May 27, 2015) (A4Q1A2).

[1244] Exhibit C363-25-2 - Upper Nicola Band Response to Information Request from Government of Canada (July 14, 2015) (A4R4I4).

anticipated. Opportunity for exposure of the general public by these other pathways would be limited, in part, because of the emergency and spill response measures that would be taken by Trans Mountain, the WCMRC, Coast Guard authorities and/or other spill response agencies and personnel, to quickly contain and recover the spilled oil. These timely, coordinated spill response actions are intended to reduce the prospect for people to be exposed to the spilled oil itself and/or chemicals released from the oil via all exposure pathways on both a short-term and longer-term basis.[1245]

Certain intervenors expressed concerns regarding the potential health effects associated with the spillage of products other than Cold Lake Winter Blend ("CLWB") diluted bitumen, including light and synthetic crudes as well as refined products such as gasoline or jet fuel. As discussed in Trans Mountain's response to City of Vancouver IR No. 2.08.04b, although the TMPL system (existing Line 1) currently transports a variety of crude oil and refined products such as gasoline or jet fuel, the expansion (Line 2) has been proposed 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.[1246] The expanded TMPL system will have the capability to transport a variety of crude oil products, including both light and heavy crude oil. Those crude oils often referred to as diluted bitumen will be the primary crude oil transported in Line 2, and refined products such as gasoline will continue to be transported in existing Line 1. Assessment of products carried in existing Line 1 is outside the scope of the Application.[1247]

[1245] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-66.

[1246] Exhibit B314-46 – Trans Mountain Response to City of Vancouver IR No. 2 (February 18, 2015) (A4H8I9).

[1247] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-58.

Based on the rationale provided in response to Living Oceans Society IR No. 1.33c[1248] and summarized below, CLWB diluted bitumen was selected as the representative crude oil for the identification of the COPC to be assessed in the HHRAs. The rationale for the selection of CLWB was:

(a) Diluted bitumen is expected to comprise a large percentage of the oil transported by Line 2.[1249]

(b) CLWB is currently transported by Trans Mountain, and it will continue to represent a large percentage of the total products transported by Line 2. Accordingly, in the unlikely event of a spill occurring, there is a strong possibility that the spilled product will be CLWB.

(c) The diluent in CLWB is liquid condensate that is rich in light-end hydrocarbons that are volatile or semi-volatile in nature. These hydrocarbon components could potentially be released as vapours from the surface of the spilled oil, which would then disperse in a downwind direction, possibly reaching people who could inhale them.

(d) A sample of CLWB was tested by an accredited third-party laboratory to provide information on its physical and chemical characteristics. A full list of trace elements and organic compounds analyzed in CLWB, including the concentration of individual chemical compounds, was provided in Table 6.2 of the Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report.[1250]

[1248] Exhibit B136-1 – Trans Mountain Response to Living Oceans IR No. 1 (June 18, 2014) (A3Y2T4).

[1249] Exhibit B18-1 - V7 1.0 TO 5.2.8.3 RISK ASSESS MGMT SPILLS (December 17, 2013) (A3S4V5), 7-49 – 7-51.

[1250] Exhibit B18-15 - V7 TR 71 01 OF 02 ERA PIPELINE (December 17, 2013) (A3S4W9).

(e) A study characterizing the emissions from the surface of the CLWB in terms of the types and amounts of chemicals present was conducted. The study was provided as BROKE IR No 1.9a – Attachment 1 – Flux Chamber Sampling Program in Support of Spill Modelling for the Trans Mountain Expansion Project Final Report.[1251]

It remains Trans Mountain's position that CLWB diluted bitumen is a representative product for the assessment of the potential health effects that might be experienced by people in the event of an oil spill.[1252]

In terms of the specific chemical constituents of the CLWB diluted bitumen that were examined, selection was guided by the results of a chemical analysis together with the results from a study characterizing the emissions from the surface of the CLWB as discussed above.[1253] On the basis of these results, the COPC consisted principally of lighter-end volatile and semi-volatile hydrocarbons, including aliphatic and aromatic constituents. These latter constituents included benzene, which was identified as a chemical of primary concern to certain intervenors.[1254]

Consistent with the NEB's letter entitled "Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities, Trans

---

[1251] Exhibit B115-2 – Trans Mountain Response to BROKE IR No.1.9a-Attachment1 (June 18, 2014) (A3Y2D4).

[1252] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-59.

[1253] The study was provided as BROKE IR No 1.9a – Attachment 1 – Flux Chamber Sampling Program in Support of Spill Modelling for the Trans Mountain Expansion Project Final Report (see Exhibit B115-2 – Trans Mountain Response to BROKE IR No.1.9a-Attachment1 (June 18, 2014) (A3Y2D4)).

[1254] Exhibit C41-8-2 - Human Health Impacts Report TMEP - Takaro (May 27, 2015) (A4L6U5); Exhibit C77-28-5 - Appendix 51 (May 27, 2015) (A4L7L0); Exhibit C109-3-1 - Written Evidence D Doherty (May 27, 2015) (A4L8U3); Exhibit C259-8-2 - NSNOPE written evidence (J Edmonds) (May 26, 2015) (A4L5V1); Exhibit C214-18-5 - Attachment D to written evidence of Living Oceans - Health Risks - Dr Batterman (May 27, 2015) (A4L9S0); Exhibit C312-8-3 - Collier Impacts of Freshwater or Marine Spill of Aquatic Resources Report (May 27, 2015) (A4Q1A1).

Mountain Expansion Project",[1255] each of the HHRAs examined a set of simulated and unmitigated spill scenarios involving different-sized spills: one corresponding to credible worst-case circumstances and the second involving a similar, but smaller-sized spill. Descriptions of each of the simulated and unmitigated oil spill scenarios are discussed below.

The QHHRA of Westridge Marine Terminal involved the spillage of oil while loading a tanker vessel at berth at the Westridge Marine Terminal. The Credible Worst-Case spill was assessed assuming a volume of 160 m^3 of CLWB diluted bitumen. At 160 m^3, this spill is substantially smaller than the over 1,500 m^3 capacity of the precautionary boom that will be deployed around each berth while any cargo transfer activities are taking place, and reasonable currents at the terminal support the full containment of the spilled oil within the pre-deployed boom. As a conservative approach to this scenario, it was deemed that, for the purpose of oil spill modelling and health effects assessment, 20 per cent of the oil released (i.e., 32 m^3) would escape the containment boom. This condition was chosen to ensure a conservative approach to spill response requirements at the site and does not reflect Trans Mountain's expectation for performance of the precautionary boom, which will be in place to fully contain such a release at the Westridge Marine Terminal. A smaller release of 10 m^3 of CLWB diluted bitumen was also evaluated. This smaller release was assumed to result from a loading arm leak and be totally contained within the boom placed around all tankers during loading.[1256]

The QHHRA of marine transportation involved a second set of simulated and unmitigated spill scenarios of different sized spills resulting from the grounding of a laden tanker on Arachne Reef.

[1255] NEB Letter and Filing Requirements to Trans Mountain - Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities - Trans Mountain Expansion Project (September 10, 2013), (A53984).

[1256] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-44.

The Credible Worst-Case oil spill scenario and the similar but smaller spill scenario that were assessed involve the spillage of 16,500 m³ and 8,250 m³, respectively, of CLWB diluted bitumen into the northern portion of the Haro Strait from the powered grounding of a laden tanker on Arachne Reef. Both scenarios shared a number of common features with respect to the various criteria that governed their selection in terms of the spill location, including:

(a) the northern entrance to the Haro Strait has the greatest level of navigation complexity for the entire passage that would be taken by the tanker, due in part to the nature of the route and conditions encountered, as well as the numerous vessels that transit the Strait;

(b) the tanker was assumed to strike the reef while under its own power; whereas, it has been proposed that the tanker be tethered to a tug through this part of the passage; and

(c) the spill location has a very high environmental and socio-economic value, with several distinct areas and habitats present including Boundary Bay, the Gulf Islands, the San Juan Islands, the Salish Sea, and the Juan de Fuca Strait.[1257]

The findings of the QHHRAs suggested that people's health could be affected by acute inhalation exposure to the chemical vapours released during the early stages of an oil spill under each of the simulated oil spill scenarios examined. Although the health effects would likely be confined to mild, transient sensory and/or non-sensory effects, attributable largely to the irritant and central nervous system depressant properties of the chemicals, the findings of the QHHRAs signaled the need for further analysis to define the nature and extent of any health effects. On this basis, the HHRA of facility and marine spill scenarios was completed, which presents a more in-depth

[1257] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-44.

analysis of the potential health effects that could be experienced by people under the different simulated spill scenarios compared to the earlier QHHRAs, providing better definition of the types of effects that could occur, the time course of these effects, and the populations that might be affected.[1258]

In addition, in Trans Mountain's response to Surrey Teachers IR 1.5a – Attachment 1, an HHRA aimed at identifying and understanding the potential health effects that might be experienced by people under a set of simulated and unmitigated pipeline oil spill scenarios was completed.[1259] The oil spill scenarios examined involved the spillage of oil to land in Metro Vancouver as a result of third-party damage to the pipeline during the summer season. The selection of the spill location was based, in part, on the fact that more people could be potentially affected by a spill occurring near an urban centre compared to a spill in a remote, largely uninhabited area along the pipeline corridor because of the higher population size and density involved. Moreover, the large population size found in urban centres better allows for the possibility that individuals showing heightened sensitivity to chemical exposures could be part of the exposed cohort compared to the sparser populations found in remote areas. In addition, stakeholders at various community meetings and the Fraser Health and Vancouver Coastal Health expressed an interest in understanding the potential human health effects that could result from an oil spill in an urban area. Although the pipeline oil spill scenarios assumed that the spills occurred in Metro Vancouver, the findings and conclusions of the HHRA were considered to be representative of the manner and

[1258] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-45

[1259] Exhibit B88-2 – Trans Mountain Response to Surrey Teachers IR No. 1.5a-Attachment1 (June 4, 2014) (A3X6U1).

extent to which people's health could potentially be affected by exposure to the chemical vapours emitted by the spilled oil in the unlikely event of a spill along the entire pipeline route.[1260]

Certain intervenors[1261] expressed concern regarding the potential health effects that might be experienced by people in the event of a large tanker spill (i.e., 16,000 m³) within Burrard Inlet or English Bay. This concern was re-iterated in Health Canada's letter of comment.[1262] Identification of the exact location to be examined in the HHRA[1263] of the marine transportation spill scenarios (i.e., Arachne Reef) was risk-informed, taking into consideration both spill probability and potential consequences in terms of ecological, human and socio-economic sensitivities.[1264] Furthermore, the Credible Worst-Case of 16,500 m³ was specific to a vessel grounding or collision that results in complete loss of two cargo tanks in an Aframax tanker, which is not a credible scenario within Burrard Inlet or English Bay. DNV[1265] found that the likelihood of a spill of this size (i.e., 16,000 m³) occurring in the Burrard Inlet is very low due to the strong set of risk reducing measures in place as well as the slow speed of tankers and other vessels in this area.[1266]

The major conclusions that emerged from the HHRAs were:

[1260] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-45.

[1261] Exhibit C41-8-2 - Human Health Impacts Report TMEP - Takaro (May 27, 2015) (A4L6U5); Exhibit C69-44-21 - Health Impacts - VCH and FH to City of Vancouver and City of Burnaby (May 27, 2015) (A4L8H5); Exhibit C77-28-4 - Appendix 50 (June 12, 2015) (A4L7K9); Exhibit C77-27-1 - Written Evidence (June 12, 2015) (A4L7V8); Exhibit C77-28-5 - Appendix 51 (June 12, 2015) (A4L7L0).

[1262] Health Canada – Letter of Comment (August 11, 2015) (A4S0Z6).

[1263] Exhibit B106-1 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 1 (June 16, 2014) (A3Y1E9); Exhibit B106-2 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 2 (May 27, 2015) (A3Y1F0); Exhibit B106-3 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 3 (May 27, 2015) (A3Y1F1); Exhibit B106-4 – Trans Mountain Pipeline ULC HHRA Facility Spill Scenarios Part 4 (May 27, 2015) (A3Y1F2).

[1264] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-56.

[1265] Exhibit B93-1- Trans Mountain Response to PMV IR No. 1 (June 4, 2014) (A3X6V4).

[1266] Exhibit B21-2- V8C TR 8C 12 02 of 03 TERMPOL 3.15 RISK ANAL (December 17, 2013) (A3S5F6).

(a) Based on the weight-of-evidence, there was no obvious indication that people's health would be seriously adversely affected by acute inhalation exposure to the chemical vapours released during the early stages of a spill under any of the simulated oil spill scenarios examined.

(b) The evidence indicated that the health effects that could be experienced by people in the area would likely be confined to mild, transient sensory and/or non-sensory effects, attributable largely to the irritant and central nervous system depressant properties of the chemicals. Odours also might be noticed, which could contribute to added discomfort and irritability.

(c) The evidence indicated that these mild, transient health effects could be experienced under all of the simulated oil spill scenarios examined; however, the intensity of the effects would be greatest for the larger spill sizes because of the higher concentrations of the chemical vapours that could be encountered and the longer durations of exposure.

(d) Although mild and transient, the effects would still be annoying and discomforting, indicating the need for and importance of the spill prevention programs described in Volumes 7 and 8A of the Application. Planning and preparedness around emergency and spill response also are critical to ensure timely and adequate response to any spill events in order to limit opportunities for chemical exposures such that public health is not threatened or compromised, again highlighting the need for and importance of the emergency and spill response programs described in Volumes 7 and 8A.

(e) The absence of any serious adverse health effects from exposure to the chemical vapours released from the surface of the oil surface during the early stages of the

> spill scenarios applies to people in general, including the general public as well as first responders arriving on scene. However, because the first responders could remain on scene for some time while working to isolate, contain, and recover the spilled oil, and could face the prospect of direct physical contact with the oil and/or more prolonged exposure to the vapours, it is important that they be trained in emergency and spill response procedures, be equipped with personal protective equipment and be alert to potential exposure opportunities so as to minimize any exposures they might receive.[1267]

A number of considerations were offered by Health Canada in its Letter of Comment in relation to the development of mitigation measures and spill management plans aimed at minimizing potential exposure opportunities and any associated health effects that people could experience in the event of an oil spill, including the importance of: (i) monitoring of environmental media, with allowance for lag times for the possible appearance of contaminants in drinking water sources and/or foodstuffs, including country foods; (ii) identification of people and communities potentially at risk, including Aboriginal communities; and (iii) consultation with health authorities and potentially-affected communities in the development of communication plans and health advisories.[1268] Trans Mountain welcomes these considerations and has embraced them as part of its emergency and spill response programs, as evidenced, in part, by the emergency and spill response plans described in Volumes 7 and 8A of the Application, on-going dialogue and a continued commitment to engage and inform the local health authorities and local communities of emergency and spill response programs.

[1267] Trans Mountain Reply Evidence, Section 45 – Human Health Risk Assessment (August 20, 2015), 45-48.

[1268] Health Canada – Letter of Comment (August 11, 2015) (A4S0Z6).

8.4 Social Conclusion

Trans Mountain has taken social considerations and effects related to the Project seriously. Trans Mountain's comprehensive data collection program and its interactions with stakeholders and the public have allowed it to carefully assess the potential effects the Project may have on the social or human environment including Aboriginal groups, communities, service providers, resource users and other potentially affected groups. Trans Mountain has committed to a comprehensive suite of mitigation measures which will minimize effects on the social or human environment. Trans Mountain has also committed to developing a program to monitor adverse socio-economic effects during the construction phase of the Project, as per NEB Draft Condition No. 11. No significant adverse residual social effects are anticipated in relation to the Project. Given the dynamic nature of socio-economic conditions and the influence of factors beyond the Project, Trans Mountain submits that the mitigation measures it proposes are effective and that the issues that have arisen during the regulatory process will be adequately addressed.

9. ECONOMIC

9.1 Economic Overview

Trans Mountain's evidence demonstrates the significant economic benefits of the Project to Canada and its regions, including oil producers in Western Canada and all Canadians. Western Canadian oil producers are projected to see an increase in netbacks of approximately $61 billion over the first 20 years of the Project's operations.[1269] The overall economic benefits associated with the Project include a boost to Canada's GDP by approximately $18.2 billion and 108,000 person years of employment. The fiscal benefits to federal and provincial governments from the development, operations and higher netbacks to producers are estimated to be approximately $24 billion over the same time period.[1270]

The main benefits of the Project result from alleviating the current shortage of pipeline capacity, diversifying market access (e.g., to growing markets in the Pacific Rim) and providing option value to producers.[1271] Western Canadian producers will have the opportunity to realize higher netback prices through the Project on crude oil supplies that are priced in the Asia/Pacific region rather than the U.S. Gulf Coast region.[1272]

[1269] This is an increase from approximately $45 billion estimated in the IHS written evidence filed in 2013, and resulted from the revised market analysis completed in April 2015 in response to NEB IR No. 4.2. See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3); Trans Mountain Reply Evidence, Attachment 1.02 – Reply to Dr. Catherine Douglas and the Pro Information Pro Environment United People Network "Economic Costs and Benefits of TMX for B.C. and Metro Vancouver" (August 20, 2015).

[1270] The approximately $24 billion fiscal impact includes an increase in the fiscal impact of higher netbacks to producers, from approximately $14.7 billion estimated in the IHS written evidence filed in 2013 to approximately $19.9 billion, as a result of the revised market analysis completed in April 2015 in response to NEB IR No. 4.2. See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3) and Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-41-2-42; Trans Mountain Reply Evidence, Report 1.03 - Reply to Economic Costs and Benefits of TMX for B.C. and Metro Vancouver (Goodman and Rowan Report) (August 20, 2015).

[1271] Exhibit B371-2 – Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3), 17.

[1272] Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-43.

9.2 Purpose and Need for Project

The demand for transportation services exceeds the current TMPL system capacity and has resulted in the ongoing need to apportion the available capacity. Additional pipeline capacity is required to meet the needs of Trans Mountain's long-term contractual shippers and the general growth in demand for transportation service by all shippers. The Project will provide additional transportation capacity for crude oil from Alberta to markets in the Pacific Rim including B.C., Washington State, California and Asia. Enhancing access to growing Pacific Rim markets provides a critical alternative market to Canadian crude oil producers.

The need for the Project has also been strongly demonstrated by the long-term financial commitments shippers have made through entering into firm contracts for 80 per cent of the nominal capacity on the expanded system.[1273] The tolling methodology, including all aspects of the transportation service agreements, was approved by the Board in its Reasons for Decision RH-001-2012.[1274] Shippers would not have freely entered into these long-term contracts if they were not convinced of the need for the Project. The shippers who signed firm transportation contracts confirmed their commitment to the Project despite the recent fall in crude oil prices.[1275]

Beyond the contracting shippers, there is a need for the Project to meet the transportation requirements of spot shippers. The TMEP will reserve 20 per cent of the total nominal capacity on a spot basis for those shippers.

[1273] This represents the full amount of the Project's nominal capacity that was made available for firm service, with the remaining 20 per cent of nominal capacity reserved for common carriage service.

[1274] NEB – Reasons for Decisions – Trans Mountain Pipeline ULC – RH – 001-2012 (May 2015).

[1275] Exhibit C37-3-2 - Response of BP Canada Energy Group ULC to NEB Information Request No. 1 (July 27, 2015) (A4R7K8); Exhibit C344-1 - Tesoro Canada Supply & Distribution Ltd. - Response to NEB Information Request No. 1 (July 27, 2015) (A71459); Exhibit C50-2 - Canadian Oil Sands, Cenovus, Devon, Husky Oil, Imperial Oil, Statoil, Suncor and Total - Response to NEB Information Request No. 1 (July 27, 2015) (A71461).

More generally, the Project is required to provide needed market diversification and optionality for producers in Western Canada. Oil markets are continually subject to changing market conditions. For western Canadian producers to obtain access to the highest value markets on an ongoing basis sufficient pipeline capacity to alternative markets is required.

From a broader public interest perspective, the Project is required to ensure that producers and governments obtain the highest value for their petroleum resources. Canadians are the ultimate owners of petroleum resources as represented through their provincial governments. The Canadian public is deprived of receiving the full market value for these resources when it is not possible to access the highest value end markets.[1276]

During this process, intervenors raised various challenges related to the purpose and need for the Project. For example, some intervenors took the position that there is no demonstrated need for the Project because: (i) supply is unlikely to grow as fast as Trans Mountain has predicted; (ii) there are numerous other options to transport oil (e.g., other pipelines and rail); and (iii) the benefits or netbacks of the Project are zero.[1277] As discussed below, these claims are unfounded and without merit.

[1276] Exhibit B1-1-Trans Mountain Pipeline ULC - V1 SUMM (December 16, 2013) (A3S0Q7), 1-21, 1-22.

[1277] Exhibit C214-18-7 - Attachment F to written evidence of Living Oceans - Public Interest Assessment - Dr Gunton et al. (May 27, 2015) (A4L9S2); Exhibit C355-15-28 -Tsawout First Nation Expert Report. Public Interest Evaluation of the TMEP (May 27, 2015) (A4Q1G6); Exhibit C214-18-7 - Attachment F to written evidence of Living Oceans - Public Interest Assessment - Dr Gunton et al. (May 27, 2015) (A4L9S2); C363-21 - Upper Nicola Band Written Evidence (May 27, 2015) (A70333).

9.3 Cost of Surplus Capacity

The Gunton Report[1278] took the position that the Project-related pipeline capacity will result in considerable costs and no benefits.[1279] These assertions are unfounded for the reasons below.

As outlined in reply evidence, there is an asymmetrical risk associated with the costs of inadequate pipeline capacity and the costs of excess capacity. Inadequate pipeline capacity to carry production out of Western Canada has resulted in extraordinary discounts in crude prices. This situation existed from 2003 to 2013 and resulted in billions of dollars in lost revenue to producers, governments and Canadian citizens. Trans Mountain estimated the loss in producer revenue in 2012 alone to be between $15 and $19 billion.[1280] Using the lower end of this range, one year of inadequate pipeline capacity can result in lost revenues that are roughly equal to 12 years of the total fixed toll charges on the TMEP. This illustrates the asymmetrical risk relationship between the costs of inadequate capacity and the potential costs of too much capacity.

As stated in the evidence of John Reed, the TMEP provides a feasible and efficient means of addressing the asymmetrical risk of too much/too little capacity.[1281] Some excess capacity in the pipeline system provides shippers with options to react to shifts in market demand to maximize netbacks on an ongoing basis. Having transportation infrastructure that accommodates shifts in

---

[1278] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6).

[1279] Exhibit C214-18-7 - Attachment F to written evidence of Living Oceans - Public Interest Assessment - Dr Gunton et al. (May 27, 2015) (A4L9S2).

[1280] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 40.

[1281] Exhibit B1-5 - V2 4of4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), C-1 – D-1.

market preferences creates value by providing the option and ability to redirect flows as markets change, thereby promoting economically efficient outcomes.

The NEB recognized the value of some excess capacity in the pipeline system when building for market growth in its Reasons for Decision for the Keystone XL Project:

> The Board is of the view, however, that prudent design must consider both the current and future requirements for transportation service over the life of a Project to achieve the objective of efficiency. The Board is satisfied that the Keystone XL Pipeline, as proposed, reflects a reasonable balance of both the current and anticipated requirements of shippers over the longer term, given the supply potential of the WCSB and the size of the USGC market.[1282]

Excess transportation capacity is required for competitive markets to efficiently close arbitrage opportunities.[1283] Closing arbitrage opportunities means reducing the basis differential to the transportation cost between trading points, which requires the availability of excess transportation capacity to achieve this efficient market outcome. The assumption that all pipeline projects will proceed at the earliest possible in-service was an assumption made for the purposes of Trans Mountain's analysis and is not a forecast. The NEB can approve pipeline projects that have demonstrated market support, subject to conditions to ensure that the projects will be built and operated in a manner that protects the environment and considers other public interests. The market will then determine which projects should proceed and on what timeline.[1284]

[1282] NEB, Reasons for Decision, OH-1-2009 (March 2010), 18.

[1283] Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 3.

[1284] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 40.

The Gunton Report asserts that the Project creates the possibility of major commercial impacts on other oil transportation capacity by creating excess capacity.[1285] If the Gunton Report's assertion were correct, one could reasonably expect to see some objections to the Project due to these potential "major commercial impacts". No other pipeline company or group of shippers has intervened to object to the Project on the grounds that it will create excess capacity. As the Board is well aware, pipeline companies are not averse to intervening in NEB proceedings when they perceive a commercial threat.[1286]

In response to an IR from the NEB, the Project's firm shippers stated that they were not concerned about the potential for excess capacity on the pipeline system:

> If other pipelines were to experience some degree of under-utilization for a period of time, shippers on those systems could potentially experience higher tolls. However, all western Canadian producers are likely to benefit from the Project over the longer term, through broader market access, greater customer choice and efficiencies gained through competition among pipelines.[1287]

Clearly, industry is not concerned about the potential for excess capacity. Rather, industry recognizes the benefits that some additional capacity will bring to all western Canadian oil producers.

In conclusion, there is no credible evidence that the Project will result in unnecessary excess capacity that will be a burden to the industry and a net social cost. Rather, the evidence indicates that industry needs additional pipeline capacity as soon as possible, and that the benefits of any

---

[1285] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6).

[1286] See for example, NEB – Report – NOVA Transmissions Ltd. GH-001-2014 (April 2015); NEB – Reasons for Decision – NOVA Gas Transmission Ltd. – GH-001-2012 (January 2013).

[1287] Exhibit C50-2 - Canadian Oil Sands, Cenovus, Devon, Husky Oil, Imperial Oil, Statoil, Suncor and Total - Response to NEB Information Request No. 1 (July 27, 2015) (A71461).

potential excess capacity can be expected to far outweigh the costs. Trans Mountain submits that the NEB can approve the Project, confident that it will be used and useful and that it will provide benefits that extend to all producers in Western Canada, not just the long-term contractual shippers on the Project.

Trans Mountain submits that the Board may want to consider the approach it has taken when assessing applications for long-term liquefied natural gas ("LNG") export licence applications. The NEB has approved several of these applications that, in aggregate, amount to a very large quantity of natural gas being licensed for export. The Board made the following statement in its most recent letter decision:

> The Board acknowledges that, in aggregate, the LNG export licence applications submitted to the Board to date represent a significant volume of LNG exports from Canada. However, all of these LNG ventures are competing for a limited global market and face numerous development and construction challenges. Consistent with the evidence submitted in WPMV's Application, the Board believes that not all LNG export licences issued by the Board will be used or used to the full allowance. The Board also evaluates each application based on the merit of its own evidence.[1288]

In other words the Board is approving all of the export licence applications that meet the Board's requirements under Part VI of the NEB Act and is letting the market determine which projects will actually proceed. In a similar manner, the Board may wish to consider approving those applications for new pipeline facilities which meet the requirements of section 52 of the NEB Act, and let the market determine which projects actually proceed to construction and operation rather than attempting to determine the amount of pipeline capacity that the industry requires. Trans Mountain submits that such an approach would be consistent with the Board's responsibilities to

[1288] NEB – Letter of Decision of WestPac Midstream – OF-EI-Gas-W159-2014-01 01 (May 7, 2015).

protect the public interest while at the same time respecting the choices of market participants to make the best market decisions in their interests.

9.4 Estimated Cost Savings as a Result of the Project

As discussed above, oil producers in Western Canada experienced extraordinary discounts in crude oil prices from 2003 until 2013, resulting in revenue losses of between $15 and $19 billion in 2012.[1289] These extraordinary losses occurred because of inadequate pipeline transportation capacity. Recently, in absence of additional pipeline capacity, producers have increasingly been relying on using rail transportation.[1290]

Rail transportation, however, is more costly than transportation by pipeline.[1291] When adequate pipeline transportation becomes available, shippers are expected to move from rail to pipeline, leaving rail to provide service in certain niche situations. Shippers will realize savings equivalent to the difference in the transportation costs by pipeline and rail.[1292]

The Gunton Report claims that Trans Mountain did not take into account the potential for less expensive options for rail transport (e.g., by moving undiluted bitumen). As explained by Trans Mountain, the economics of transporting undiluted bitumen by rail are not proven and would be a complicated and costly undertaking owing to various commercial, market and logistical

---

[1289] Exhibit B1-5 - V2 4of4 PROJ OVERVIEW (June 16, 2013) (A3S0R1), 7 of Appendix A.

[1290] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 38.

[1291] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 3.

[1292] Exhibit B1-5 - V2 4of4 PROJ OVERVIEW (June 16, 2013) (A3S0R1), A-1 – B-1.

impediments.[1293] Shippers who are in the business of moving their bitumen to market are well aware of the relative economics of transportation by pipeline and rail, and of the potential for the transport of undiluted bitumen by rail, and have chosen to make long-term contractual and financial commitments to the expansion of pipeline capacity.

9.5 The Project will Result in Increased Netbacks for Producers

9.5.1 Netbacks and Price-Setting Mechanisms

The Gunton Report contains two major critiques of Trans Mountain's estimate of benefits to producers from the Project. First, Trans Mountain did not adequately consider the less costly option of shipping undiluted bitumen by rail. As discussed above, producers are well aware of the potential options for shipping bitumen by rail and yet they are opting to commit to long-term firm contracts shipping bitumen crude by pipeline. Second, the Gunton Report states that Trans Mountain's analysis assumes that the oil market is perfectively competitive and that TMEP shipments are the marginal deliveries establishing (and in this case increasing) the netbacks for all WCSB sales.[1294] This assumption is not valid.

Contrary to the views expressed in the Gunton Report, the TMEP can reasonably be expected to provide higher netbacks to producers. The approach taken by Trans Mountain to estimate these benefits is consistent with sound economic theory and the real world nature of competitive markets. The oil market is an international one in which arbitrage opportunities are exploited and, as noted in the Direct Testimony of Mr. John Reed, is a market where "the law of one price"

[1293] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 3.

[1294] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6), 22.

prevails, whereby differences between prices are eliminated by market participants taking advantage of arbitrage opportunities until prices converge across markets.

The Gunton Report also incorrectly states that Trans Mountain assumed that TMEP shipments are the marginal deliveries establishing (and in this case increasing) the netbacks for all WCSB sales. In fact, Trans Mountain does not assume that TMEP shipments provide the marginal deliveries of heavy crude from the WCSB. Trans Mountain explained that it would be the cumulative impacts of all the pipeline projects that would increase netback prices for all WCSB heavy crude producers. The increase in netback prices would be achieved through the elimination of rail to the US Gulf Coast as the market-clearing mechanism for heavy crude. The benefits of this shift in the market clearing mechanism from rail to pipeline were allocated across all assumed new pipelines projects and a proportion of the benefits were allocated to the Project. Trans Mountain noted that, to the extent that some other pipeline projects are delayed or do not proceed to completion, the pro-rata share of benefits attributable to the Project would increase so long as there is adequate capacity to enable pipeline shipments to set the marginal price in the market.[1295]

Trans Mountain submits that the estimates of netback benefits provided in its reply evidence are valid and provide a reasonable basis for estimating the benefits of the TMEP.

9.5.2 The Asian Premium

The Gunton Report also criticizes the estimates of an “Asian premium” in Trans Mountain’s evidence and states that Trans Mountain provides no evidence to support its forecast of a

[1295] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society “Public Interest Evaluation of the Trans Mountain Expansion Project” (August 20, 2015), 28.

permanent oil price premium in Asia to 2037.[1296] Trans Mountain is of the view that the critique in the Gunton Report is based on a misunderstanding of the nature of the Asian premium.

Trans Mountain estimates benefits for shippers to China on TMEP that would arise from a location advantage for crude deliveries to this market, relative to Middle East or other suppliers into the same market. Trans Mountain provided the details supporting its forecast of Asian prices and resulting netback prices in Western Canada.[1297] The Asian premium arises because the Project will provide an efficient transportation option to Asia resulting in higher netbacks for sales into this market than would be realized from sales into other markets such as the Gulf Coast. The premium does not arise due to any assumption about higher sustained crude prices in Asia compared to other major world markets. The increased netbacks from sales into Asian markets are a real benefit of the TMEP, and it is clear that shippers committed to long-term contracts on the TMEP in order to gain access to those markets.[1298]

9.6 Benefit-Cost Analysis

As indicated in Trans Mountain's response to Allan R IR No. 1.01x,[1299] Trans Mountain does not believe that a quantification of the environmental impacts is needed to evaluate whether the proposed project is in the public interest, nor is a benefit-cost analysis ("BCA") required.

[1296] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6), 22.

[1297] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 26.

[1298] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 40.

[1299] Exhibit B40-1 – Trans Mountain Response to Allan R IR No. 1 (June 4, 2014) (A3X5V9), 14.

In economic terms, if the Project adequately addresses the potential negative environmental and safety concerns (externalities), the costs of addressing environmental and safety issues are internalized to the Project. Therefore, there is no need to conduct an exercise that attempts to quantify these impacts because the costs associated with these externalities are already internalized to the Project costs and borne by Trans Mountain. If the Project remains economically feasible after these concerns are addressed, it will be in the public interest.[1300]

The NEB Filing Manual does not mention BCA and the Board does not require applicants to quantify all potential benefits and costs associated with a project. In a number of previous proceedings, the Board has approved projects that did not submit a comprehensive BCA. In March 1990, the Board issued its Reasons for Decision G-4-89, Review of Certain Aspects of the Market-Based Procedure, concerning gas export applications and the use of BCAs and noted the general limitations of a BCA:

> [A]s applied to the calculation of the value of total incremental production costs, benefit-cost results tend to fluctuate widely, depending on the assumptions and forecasts used.
>
> […]
>
> In view of the foregoing, the Board has decided not to use benefit-cost analysis in its gas export licensing procedures and will henceforth not require applicants for licences pursuant to Part VI of the Act to provide evidence on the net social benefits of their projects. The Board notes that this decision is confined to the use of benefit-cost analysis in Part VI proceedings. Furthermore, the Board is satisfied that it can fulfill its mandate under Section 118 of the Act and can find proposed exports to be in the public interest without using benefit-cost analysis to assess export applications."[1301]

[1300] Exhibit B40-1 – Trans Mountain Response to Allan R IR No. 1 (June 4, 2014) (A3X5V9), 5, 14.

[1301] NEB - Reasons for Decision, GHW-4-89 (March 1990), 27-28.

7289 With the exception of Northern Gateway,[1302] a BCA has typically not been filed for NEB or JRP
7290 facilities applications. TransCanada's Keystone XL as well as Enbridge's Alberta Clipper and Line
7291 9 projects did not file a BCA with their applications.[1303]

7292 There are a number of reasons why a BCA is neither appropriate nor helpful to the Board in making
7293 its public interest determination. First, while many of the benefits and burdens associated with
7294 pipeline projects can be quantified, many other impacts are less tangible. Relying on these less
7295 tangible impacts to arrive a monetary value renders the information useless. In Northern Gateway
7296 the Board acknowledged this dilemma by stating that, when it comes to making a public interest
7297 determination, "[s]ome effects can be measured in dollars and cents... [m]any effects cannot."
7298 Second, a wide range of input assumptions can be applied to a BCA which has the potential to lead
7299 to an equally wide range of results. Finally, the wide range of input assumptions and the sensitivity
7300 of BCA results allows for unreliable findings that are subject to a wide range of expert conclusions
7301 which do not assist the Board in addressing key issues. This is precisely what occurred in Northern
7302 Gateway.

7303 Similar to the regulatory proceeding for the TMEP, Enbridge did not file a BCA with its
7304 application for the Northern Gateway Project. The Coastal First Nations filed intervener evidence
7305 that included a BCA that focused on costs and benefits to the Canadian oil industry and claimed

---

[1302] In the Northern Gateway proceeding, the BCA of Wright Mansell Research Ltd. was submitted in reply to a BCA filed by an intervenor. The Wright-Mansell Research study of July 2012 entitled "*Public Interest Benefit Evaluation of the Enbridge Northern Gateway Pipeline Project: Update and Reply Evidence*" Prepared by Eglington P, Mansell R, Ruitenbeek J, and Schlenker R, which includes various references to spill costs and probabilities relevant to NGP in the context of a benefit cost analysis, and includes an Appendix B entitled "*Valuation of Environmental Externalities*". Coincidentally, the WMR Report was filed in its entirety in the current Proceedings as evidence by Catherine Douglas (See Exhibit C112-2-4 - Wright Mansell Research Report for NEB B83-4 Attachment 2 Public Interest Benefit Evaluation Update and Reply Evidence (May 27, 2015) (A2V1R8 – A4Q0A9).

[1303] NEB – Reasons for Decision, OH-1-2009 (March 2010); NEB, Reasons for Decision OH-4-2007 (February 22, 2008) (A17787); NEB, Reasons for Decision OH-002-2013 (March 6, 2014).

that the Northern Gateway Project would result in roughly $1.5 billion in net costs.[1304] Enbridge responded by filing a BCA conducted by Wright Mansell Research Ltd. ("Wright Mansell BCA") despite the fact that the NEB did not require it to do so. According to Mr. Mansell, "it was an exercise to put in more detail than was provided in the Coastal First Nations and, actually better information; we had better information on a lot of the items."[1305]

The Wright Mansell BCA concluded that the Northern Gateway Project would result in a net benefit to Canada of $23.5 billion.[1306] In other words, two parties were each able to utilize a BCA to reach different conclusions regarding the net benefits of the project, with the differential between the two analyses being $25 billion. In the JRP for the Northern Gateway Project, the Board made no reference to the BCAs in its Decision.[1307]

When determining whether a project is in the public interest, the Board assesses the benefits and the burdens of a project and takes into consideration economic, environmental and social interests. The Board expects applicants to identify burdens associated with the project and to implement measures aimed at reducing the risk and impact of the burdens. In many cases, the Board will make the approval of a project conditional on the implementation of measures designed to further mitigate the burdens of the project.

[1304] Exhibit C214-18-7 – Attachment F to written evidence of Living Oceans – Public Interest Assessment – Dr. Gunton et.al. (May 27, 2015) (A4L9S2).

[1305] NEB – Hearing Order – Northern Gateway Pipeline Inc., hearing Examination by Ms. Hales (September 22, 2012), transcript line 27374.

[1306] Exhibit C112-2-1- Wright Mansell Research Report for NEB B83-4 Attachment 2 Public Interest Benefit Evaluation Update and Reply Evidence (May 27, 2015) (A2V1R8 – A4Q0A9).

[1307] Northern Gateway, Joint Review Panel Report, Volume 2, OH-4-2011 (May 2011).

Projects should be built in a way that protects the public interest. In the Application, Trans Mountain provides extensive information on the potential benefits and burdens of the Project. Trans Mountain has also provided information regarding proposed mitigation measures and the commitments it has made to reduce burdens placed on local and regional communities. The Gunton Report BCA serves as a prime example of why the Board is well advised to continue its practice that cost-benefit analyses are not required or expected in public interest determinations for facilities applications. The Gunton Report is not based on objective or credible analysis. As outlined in reply evidence, it is apparent that the Gunton Report started with pre-determined conclusions (e.g. there is a net social cost associated with the Project) and made unreasonable assumptions about benefits and costs to support those conclusions.[1308] This is evident in their treatment of the Project's netback benefits and the potential for rail; excess transportation capacity; macroeconomic benefits; and, spill costs and their likelihood.

9.7 Economic Cost of a Spill

A number of intervenors and commenters have addressed issues associated with the liability for and compensation related to the costs of a potential oil spill arising from Project operations of the pipeline, from activities at a facility or from operations of Project-related tankers calling at the Westridge Marine Terminal.[1309] Trans Mountain notes that the evidence filed sometimes does not

[1308] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 40.

[1309] Exhibit C73-5-1 Affidavit of Dorit Mason (May 26, 2015) (A4L6L4); Exhibit C74-11-3 - Evidence of Paul Rockwood Port Moody (May 27, 2015) (A4L7Q6); Exhibit C358-13-15 - Vol 5 Tab 4A Appendix 1 Assessment of Spill Risk Report (May 26, 2015) (A4L6A6); Exhibit C106-8-22 - Affidavit of Dorit Mason (May 27, 2015) (A4Q0H6); Exhibit C107-10-1 - Affidavit of Dorit Mason (May 26, 2015) (A4L6L4); Exhibit C112-2-5 - FU Goodman Report (2014) Economic Costs and Benefits of the Trans Mountain Expansion Project (TMX) for B.C. and Metro Vancouver 20141110 (May 27, 2015) (A4Q0C1); Exhibit C219-6-2 - Written Evidence of Lyackson First Nation (May 27, 2015) (A4Q0H9); Exhibit C223-3-1 – Makah KM-TM writ-evid 5-27-15 (May 27, 2015) (A4Q2A4); Exhibit C350-3-1 - TLBCC Intervenor evidence May 27th submission (May 27, 2015) (A4Q2G1);

7339 treat or specify whether the costs are associated with pipeline, facility or tanker spills. Similarly,
7340 the evidence at times does not specify whether the spills originate in the terrestrial or marine
7341 environment. Trans Mountain notes that it is not the Responsible Party in the event of a tanker-
7342 based spill. Nevertheless, Trans Mountain is interested in addressing concerns about the safety of
7343 tankers, prevention of oil spills, and ensuring that adequate and efficient response means are
7344 available, should a low likelihood event such as an oil spill take place.[1310]

7345 Some intervenors are concerned because their evidence shows spill costs to range into billions of
7346 dollars while existing compensation schemes will fall short of this amount. City of Vancouver,[1311]
7347 among others, have expressed such concerns in their evidence. Tsawout First Nation, in their
7348 Response to Government of Canada IRs relating to a draft issues tracking table indicate that "there
7349 will be damages from potential oil spills of between $2.3 and $18.6 billion that will only be
7350 partially mitigated by existing spill compensation mechanisms".[1312]

7351 Intervenors have relied on evidence such as the Goodman Report,[1313] the Sumaila Report,[1314]
7352 observations by Mr. Jeremy Stone[1315] and submissions by Brand Finance.[1316] The evidence in
7353 these reports typically does not pay attention to risk profiles, especially the likelihood of such an

---

Exhibit C376-8-1 – WSDOE Written Evidence With Cover Letter (May 27, 2015) (A4Q1X6); Exhibit C411-1-1- Written Evidence of the Maa-nulth Nations (May 26, 2015) (A4L6D5).

[1310] Trans Mountain Reply Evidence, Section 61 – Marine Spill Liability Compensation (August 20, 2015), 61-3.

[1311] Exhibit C77-27-1 - Written Evidence (May 27, 2015) (A4L7V8).

[1312] Exhibit C355-18-2 - Tsawout First Nation Response to Information Request from Government of Canada (July 14, 2015) (A4R4G4), 15-16.

[1313] Exhibit C358-13-15 - Vol 5 Tab 4A Appendix 1 Assessment of Spill Risk Report (May 26, 2015) (A4L6A6).

[1314] Exhibit C77-31-8 - Appendix 83 (May 27, 2015) (A4L9G4).

[1315] Exhibit C77-30-6 - Appendix 81 (May 27, 2015) (A4L8E9).

[1316] Exhibit C77-30-7 - Appendix 82 (May 27, 2015) (A4L8F0).

occurrence in the region, and the reports thus implicitly ignore the credibility of the scenario, the outflows, or the costs associated with outflows. Moreover, the evidence typically relies on selective, high-cost incidents that are not applicable to this Application. The scenarios routinely refer to incidents such as the Exxon Valdez single-hull tanker oil spill, the Deepwater Horizon well blowout or the Kalamazoo oil spill in Michigan among others. All of these cases are simply not analogs for a spill associated with the TMEP. Costs are exaggerated, outflows are over-stated and the incident likelihood or credibility is not addressed rendering these reports not particularly credible.[1317]

The Gunton & Broadbent Report makes the most aggressive case for stating that compensation systems are inadequate. When the authors include items such as passive use values, their speculative spill costs "could increase up to $25.5 billion."[1318]

The Gunton & Broadbent estimates of costs and resulting conclusions regarding the adequacy of the compensation regimes are a flight of fantasy. The authors consistently select the highest multipliers or spill values in the literature, and ignore any assessment of whether it is reasonable or correct to transfer values from the "selected case studies" (Kalamazoo in this instance) or literature values for damage multipliers. Interestingly, the authors accepted five key spill cost parameters from Etkin yet ignore her primary finding—that unit costs decline with volume spilled—that would have reduced estimated costs. It is inappropriate to manipulate the costs in such a manner. To compute tanker spill costs, they also incorrectly transfer values from the WMR

[1317] Trans Mountain Reply Evidence, Section 61 – Marine Spill Liability Compensation (August 20, 2015), 61-4.

[1318] Exhibit C358-13-15 - Vol 5 Tab 4A Appendix 1 Assessment of Spill Risk Report (May 26, 2015) (A4L6A6), 13.

Report.[1319] They ignore the facts that the WMR Report used such values for a different purpose (CBA sensitivity analyses), in a different context (greenfield circumstances), and for a different project (Northern Gateway). In drawing faulty inferences from the WMR Report, they ignored the one piece of peer-reviewed evidence that might have generated defensible costs as it provided regression estimates of spill costs based on International Oil Pollution Compensation Fund data. Had the authors considered the Kontovas regressions, their spill costs estimates would have been an order of magnitude lower and fallen well within currently available compensation limits under the Compensation Regime applied in Canada. Calculations in Trans Mountain's reply to the Gunton & Broadbent Report demonstrate that, based on the Kontovas regressions, spill costs would be no more than $455 million for the very scenario Gunton & Broadbent described. For that same scenario, Gunton & Broadbent inferred a cost of $4.4 billion. As a consequence, their conclusions are neither realistic nor conservative and cannot be relied upon.[1320]

In contrast to the assumptions and methods used in some intervenor evidence, the assumptions and approaches on which Trans Mountain has relied for assessing spill costs are conservative and reasonable. They suit the purpose (estimating potential liability), the location (as defined by the Application), and the circumstances (that the Application is an expansion of existing operations that have been ongoing for 60 years). Significant evidence has already been placed on the record through Trans Mountain's Application and supplemental filings, through Trans Mountain's responses to IRs and through independently prepared material (e.g., TERMPOL Review Process

[1319] Exhibit C112-2-4 - Wright Mansell Research Report for NEB B83-4 Attachment 2 Public Interest Benefit Evaluation Update and Reply Evidence (May 27, 2015) (A2V1R8 – A4Q0A9).

[1320] Trans Mountain Reply Evidence, Section 61 – Marine Spill Liability Compensation (August 20, 2015), 61-4.

7392 Report on the Trans Mountain Expansion Project).[1321] This evidence illustrates that adequate
7393 financial resources are available to meet claims in event of a spill.

7394 The Application provides Trans Mountain's evidence relating to oil spills for which it is the
7395 Responsible Party. The assessment indicates that a credible worst-case spill would have a cost the
7396 order of $100 million to $300 million. Additional sensitivity analyses are reflected in Trans
7397 Mountain's Response to NEB IR No. 1.10b;[1322] that response indicates that a large spill (4,000
7398 m^3) affecting a high consequence area would have a cost of the order of $340 million. A full
7399 description of the model with all assumptions, and equations was provided as part of Follow-Up
7400 Response to NEB Ruling 33 Allan R F-IR No. 1.18c.[1323]

7401 Trans Mountain has also documented the resources available to address any such costs. Trans
7402 Mountain has access to $750 million in insurance for a land-based spill. Compensation frameworks
7403 and insurance covering a land-based spill are described in responses to NEB IR No. 1.08b to
7404 1.08h.[1324] In the event that a liability occurs that is in excess of its insurance, Trans Mountain
7405 expects that any losses and claims would be paid out of cash reserves and cash flow from
7406 operations, which are illustrated in the response to NEB IR No. 1.09a and 1.09b.[1325]

[1321] Exhibit C353-4-3 - TMEP TERMPOL Report December 11 2014 (December 11, 2014) (A4F8Z4).

[1322] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 32.

[1323] Exhibit B280-5 – Trans Mountain Follow-Up Response to NEB Ruling 33 Allan R F-IR No. 1.18c Attachment1 (October 17, 2014) (A4D3G4).

[1324] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 24.

[1325] Exhibit B32-2 – Trans Mountain Response to NEB IR No. 1 1 of 2 (May 14, 2014) (A3W9H8), 24.

9.8 Upgrading and Refining in Canada

Certain interveners expressed concerns that the Project would adversely impact domestic upgrading and refining.[1326] While its evidence is largely outside the scope of this proceeding as specified in the Board's adopted List of Issues, Unifor argues that by shipping mainly diluted bitumen destined for foreign markets, the Project is supporting upgrading and refining activity in other countries thereby undermining such value-added production in Canada. If approved, the Project will in no way inhibit or prevent further investment in domestic upgrading and refining operations. Rather, the Project will offer significant benefits to Chevron's existing Burnaby refinery in B.C., by increasing the amount of spot market transportation capacity available to deliver oil to that facility.

Canada is a significant net exporter of petroleum products. It should be recognized that whether products are transported to market as heavy oil, diluted blend, synthetic crude oil or refined products, there is still a requirement for additional pipeline capacity to facilitate diversified market access. Otherwise, the lost export opportunities will result in foregone production and the associated loss of employment, income and fiscal benefits.

In its evidence, Unifor takes the position that the Project is not in the public interest because it fails to capture the full value of its petroleum through upgrading and refining. The implication of this position is that the Board should only approve oil pipeline projects that, regardless of market sentiment and economic realities, support domestic upgrading and refining. It is Trans Mountain's firm belief that the Board or any other government entity should not be engaged in protectionist policy-making designed to subsidize or give preference to domestic upgrading and refining.

[1326] Exhibit C362-4-2 - Evidence of Unifor (Revised) (May 27, 2015) (A4L8F0), 1.

Whether a particular project supports greater upgrading and refining activity in Canada is a decision that is best left to the market. The Board believes that well-functioning, competitive markets efficiently balance supply and demand, and lead to innovative and robust energy systems.[1327]

Under section 52 of the NEB Act, the Board has broad discretion to decide what factors are relevant to a public interest determination. In previous hearings the Board has considered the impact of regulatory decisions on value-added production. Specifically, the Board has addressed the issue of how an oil pipeline project designed to ship diluted bitumen—as opposed to refined petroleum products—might impact domestic upgraders and refiners. In Keystone XL, the Board stated:

> [T]he Board has not been convinced that development of pipeline infrastructure deters investment in upgraders and refineries in Canada. The Board also believes that given the fact the Keystone XL would have the ability to transport both heavy and light crude oil and potentially with modifications, refined petroleum products that the market would properly decide what type of commodity is transported on the pipeline.[1328]

The Board came to a similar conclusion in Northern Gateway, where it stated:

> The Panel is of the view that properly functioning petroleum markets require adequate transportation capacity to be in place and, further, that the type of commodity to be transported on a pipeline is a decision properly made by the market. The Panel is of the view that well-functioning markets tend to produce outcomes that are in the public interest.
>
> […]
>
> The Panel finds that no evidence was presented that lead it to conclude that the development of new infrastructure to significantly increase access to growing crude oil markets will hinder the

[1327] National Energy Board, "Canadian Energy Dynamics: Review of 2014 - Energy Market Assessment" (February 2014) online: <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/dnmc/2014/index-eng.html#ftn1back>; National Energy Board, "Canadian Pipeline Transportation System - Energy Market Assessment" (April 2014) online: <https://www.neb-one.gc.ca/nrg/ntgrtd/trnsprttn/2014/index-eng.html>.

[1328] NEB, Reasons for Decision, OH-1-2009 (March 2010), 34.

> functioning of the Canadian refining and upgrading sector. The Panel agrees with the view of the Government of Alberta that, should additional domestic refining and upgrading capacity materialize, pipelines can be reconfigured to transport a range of hydrocarbons, including refined petroleum products.[1329]

9.9 Employment and Economy

The selected indicators for employment and economy included national and provincial economies; regional employment; municipal economies; contracting and procurement; training and capacity development; business and livelihood disruption.[1330]

The ESA concluded that there were potential residual socio-economic effects on employment and economy indicators associated with the construction and operations of the Project.[1331] However, it is important to note the significant socio-economic benefits the Project will provide regarding employment and the economy.

First and foremost, Project capital expenditures are estimated at approximately $5.4 billion[1332] (2012 dollars; equating to $4.9 billion in 2012 dollars when adjusted for price increases).[1333]

Secondly, Trans Mountain commissioned an independent study by the Conference Board of Canada to estimate the economic and fiscal benefits of the Project. The Conference Board of

---

[1329] Northern Gateway, Joint Review Panel Report, Volume 2, OH-4-2011 (May 2011) 335.

[1330] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-158.

[1331] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-165.

[1332] Exhibit B1-1 – V1_SUMM (December 16, 2013 (A3S0Q7)

[1333] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (December 16, 2013) (A3S1S7), 7-167.

Canada found that the Project would result in substantial economic benefits at the national and provincial levels as defined in the public interest section of this final argument.[1334]

Third, Trans Mountain submits that the Project will also yield benefits to communities and regions along the right-of-way through employment and procurement/contracting opportunities, and generating additional municipal taxes for the operating life of the Project. Trans Mountain estimated that the additional municipal property taxes generated by the Project will be about $22.1 million (a 103 per cent increase) annually in B.C. and $3.2 million (a 119 per cent increase) annually in Alberta. [1335]

Fourth, the Project will also provide benefits to Aboriginal groups. Trans Mountain has invested significant resources in Aboriginal contracting and funding for Aboriginal participation, TLRU/TMRU studies, capacity funding for engagement, third-party technical reviews, socio economic studies, work plans and Mutual Benefits Agreements.[1336] Trans Mountain is committed to maximizing Project-related Aboriginal business opportunities and is committed to the completion of opportunity monitoring reports, as suggested through NEB Draft Condition No. 44. Trans Mountain is also committed to maximizing Project-related Aboriginal employment opportunities and is committed to the completion of opportunity monitoring reports, as suggested through NEB Draft Condition No. 44. Further, Trans Mountain has developed a Training and Education Program to support training opportunities for Aboriginal People related to pipeline construction and transferrable skills. This will result in long-term, meaningful benefits to the

---

[1334] Exhibit B001 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 2 (December 16, 2013) (A3S0Q9), 2-24.

[1335] Exhibit B1-4 - V2 3of4 PROJ OVERVIEW – (December 16, 2013) (A3S0R0), 2-42.

[1336] Trans Mountain Reply Evidence, Appendix 7A: Consultation Update No. 4 – Aboriginal Engagement (August 20, 2015).

Aboriginal population in communities whose reserves and asserted traditional territories may be directly affected by the Project as detailed in Section 4 – Emergency Response of this final argument.

Regarding procurement, Trans Mountain has committed to developing a Project-specific policy six months prior to construction,[1337] which will be based on the KMC Procurement Policy, Procedures and Transaction Guidelines. All major construction contracts will include contract language to pass on Trans Mountain's commitment to maximizing Project-related Aboriginal, local and regional business and employment opportunities to construction contractors. These contracts will also include requirements for contractor monitoring and reporting on Project-related Aboriginal, local and regional procurement (business) opportunities as well as employment and training opportunities.

As detailed in the ESA, there are no situations for employment and economy indicators that would result in a significant adverse residual socio-economic effect. Therefore, the adverse residual socio-economic effects of Project construction and operation on employment and economy indicators will be not significant. However, it is important to note that there will be significant positive residual socio-economic effects related to provincial and national economic benefits, as well as the increase in municipal taxes.[1338]

9.10 Tolls and Tariffs

In respect of tolls, the NEB's mandate is found in Part IV of the Act. Sections 62 and 67 specify the "fundamental standards of toll-making" and state:

[1337] Exhibit B32-1 – Trans Mountain Letter NEB IR No. 1 May 1 2014 (May 14, 2014) (A3W9H7), 159.

[1338] Exhibit B5-38 - V5B ESA 13of16 SOCIOEC (A3S1S7) (December 16, 2013), 7-198.

> Tolls to be just and reasonable
> 62. All tolls shall be just and reasonable, and shall always, under substantially similar circumstances and conditions with respect to all traffic of the same description carried over the same route, be charged equally to all persons at the same rate.
>
> No unjust discrimination
> 67. A company shall not make any unjust discrimination in tolls, service or facilities against any person or locality.[1339] [Emphasis added.]

The primary principle that the NEB considers in determining whether tolls are just and reasonable is the cost causation or cost-based/user pay principle, which is that tolls should be, to the greatest extent possible, based on the cost of the pipeline facilities and the users of a pipeline system should bear the financial responsibility for the costs caused by the transportation of their product through the pipeline.

Unjust discrimination, fairness and economic efficiency are also principles that the Board considers in determining whether a proposed tolling methodology is appropriate. The Board may also consider the following factors in determining whether the Board's broad tolling principles are met for pipeline system expansions: (i) the degree of integration between the expansion and the remainder of the system; (ii) the nature of the service provided by the expansion; (iii) benefits to existing toll payers; and (iv) practicality, toll stability and administrative simplicity.

In May 2013, pursuant to NEB Reasons for Decision RH-001-2012, the Project received approval pursuant to Part IV of the NEB Act for the toll methodology, terms and conditions that would apply to the Project. The applied-for toll methodology resulted from an Open Season and is based on negotiated tolls rather than cost of service. While the toll methodology involved negotiations between Trans Mountain and its shippers, those negotiations included confidential discussions

[1339] NEB, Reasons for Decision, RH-1-2007 (July 2007) 21.

between Trans Mountain and each shipper separately, and consequently it was not presented as a negotiated settlement as set out in the Board's guidelines.

According to the Board, the Open Season and negotiation process conducted by Trans Mountain was fair and transparent. After considering the entirety of the record, the Board concluded, on balance, that the toll methodology as proposed by Trans Mountain will produce tolls that will be just, reasonable and not unjustly discriminatory. Further, the Board noted Trans Mountain's commitment to continue to maintain the integrity of the pipeline and its safe operation if the proposed toll methodology was approved.[1340]

In its written evidence, Unifor asserts that a recent amendment to Trans Mountain's tariff, which was approved by the Board, puts a Canadian refinery at a competitive disadvantage to US refiners.[1341] The tariff amendment referred to by Unifor was proposed in response to the NEB's MH-002-2012 Reasons for Decision where the Board found that the current nomination and capacity allocation procedures are likely contributing to ongoing apportionment of the TMPL. In its Decision, the Board directed Trans Mountain to submit its proposed procedures, or an explanation of why the procedures in place were adequate. In response to this request, Trans Mountain filed a Tariff Amendment Application regarding Verification Procedures. The application was assessed by the Board in the RHW-001-2013 proceeding. In the RHW-001-2013 Reasons for Decision, the Board provided direction for Trans Mountain to implement certain Tariff amendments regarding verification procedures. These Tariff amendments were necessary to deal with a current Trans Mountain operational issue and were not precipitated by the Application. In

[1340] NEB, Reasons for Decision – Trans Mountain Pipeline ULC – RH-001-2012 (May 2013), 1.

[1341] Exhibit C362-4-2 - Unifor Evidence TMX (May 26, 2015) (A4L6C6), 4-5.

Trans Mountain's view, the outcome of the RHW-001-2013 proceeding is not relevant to the List of Issues.[1342] The Board made the following statement in the RHW-001-2013 Reasons for Decision:

> If unintended impacts arise or if market circumstances materially change, the Board expects Trans Mountain and its shippers to negotiate solutions between themselves. Should the parties fail to reach an agreement, they may bring any concerns forward to the Board for resolution.[1343]

9.11 Need for the Project

The NEB must find that the applied for facilities are required in the public convenience and necessity. Trans Mountain submits that the evidence overwhelmingly demonstrates that there is a need for the Project, that the Project is in the public interest and that the Project should be approved.

The strongest evidence of the need for the Project is the long-term contractual and related financial commitments made by shippers. Firm contracts account for 80 per cent of the nominal capacity on the expanded system. In May 2013 the Project received approval pursuant to Part IV of the NEB Act for the toll methodology, terms and conditions that would apply to the Project.[1344] Shippers

---

[1342] Trans Mountain Reply Evidence, Section 5 – Tariffs (August 20, 2015), 5-1.

[1343] NEB, Reasons for Decision, RHW-001-2013 (January 2015) 39.

[1344] NEB, Reasons for Decision, Trans Mountain Pipeline ULC – RH-001-2012 (May 2013) RH-001-2012; Exhibit C2-2 - BP Canada Energy Trading Company - Written Evidence of BP Canada Energy Trading Company (A49778); Exhibit C2-9 - BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. - Written Argument of BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. (February 20, 2013) (A50539); Exhibit C11-2 - Nexen Marketing - Written Evidence of Nexen Marketing (December 13, 2012) (A49780); Exhibit C14-2 - Statoil Canada Ltd. - Written Evidence of Statoil Canada Ltd. (December 13, 2012) (A49781); Exhibit C15-4 - Suncor Energy Marketing Inc. and Suncor Energy Products Partnership - Written Evidence (December 13, 2012) (A49786); Exhibit C16-6 - Total E&P Canada Ltd. - Written Direct Evidence of Total E-P Canada Ltd. (December 13, 2012) (A50376).

would not have freely entered into these contracts if they were not convinced of the need for the Project and that they would utilize the capacity.[1345]

Pursuant to section 52 of the NEB Act, the NEB must determine whether the applied-for Project is economically feasible. The evidence submitted by Trans Mountain regarding market opportunities in the Pacific Rim, including California, the US Pacific NW, China and other Asian countries, demonstrates that there are adequate markets for the Project.[1346] The long-term transportation contracts demonstrate that shippers have adequate supply to support the Project; shippers would not make these commitments if this was not the case. Lastly, the evidence submitted by Trans Mountain on projected oil production from Western Canada clearly demonstrates that there will be sufficient and growing production coming from the oil sands to ensure the Project will be used at a high utilization rate. This evidence is demonstrative of the Project's economic feasibility.

Trans Mountain notes that Dr. Harrison and Dr. Jaccard questioned the outlook for oil demand and the need for the Project in their evidence.[1347] In its reply evidence, Trans Mountain demonstrated that both Dr. Harrison and Dr. Jaccard were relying on hypothetical "what if" scenarios that do not

---

[1345] NEB, Reasons for Decision, Trans Mountain Pipeline ULC – RH-001-2012 (May 2013); Exhibit C2-2 - BP Canada Energy Trading Company - Written Evidence of BP Canada Energy Trading Company (December 13, 2012) (A49778); Exhibit C2-9 - BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. - Written Argument of BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. (February 20, 2013) (A50539); Exhibit C11-2 - Nexen Marketing - Written Evidence of Nexen Marketing December 13, 2012) (A49780); Exhibit C14-2 - Statoil Canada Ltd. - Written Evidence of Statoil Canada Ltd. (December 13, 2012) (A49781); Exhibit C15-4 - Suncor Energy Marketing Inc. and Suncor Energy Products Partnership - Written Evidence (December 13, 2012) (A49786); Exhibit C16-6 - Total E&P Canada Ltd. - Written Direct Evidence of Total E-P Canada Ltd. (February 6, 2013) (A50376).

[1346] Exhibit B1-5 - V2 4of4 PROJ OVERVIEW (June 16, 2013) (A3S0R1), A-1 – B-1.

[1347] Exhibit C77-27-11 - Appendix 10 (May 27, 2015) (A4L7W8); Exhibit C77-27-14 - Appendix 13 (May 27, 2015) (A4L7X1).

7587 represent the most likely view of the future demand for petroleum.[1348] Based on these findings,
7588 Trans Mountain is of the view that the scenarios relied on by Drs. Harrison and Jaccard are
7589 extremely improbable.

7590 According to the Gunton Report[1349] there is no need for the Project because:

7591 (a) Trans Mountain has underestimated the amount of pipeline capacity there will be
7592 in place and the Project will only create excess capacity;
7593 (b) Trans Mountain has overestimated the likely growth in crude oil production; and
7594 (c) Trans Mountain demonstrated upward bias in its oil price forecasts.

7595 These claims were clearly rebutted in Trans Mountain's reply evidence.[1350] With respect to the
7596 first point, the Gunton Report alleged that Trans Mountain's evidence showed that there would be
7597 excess pipeline capacity if all the proposed pipeline projects went ahead. However, Trans
7598 Mountain's reply evidence shows that the Gunton Report misinterpreted the written evidence. The
7599 fact is that with growing oil production and market changes, new pipeline capacity is required.
7600 There is competition occurring between pipeline companies to transport the growing production.
7601 As discussed above, the Project has received support from shippers in the form of long-term
7602 financial commitments.[1351]

[1348] Trans Mountain Reply Evidence, Section 2 - Project Need and Economic Feasibility (August 20, 2015), 2-6.

[1349] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6).

[1350] Exhibit B1-5 - V2 4 of 4 PROJ OVERVIEW (December 16, 2013) (A3S0R1), 7. See also Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Expansion Project" (August 20, 2015), 40.

[1351] Exhibit C50-2-2 - Response of Canadian Oil Sands, Cenovus, Devon, Husky Oil, Imperial Oil, Statoil, Suncor and Total to NEB Information Request No. 1 (July 27, 2015) (A4R7K5); Exhibit C37-3-2 - Response of BP Canada Energy Group ULC to NEB Information Request No. 1 (July 27, 2015) (A4R7K8).

The Gunton Report also claimed that Trans Mountain under-estimated available capacity because it had excluded rail capacity. Trans Mountain's reply evidence demonstrates that the Gunton Report was based on a serious misunderstanding of the industry. The reality is that pipeline transportation is far more efficient, and less costly, than transport by rail. Shippers will use pipeline capacity when it is available because rail is generally not a cost-effective option, except in unique situations. While the Gunton Report suggests that new pipeline capacity is not required because rail is available, Trans Mountain correctly concludes that crude oil shippers prefer to use the less costly means of pipeline transportation.[1352]

With respect to the likely growth in crude oil production, Trans Mountain's reply evidence explains that it had revised its production forecast downward in light of the lower price environment but that strong growth in production is still expected. Trans Mountain's evidence demonstrates that industry has a tendency to be overly optimistic in its production projections when oil prices are high and overly pessimistic when oil prices are low. Trans Mountain believes that its revised forecast is both reasonable and credible.

With respect to the assertion of an upward bias in HIS's crude oil price forecast, Trans Mountain's reply evidence demonstrated that its price forecast is reasonable. The price forecast is based on the sound economic principles that over the long-term prices must cover the marginal cost of production of the highest cost source required to meet market demand. The price forecast is consistent with Trans Mountain's assessment of the need for a growing supply of oil sands crude within the global energy mix.

[1352] Trans Mountain Reply Evidence, Attachment 1.12 – Reply to Tsawout First Nation, Upper Nicola Band and Living Oceans Society "Public Interest Evaluation of the Trans Mountain Project" (August 20, 2015), 3.

9.11.1 Economic Benefits of the Project

Canadian production currently lacks sufficient pipeline capacity to the Asia/Pacific region. If the Project is approved, Canadian production will have the opportunity to garner higher prices through production priced in the Asia/Pacific region rather than the US Gulf Coast region.[1353] Canada and its regions will receive significant economic benefits as oil producer revenues are forecasted to rise by approximately $61 billion over the first 20 years of the Project's operations. The revenue associated with higher netbacks is expected to generate total federal and provincial fiscal benefits of $19.9 billion.[1354]

The Gunton Report dismisses the idea that pipeline transportation will result in cost savings to shippers and concludes that the Project will not result in netback benefits to shippers or Canadian oil producers.[1355] This conclusion is unjustified and is analogous to suggesting that the shippers who entered into firm contracts and expressed their support for the Project do not understand the nature of their business and the Project's value to their business. As demonstrated in Trans Mountain's reply evidence, transport by pipeline is considerably more cost efficient than transport by rail.

[1353] Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-43.

[1354] By comparison to the IHS and Conference Board of Canada written evidence filed in 2013, this includes an increase in the estimated higher netbacks to producers from approximately $45 billion to approximately $61 billion, and a proportionate increase in the fiscal impact of higher netbacks from approximately $14.7 billion to approximately $19.9 billion, as a result of the revised market analysis completed in April 2015 in response to NEB IR No. 4.2. See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3) and Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-37; Trans Mountain Reply Evidence, Report 1.03 - Reply to Economic Costs and Benefits of TMX for B.C. and Metro Vancouver (Goodman and Rowan Report) (August 20, 2015).

[1355] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6).

The Gunton Report also suggests that Trans Mountain's market analysis did not take into account the potential benefits of shipping undiluted bitumen by rail. However, due to significant market, logistical and commercial impediments, rail shipment of undiluted bitumen is much more complicated and costly than indicated in the Gunton Report. Shippers are aware of the option for shipping both diluted and undiluted bitumen by rail and they are choosing to support the Project through firm transportation contracts.

The Project will increase pipeline capacity out of Western Canada and will provide a price lift for all heavy oil producers. The Project will provide producers with much-needed market diversification and access to some of the world's fastest growing petroleum markets, and will enable producers to obtain the highest available prices for their production on an ongoing basis, ensuring that both industry and Canadians benefit from efficient energy infrastructure and markets. This will translate into real, long lasting economic benefits in the Canadian public interest.[1356]

The evidence submitted by the Conference Board of Canada demonstrates that Canada will derive very large economic benefits from the Expansion Project.[1357] Oil producer revenues were estimated to rise by approximately $45 billion over the first 20 years of the Project's operations. The revenue associated with higher netbacks was expected to generate total federal and provincial fiscal benefits of $14.7 billion.[1358] In response to an IR from the NEB, Trans Mountain recalculated these benefits in April 2015. Oil producer revenues were estimated to increase by $61 billion

[1356] Exhibit B001 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 1, 2, 3A, 3B, 3C (December 16, 2013) (A55987).

[1357] Exhibit B001 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 1, 2, 3A, 3B, 3C (December 16, 2013) (A55987).

[1358] Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-37.

instead of $45 billion, and the total fiscal benefits to federal and provincial governments can be expected to increase proportionately from $14.7 billion to $19.9 billion.[1359]

The Conference Board of Canada's report indicates that the Project will result in significant economic benefits. During the development phase and over the first 20 years of operations, these benefits include a forecasted boost to Canadian GDP of about $18.2 billion; a total of 108,000 person-years of employment generated across Canada; additional federal and provincial government revenues of $18.5 billion (not including the $5.2 billion associated with the April 2015 revised netback benefits outlined above); and benefits to communities along the right-of-way through employment and economic activity.[1360]

The Gunton Report criticized the Conference Board of Canada's report on the basis that the economic benefits and job impacts were over-estimated by stating:

> In a well-developed economy such as Canada's most if not all the labour and capital employed on the TMEP will be employed elsewhere in the economy if the TMEP does not proceed, and the net gain in economic activity generated by the TMEP will be much less potentially minimal, as compared to the gross impacts estimated by the Conference Board."[1361]

The Conference Board of Canada's reply evidence clearly demonstrates that the criticisms contained in the Gunton Report are unfounded. First, the capital for the Project will be provided

---

[1359] See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3); Trans Mountain Reply Evidence Attachment 1.02 – Reply to Dr. Catherine Douglas and the Pro Information Pro Environment United People Network "Economic Costs and Benefits for TMX for B.C. and Metro Vancouver" (August 20, 2015).

[1360] Exhibit B286-2 - Report- Conference Board of Canada (November 24, 2014) (A4F2K9), 6-8; Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-37.

[1361] Exhibit C355-15-28, Tsawout First Nation Expert Report, "Public Interest Evaluation of the Trans Mountain Expansion Project" (May 27, 2015) (A4Q1G6), 24.

by Trans Mountain's US parent and thus would be a net capital injection into the Canadian economy. If the Project were to not proceed, there is no reason to assume there would be a comparable substitute investment. Simply put, the benefits of the investment will not be realized if the Project does not proceed.

With respect to employment benefits, the Conference Board of Canada provided clear evidence that the B.C. labour market cannot be considered fully employed, and it is not reasonable to assume that the Project will not create new incremental jobs. Although the Conference Board of Canada recognized that some of the jobs may be taken by Canadians moving to B.C., it correctly stated that these are still incremental jobs in the B.C. economy.

With respect to fiscal benefits, the Gunton Report does not recognize the price lift that the Project will provide to producers. Therefore, it assumes away the fiscal benefits. As discussed above, producers will realize significant increases in their netbacks due to the transportation cost savings that will result from the Project. This will generate many of the fiscal benefits identified by the Conference Board of Canada.

A report published by Simon Fraser University's Centre for Public Policy Research entitled "The Economic Costs and Benefits of the Trans Mountain Project (TMX) for B.C. and Metro Vancouver" (the "Goodman Rowan Report") was appended to the evidence of Dr. Catherine Douglas and the Pro Information Pro Environment United People Network.[1362] The Goodman Rowan Report concluded that the potential economic benefits of the Project, in terms of jobs and tax revenues, were significantly over-estimated by the Conference Board of Canada.

[1362] See Exhibit C112-2-2 - Douglas NEB Hearing Evidence May 2015 (May 27, 2015) (A4Q0A6).

According to the Goodman Rowan Report, the multipliers estimated for job impacts from both construction and operations of the Project were too high. The Goodman Rowan Report suggested that multipliers estimated for the construction phase for the Northern Gateway would be more appropriate for TMEP and that multipliers estimated for the operations phase for the Energy East project might be more appropriate for TMEP.

In its reply evidence, the Conference Board of Canada explained why the multipliers used by Goodman Rowan were completely inappropriate and had obviously been selected to produce the lowest results. A prime example is the fact that only selected multipliers were used from Northern Gateway's evidence before the NEB. If all of the multipliers estimated by Northern Gateway had been applied to the Project the estimated employment and other economic impacts would have been higher by orders of magnitude than those conservatively estimated by the Conference Board of Canada. The Conference Board of Canada also explained how the use of multipliers for Energy East – a project that is planned for another region of the country and involving conversion of an existing pipeline system to oil – is completely inappropriate for estimating the employment and other economic impacts that can be expected from the TMEP.

Another criticism in the Goodman Rowan Report was that many Project-related jobs may be taken by non-local workers. Based on this criticism, the Goodman Rowan Report arbitrarily reduced the estimated jobs that would be created by the Project. This reduction is not justifiable because many non-local workers will likely come from elsewhere in the province and some people who move to B.C. to take jobs will become B.C. residents. Further, the Goodman Rowan Report did not account for the fact that some of the jobs estimated for Alberta and other provinces may be filled by B.C. residents. Regardless of the outcome, jobs created in B.C. are jobs in B.C. and should be treated as such, and the criticisms offered by Goodman Rowan are unfounded.

The Goodman Rowan Report also claimed that the fiscal impacts estimated by the Conference Board of Canada during both the construction and operations phases of the Project were too high. The Conference Board of Canada's reply evidence demonstrated that there was no clear basis for the figures produced in the Goodman Rowan Report and that most of their figures seemed to be arbitrary estimates. In contrast, the estimates provided by the Conference Board of Canada are based on well-established methods and models, including Statistics Canada's I/O model and the Conference Board of Canada's highly respected in-house fiscal models, which are relied on by the private sector and both the federal and provincial governments.

In conclusion, Trans Mountain submits that the criticisms of the Conference Board of Canada's estimates of the benefits that will flow from the Project are without merit. The original written evidence and reply evidence submitted by the Conference Board of Canada clearly demonstrates that the Project can reasonably be expected to provide large economic benefits to Canada, and particularly to B.C. and Alberta.[1363]

9.11.2 Local Benefits

The public record demonstrates that Trans Mountain has taken a collaborative approach to infrastructure development in the Canadian public interest. Significant efforts have been made to engage with stakeholders and Aboriginal groups that may be impacted by construction or operation of the Project. Economic benefits were, and continue to be, an important part of Trans Mountain's ongoing engagement with these parties.[1364]

[1363] Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42.

[1364] Exhibit B407 - Trans Mountain Pipeline ULC - Response to The WaterWealth Project Notice of Motion dated June 4, 2015 (June 15, 2014) (A70682).

Through Community Benefit Agreements, Trans Mountain has provided tangible benefits to local communities with input from local governments and other local stakeholders. The benefits may be environmental or socio-economic in nature and include investments in community programs and infrastructure improvements, environmental stewardship and education and training.[1365] To date, over $5.5 million has been made available to these communities.[1366]

Employment is a key component of community economic development managed in combination with procurement, education, and training for interested communities.[1367] Trans Mountain's goal is to maximize employment opportunities for local, regional and Aboriginal groups along the proposed pipeline corridor. To foster the creation and development of economic development opportunities for Aboriginal groups, a funding program has been established to contribute to education and training initiatives that focus on pipeline construction and related transferable skills.[1368] In the present case, the market has provided strong support for the TMEP. If approved, the Project will result in immense economic benefits for Canadians for years to come.

9.12 Conclusion

The evidentiary record is clear. There is a demonstrated need for the Project and the Project is economically feasible. Canadian production currently lacks sufficient pipeline capacity to the Asia/Pacific region. If the Project is approved, Canadian production will have the opportunity to

[1365] Exhibit B306-27 - Trans Mountain Pipeline ULC - Response to NEB IR No. 3 – Part 1 of 2 (February 3, 2015) (A4H1X7).

[1366] Exhibit B306-12 – Trans Mountain Response to NEB IR No. 3.005a-Attachment 1-Part 1 (February 3, 2015) (A4H1W2).

[1367] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 20.

[1368] Exhibit B001 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 3B (December 16, 2013) (A3S0U5).

7754 garner higher prices through production priced in the Asia/Pacific region rather than the US Gulf
7755 Coast region.[1369] Canada and its regions will receive significant economic benefits as oil producer
7756 revenues are forecasted to rise by approximately $61 billion over the first 20 years of the Project's
7757 operations. The revenue associated with higher netbacks is expected to generate total federal and
7758 provincial fiscal benefits of approximately $19.9 billion.[1370]

7759 Further evidence of Project need is the long-term financial commitments made by shippers. Firm
7760 contracts account for 80 per cent of the nominal capacity on the expanded system. In May 2013
7761 the Project received approval pursuant to Part IV of the NEB Act for the toll methodology, terms
7762 and conditions that would apply to the Project.[1371] Shippers would not have freely entered into
7763 these contracts if they were not convinced of the need for the Project and that they would utilize
7764 the capacity.

7765 According to the Conference Board of Canada, the Project will result in significant economic
7766 benefits including: a forecasted boost to Canadian GDP by approximately $4.9 billion; a total of

---

[1369] Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-43.

[1370] By comparison to the IHS and Conference Board of Canada written evidence filed in 2013, this includes an increase in the estimated higher netbacks to producers from approximately $45 billion to approximately $61 billion, and a proportionate increase in the fiscal impact of higher netbacks from approximately $14.7 billion to approximately $19.9 billion, as a result of the revised market analysis completed in April 2015 in response to NEB IR No. 4.2. See Exhibit B371-2, Trans Mountain Response to NEB IR No. 4 (April 13, 2015) (A4K4W3) and Exhibit B1-4 – Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42; Trans Mountain Reply Evidence, Report 1.03 - Reply to Economic Costs and Benefits of TMX for B.C. and Metro Vancouver (Goodman and Rowan Report) (August 20, 2015).

[1371] NEB, Reasons for Decision, Trans Mountain Pipeline ULC – RH-001-2012 (May 2013); Exhibit C2-2 - BP Canada Energy Trading Company - Written Evidence of BP Canada Energy Trading Company (December 13, 2012) (A49778); Exhibit C2-9 - BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. - Written Argument of BP Canada Energy Group ULC, Canadian Oil Sands Partnership #1, Nexen Marketing and Statoil Canada Ltd. (February 20, 2013) (A50539); Exhibit C11-2 - Nexen Marketing - Written Evidence of Nexen Marketing (December 13, 2012) (A49780); Exhibit C14-2 - Statoil Canada Ltd. - Written Evidence of Statoil Canada Ltd. (December 13, 2012) (A49781); Exhibit C15-4 - Suncor Energy Marketing Inc. and Suncor Energy Products Partnership - Written Evidence (December 13, 2012) (A49786); Exhibit C16-6 - Total E&P Canada Ltd. - Written Direct Evidence of Total E-P Canada Ltd. (February 6, 2013) (A50376).

58,000 person-years of employment generated across Canada during development; $646 million in federal taxes generated during the Project development phase and an additional $568 million of provincial taxes; $1.4 billion in additional tax revenues for the federal government during operations; $1.1 billion in provincial taxes; and benefits to communities along the right-of-way through employment and economic activity.[1372]

The Project involves a $5.4 billion capital cost expenditure.[1373] This large investment in Canadian infrastructure will help to realign Canada's pipeline system with changing supply/demand fundamentals. Trans Mountain's expert evidence clearly demonstrates the benefits of the Project to Canadian energy production. This includes the benefits associated with increasing market access for Canadian heavy crudes to help ensure that extraordinary price discounts are avoided in future.[1374]

The public record demonstrates that Trans Mountain has taken a collaborative approach to infrastructure development in the Canadian public interest. Significant effort have been made to engage with stakeholders and Aboriginal groups that may be impacted by construction or operation of the Project. Economic benefits were, and continue to be, an important part of Trans Mountain's ongoing engagement with these parties.[1375] Through Community Benefit Agreements, Trans

---

[1372] Exhibit B286-2 - Report- Conference Board of Canada (November 24, 2014) (A4F2K9), 6-8; Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-42.

[1373] Exhibit B1-1 - V1_SUMM (December 16, 2013) (A3S0Q7).

[1374] Exhibit B1-4 –Trans Mountain Expansion Project Application, Volume 2, Project Overview 3 of 4 (December 16, 2013) (A3S0R0), 2-43.

[1375] Exhibit B407 - Trans Mountain Pipeline ULC - Response to The WaterWealth Project Notice of Motion dated June 4, 2015 (June 15, 2014) (A70682).

Mountain has provided tangible benefits to local communities with input from local governments and other local stakeholders.[1376]

Employment is a key component to community economic development managed in combination with procurement, education, and training for interested communities.[1377] Trans Mountain's goal is to maximize employment opportunities for local, regional and Aboriginal groups along the proposed pipeline corridor. To foster the creation and development of economic development opportunities for Aboriginal groups, a $1.5 million funding program has been established to contribute to education and training initiatives that focus on pipeline construction and related transferable skills.[1378]

In the present case, the market has provided strong support for the TMEP. If approved, the Project will result in immense economic benefits for Canadians for years to come. Importantly, Trans Mountain has endeavored to use economic benefits as a means to fulfill environmental and socio-economic objectives. These efforts will continue throughout the life of the Project.

[1376] Exhibit B306-12 – Trans Mountain Response to NEB IR No. 3.005a-Attachment 1-Part 1 (February 3, 2015) (A4H1W2).

[1377] Exhibit B1-39 - V3B 1.0 TO 3.0 ABOR ENGAG (December 16, 2013) (A3S0U5), 20.

[1378] Exhibit B001 - Trans Mountain Pipeline ULC - Trans Mountain Expansion Project Volume 3B (December 16, 2013) (A3S0U5).

10. CONCLUSION

The NEB's task is to balance the burdens and benefits of the Project in arriving at its public interest determination. That means critically looking at the evidence on environmental, social and economic issues and demining what is credible and what is not.

Trans Mountain submits that by building on its existing system, paralleling the existing right-of-way and implementing well known and proven mitigation there are no environmental, or social impacts that cannot be mitigated. That conclusion must be balanced with the material and certain economic benefits that will flow from increased market access, world prices for our resources and the jobs and opportunities that accompany the development of this Project. In balancing those benefits and burdens, Trans Mountain respectfully submits that the Board can arrive at only one conclusion—the Project is in the public interest.

Further, in looking at the evidence, the Board must distinguish between what is likely to happen and what is not likely to happen and make its decision accordingly. Real and important benefits for all Canadians should not be cast aside, based on improbable risks.

This Project is critical to the country and all Canadians. In Trans Mountain's view, Canadians should not accept that our resources will be forever sold at a discount due to inadequate pipeline infrastructure. The Project is the response to the need for market opportunity for Canadian heavy crudes which will help stem losses to the Canadian economy from the extraordinary price discounts to Canadian production. Trans Mountain submits that the TMEP is the safest, most viable and most appropriate option to meet the needs of Canadian oil production while minimizing environmental and social impacts, which serves the public interest.

Trans Mountain requests that the Board:

(a) recommend the issuance of a CPCN, pursuant to section 52 of the NEB Act, authorizing the construction and operation of the Project;

(b) issue an order, pursuant to section 58 of the NEB Act, exempting Trans Mountain from the requirements of sections 31(c), 31(d) and 33 of the NEB Act (PPBoR filings) in relation to temporary lands or infrastructure required for construction of the Project. These early works activities include: the development of camp locations, stockpile sites, contractor staging areas (i.e., co-located with camps or stockpile sites), access roads for the first 10 km of each pipeline spread (i.e., including temporary, clear-span bridges associated with these access roads), and clearing activities associated with the first 10 km of each pipeline spread, to be undertaken outside of the migratory bird restricted activity period;[1379]

(c) grant leave, pursuant to section 45(1) of the OPR,[1380] to reactivate the NPS 24 pipeline segment from Hinton, Alberta to Hargreaves, B.C. and the NPS 24 pipeline segment from Darfield, B.C. to Black Pines, B.C.; and

(d) grant such further and other relief as the Board may consider appropriate.[1381]

All of which is respectfully submitted.

[1379] Trans Mountain Reply Evidence, Section 64 – Early Works (August 20, 2015).

[1380] SOR/99-294.

[1381] Exhibit B1-1-V1 SUMM (December 13, 2013 (A3S0Q7), 1-10.