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Trans Mountain Pipeline ULC
Trans Mountain Expansion Project
NEB Hearing Order OH-001-2014
Responses to Information Request from National Energy Board

Markets and supply

1.1 Rail capacity

Reference:

A3S0R1, Application Volume 2, Project Overview, Economics and General Information, Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited:

i) PDF page 12 of 230, Lines 1 to 6
ii) PDF page 46 of 230, Lines 31 to 33
iii) PDF page 47 of 230, Lines 4 to 6

Preamble:

Reference i) states that, in the Expansion Scenario, rail deliveries will be required until 2016, at which time Enbridge expansions and Keystone XL absorb the growth in the marketable crude supply. It also states that the Project, Energy East, and Northern Gateway are assumed to come on in 2017 and 2018, and thereby reduce the need for rail.

Reference ii) states that rapid growth is projected in Western Canadian and US northern tier crude on-loading capacity, as summarized in Table A-12 – Rail Loading Facilities in Western Canada and North Dakota. It also states that more project announcements are expected.

Reference iii) states that, in IHS Global Canada's (IHS') opinion, proposed pipelines will add sufficient takeaway capacity for crude oil from Western Canada and the US northern tier to reduce the need for rail loading. It also states that rail loading capacity for crude oil would become underutilized by 2015 or 2016.

Request:

a) Please discuss why, in IHS's view, rail loading facilities would become underutilized or cease to be used after 2015 or 2016, if companies are investing in these facilities.

b) Please explain under what circumstances, in IHS's view, a shipper would choose to transport crude oil by rail versus pipeline.

c) Please describe the markets that are accessed by rail, and discuss whether these markets are the same markets being accessed by pipeline expansions.

d) Please discuss whether IHS envisions a scenario whereby rail would exist alongside pipeline expansions or new pipelines.

Response:

a) The response of the market to extraordinary price discounting for Canadian crude and the need for takeaway capacity has led to increased interest in crude by rail (CBR) transportation projects. This is consistent with crude producers seeking to maximize netbacks by using the lowest cost transportation available at the time.

In IHS' view, rail loading facilities would become underutilized or cease to be used after 2015 or 2016 due to the availability of pipeline capacity for crude deliveries from Western Canada, and the associated reduction or elimination of extraordinary price discounts for Canadian crude that are expected by that time. Pipelines remain the most efficient mode of long-haul transportation for large volumes of crude. CBR projects typically require relatively small capital investment, and may be expected to achieve an economic return over a relatively short period of time. In addition, producers using CBR are typically making shorter contractual commitments for this service.

b) IHS expects that there may be several circumstances in which a shipper would choose to transport crude by rail rather than by pipeline. These are noted below:

- Shippers seeking to transport crude to markets but who do not have access to pipeline capacity
- Shippers seeking to transport specific crude types while managing particular quality issues
- Shippers that have more direct transportation access by rail than by pipeline, which offers the opportunity to shorten transit times and reduce working capital costs
- Shippers that do not meet a creditworthiness requirement for term commitments for pipeline capacity

Some bitumen producers are pursuing rail transportation to access markets during a period where pipeline takeaway capacity is limited. This creates an opportunity to ship bitumen with less diluent than required for pipeline shipment (or with no diluent), and potentially realize a higher (that is, less discounted) netback price. To the extent that refiners prefer to receive and process bitumen in this form, such an operation could continue after pipeline capacity is available. However, to date this has been a limited opportunity. IHS does not expect that there will be significant opportunities to earn higher netback prices via rail as compared to pipelines, once adequate pipeline capacity is in place.

c) IHS notes that market access for crude oil by rail is generally flexible enough to allow crude from any producing region to be delivered to any refining location, assuming that adequate facilities exist for loading and offloading. The rail network in North America is extensive, and it would likely be the exception that a refinery is not accessible via the rail network. Currently, crude is being delivered to North American refineries, including refineries on the East Coast of Canada and the US, the West Coast of Canada and the US, and the Gulf Coast of the US.

The key consideration for producers is to reach markets that yield world prices for crude, rather than inland markets that are subject to extraordinary discounts. The market regions

noted above all provide access to world prices, and all have access to world markets via waterborne transportation. It is not surprising that these are the same market regions that would be served by proposed pipeline projects.

d) IHS expects that rail could continue to provide crude transportation services even as pipeline expansions or new pipelines are started up. However, it is our view that once takeaway pipeline capacity is available it will be utilized. As a result, the utilization of rail loading facilities will decrease. The remaining use of rail for crude transportation would likely fall into one of the categories noted in response to NEB IR No. 1.1b.

1.2 Transportation

Reference:

A3S0R1, Application Volume 2, Project Overview, Economics and General Information, Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited:

i) Figure A-9 – Western Canadian Supply for Pipeline Export vs. Pipeline Capacity, PDF page 48 of 230
ii) PDF page 48 of 230, Lines 16 to 18

Preamble:

Reference i) is a chart that illustrates Western Canadian supply for pipeline export versus pipeline capacity. It shows pipeline takeaway capacity for the Expansion Scenario and the three crude oil production cases developed by IHS.

Reference ii) states that surplus capacity is estimated to reach a maximum value of 1.8 million barrels per day (bbl/d) in 2019 and, by 2030, surplus pipeline capacity is projected to be absorbed.

Request:

Please provide:

a) in table format, the underlying data for Figure A-9 (Reference i);

b) an explanation why the Board, in IHS's view, should or should not be concerned with 1.8 million bbl/d of surplus capacity in 2019 and surplus pipeline capacity to 2030. Please also explain:
   b.1) the impacts of this surplus capacity on pipeline companies;
   b.2) the impacts of this surplus capacity on shippers, including a discussion on the toll impacts of possible surplus capacity on pipelines; and
   b.3) whether this surplus capacity includes rail.

Response:

a) The underlying data for Figure A-9 is provided in Table 1.2A-1.

TABLE 1.2A-1

IHS REPORT FIGURE A-9 DATA (THOUSAND BARRELS PER DAY)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Pipeline Capacity													
Rangeland/Milk River/Express	320	320	320	320	320	320	320	320	320	320	320	320	320
Trans Mountain - Existing	265	265	265	265	265	265	265	265	265	265	265	265	265
Keystone	501	516	530	530	590	590	590	590	590	590	590	590	590
Enbridge Mainline	1,795	1,845	2,005	2,005	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420
Keystone XL	0	0	0	0	183	730	730	730	730	730	730	730	730
Trans Mountain - Expansion	0	0	0	0	0	148	590	590	590	590	590	590	590
Energy East	0	0	0	0	0	63	400	800	800	800	800	800	800
Northern Gateway	0	0	0	0	0	131	525	525	525	525	525	525	525
Western Canadian Supply													
Base Production Case	2,684	2,950	3,195	3,444	3,762	3,997	4,219	4,398	4,516	4,674	4,822	4,964	5,109
Low Production Case	2,678	2,845	3,098	3,333	3,559	3,697	3,840	3,918	3,992	4,103	4,188	4,249	4,315
High Production Case	2,678	2,845	3,098	3,496	3,884	4,185	4,492	4,734	4,971	5,244	5,490	5,712	5,939

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Pipeline Capacity													
Rangeland/Milk River/Express	320	320	320	320	320	320	320	320	320	320	320	320	320
Trans Mountain - Existing	265	265	265	265	265	265	265	265	265	265	265	265	265
Keystone	590	590	590	590	590	590	590	590	590	590	590	590	590
Enbridge Mainline	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420	2,420
Keystone XL	730	730	730	730	730	730	730	730	730	730	730	730	730
Trans Mountain - Expansion	590	590	590	590	590	590	590	590	590	590	590	590	590
Energy East	800	800	800	800	800	800	800	800	800	800	800	800	800
Northern Gateway	525	525	525	525	525	525	525	525	525	525	525	525	525
Western Canadian Supply													
Base Production Case	5,258	5,404	5,547	5,696	5,846	5,993	6,175	6,317	6,498	6,641	6,715	6,875	7,036
Low Production Case	4,385	4,469	4,568	4,653	4,752	4,847	4,955	5,023	5,117	5,137	5,154	5,164	5,153
High Production Case	6,170	6,415	6,675	6,920	7,179	7,433	7,701	7,929	8,184	8,365	8,542	8,712	8,862

b) In IHS' view, the Board should not be concerned that pipeline projects may result in some surplus pipeline takeaway capacity for the period from 2016 to 2030, for the reasons outlined below:

- The projects are generally supported by commercial contractual arrangements with well-capitalized and sophisticated parties.
- The availability of surplus capacity would provide benefits in terms of market diversity and greater certainty of access to the highest value market for shippers, in a market characterized by substantial uncertainty, and ensuring that multiple markets are accessible offers significant value to producers. This optionality is especially important in light of the significant market shift that is taking place in North American crude markets. The traditional role of inland markets in the US (mainly PADD II and IV) in absorbing much of the surplus production from Western Canada is being challenged by growing US domestic production. Western Canadian production must find new market outlets, including tidewater locations, to achieve the optionality and diversity that shippers desire. In this situation, it is to be expected that some excess capacity may be created in the traditional markets. This is a normal feature of a well-functioning market that is adapting to changes in market dynamics.
- The availability of surplus pipeline capacity is considered a more desirable situation for producers than the situation in recent years, where capacity is inadequate. The costs to

the industry associated with discounted crude prices (arising from constraints on pipeline takeaway capacity) in 2012 were estimated by IHS at $15-19 billion.

- Figure A-9 presents pipeline capacity additions as announced for each project. In the event that there is some phasing of the project startups, the maximum extent of the capacity surplus is likely to be less than shown. Furthermore, higher growth rates for crude supply would reduce the level and duration of the surplus capacity. For example, in the Expansion Scenario with increased bitumen and tight oil production growth (defined as the High Production case), IHS estimates that pipeline capacity additions will fall short of crude supply growth before 2025 rather than 2030.

As noted above, the competitive context for the Project is that shippers want access to multiple markets, and that they see a benefit in having flexibility to access the market offering the highest netback price at any time. The conclusions reached in the Direct Evidence of Mr. John Reed addresses the issue of surplus capacity, the implications for the economic and financial viability of the Project, and related public interest considerations. Mr. Reed concluded, and IHS agrees, that:

> "The potential for some level of under-utilization of the region's aggregate pipeline capacity during the 2017-2030 period does not indicate that the TMEP, or any of the other proposed projects, are not economically feasible. The TMEP provides a feasible and efficient means of addressing the asymmetrical risk of too much/too little capacity. Some level of optionality in capacity markets promotes economic efficiency, reflects the likelihood of future additional demand and does not detract from the economic feasibility of the TMEP." [pg.3-4]

b.1) The potential impact of surplus capacity on pipeline companies is dependent upon whether the companies have contracted or uncommitted capacity, and the extent of the surplus capacity. To the extent that their contractual arrangements include "take-or-pay" provisions, pipeline companies would have the financial certainty of receiving the equivalent of the fixed toll regardless of whether the capacity was actually used.

It can be reasonably expected that shippers will use contracted firm pipeline capacity first, before they would utilize uncommitted or spot capacity. Therefore, surplus capacity can be expected to result in the potential offloading of pipeline companies with uncommitted capacity.

On most if not all of the newer oil pipelines, the pipeline's fixed costs are covered through firm service demand charges, and the volume of spot shipments, and the risk of revenue loss from a downturn in volumes shipped is not a significant concern to the pipeline. These tolling parameters, and the risks to be borne by all parties, have been agreed to by the contracting parties, and should not, therefore, be viewed by the Board as troubling or inequitable.

On oil pipelines with primarily common carrier service, and volumetric tolls, there may be some revenue loss from the development of competing pipelines, but this effect is one which is fully consistent with the market's desire for new forms of service, new routes to expanding markets, and greater certainty of access to higher-value markets.

Such pipelines can respond by pursuing long term contractual certainty with shippers or seek rate increases, with NEB approval. The Board should view these effects of potentially surplus capacity in the market as being consistent with the public interest, and consistent with the market participants' preferences for service.

b.2) The costs of excess capacity would likely be borne in part by pipelines and in part by shippers who pay the tolls on those pipelines, although the outcomes would be pipeline-specific.

The costs of any unutilized contracted pipeline capacity would be borne by committed shippers, who would continue to pay minimum fixed charges for the capacity. IHS supports the approach used in the Direct Evidence of Mr. John Reed, in which he compared foregone producer revenues (associated with the crude price discounts experienced in recent years) to the costs to shippers of holding some excess capacity. Using the lower end of the $15-$19 billion range estimated by IHS for 2012, Mr. Reed estimated that one year of lost revenues ($15 billion) is roughly equivalent to over 12 years of fixed toll charges on TMEP. IHS agrees with Mr. Reed's conclusion that, "given that highly asymmetrical cost/benefit relationship, producers can be seen as making a rational economic decision by committing to TMEP and other projects on an unconditional basis, even if some excess capacity may result if all projects are developed as planned and on schedule."

The potential impact on uncommitted shippers should also consider the value of unutilized contract capacity in the secondary market. The potential revenue to contract shippers from selling firm capacity in the secondary market could reduce the net cost of the capacity to them. For uncommitted shippers, this would create a greater level of competition among pipelines for uncommitted production, which may have beneficial toll impacts for uncommitted shippers.

The potential toll impacts of surplus pipeline capacity for uncommitted capacity that may be underutilized would be pipeline specific. Such impacts could be mitigated by the migration of pipelines from uncommitted to contract capacity and negotiated settlements that would balance the risks between shippers and pipelines.

b.3) The capacity surplus shown in Figure A-9 excludes rail.

1.3 Supply

Reference:

A3S0R1, Application Volume 2, Project Overview, Economics and General Information, Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited, Table A-13 – Crude Supply Versus Pipeline Capacity – Base Case Supply, PDF page 49 of 230

Preamble:

Table A-13 provides IHS's analysis of available Western Canadian and U. northern tier crude supply, including designated dispositions and remaining supply.

Request:

a) Please explain why US Bakken crude oil production is included in the supply number when those volumes would not be available to many of the pipelines listed in Table A-13. Please also explain why, as with Figure A-9 (Reference i) in Information Request No. 1.2), IHS would not just include crude supply from western Canada.

b) Please breakout in table format, for the years 2012 to 2037:
   - b.1) the supply number, by Western Canada and US Bakken production;
   - b.2) the advantaged markets, by market or PADD and volume; and
   - b.3) the Subtotal Term Committed Volumes, by pipeline and volume.

c) Please identify, and explain for each pipeline noted in Table A-13, the underlying assumptions in determining the Potential Term Committed Volumes.

d) Please provide the following additional details in an updated Table A-13:
   - d.1) all major pipelines exiting western Canada for the years 2012 to 2037 (e.g., Enbridge, Express, Rangeland, Milk River, etc.) under Disposition;
   - d.2) rail loading capacity for the years where it is applicable; and
   - d.3) updates to the Total Designation Dispositions and Remaining Supply for the 2012 to 2037 period after adding the pipelines in d.1) and the rail loading capacity in d.2).

Response:

a) IHS included the crude supply from the US Northern Tier in Table A-13 because supply from Western Canada and the US Northern Tier is being served by some of the same pipelines, and these crude sources serve many of the same refining locations. Bakken crude oil production, which is included in the supply projections for Table A-13, is accessible to most of the pipeline projects shown in the table. This includes the Enbridge Gulf Coast Access project, the TransCanada Keystone XL project, the Enbridge Line 9 project and the TransCanada Energy East project. The westbound projects in Table A-13 (the Trans Mountain Expansion Project and Enbridge Northern Gateway) would not have access to Bakken supply. However, for determination of the remaining supply which would be available to uncommitted capacity on these and other pipelines at Edmonton as well as rail, it is appropriate to consider the aggregate supply and disposition of crude.

b) Please refer to Table 1.3B-1, which provides the requested detail, as follows:

b.1) crude supply, including Western Canada and US Bakken production;

b.2) crude disposition to Advantaged Markets, which are defined as Western Canada/Ontario, PADD I, the Upper Midwest portion of PADD II and PADD IV;

b.3) crude disposition to Term Committed Volumes, including Enbridge Spearhead and TransCanada Keystone.

TABLE 1.3B-1

CRUDE SUPPLY VERSUS PIPELINE CAPACITY – BASE CASE SUPPLY (THOUSAND BARRELS PER DAY)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Supply													
Western Canada	3,193	3,462	3,713	3,964	4,285	4,581	4,803	4,985	5,105	5,266	5,417	5,563	5,711
US Bakken	667	882	974	1,019	1,098	1,184	1,261	1,325	1,376	1,413	1,441	1,457	1,464
Total Supply	3,860	4,344	4,686	4,982	5,382	5,765	6,063	6,309	6,480	6,679	6,858	7,020	7,175
Disposition													
Advantaged Markets													
Western Canada/Ontario	914	947	952	997	1,001	1,005	1,010	1,016	1,018	1,024	1,026	1,029	1,033
PADD I	31	31	31	31	31	31	31	31	31	31	31	31	31
PADD II Upper Midwest	477	480	468	463	460	463	465	465	463	460	457	454	451
PADD IV	307	239	236	234	228	221	216	213	215	217	216	213	207
Subtotal Advantaged Markets	1,728	1,697	1,687	1,725	1,720	1,719	1,722	1,724	1,726	1,731	1,731	1,727	1,722
Term Committed Volumes (2)													
Enbridge Spearhead	138	138	138	138	138	138	138	138	138	138	138	138	138
TCPL Keystone	590	590	590	590	590	590	590	590	590	590	590	590	590
Subtotal Term Committed Volumes	728	728	728	728	728	728	728	728	728	728	728	728	728
Potential Term Committed Volumes (2)													
Enbridge Gulf Coast Access	-	-	219	439	439	439	439	439	439	439	439	439	439
TCPL Keystone XL (KXL)	-	-	-	-	187	498	747	747	747	747	747	747	747
Enbridge Line 9	-	-	113	225	225	225	225	225	225	225	225	225	225
Trans Mountain Expansion Project	-	-	-	-	-	177	420	640	707	707	707	707	707
TCPL Energy East	-	-	-	-	-	62	400	600	800	900	900	900	900
Enbridge Northern Gateway	-	-	-	-	-	-	223	446	446	446	446	446	446
Subtotal Potential Term Committed Volumes	-	-	332	664	851	1,400	2,454	3,097	3,364	3,464	3,464	3,464	3,464
Total Designated Dispositions	2,456	2,425	2,747	3,117	3,298	3,847	4,904	5,549	5,818	5,923	5,923	5,919	5,914
Remaining Supply (3)	1,403	1,919	1,939	1,866	2,084	1,917	1,159	760	662	756	935	1,101	1,261

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Supply													
Western Canada	5,862	6,011	6,157	6,308	6,462	6,610	6,762	6,907	7,055	7,201	7,348	7,510	7,675
US Bakken	1,466	1,406	1,350	1,300	1,255	1,215	1,178	1,145	1,115	1,088	1,057	1,027	998
Total Supply	7,328	7,417	7,507	7,608	7,717	7,825	7,940	8,052	8,170	8,289	8,405	8,537	8,673
Disposition													
Advantaged Markets													
Western Canada/Ontario	1,034	1,039	1,045	1,049	1,053	1,054	1,058	1,064	1,068	1,071	1,072	1,078	1,084
PADD I	31	31	31	31	31	31	31	31	31	31	31	31	31
PADD II Upper Midwest	448	446	444	442	440	438	436	434	432	430	428	422	419
PADD IV	201	195	187	178	167	154	140	126	110	94	78	137	157
Subtotal Advantaged Markets	1,714	1,711	1,707	1,700	1,691	1,677	1,665	1,655	1,641	1,627	1,610	1,667	1,690
Term Committed Volumes (2)													
Enbridge Spearhead	138	138	138	138	138	138	138	138	138	138	138	138	138
TCPL Keystone	590	590	590	590	590	590	590	590	590	590	590	590	590
Subtotal Term Committed Volumes	728	728	728	728	728	728	728	728	728	728	728	728	728
Potential Term Committed Volumes (2)													
Enbridge Gulf Coast Access	439	439	439	439	439	439	439	439	439	439	439	439	439
TCPL Keystone XL (KXL)	747	747	747	747	747	747	747	747	747	747	747	747	747
Enbridge Line 9	225	225	225	225	225	225	225	225	225	225	225	225	225
Trans Mountain Expansion Project	707	707	707	707	707	707	707	707	707	707	707	707	707
TCPL Energy East	900	900	900	900	900	900	900	900	900	900	900	900	900
Enbridge Northern Gateway	446	446	446	446	446	446	446	446	446	446	446	446	446
Subtotal Potential Term Committed Volumes	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464
Total Designated Dispositions	5,906	5,903	5,899	5,892	5,883	5,869	5,857	5,847	5,833	5,819	5,802	5,859	5,882
Remaining Supply (3)	1,422	1,514	1,608	1,716	1,834	1,956	2,082	2,205	2,338	2,470	2,603	2,677	2,790

Notes: (1) Includes Western Canada and U.S. Bakken production, from Base Case forecasts, August 2013.
(2) IHS estimates.
(3) Supply potentially available for Trans Mountain (for PADD V PNW), Enbridge (mainline) or Express (for Platte), spot deliveries to other pipelines or rail.

c) The assumptions that apply to the determination of Potential Term Committed Volumes for each of the pipelines listed in Table A-13 are:

- Enbridge Gulf Coast Access is assumed to have capacity of 585,000 B/D, of which 75 percent (439,000 B/D) is estimated to be term commitments
- TCPL Keystone XL (KXL) is assumed to have capacity of 830,000 B/D, of which 90 percent (747,000 B/D) is estimated to be term commitments
- Enbridge Line 9 is assumed to have capacity of 300,000 B/D, of which 75 percent (225,000 B/D) is estimated to be term commitments
- Trans Mountain Pipeline, after the Expansion Project, would have capacity of 890,000 B/D, of which approximately 80 percent (707,500 B/D) is term commitments
- TCPL Energy East is assumed to have capacity of 1,100,000 B/D, of which approximately 82 percent (900,000 B/D) is estimated to be term commitments
- Enbridge Northern Gateway is assumed to have capacity of 525,000 B/D, of which 85 percent (446,000 B/D) is estimated to be term commitments

d) Please refer to the following discussion related to pipeline and rail loading capacity in Western Canada:

d.1) IHS has not developed disposition forecasts for these pipelines on an individual or aggregate basis, and did not include this level of detail in Table A-13. Crude disposition to the Advantaged Markets shown in Table 1.3B-1 is based on IHS' forecast of demand for Canadian crude in those markets. The results shown are corridor flows rather than pipeline flows, since crude may be transported in more than one pipeline. The Remaining Supply volume would be available for disposition among all remaining dispositions, which include the Pacific North West region of PADD V, Enbridge mainline, Express (Platte deliveries to PADD II), as well as uncommitted deliveries on all pipelines named in Table 1.3B-1 and rail.

d.2) Current and future rail loading capacity in Western Canada and North Dakota is shown in Table A-12 in the IHS Report, through to the end of 2016. Rail loading capacity is identified in the table to increase to 804,000 B/D and 985,000 B/D in Western Canada and North Dakota, respectively. By comparison to the long-term commercial arrangements for pipeline capacity, IHS expects rail loading capacity to be subject to shorter contractual commitments. In this respect, rail loading capacity is similar to the pipelines noted in d.1, which do not have term volume commitments. The Remaining Supply after all Designated Dispositions would be available for disposition among these remaining disposition alternatives, including pipelines and rail loading facilities. Refer also to the response to NEB IR No. 1.1.

d.3) The requested update to the Total Designation Dispositions and Remaining Supply for the 2012 to 2037 period cannot be provided, for the reasons noted above, in relation to the commercial arrangements applicable to operation of the pipelines (in d.1) and rail loading capacity (in d.2).

1.4 Markets – California

Reference:

A3S0R1, Application Volume 2, Project Overview, Economics and General Information:

i) Appendix C – Direct Evidence of John J. Reed of Concentric Energy Advisors, Inc. to the National Energy Board, PDF page 134 of 230, Lines 13 to 18
ii) Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited, PDF page 36 of 230, Line 13
iii) Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited, PDF page 36 of 230, Lines 7 to 11

Preamble:

Reference i) states that the Project will provide access to California, the US Pacific Northwest and other Pacific Rim markets. It also states that the results of the IHS study also indicate that the netbacks calculated to California and other Pacific Rim markets are expected to remain at a premium to all other markets served by oil pipelines connected to Western Canadian oil production over the entire study period.

Reference ii).states that there are several factors that favour growth in oil sands crude in the PADD V market.

Reference iii) states that imports of Canadian crude by California refineries have been a relatively small fraction of the total imports to the state, but the trend has been increasing. California Energy Commission statistics indicate that Canadian crude imports in 2012 were 39,000 bbl/d (about 2.3 per cent of total California crude runs). This is up from 15,000 bbl/d in 2007, which was about 0.8 per cent of California crude runs in that year."

Request:

Please explain why California appears to be highlighted as a significant market for Canadian Crude in the Project application.

Response:

California is highlighted as a potential market for Canadian crude in the Project application because it has several favourable attributes, which are summarized below:

- As illustrated in Figure A-7 of the IHS Report, the California refining market has experienced a steadily growing need for imported crude for more than two decades. Imports accounted for just over 50 percent of the crude oil processed in California in 2012.
- As shown in Table A-7 of the IHS Report, the California refining market is both large (approximately 2 million B/D of capacity) and complex (having 80 percent of its refining capacity in highly complex "coking" configurations).
- California refineries have a high proportion of capacity that is suitable for processing of heavy, high Total Acid Number (TAN) crude oils.

- PADD V is a region of the US that is readily accessible to Canadian crude from the West Coast of Canada. The Pacific Northwest has historically been served by Canadian crude (via Trans Mountain). Regarding California, it is growing its runs of Canadian crude, albeit from a very small baseline (as noted in the Preamble to this Information Request). Furthermore, the capacity for exports via Westridge has historically been limited.
- Netback prices for heavy crude calculated for the California market are forecast to achieve a premium relative to China and the US Gulf Coast.

As discussed in response to NEB IR No. 1.5, state environmental policies could potentially limit the extent to which Western Canadian crude is processed in California in the future, but this remains uncertain. On balance, for the reasons listed above, IHS expects the California market will provide incremental opportunities for the processing of Canadian crude over the forecast period.

1.5 Markets – California environmental policy impact

Reference:

A3S0R1, Application Volume 2, Project Overview, Economics and General Information, Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited, PDF page 36 of 230

Preamble:

The reference states that overall demand for crude is forecast to decrease, largely due to mandated fleet efficiency improvements which will reduce gasoline demand.

Request:

a) Please describe how Trans Mountain considered California's environmental policies and their impact on the demand for Canadian crude.

b) If Trans Mountain did not consider these policies, please explain why.

Response:

a) PADD V crude demand (Figure A-6 in the IHS Report) follows a similar trend to the overall US refining market, for the reason given in the preamble. IHS monitors regulatory developments in California and in other jurisdictions, because these developments have the potential to impact future markets for Canadian crude. The historical and forecast PADD V imports of Canadian crude, by crude type, are summarized in Table 1.5A-1. Note that the IHS balance is for PADD V as a whole, and does not break out California. IHS did not attempt to differentiate PADD V imports of Canadian crude by scenario because this was not considered to be a key variable underlying the market analysis for the Project. An increase in PADD V imports of Canadian crude from the recent historical level is considered to be more likely than a decrease, for the reasons outlined in the response to NEB IR No. 1.4. However, lack of certainty in California's environmental regulations and enforcement mechanisms does not permit a more granular analysis.

TABLE 1.5A-1

PADD V CANADIAN CRUDE IMPORTS (THOUSAND BARRELS PER DAY)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Sweet Crude	122	118	113	130	130	130	130	130	130	130	130	130	130
Light Sour Crude	15	10	10	44	34	24	14	14	14	14	14	14	14
Heavy Sour Crude	55	50	65	48	48	48	48	102	150	150	150	150	150
Total Canadian Imports	192	177	187	223	213	203	193	247	294	294	294	294	294

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Sweet Crude	130	130	130	130	130	130	130	130	130	130	130	130	130
Light Sour Crude	14	14	14	14	14	14	14	14	14	14	14	14	14
Heavy Sour Crude	150	150	150	150	150	150	150	150	150	150	150	150	150
Total Canadian Imports	294	294	294	294	294	294	294	294	294	294	294	294	294

b) Please see the response to NEB IR No. 1.5a.

1.6 Benefits calculation

Reference:

i) A3S0Q7, Application Volume 1, Summary, PDF page 31 of 113

A3S0R1, Application Volume 2, Project Overview, Economics and General Information, Appendix A – Direct Written Evidence of Steven J. Kelly, IHS Global Canada Limited:

ii) PDF page 19 of 230
iii) Footnote 7, PDF page 19 of 230
iv) Figure 1 – Western Canadian Supply for Pipeline Export vs. Pipeline Capacity, PDF page 12 of 230

Preamble:

Reference i) states that oil producer revenues in Western Canada are forecast to rise by $US45.4 billion over the first 20 years of the Project's operation, as a result of higher netbacks that can be attributed to producers having access to new markets through the Project.

Reference ii) states that $US37.4 billion of the $US45.4 billion in Reference i) is the Project's share of the total industry benefits over the 2018 to 2037 time period.

Reference ii) also states that the Project's share, as part of an aggregate expansion of capacity, is 26.6 per cent of the assumed capacity additions.

Reference iii) states the assumed capacity additions: Project capacity is 590,000 bbl/d, Energy East capacity is 1.1 million bbl/d, and Northern Gateway capacity is 525,000 bbl/d.

Reference iv) illustrates the assumed capacity additions by pipeline, including the Enbridge Mainline expansion and Keystone XL. The Board notes that, for the Low Production Case in particular, between 2018 and 2024, not all of Keystone XL assumed capacity is required and, thus, the Project's share of aggregate industry benefits over the 2018 to 2024 time period could differ from the 26.6 per cent share as stated in Reference iii).

Request:

a) Please provide the Project's share of total industry benefits, in dollars, for the High Production Case and Low Production Case, as is stated for the Base Production Case in Reference ii).

b) Please provide the Project's share of the aggregate expansion of capacity, in per cent, for the High Production Case and Low Production Case, as is stated for the Base Production Case in Reference ii).

c) Please provide how much oil producers' revenues in Western Canada are expected to rise as a result of higher netbacks that can be attributed to producers having access to new markets through the Project, for the High Production Case and Low Production Case, as is provided for the Base Production Case in Reference i).

Response:

a) The Project's share of total industry benefits is $29.7 billion US for the High Production Case and $41.9 billion US for the Low Production Case.

b) IHS assumed that all the pipeline projects identified as being included in the Expansion Scenario (Trans Mountain Expansion, Energy East and Northern Gateway) would proceed to completion on the same schedule in the High Production Case and the Low Production Case. The Project's share of the aggregate expansion of capacity is the same for the High Production Case as for the Base Production Case in Reference ii), specifically 26.6 percent.

   If it is assumed that any of the other projects identified in the Expansion Scenario were delayed relative to their announced startup schedule, this would have the effect of increasing the Project's share of the aggregate benefits for the period of time that the project(s) are assumed to be delayed.

c) IHS estimates that oil producers' revenues in Western Canada are expected to rise by an aggregate of $140.5 billion between 2018 and 2037 in the Base Production Case, as a result of producers having access to new markets, and netback prices being established by pipeline rather than rail transportation. The 26.6 percent pro-rata share of the aggregate industry benefits attributed to the Project is $37.4 billion in the Base Production Case. In addition, the benefits attributable to the Project associated with access to the higher netback prices in Asia are equal to $8 billion over the same period. This results in a total benefit attributable to the Project of $45.4 billion.

   For the Low Production Case the aggregate benefits are $138.5 billion, of which $36.9 billion is attributed to the Project. The benefits associated with access to the higher netback prices in Asia are $5 billion over the same period, for a total of $41.9 billion.

   For the High Production Case the aggregate benefits are $56.7 billion, of which $15.1 billion is attributed to the Project. The benefits associated with access to the higher netback prices in Asia are $14.6 billion over the same period, for a total of $29.7 billion. As noted in the IHS report, this benefits calculation excludes the cost of extraordinary price discounts, which would be most likely to re-emerge and persist in the High Production Case.

Financial and economics

1.7 Corporate structure

Reference:

A3S4V6, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF page 129 of 137

Preamble:

The reference identifies corporate entities such as Trans Mountain Pipeline ULC, Trans Mountain Pipeline L.P., Kinder Morgan Canada Inc., and Kinder Morgan Energy Partners, L.P. that are associated with this Project.

The Board requires additional information on the interrelationships of these entities and their respective roles in managing the limited partnership and operating the pipeline.

Request:

Please provide:

a) a corporate structure chart that shows each entity in the reference;

b) a description summarizing each entity's ownership and the operating relationships with each other. This description and the chart in a) must show, but not be restricted to:
   - b.1) the ownership of each entity and the jurisdiction in which each entity is registered;
   - b.2) the general and limited partners in Trans Mountain Pipeline L.P.; and
   - b.3) the respective roles and responsibilities of Trans Mountain ULC and Kinder Morgan Canada Inc. in managing the limited partnership (Trans Mountain Pipeline L.P.) and operating the pipeline;

c) confirmation as to whether the limited partners of Trans Mountain Pipeline L.P. and/or the parent of Trans Mountain Pipeline ULC would or would not provide financial backstopping to Trans Mountain Pipeline ULC and the limited partnership should it be unable to pay its creditors. If confirmation is not possible at this time, please indicate whether this backstopping would be an option these parties would consider when the Project is placed in service;

d) the name of the legislation governing Trans Mountain Pipeline L.P., as well as a reproduction of the parts of the legislation specifying a limited partner's liability and the conditions that apply to the sharing of a limited partnership's profits with partners; and

e) a summary of Trans Mountain Pipeline L.P.'s distribution policy that would determine how cash in the limited partnership would be distributed to the limited partners.

Response:

a) The corporate structure is provided in Attachment 1 to NEB IR No. 1.07a (NEB IR No. 1.07a – Attachment 1).

b) Trans Mountain Pipeline L.P.

Trans Mountain Pipeline L.P. is an Alberta limited partnership governed by the *Partnership Act* (Alberta) and is registered in Alberta.

The general partner in Trans Mountain Pipeline L.P. is Trans Mountain Pipeline ULC. Trans Mountain Pipeline ULC holds a 0.01% partnership interest in Trans Mountain Pipeline L.P.

The sole limited partner in Trans Mountain Pipeline L.P. is Kinder Morgan Cochin ULC, an unlimited liability company governed by the *Companies Act* (Nova Scotia). Kinder Morgan Cochin ULC holds a 99.99% partnership interest in Trans Mountain Pipeline L.P.

Trans Mountain Pipeline ULC

Trans Mountain Pipeline ULC is an Alberta unlimited liability corporation governed by the *Business Corporations Act* (Alberta) and is registered in Alberta.

Trans Mountain Pipeline ULC is a direct wholly-owned subsidiary of Kinder Morgan Canada Company, an unlimited liability company governed by the *Companies Act* (Nova Scotia).

Trans Mountain Pipeline ULC is the general partner of Trans Mountain Pipeline L.P., holding a 0.01% interest in Trans Mountain Pipeline L.P.

Kinder Morgan Cochin ULC

Kinder Morgan Cochin ULC is an Alberta unlimited liability corporation governed by the *Business Corporations Act* (Alberta) and is registered in Alberta.

The outstanding capital stock of Kinder Morgan Cochin ULC is comprised of 1 class of common voting shares and 6 classes of non-voting redeemable preferred shares. Kinder Morgan Canada Company, the direct parent of Trans Mountain Pipeline ULC (the general partner) and Kinder Morgan Canada Inc. (the operator), holds 99.63% of the common voting shares and 4 of the 6 classes of non-voting redeemable preferred shares of Kinder Morgan Cochin ULC. The balance of the outstanding share capital of Kinder Morgan Cochin ULC is held indirectly by Kinder Morgan Energy Partners L.P.

Kinder Morgan Cochin ULC is the sole limited partner of Trans Mountain Pipeline L.P., holding a 99.99% interest in Trans Mountain Pipeline L.P.

Kinder Morgan Canada Inc.

Kinder Morgan Canada Inc. is an Alberta corporation governed by the *Business Corporations Act* (Alberta) and is registered in Alberta.

Kinder Morgan Canada Inc. is a direct wholly owned subsidiary of Kinder Morgan Canada Company, a corporation governed by the *Companies Act* (Nova Scotia).

Kinder Morgan Canada Inc. is the operator of the Trans Mountain Pipeline pursuant to an Operating Agreement between the two entities.

Kinder Morgan Energy Partners L.P.

Kinder Morgan Energy Partners L.P. is a Delaware limited partnership governed by the *Delaware Revised Uniform Limited Partnership Act* (Delaware) and is registered in Delaware. The common limited partnership units of Kinder Morgan Energy Partners L.P. trade on the New York Stock Exchange under the symbol "KMP".

The general partner of Kinder Morgan Energy Partners L.P. is Kinder Morgan G.P., Inc., a Delaware corporation. All of the common stock of Kinder Morgan G.P., Inc. is indirectly owned by Kinder Morgan Inc., a Delaware corporation whose common stock trades on the New York Stock Exchange under the symbol "KMI".

c) The limited partner of Trans Mountain Pipeline L.P. (the Partnership) would not be liable to creditors of the Partnership. The liability of the limited partner is limited to any amount of its required capital contributions that remain unpaid. The general partner, Trans Mountain Pipeline ULC, has unlimited liability for the liabilities and obligations of the Partnership. There is no formal financial backstopping arrangement in place between Trans Mountain Pipeline ULC and its parent.

Noting that upon completion of the expansion, Trans Mountain intends to have $750 million of insurance and equity in the order of $3.2 billion, as compared to a credible worst case scenario of less than $300 million. To the extent that the NEB determines as a condition, that Trans Mountain should have a financial backstopping arrangement in place between Trans Mountain Pipeline ULC and its parent, Trans Mountain would accept an appropriate condition.

d) Trans Mountain Pipeline L.P. is governed by the *Partnership Act*, RSA 2000, c P-3 (the "*Partnership Act*").

1. *Sections 57, 63 and 64 of the Partnership Act specify a limited partner's liability.*

Liability of limited partner

57 *Subject to this Part, a limited partner is not liable for the obligations of the limited partnership except in respect of the amount of property the limited partner contributes or agrees to contribute to the capital of the limited partnership.*

Limited partner's liability to partnership

63(1) *A limited partner is liable to the limited partnership*

(a) for the difference, if any, between the amount of the limited partner's contribution as actually made and the amount stated in the certificate as having been made, and

(b) for any unpaid contribution that the limited partner agreed in the certificate to make in the future at the time and on the conditions, if any, stated in the certificate.

63(2) *A limited partner holds as trustee for the limited partnership*

(a) specific property stated in the certificate as contributed by the limited partner, but that has not in fact been contributed or that has been wrongfully returned, and

(b) money or other property wrongfully paid or conveyed to the limited partner on account of the limited partner's contribution.

63(3) *The liabilities of a limited partner as set out in this section may, subject to subsection (4), be waived or compromised, but only with the consent of all partners.*

63(4) *A waiver or compromise agreed to pursuant to subsection (3) does not affect the right of a creditor of the limited partnership to enforce a liability arising from credit that was extended or a claim that otherwise arose*

(a) subsequent to the filing of the certificate whereby the limited partnership was formed, but

(b) prior to the cancellation or amendment of the certificate whereby the waiver or compromise was effected.

63(5) *When a limited partner has rightfully received the return, in whole or in part, of the capital of the limited partner's contribution, the limited partner is nevertheless liable to the limited partnership for any sum, not in excess of that return with interest, necessary to discharge its liabilities to all creditors who extended credit or whose claims otherwise arose before the return.*

Liability to creditors

64 *A limited partner does not become liable as a general partner unless, in addition to exercising the limited partner's rights and powers as a limited partner, the limited partner takes part in the control of the business.*

2. *Sections 59, 61 and 62 of the Partnership Act relate to the sharing of a limited partnership's profits with partners.*

Share of profits

59(1) *A limited partner has, subject to this Act, the right*

(a) to a share of the profits or other compensation by way of income, and

(b) to have the limited partner's contribution to the limited partnership returned.

59(2) *A limited partner may receive from the limited partnership the share of the profits or the compensation by way of income stipulated for in the certificate if after payment of it is made, whether from the property of the limited partnership or that of a general partner, the limited partnership assets exceed all the limited partnership liabilities, excepting liabilities to limited partners on account of their contributions and to general partners.*

Limited partners' rights as between themselves

61(1) *Subject to subsection (2), limited partners, in relation to one another, share in the limited partnership assets in respect of their claims*

(a) for capital, and

(b) for profits or compensation by way of income on their contributions, in proportion to the respective amounts of their claims.

61(2) *When there are several limited partners, the partners may agree that one or more of the limited partners is to have a priority over other limited partners*

(a) as to the return of contributions,

(b) as to compensation by way of income, or

(c) as to any other matter,

but the existence of and nature of the agreement shall be stated in the certificate, and in the absence of a statement all limited partners, subject to subsection (1), stand on equal footing.

Return of limited partner's contribution

62(1) *A limited partner is not entitled to receive from a general partner or out of the limited partnership property any part of the limited partner's contribution until*

(a) all liabilities of the limited partnership, except liabilities to general partners and to limited partners on account of their contributions, have been paid or there remains sufficient limited partnership property to pay them,

(b) the consent of all partners is obtained, unless the return of the contribution may be rightfully demanded under subsection (2), and

(c) the certificate is cancelled or so amended as to set out the withdrawal or reduction.

62(2) *Subject to subsection (1), a limited partner may rightfully demand the return of the limited partner's contribution*

(a) on the dissolution of the limited partnership,

(b) when the time specified in the certificate for its return has arrived, or

(c) after the limited partner has given 6 months' notice in writing to all other partners, if no time is specified in the certificate either for the return of the contribution or for the dissolution of the limited partnership.

62(3) *A limited partner has, irrespective of the nature of the limited partner's contribution, only the right to demand and receive cash in return for the limited partner's contribution, unless*

(a) there is a statement to the contrary in the certificate, or

(b) all the partners consent to some other manner of returning the contribution.

62(4) *A limited partner is entitled to have the limited partnership dissolved and its affairs wound up when*

(a) the limited partner rightfully but unsuccessfully demands the return of the limited partner's contribution, or

(b) the other liabilities of the limited partnership have not been paid, or the limited partnership property is insufficient for their payment as required by subsection (1)(a) and the limited partner seeking dissolution would otherwise be entitled to the return of the limited partner's contribution.

e) Pursuant to the terms of the Amended and Restated Limited Partnership Agreement dated February 1, 2008 which governs Trans Mountain Pipeline L.P., distributions made from Trans Mountain Pipeline L.P. are subject to the consent of the General Partner, Trans Mountain Pipeline ULC. The distributions are limited to the amount by which the cash held by the Partnership exceeds the aggregate of (i) the liabilities of the Partnership (other than any liability secured by non-cash assets of the Partnership having a net realizable value greater than all liabilities thereby secured) and (ii) such amount the General Partner establishes as a reasonable reserve to be retained for use in the Business of the Partnership.

1.8 Insurance and other financial coverage for spill events

Reference:

i) A3S0Q7, Application Volume 1, Summary, PDF Page 72 of 113
ii) A3S4W8, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, Appendix G – Potential Cleanup and Damage Costs of a Hypothetical Oil Spill: Assessment of Trans Mountain Expansion Project, PDF page 9 of 28
iii) A3S4V6, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF page 129 of 137
iv) A3S4W8, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, Appendix G – Potential Cleanup and Damage Costs of a Hypothetical Oil Spill: Assessment of Trans Mountain Expansion Project, PDF page 9 of 28

Preamble:

In Reference i), Trans Mountain states that it currently has $750 million of spill liability insurance, the first $2 million of which is covered by self-insurance. Trans Mountain also states its intention to maintain this level of spill liability insurance throughout the life of the pipeline system.

Reference ii) states that Trans Mountain Pipeline ULC currently maintains a General Liability insurance program with an annual limit totalling US$750 million, and that coverage for pollution legal liability is included within this program.

Reference iii) states that Trans Mountain currently has $750 million of spill liability insurance and that it intends to maintain this level of spill liability insurance throughout the life of the TMPL asset.

Reference iv) states that Trans Mountain Pipeline currently maintains a General Liability insurance program with an annual limit totalling US$750 million. Coverage for pollution legal liability is included with this program.

The Board requires more information on Trans Mountain's spill liability insurance.

Request:

a) Please describe the type and amount of insurance that Trans Mountain would hold during the Project's construction phase. Please include details of the risk analysis performed, assumptions made, and supporting data considered in evaluating the coverage limits proposed.

b) Please confirm that the spill liability insurance described in Reference i) applies exclusively to Trans Mountain's pipeline system and cannot be used for any other pipeline, any other Trans Mountain business unit, or any Kinder Morgan business unit. If this cannot be confirmed, please identify the Trans Mountain and/or Kinder Morgan corporate entities covered by this insurance.

c) Please provide an overview of the key elements in the spill liability insurance described in References ii) and iv), including the facilities and business functions and related activity risks that are covered by the current spill liability insurance program, the name of the insurance provider and the provider's credit rating.

d) Please describe the conditions, circumstances, or exclusions, if any, under which the spill liability insurance would not cover the losses of Trans Mountain and/or third parties in the event of a large oil spill. For clarity include a list of the standard risks and non-standard risks that are excluded from this insurance program.

e) If the response to d) confirms that the spill liability insurance may not cover all losses and liabilities, please:
   e.1) describe how Trans Mountain would financially cover any losses and claims for spills, malfunctions, or other potential liabilities in excess of its insurance coverage during the life of the pipeline system; and
   e.2) describe and quantify, to the extent possible, the role of cash from operations, tariff provisions, indemnities, bonds, letters of credit, parental guarantees, cash reserves, or other instruments that would be available to cover these potential liabilities. Regarding cash from operations and cash reserves, please reference this response to the response to Information Request No. 1.9 a) to illustrate the financial capacity that these cash items could provide.

f) In Reference ii), Trans Mountain states that it currently has $750 million in insurance coverage. Please explain whether the coverage amount would change as a result of the increased capacity of the pipeline system if the Project is approved. Include any risk analysis performed and assumptions made to arrive at this level of coverage after the Project goes into service.

g) Regarding the spill liability insurance program described in References iii) and iv), please describe:
   g.1) the priority of payments for the components of insurance claims for spill events, such as clean-up costs, remediation costs, and third party liability claims;
   g.2) how first party (Trans Mountain) and third party claims are managed, including the priorities and the allocation of coverage for each of these parties; and
   g.3) whether the coverage is per event or for more than one event in an insurance year.

h) Regarding References iii) and iv), please confirm that the total insurance coverage for spill liability is currently $750 million, and that any cash recovery for spill claims would be in addition to and separate from any recovery from the $750 million General Liability insurance program for claims not involving spills. If this cannot be confirmed, please explain the methodology for allocating the total insurance coverage among competing claims if the total claims exceed the $750 million coverage limit.

Response:

a) Trans Mountain will have in place a stand-alone liability policy to cover liabilities that may arise as a result of the construction activities undertaken by the Project. While the

coverage amount has not been finalized Trans Mountain expects that it would be at least $20 million. Discussions with Kinder Morgan's insurance broker, and the outcome of this proceeding, will aid in finalizing an appropriate coverage limit for the stand alone insurance policy for this project. Third-party contractors involved in the construction of the Project will also be required to maintain their own separate insurance coverage. The current insurance program will continue to provide coverage for the existing operations while the Project is being constructed.

b) Not confirmed, the insurance applies to more than just the Trans Mountain pipeline system.

The current insurance program maintained by Kinder Morgan includes pollution coverage for legal liabilities arising out of a sudden and accidental pollution event (e.g., an oil spill). The General Liability insurance which includes the aforementioned pollution coverage consists of two components. A $150 million General Liability insurance component, which covers all of the Kinder Morgan assets located in Canada as well as the Puget Sound Pipeline but excluding the segment of the Kinder Morgan Cochin Pipeline located in Canada (which is covered by a separate Kinder Morgan program). In addition to this dedicated placement a second component provides $600 million of coverage for all of the entities in the Kinder Morgan (North America) group of companies. The components together provide aggregate coverage totaling $750 million that Trans Mountain would have access to if required.

c) The General Liability insurance program that Trans Mountain has access to provides coverage for Trans Mountain's legal liabilities arising from the operation of Trans Mountain's facilities and Trans Mountain's business functions. For clarity, such insurance includes but is not limited to:

- Trans Mountain's pipeline, pump stations, tanks, docks, right of way;
- Trans Mountain's activities such as transportation and storage of oil;

The insurance program is placed with a number of domestic Canadian insurers as well as a consortium of insurer's both licensed and unlicensed within Canada (e.g. Lloyd's of London, Swiss Re, AIG, ACE et al). All insurers participating in the program maintain a minimum AM Best financial strength rating of A- or an equivalent rating with a recognized rating agency.

d) In the event of a large oil spill, the coverage for sudden and accidental pollution would apply if Trans Mountain identifies the large oil spill within 20 days of its occurrence and Trans Mountain reports the incident to the insurance providers within 90 days of its occurrence. Kinder Morgan's practice is to notify insurance providers of all spills, regardless of size, immediately after the spill has been identified. Trans Mountain would be responsible for the first $2 million of costs associated with a large oil spill. Please also refer to Trans Mountain's response to NEB IR No. 1.08g.3.

The General Liability coverage has standard exclusions typical for a company operating in the liquid pipeline industry including but not limited to 1) liabilities arising from gradual

seepage 2) liabilities resulting from asbestos, tobacco, mold, coal dust, MTBEs, PCBs and a variety of other products 3) fines and penalties 4) damage to property owned by or in the care, custody or control of Kinder Morgan. In the case of damage to property Kinder Morgan carries a separate property insurance policy.

e) As indicated in the Application, Trans Mountain has access to $750 million of General Liability insurance which exceeds the estimated cost of a credible worst case spill of $300 million. As indicated in the response to NEB IR No. 1.09, Trans Mountain expects that it would have large cash available (e.g., projected at $2.1B from 1st to 5th year) and large cash reserve balance (e.g. projected at $150 million in 5th year). In addition, as indicated in the response to NEB IR No. 1.07c, Trans Mountain is agreeable to a financial backstopping arrangement in place between Trans Mountain Pipeline ULC and its parent.

In the event that a 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, which are illustrated in the response to NEB IR No. 1.09a. To the extent there is insufficient cash available Trans Mountain would either draw on credit facilities, issue debt, or borrow from its parent depending on the extent of the loss and its immediacy.

f) The current $750 million coverage limit for the current Kinder Morgan insurance program reflects the amount available to Kinder Morgan as a whole based on the current market conditions. If the Project is approved and given similar market conditions, Kinder Morgan does not expect the coverage limit currently in place will change as a result of the increased capacity of the pipeline system. Trans Mountain's assessment is that the current $750 million limit would be adequate to cover the cost of a credible worst case spill scenario as outlined in Volume 7 of the Application.

It is important to note that the amount of insurance available to an insurance program is subject to the market conditions at the time the insurance is placed. Market conditions such as loss history in a particular industry, a change in an insurance underwriter's allocation of risk within their portfolio, a change in re-insurance conditions or an underwriter's appetite for a specific class of business or merger activity within the marketplace can all have a impact on the amount of insurance coverage available.

g.1) There is no priority of payments for the components of an insurance claim for spill events.

g.2) In the event of a claim, Trans Mountain would make a payment when the obligation for payment is identified and in accordance with the payment terms for the obligation which in some cases may be immediate. After the payment is made Trans Mountain would submit a claim to the insurance provider for reimbursement of the cost. While there is no preset priority for the payment of claims, the identification of obligations to be paid would likely mirror the phases of a response to a spill being the safety of people and assets, containment, clean-up and remediation.

g.3) In the case of a sudden and accidental pollution claim the insurance coverage limit of $750 million is both a per occurrence limit and an annual aggregate coverage limit within an insurance year. Should a specific claim or claims within a policy year result in significant

erosion of the $750 million aggregate limit Kinder Morgan would immediately seek to reinstate the limits for the balance of the insurance year.

h) Not confirmed. The General Liability insurance program includes coverage for sudden and accidental pollution events within the $750 million limit. Cash recovery for spill claims would reduce the $750 million coverage limit available for claims not involving spills. Any claims against the $750 million limit are handled on a first in first out basis. Please also refer to Trans Mountain's responses to NEB IR No. 1.08g and 1.08e.

1.9 Trans Mountain's financial capacity

Reference:

i) A3S4V6, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF page 129 of 137
ii) A3S4W8, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, Appendix G – Potential Cleanup and Damage Costs of a Hypothetical Oil Spill: Assessment of Trans Mountain Expansion Project, PDF page 9 of 28

Preamble:

Reference i) states that Trans Mountain will have sufficient financial capacity to meet either the credible worst case scenario ($300 million, as estimated by HJ Ruitenbeek Resource Consulting) or the $1 billion financial capacity that is anticipated to be legislated by the federal government.

Reference i) also states that Trans Mountain currently has $750 million of spill liability insurance, the first $2 million of which is covered by self-insurance.

Reference ii) states that losses and claims in excess of insurance coverage could be covered by cash from operations, the issuance of debt, commercial paper and/or credit facility draws, expected future access to capital markets, or the sale of assets. Reference ii) notes that, upon commissioning of the Project, Trans Mountain's structure is projected at $6.4 billion in assets with approximately $3.2 billion in equity.

Request:

a) Please provide the following for Trans Mountain Pipeline L.P. for the first full year and the fifth full year following Project commissioning:
   a.1) operating cash flow projections that identify net income and other components of cash flow; and
   a.2) the estimated total asset and liability values and their main components.

b) Please describe the following aspects of Trans Mountain's cash management as anticipated at this time:
   b.1) the estimated per cent of total cash flow from Trans Mountain L.P.'s operations that would be distributed to the partners of the limited partnership over the first five years of operation following Project commissioning; and
   b.2) the estimated cash or near cash that Trans Mountain plans to retain on its balance sheet by the end of the fifth full year of operation after Project commissioning.

c) With respect to the $2 million in self-insurance described in Reference i), please explain how Trans Mountain would ensure that it has unfettered access to these funds at all times, and indicate if Trans Mountain will segregate the self-insurance funds from its general funds.

d) In the case of a spill incident, please explain the amount of cash that Trans Mountain could access within 10 business days to pay some or all of the clean-up and remediation costs and to compensate third parties for some losses and damages while any insurance claims

are being processed. Please describe the financial instruments that Trans Mountain will use to ensure this unfettered access to funds.

Response:

a) The requested financial projections are provided in Attachment 1 to the response to NEB IR No. 1.09a (NEB IR No. 1.09a – Attachment 1).

b) Please refer to Trans Mountain's response to NEB IR No. 1.07e. Using the financial projections provided in response to NEB IR No. 1.09a, Trans Mountain expects that it would have cash available for distribution to its partners over the first 5 years of approximately $2.1 billion and a cash reserve balance at the end of Year 5 of approximately $150 million.

c) The $2 million in self-insurance would be accounted for in the cash reserve retained by Trans Mountain Pipeline L.P. for use in the business of the Partnership as described in NEB IR No. 1.07e. Trans Mountain Pipeline L.P. will continue to maintain its own bank accounts where operating funds will be collected and disbursed. Trans Mountain does not intend to establish a separate account to segregate the self-insurance funds.

d) Each spill incident is unique and the amount of cash payments made within 10 business days will vary depending on the circumstances surrounding the incident. While there may be costs incurred during the first 10 business days the obligation to pay the cost would typically be at some later date in accordance with a vendor's payment terms. To the extent cash payments are required within the first 10 business days, Trans Mountain would utilize cash reserves and available credit facilities to make the payments.

   As per Trans Mountain's response to NEB IR No. 1.09a, assuming a cash reserve equal to 60 days of operating cash flow, Trans Mountain projects that approximately $140 million would be available in cash to accommodate payments within the first 10 business days following an incident. This cash reserve would account for approximately 46% of the cost of a credible worst case spill estimated at $300 million. In Trans Mountain's view it is highly unlikely that this amount of cash would be paid out within the first 10 business days after an incident.

   As described in NEB IR No. 1.08g.2, Trans Mountain would make payments for losses when the obligation to pay is identified and in accordance with the vendor's payment terms. Trans Mountain would then submit a claim to the insurance provider for reimbursement. Trans Mountain acknowledges there will be a delay between the time payments are made and reimbursement from the insurance provider is received. However, Trans Mountain expects that a 60 day cash reserve would be more than sufficient to accommodate this delay.

   Trans Mountain commits to ensuring that either through cash reserve or credit facilities that it will have immediate access to cash in the case of an incident. In addition, please also refer to Trans Mountain's response to NEB IR No. 1.09c and NEB IR No. 1.08g.2.

1.10 Potential clean-up and damage costs of a hypothetical oil spill

Reference:

A3S4W8, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, Appendix G – Potential Cleanup and Damage Costs of a Hypothetical Oil Spill: Assessment of Trans Mountain Expansion Project:

i) PDF Page 2 of 28
ii) PDF Page 19 of 28
iii) Table B.1 – Typical unit cleanup and damage costs from oil spills, PDF Page 27 of 28
iv) Table B.2 – Cleanup and damage cost estimates from oil spill scenarios along the Project pipeline right of way, PDF Page 28 of 28

Preamble:

Reference i) states that the assessment was conducted by HJ Ruitenbeek Resource Consulting Limited.

Reference ii) states that the hypothetical rupture scenarios are considered credible worst case scenarios, based on the outflow modelling results conducted by Dynamic Risk Assessment Systems. It is indicated that the maximum credible outflow for the corridor, as a whole, corresponds to 25,160 barrels, and, for high consequence areas, it corresponds to 12,580 barrels.

Reference iii) states that the North American Average Cleanup Costs are US$19,815 per tonne in 1999 dollars and that foreign exchange differences are ignored.

Reference iv) provides the detailed clean-up and damage cost estimates for the oil spill scenarios.

Request:

a) Please provide the résumé for the consultant that was involved in completing the report in Reference i).

b) Please provide detailed rationales behind the size of the six hypothetical spills included in Table B.2 and explain why the largest spill for which costs are estimated occurs in a non-high consequence area.

c) Please confirm that the hypothetical rupture scenarios in Table B.2 (Reference iv) are based on a full-bore rupture of Line 2 and not a full-bore rupture of both Lines 1 and 2.

d) Regarding Table B.1 (Reference iii), please provide a reference for the 1999 North American Average Cleanup Costs and attach a copy of any literature referenced.

e) With respect to converting the North American Average Cleanup Costs, please:
   e.1) provide a rationale for not considering foreign exchange rate differences when converting from 1999 US dollars per tonne to 2013 Canadian dollars per barrel; and

e.2) describe the impacts on the results had foreign exchange rate differences been considered.

Response:

a) Please find attached the resumé for Dr. Jack Ruitenbeek in NEB IR No. 1.10a – Attachment 1.

b) The six scenarios as a group provide a representative distribution that is regarded as appropriate for calculating potential financial exposure in the unlikely event of an oil spill. Of the six scenarios, two represent leaks and four represent ruptures; the range of spill sizes is from 30 barrels (4.8 m^3) to approximately 25,000 barrels (4,000 m^3). The resultant range of upper bound spill costs in the various scenarios using the described methodology is from approximately $3 million to $160 million. The selection is also intended to demonstrate the potential contributing effects to unit spill costs under different circumstances. Notably, the methodology and the table demonstrate the idea that economies of scale exist in spill cleanup: larger spills generally tend to have lower unit cleanup costs. The comparison between the 1000 m^3 and 2000 m^3 spills within a high consequence area (HCA) and the comparison between leaks and ruptures in non-HCA scenarios display such economies of scale.

The rationale for selecting the particular values is informed by historical experience for the leaks and modeling assessments for the ruptures.

The leaks are statistically more common than ruptures, and – as described in Volume 7 Appendix G – the spill sizes were informed by the Pipeline and Hazard Materials Safety Administration (PHMSA) Incident Database for the period 2002-2009: 23 events relating to manufacturing defects, operational system faults, and construction faults resulted in a mean spill of approximately 692 barrels and 8 third party strikes resulted in a mean spill of 758 barrels. The mean of all of these 31 events was approximately 715 barrels (114 m^3); the median of these events was approximately 30 barrels (4.8 m^3). The two leak scenarios thus represent the statistical mean and median releases based on the PHMSA database. Recall that one half of such leaks are expected to be less than the median.

Ruptures are uncommon and the PHMSA database does not provide an adequate statistical sample of ruptures. Reference ii) describes generally the rationale for selecting the 2,000 m^3 outflow as a scenario for High Consequence Areas (HCA) and 4,000 m^3 as a scenario for non-HCAs. Selection of these benchmarks was informed by the outflow analysis for the corridor. Inspection of the outflow analysis for the corridor as a whole showed that 99% of the outflows in the entire corridor were less than 4,000 m^3; 90% were less than 2,700 m^3. This implies that, if a rupture occurs (itself a rare event), only about 1 in 100 would be greater than 4,000 m^3. The incidence of such large spills in HCAs is even lower because of the additional design measures in place to reduce potential outflows. For example, within the BC Lower mainland 99.9% of outflows were less than 3,000 m^3; 90% of outflows were less than 2,100 m^3. This same effect is shown graphically in the oil spill outflow model result charts for the Threat Assessment of the pipeline corridor (Volume 7, Appendix B): simple inspection of the charts shows that outflows are generally less than 4,000 m^3.

The range of costs generated by the scenarios (maximum cost of approximately $160 million) is also consistent with that which would have been estimated for spills such as those described as "credible worst case spill volumes" for various hypothetical spills in the risk assessment (Volume 7 Table 5.3.2, Table 6.17, and Table 7.1.1). Those four spills included outflows of 1,250 m^3 to 1,400 m^3 impacting the Fraser or North Thompson Rivers in BC, or a 2,700 m^3 spill impacting the Athabasca River in Alberta. Using the methodology in Table B.2, and assuming all are HCAs, it can be shown that the resultant Spill Total Cost (Upper Bound) would be in the range of $125 to $150 million.

The rationale for not including a 4,000 m^3 spill into a HCA is that the outflow models suggested that such spill event was highly unlikely, as described above. However, should one occur, it can be shown that the methodology in Table B.2 would generate a Spill Total Cost (Upper Bound) for such an event of $222 million. Also, this spill event was not explicitly included because, to be conservative, a more comprehensive Sensitivity Case was designed to reflect increased unit damage costs for all spills regardless of where they occurred. This Sensitivity Case is reported in Table B.2 and shows a maximum cost estimate for a 4,000 m^3 spill of $316 million. It can be shown that a high damage cost Sensitivity Scenario for a 4,000 m^3 spill in a HCA would increase this to approximately $340 million (or 7.6%).

To summarize, the primary rationale for choosing the six scenarios was that these provide an appropriate range for estimating potential financial liability arising from a spill. The volumes selected for small spills are consistent with events documented in the PHMSA Incident Database. The volumes selected for ruptures are consistent with the range of potential outflows associated with the Threat Assessment of the pipeline corridor. The maximum oil spill cost generated by this range of scenarios ($160 million) is greater than the costs of the four hypothetical "credible worst case" spills treated elsewhere in the Application. A 4,000 m^3 spill in a HCA was excluded because outflow analyses suggested such an event to be unlikely. If it did occur, its Upper Bound cost of $222 million would still be less than the highest "High Damage Cost" Sensitivity Case presented in Table B.2 of $316 million. These results are anticipated to remain robust to any future changes in routing or valve placement given that such valve placement will be planned with similar design criteria.

c) Confirmed.

d) Table B.1 is based on Etkin (2004), a copy of which is attached in reply to NEB IR No. 1.11. Etkin (2004) provides an additional clarifying reference to Etkin (2000), which is attached as NEB IR No. 1.10d – Attachment 1. Table 9 in Etkin (2000) (PDF Page 10 of 14) provides the 1999 North American Average Cleanup Costs as US$19,814.63/tonne. That figure is itself a weighted average of Canada (US$6,508.14/tonne) and United States (US$25,614.63/tonne).

e.1) The original spill cost database is represented primarily by US spills with about 90% of expenditures occurring in the US; these costs were thus first escalated to cast them in "current" (approximately mid-2013) terms. The inflators used for this exercise are provided in Table B.1 (PDF Page 27 of 28) and result in an inflation adjusted spill cost in 2013

terms of US$25,799/tonne, as shown in the same table. This converts to US$3,686/bbl in 2013 corresponding to 7.00 bbl/tonne. Foreign exchange rate differences were ignored because the Canadian and US dollars were approximately at parity in mid-2013, hence the table shows cleanup costs of C$3,686/bbl.

e.2) The impacts on the final results of considering some exchange rate adjustment for 2013 are negligible. For example, the Bank of Canada exchange rate average for a twelve-month period ending 30 June 2013 is 1.0046 C$/US$ (see NEB IR No. 1.10e – Attachment 1). This translates to a 0.46% increase in the spill costs in Canadian dollar terms. The current exchange rate is approximately 90c/100c (USD:CDN). The effect of this change, if it remains constant, is approximate 11% increase in cost.

References:

Etkin, Dagmar. 2000. Worldwide analysis of oil spill cleanup cost factors. Proc. 23rd Arctic & Marine Oilspill Program Tech. Sem.: 161-174.

Bank of Canada. 2013. Financial Markets Department Monthly Average of Exchange Rates. Ottawa. http://www.bankofcanada.ca/rates/exchange/. Accessed: 24 April 2014. Provided as NEB IR No. 1.10e – Attachment 1.

1.11 Copies of references

Reference:

A3S4W8, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, Appendix G – Potential Cleanup and Damage Costs of a Hypothetical Oil Spill: Assessment of Trans Mountain Expansion Project:

i) Footnote 1, PDF Page 7 of 28
ii) Footnote 4, PDF Page 13 of 28

Preamble:

For his analysis, Dr. Ruitenbeek relies on methodologies in:

- Etkin DS (1999). Estimating Cleanup Costs for Oil Spills (Reference i); and
- Etkin DS. 2004. Modelling Oil Spill Response and Damage Costs (Reference ii).

Request:

Please provide a copy of each of these studies.

Response:

Please find copies attached as NEB IR No. 1.11 – Attachment 1 (Etkin 1999) and NEB IR No. 1.11 – Attachment 2 (Etkin 2004).

Consultation

1.12 Consultation with potentially affected stakeholders on alternate routes

Reference:

i) A3S0V2, Application Volume 3C, Landowner Relations, PDF pages 25 and 27 of 103
ii) A3S1L4, Application Volume 5A, Environmental and Socio-Economic Assessment - Biophysical, PDF pages 3 to 5, and 12 to 14 of 39

Preamble:

Reference i) states that Trans Mountain identified a study corridor generally 150 metres wide along the entire length of the Project. The reference further states that, along this corridor, landowners, Crown rights holders, and pending land purchasers were contacted.

Reference ii) refers to several deviations in pipeline routing being considered by Trans Mountain. These include, but are not limited to, the following:

- through Wabamun Lake Provincial Park;
- avoiding Zoht 5 and Zoht 4 Indian Reserves;
- avoiding Joeyaska Indian Reserve No. 2;
- avoiding Cheam Lake Wetland Regional Park;
- avoiding Ohamil Indian Reserve No. 1, Peters Indian Reserve No. 1A, and Popkum Indian Reserve No. 1;
- avoiding Grass Indian Reserve No. 15 and Tzeachten Indian Reserve No. 13;
- avoiding Matsqui Main Indian Reserve No. 2;
- avoiding a local natural area in the Salmon River area;
- traversing Surrey Bend Regional Park;
- east side of the Port Mann Bridge; and
- avoiding Lougheed Highway by traversing existing industrial land and railway easement within Brunette River Conservation Area.

Request:

a) Please provide a detailed summary of all consultation activities undertaken with potentially affected stakeholders, including landowners and Aboriginal groups, along the deviations being considered in Reference ii). This summary must include a description of any issues and concerns raised and the steps Trans Mountain has taken or will take to address them, or, if it will not take steps to address any particular concerns, an explanation why.

b) If consultation activities have not been undertaken with the potentially affected stakeholders described in a), please provide an explanation why it was considered unnecessary.

Response:

a) Trans Mountain's Facilities Application, filed on December 16, 2013, identified a proposed pipeline corridor and in some cases proposed alternative pipeline corridors. The Application reported Trans Mountain's public consultation activities for the period of May 2012 through

to July 31, 2013; Aboriginal Engagement activities for the period of May 2012 through to September 30, 2013; and Landowner Relations for the period of April 2012, to July 31, 2013.

Following the December 2013 filing, Trans Mountain continued its work to optimize the route and reduce impacts to people and the environment through a combination of technical and environmental studies, engagement activities and on-the-ground fieldwork. On March 20, 2014 Trans Mountain filed Consultation Update No. 1 and Errata with the NEB, which reported the outcomes of our ongoing engagement activities with Aboriginal groups, landowners and stakeholders conducted following the filing of the Application through to December 31, 2013.

Trans Mountain's engagement is ongoing. In Q3 2014, Trans Mountain will file Consultation Update No. 2 with the NEB, which will report on the outcomes of Trans Mountain's ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014. Consultation Update No. 2 will provide more details on the consultation undertaken related to routing decisions in addition to the information provided in this IR response.

The following provides an overview of the proposed pipeline corridor deviations currently being considered by Trans Mountain and describes the routing specific engagement efforts undertaken since the March 2014 Consultation Update No. 1 and Errata. Due to the recent timing of consultation activities related to the proposed deviations (i.e., in March and April 2014), Trans Mountain has not processed the results of all the consultation activities to determine how to address all the issues raised. The information in Consultation Update No. 2 will provide further support to the information presented in this response.

The tables that follow reference a series of Proposed Pipeline Corridor Optimization Workshops, which have also been referred to as Route Refinement Workshops and Study Corridor Optimization Workshops. The content in the tables is a result of these workshops and open houses.

Included in this overview are those areas where the proposed pipeline corridor has been refined to include lands not identified in the NEB Application filed on December 16, 2013. This summary excludes areas where the proposed pipeline corridor has been narrowed through further engineering and constructability studies as no new land would be affected by the change.

Within the tables, Trans Mountain identifies issues raised that have already been addressed in either the Application or Consultation Update No. 1. Also within the tables, Trans Mountain identifies those issues that are still being addressed through ongoing engagement. These will be documented and filed with the NEB in Q3 2014 in Consultation Update No. 2.

Trans Mountain's responses to NEB IR No. 1.40 and NEB IR No. 1.84 provide additional information pertaining to Trans Mountain's ongoing proposed pipeline corridor deviation work. In some instances the proposed pipeline corridors or alternates presented in the tables below, have been removed from the tables in NEB IR No. 1.40a as those corridors are no longer being considered. The tables below however, document Trans Mountain

engagement activities and feedback received that resulted in the decision to delete the referenced corridor.

1.1 Alberta

The following highlights engagement activities pertaining to proposed pipeline corridor deviations within specific reference kilometre (RK) ranges that are currently being studied in Alberta.

Proposed Alternate Pipeline Corridor Deviation (RK 0.1 to RK 2.2)

Proposed alternate pipeline corridor (Edmonton Terminal Exit North) deviates to the east from TMPL right-of-way along the south side of Baseline Road and rejoins the proposed pipeline corridor on the west side of Anthony Henday Drive.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.1-1 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 0.1 to RK 2.2).

TABLE 1.12A.1-1

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 0.1 TO RK 2.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Sherwood Park on March 24, 2014. 11 community members participated • Online input sought until April 17, 2014.	• No specific concerns raised	• Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Owners of three private and one public parcels were contacted in November 2012 and May 2013	• No specific concerns were identified.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 0.8 to RK 3.9)

Proposed alternate pipeline corridor (Edmonton Terminal Exit South) continues further south paralleling the existing Trans Mountain Pipeline (TMPL) to 92 Avenue, then runs east to rejoin the proposed pipeline within the Transportation Utility Corridor.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.1-2 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 0.8 to RK 3.9).

TABLE 1.12A.1-2

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 0.8 TO RK 3.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Sherwood Park on March 24, 2014. 11 community members participated • Online input sought until April 17, 2014.	• No specific concerns raised	• Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Owners of three public parcels were contacted in June 2012	• No specific concerns were identified.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list

Proposed Pipeline Corridor Deviation (RK 2.8 to RK 13.6)

Realigned the previously proposed pipeline corridor (Edmonton East TUC) in the Transportation Utility Corridor. Reconfigured the shape of the previously proposed pipeline corridor to provide options for crossings of Highway 14 and Anthony Henday Highway. Table 1.12A.1-3 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 2.8 to RK 13.6).

TABLE 1.12A.1-3

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 2.8 TO RK 13.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Sherwood Park on March 24, 2014. 11 community members participated • Online input sought until April 17, 2014	• Impact to Strathcona Druids Rugby Club fields and clubhouse • Construction timing, and exact location of the pipeline (*i.e.*, centerline, setback) • Protecting trees that provide a windbreak for rugby fields	• Potential effects on community way of life, including community assets used for outdoor recreation, are discussed in Section 7.2.3 of Volume 5B. • Additional information related to these issues can be found in Volume 5D-2, Socio-economic Technical Report; and Volume 6B, Pipeline Environmental Protection Plan, including the Socio-economic Management Plan in Appendix C (Management Plans). • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• No private landowners were affected by the adjustment. Initial contact with Alberta Transportation and Infrastructure was in June 2012	• No specific concerns were identified.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 14.3 to RK 14.8)

Increased width of the previously proposed pipeline corridor to provide options for crossing highway interchange. Table 1.12A.1-4 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 14.3 to RK 14.8).

TABLE 1.12A.1-4

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 14.3 TO RK 14.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Edmonton on March 25, 2014. Eight community members participated • Online input sought until April 17, 2014.	• No new issues raised	• Engagement complete for this phase
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One private landowner is affected by the adjustment. Initial contact was made with private landowner in May 2013 and Alberta Transportation and Infrastructure in June 2012	• No new issues raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 21.7 to RK 23.5)

Increased width of the previously proposed pipeline corridor to provide options for crossing highway interchange. Table 1.12A.1-5 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 21.7 to RK 23.5).

TABLE 1.12A.1-5

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 21.7 TO RK 23.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Edmonton on March 25, 2014. Eight community members participated • Online input sought until April 17, 2014.	• Reclamation of water crossings and wetlands	• Information related to these issues can be found in Volume 5A, Sections 7.2.3, 7.2.7 and 7.2.8 (Water Quality and Quantity, Fish and Fish Habitat and Wetland Loss and Alteration); Volume 6B, Pipeline Environmental Protection Plan and Volume 5C, Biophysical Technical Reports
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One private landowner was contacted in January 2013 and February 2014, Alberta Infrastructure was contacted in June 2012. Additional contacts were made throughout 2013 and early 2014.	• Routing	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 27.1 to RK 27.9)

Increased the width of previously proposed pipeline corridor to provide workspace for a trenchless crossing (*i.e.*, Horizontal Directional Drill) of Whitemud Creek. Table 1.12A.1-6 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 27.1 to RK 27.9).

TABLE 1.12A.1-6

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 27.1 TO RK 27.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Edmonton on March 25, 2014. Eight community members participated • Online input sought until April 17, 2014.	• Environmental value of the Whitemud ravine • Sedimentation of clay and coal soil types below Whitemud Creek • Erosion and siltation associated with rainfall events during construction • Slope stability along the banks of the Whitemud Creek • Fish spawning in Whitemud Creek • Strong preference for trenchless crossings for Whitemud Creek	• Information related to these issues can be found in Volume 5A, Sections 7.2.1, 7.2.3, and 7.2.7 (Physical and Meteorological, Environmental, Water Quality and Quantity, Fish and Fish Habitat); and Volume 6B, Pipeline Environmental Protection Plan • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were initially contacted in June 2012 and again in May 2013.	• Routing	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 41.8 to RK 43.8)

Proposed alternate pipeline corridor (Lewis Estates) follows Transportation Utility Corridor north to the existing TMPL right-of-way, before following the TMPL right-of-way west to the revised proposed pipeline corridor.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.1-7 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 41.8 to RK 43.8).

TABLE 1.12A.1-7

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 41.8 TO RK 43.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Edmonton on March 25, 2014. Eight community members participated • Online input sought until April 17, 2014	• Stakeholder engagement opportunities for residents in communities on the west side of Edmonton • Road crossings and access to communities during construction at Whitemud Road and Winterburn Road	• Information related to these issues can be found in Volume 3A, Public Consultation; and Volume 5B, Sections 7.2.4 and 7.2.5 (Human Occupancy and Resource Use and Infrastructure and Services). • Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Owners of one private and four public parcels were contacted in June, July and September 2012	• No specific concerns were identified.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 43.1 to RK 45.9)

Rerouted the previously proposed pipeline corridor (Whitemud to TMPL) along 216th Street. Table 1.12A.1-8 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations proposed pipeline corridor deviation (RK 43.1 to RK 45.9).

TABLE 1.12A.1-8

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 43.1 TO RK 45.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House held in Edmonton on March 25, 2014. Eight community members participated • Online input sought until April 17, 2014	• Stakeholder engagement opportunities for residents in communities on the west side of Edmonton • Road crossings and access to communities during construction at Whitemud Road and Winterburn Road	• Potential effects on transportation infrastructure, including disturbance to roads, are discussed in Section 7.2.5 of Volume 5B. Key mitigation includes: boring under paved and high-use roads, where practical; where minor roads are crossed that may affect established community use/access routes, completing open cut crossing within one day, to the extent practical; and developing a Traffic and Access Control Management Plan for the Project, and Traffic Control Plans for particular contracts. • Additional Information related to these issues can be found in Volume 3A, Public Consultation. • Engagement on proposed routing for residents of communities on the west side of Edmonton planned for June 2014. • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners were initially contacted in May 2013 and again in October 2013.	• Routing	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 62.0 to RK 62.8)

Realigned the previously proposed pipeline corridor northeast to avoid a conflict with an existing high pressure gas pipeline. Table 1.12A.1-9 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 62.0 to RK 62.8).

TABLE 1.12A.1-9

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 62.0 TO RK 62.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of two private tract were initially contacted in June 2012 and again in July 2012	• Routing	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 93.3 to RK 99.6)

Reroute previously proposed pipeline corridor adjacent to the existing 24" Trans Mountain Pipeline through Wabamun Provincial Park. Table 1.12A.1-10 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations proposed pipeline corridor deviation (RK 93.3 to RK 99.6).

TABLE 1.12A.1-10

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 93.3 TO RK 99.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop held in Wabamun on March 26, 2014. Seven community members participated • Online input sought until April 17, 2014	• Eagles and ospreys nest along powerline that runs parallel to the existing TMPL • Quick and quality reclamation important in order to avoid Phosphorous rich sedimentation into Lake Wabamun • Catchment area funnels runoff (or potential spill) across entrance to Village of Wabamun, through the Village and into Lake Wabamun • Preference for adjacent to existing TMPL route, as North route would restrict potential future activity and development on north side of highway • Desire to have emergency response training opportunities for local first responders – as well as equipment housed in Wabamun	• Potential effects on access, including change in access to areas that deviate from the existing TMPL right-of-way, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on emergency services are discussed in Section 7.2.5 of Volume 5B. Emergency preparedness and response protocols are discussed in Section 4.0 of Volume 7. • Additional information related to these issues can be found in Volume 5A, Sections 4, 7.2.3, 7.2.10, and 7.9 (Corridor and Facility Site Selection, Water Quality and Quantity, Wildlife and Wildlife Habitat, and Accidents and Malfunctions); and Volume 5B, Section 4 (Corridor and Facility Site Selection).

TABLE 1.12A.1-10

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 93.3 TO RK 99.6) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	See above	• Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015. • Plan to conduct emergency management workshops for first responders in 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One new private landowner was contacted in November 2013.	• No specific issues noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 134.0 to RK 135.8)

Revised the previously proposed pipeline corridor to provide a suitable crossing for an open cut contingency of the Pembina River. Table 1.12A.1-11 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 134.0 to RK 135.8).

TABLE 1.12A.1-11

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 134.0 TO RK 135.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop held in Wabamun on March 26, 2014. Seven community members participated • Online input sought until April 17, 2014	• Participants expressed a preference for a horizontal directionally drilled (HDD) crossing • Interest in the feasibility of HDD for Pembina River – in the event it has to be a trenched crossing, it should be outside tourism (tubing) busy season July 1 – August 31 • Safety of residents and tourists	• Potential effects on navigation and navigation safety are discussed in Section 7.2.6 of Volume 5B. 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.

TABLE 1.12A.1-11

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 134.0 TO RK 135.8) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	See above	• Additional information related to these issues can be found in Volume 5A Sections 4 and 7.9 (Corridor and Facility Site Selection and Accidents and Malfunctions); and Volume 5B, Sections 4, 7.2.4 and 7.2.6 (Corridor and Facility Site Selection, Human Occupancy and Resource Use and Navigation and Navigation Safety). • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of four private tracts were contacted in July and September 2012, and in March and April 2013.	• Routing, Depth of Pipeline	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 247.5 to RK 248.0)

Revised the previously proposed pipeline corridor due to a change in crossing technique to be implemented at Sundance Creek. Table 1.12A.1-12 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 247.5 to RK 248.0).

TABLE 1.12A.1-12

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 247.5 TO RK 248.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• No new landowners.	• N/A	• N/A

Proposed Pipeline Corridor Deviation (RK 248.4 to RK 249.4)

Realigned the previously proposed pipeline corridor to parallel the existing 24" Trans Mountain Pipeline. Table 1.12A.1-13 provides information on Public Consultation, Aboriginal

Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 248.4 to RK 249.4).

TABLE 1.12A.1-13

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 248.4 TO RK 249.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of two private tracts were initially contacted in April and May 2013.	• Routing, fencing, access, tree removal, potential damages, reclamation and compensation.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 327.0 to RK 328.3)

Revised the previously proposed pipeline corridor to avoid conflicts with existing utilities and infrastructure, and provide workspace for a conventional crossing of Muskuta Creek. Table 1.12A.1-14 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations proposed pipeline corridor deviation (RK 327.0 to RK 328.3).

TABLE 1.12A.1-14

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 327.0 TO RK 328.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner of one tract was initially contacted in March 2013	• Routing	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 329.3 to RK 335.2)

Increased the width of the previously proposed pipeline corridor to the south and east to avoid congestion with existing infrastructure. Table 1.12A.1-15 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 329.3 to RK 335.2).

TABLE 1.12A.1-15

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 329.3 TO RK 335.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner of one private tract was initially contacted in February 2013.	• Routing	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 339.4)

Increased the size of the previously proposed pipeline corridor surrounding the Hinton Pump Station site to account for land required for facility expansion. Table 1.12A.1-16 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 339.4).

TABLE 1.12A.1-16

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 339.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• No new private landowners.	• N/A	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

1.2 British Columbia

The following highlights engagement activities pertaining to proposed pipeline corridor deviations within specific reference kilometre (RK) ranges that are currently being studied in British Columbia.

Proposed Pipeline Corridor Deviation (RK 496.6 to RK 497.3)

Revised the configuration of the previously proposed pipeline corridor to improve the crossing of the Fraser River. Table 1.12A.2-1 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations proposed pipeline corridor deviation (RK 496.6 to RK 497.3).

TABLE 1.12A.2-1

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 496.6 TO RK 497.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One crown occupant was contacted June 2013.	• Continuing access, and disruption to guiding.	• Potential effects on access for land and resource users, including change in land use patterns and disruption of outfitting, trapping, hunting and fishing activities, are discussed in Section 7.2.4 of Volume 5B. Key mitigation includes contacting guide-outfitters in relevant wildlife management units prior to clearing and construction activities, providing maps and schedule information to enable them to select alternate areas for their activities • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 498.2)

Increased the size of the previously proposed pipeline corridor surrounding the Rearguard Pump Station site to account for land required for facility expansion. Table 1.12A.2-2 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 498.2).

TABLE 1.12A.2-2

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 498.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One crown occupant was contacted June 2013.	• Continuing access, and disruption to guiding.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 500.8 to RK 504.5)

Revised the previously proposed pipeline corridor to improve alignment and to provide workspace for construction through difficult mountainous terrain. Table 1.12A.2-3 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 500.8 to RK 504.5).

TABLE 1.12A.2-3

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 500.8 TO RK 504.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land.	• N/A	• N/A

Proposed Alternate Pipeline Corridor Deviation (RK 503.9 to RK 507.0)

Proposed alternate pipeline corridor (West Jackman Hill) follows TMPL on the opposite side of power line right-of-way.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.2-4 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 503.9 to RK 507.0).

TABLE 1.12A.2-4

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 503.9 TO RK 507.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b, Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of four private tracts were initially contacted in October and November 2012.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 541.9 to RK 542.2)

Revised the previously proposed pipeline corridor to improve crossing locations for a water course and a forestry road. Table 1.12A.2-5 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations proposed pipeline corridor deviation (RK 541.9 to RK 542.2).

TABLE 1.12A.2-5

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 541.9 TO RK 542.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land.	• N/A	• N/A

Proposed Pipeline Corridor Deviation (RK 556.0 to RK 557.0)

Revise the previously proposed pipeline corridor to avoid Coho spawning habitat in the North Thompson River. Table 1.12A.2-6 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 556.0 to RK 557.0).

TABLE 1.12A.2-6

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 556.0 TO RK 557.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were initially contacted in October 2012 and July 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 572.2 to RK 575.3)

Several small adjustments were made to the previously proposed pipeline corridor to improve constructability in congested areas with difficult mountainous terrain. Table 1.12A.2-7 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 572.2 to RK 575.3).

TABLE 1.12A.2-7

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 572.2 TO RK 575.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were initially contacted in October 2012 and July 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 584.5 to RK 584.9)

Revised the location of the previously proposed pipeline corridor to the west to avoid a debris (rock/mud) slide area. Table 1.12A.2-8 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 584.5 to RK 584.9).

TABLE 1.12A.2-8

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 584.5 TO RK 584.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were initially contacted in October 2012 and July 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 608.4 to RK 613.0)

Increased the width of the previously proposed pipeline corridor to the east to overlap the CN Rail right-of-way west of the tracks. Table 1.12A.2-9 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 608.4 to RK 613.0).

TABLE 1.12A.2-9

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 608.4 TO RK 613.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner were initially in August and December 2012; Crown Occupants in October 2012 and May 2013.	• Concern about spill in ocean.	• Information related to this issues can be found in Volume 8A, Section 5, Risk Assessment and Spill Management • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 626.6 to RK 627.3)

Revised the previously proposed pipeline corridor to improve the Highway 5 crossing and to improve the constructability of the pipeline right-of-way. Table 1.12A.2-10 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 626.6 to RK 627.3).

TABLE 1.12A.2-10

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 626.6 TO RK 627.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted October 2012, September 2013 and January 2014.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 633.5 to RK 635.7)

Realigned the previously proposed pipeline corridor for geotechnical reasons to avoid potentially unstable terrain. Table 1.12A.2-11 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 633.5 to RK 635.7).

TABLE 1.12A.2-11

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 633.5 TO RK 635.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted October 2012, September 2013 and January 2014.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 636.6 to RK 638.1)

Revised the previously proposed pipeline corridor to parallel an existing electrical transmission line (rather than a fibre-optic line) and to improve constructability. Table 1.12A.2-12 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 636.6 to RK 638.1).

TABLE 1.12A.2-12

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 636.6 TO RK 638.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• BC Parks Workshop in Clearwater, BC on April 1, 2014; 12 community members participated • Deviation area shown on map presented at workshop, but not specifically reviewed • Online input sought until April 17, 2014	• No new issues identified	• Feedback received will form part of BC Parks Stage 2 Boundary Adjustment Application
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted October 2012, September 2013 and January 2014.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 637.8 to RK 639.5)

Proposed alternate pipeline corridor avoids Finn Creek Provincial Park to the north and east of the park. Table 1.12A.2-13 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 637.8 to RK 639.5).

Table 1.12A.2-13

Proposed Alternate Pipeline Corridor Deviation (RK 637.8 to RK 639.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• BC Parks Workshop in Clearwater, BC on April 1, 2014; 12 community members participated • Online input sought until April 17, 2014	• Slope stability above Finn Creek • Visual impact of land disturbance on park boundary	• Potential effects on parks and protected areas, including sensory disturbance of land and resource users, are discussed in Section 7.2.4 of Volume 5B. • Feedback will form part of BC Parks Stage 2 Boundary Adjustment Application
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupant was contacted October 2012 and September 2013.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 643.6 to RK 644.4)

Revised the previously proposed pipeline corridor to avoid highly sensitive fish habitat. Table 1.12A.2-14 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 643.6 to RK 644.4).

TABLE 1.12A.2-14

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 643.6 TO RK 644.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown occupants and one landowner were contacted December 2012 and January 2013.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 658.6 to RK 658.9)

Revised the location and width of the previously proposed pipeline corridor to improve a CN Rail crossing. Table 1.12A.2-15 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 658.6 to RK 658.9).

TABLE 1.12A.2-15

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 658.6 TO RK 658.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners were contacted in November 2012 and February 2013.	• Concern about environmental studies and resultant development restrictions.	• Information related to these issues can be found in Volume 5A, Environmental and Socio-economic Assessment – Biophysical; Volume 5B, Sections 7.2.4 and 7.2.5 (Human Occupancy and Resource Use and Infrastructure and services); and Volume 5C, Biophysical Technical Reports • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 660.7 to RK 661.1)

Revised the location and configuration of the previously proposed pipeline corridor to improve the location constructability at a crossing of Highway 5. Table 1.12A.2-16 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 660.7 to RK 661.1).

TABLE 1.12A.2-16

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 660.7 TO RK 661.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land	• N/A	• N/A

Proposed Pipeline Corridor Deviation (RK 663.0 to RK 663.4)

Revised the location and configuration of the previously proposed pipeline corridor to improve constructability at a creek crossing. Table 1.12A.2-17 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 663.0 to RK 663.4).

TABLE 1.12A.2-17

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 663.0 TO RK 663.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner was initially contacted in August 2012.	• Concern about third party access.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 663.8 to RK 663.9)

Minor revision to the previously proposed pipeline corridor to improve constructability. Table 1.12A.2-18 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 663.8 to RK 663.9).

TABLE 1.12A.2-18

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 663.8 TO RK 663.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown occupant was contacted September 2012.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 688.0 to RK 689.1)

Revised the previously proposed pipeline corridor to improve constructability by avoiding steep terrain and avoiding congestion with existing linear facilities; improves the location of a crossing of Highway 5. Table 1.12A.2-19 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 688.0 to RK 689.1).

TABLE 1.12A.2-19

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 688.0 TO RK 689.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners were contacted October 2012.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 689.2 to RK 689.3)

Minor revision to the previously proposed pipeline corridor to improve constructability. Table 1.12A.2-20 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 689.2 to RK 689.3).

TABLE 1.12A.2-20

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 689.2 TO RK 689.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner was contacted October 2012.	• No specific concerns raised	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 692.5 to RK 692.6)

Minor revision to the previously proposed pipeline corridor to improve constructability. Table 1.12A.2-21 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 692.5 to RK 692.6).

TABLE 1.12A.2-21

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 692.5 TO RK 692.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner was contacted October 2012.	• Vehicles should stay within existing right-of-way	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 716.9 to RK 717.5)

Revised the previously proposed pipeline corridor to improve constructability and avoid congestion with existing linear facilities; improves the location of a crossing of Highway 5. Table 1.12A.2-22 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 716.9 to RK 717.5).

TABLE 1.12A.2-22

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 716.9 TO RK 717.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of five private parcels initially contacted in August and September 2012, and in March 2013.	• Routing, loss of vegetation and vegetation control, oil spill impacts, effects on stream, fencing.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 717.5 to RK 718.7)

Proposed alternate pipeline corridor (Raft River Crossing) follows existing TMPL right-of-way. Table 1.12A.2-23 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 717.5 to RK 718.7).

TABLE 1.12A.2-23

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 717.5 TO RK 718.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner and occupant were contacted September 2012 and May 2013.	• Routing, loss of vegetation and vegetation control, oil spill impacts, effects on stream, fencing.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 726.2 to RK 728.1)

The proposed revised pipeline corridor follows the existing 24" Trans Mountain Pipeline through North Thompson Provincial Park and improves constructability of the pipeline. Table 1.12A.2-24 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 726.2 to RK 728.1).

TABLE 1.12A.2-24

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 726.2 TO RK 728.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• BC Parks Workshop in Clearwater, BC on April 1, 2014; 12 community members participated • Online input sought until April 17, 2014	• Clearwater River crossing • Construction impacts on recreation use of park • Construction impacts on land (trees) and wildlife / habitat • Control of dust during construction • Control / spread of invasive weeds	• Potential effects on navigation and navigation safety are discussed in Section 7.2.6 of Volume 5B. • Potential effects on parks and protected areas and outdoor recreation use are discussed in Section 7.2.4 of Volume 5B. • Potential effects on aesthetic attributes, including sensory disturbance such as dust, are discussed in Section 7.2.4 of Volume 5B. Mitigation for dust emissions include watering down construction sites and access roads, when warranted.

TABLE 1.12A.2-24

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 726.2 TO RK 728.1) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	See above	• Additional information related to these issues can be found in Volume 5A, Sections 7.2.3, 7.2.7, 7.2.9 and 7.2.10 (Water Quality and Quantity, Fish and Fish Habitat, Vegetation and Wildlife and Wildlife Habitat); and Volume 5B, Sections 7.2.3 (Social and Cultural Well-being). • Feedback will also form part of BC Parks Stage 2 Boundary Adjustment Application • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of four parcels initially contacted in August, September, December 2012.	• Routing, restrict easement to existing one.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 726.9 to RK 727.9)

An alternate Highway 5 crossing option for the proposed alternate pipeline corridor to the west of North Thompson River Provincial Park. Table 1.12A.2-25 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 726.9 to RK 727.9).

TABLE 1.12A.2-25

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 726.9 TO RK 727.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Feedback on previous versions of this alternate has been reported in Volume 3A and Update No. 1, and resulted in the current deviation being considered • BC Parks Workshop in Clearwater, BC on April 1, 2014; 12 community members participated • Online input sought until April 17, 2014	• Concerns about two crossings of Highway 5	• Potential effects on transportation infrastructure, including roads are discussed in Section 7.2.5 of Volume 5B. Key mitigation includes: boring under paved and high-use roads, where practical; where minor roads are crossed that may affect established community use/access routes, completing open cut crossing within one day, to the extent practical; and developing a Traffic and Access Control Management Plan for the Project, and Traffic Control Plans for particular contracts. • Feedback on previous versions of this alternate has been reported in Volume 3A and Update No. 1, and resulted in the current deviation being considered
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land.	• N/A	• N/A

Proposed Pipeline Corridor Deviation (RK 734.5 to RK 735.0)

Revised the previously proposed pipeline corridor to provide temporary work space needed for a trenchless watercourse crossing of the Mann River. Table 1.12A.2-26 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 734.5 to RK 735.0).

TABLE 1.12A.2-26

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 734.5 TO RK 735.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of three parcels initially contacted in October and November 2012, and in May 2013.	• Routing, object to additional pipeline.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 748.9 to RK 749.7)

Revised the previously proposed pipeline corridor to improve the crossing of Lemieux Creek; avoid congestion with existing infrastructure including a residence, a fibre-optic line and the 24" Trans Mountain Pipeline.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.2-27 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 748.9 to RK 749.7).

TABLE 1.12A.2-27

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 748.9 TO RK 749.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b. Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of three parcels initially contacted in October, 2012.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 757.8 to RK 758.0)

Revised the previously proposed pipeline corridor to improve a crossing of Highway 5 and account for needed workspace at the crossing and avoids potential conflicts with existing buildings. Table 1.12A.2-28 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 757.8 to RK 758.0).

TABLE 1.12A.2-28

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 757.8 TO RK 758.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land.	• N/A	• N/A

Proposed Pipeline Corridor Deviation (RK 760.0 to RK 761.0)

Revised the previously proposed pipeline corridor to improve a crossing of Highway 5 and account for needed workspace at the crossing. Table 1.12A.2-29 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 760.0 to RK 761.0).

TABLE 1.12A.2-29

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 760.0 TO RK 761.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of six private tracts were contacted in October, November and December 2012 and again in March 2013; Crown occupant was contacted in May 2013.	• Concerns with construction damage and compensation	• Information related to these issues can be found in Volume 5A, Section 7.9, Accidents and Malfunctions; and Volume 5B, Section 7.2.4, Human Occupancy and Resource Use • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 762.7 to RK 762.9)

Revised the previously proposed pipeline corridor to the opposite side of the existing TMPL to avoid steep side slope. Table 1.12A.2-30 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 762.7 to RK 762.9).

TABLE 1.12A.2-30

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 762.7 TO RK 762.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One private landowner was contacted October 2012	• No specific issues were noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 763.5 to RK 763.7)

Minor deviation to the previously proposed pipeline corridor to improve crossing of Highway 5. Table 1.12A.2-31 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 763.5 to RK 763.7).

TABLE 1.12A.2-31

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 763.5 TO RK 763.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Two private landowners were contacted October 2012 and March 2013	• No specific issues were noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 764.9 to RK 766.3)

Revised the location and configuration of the previously proposed pipeline corridor to provide sufficient temporary workspace and avoid congestion with existing facilities and buildings and to improve constructability. Table 1.12A.2-32 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 764.9 to RK 766.3).

TABLE 1.12A.2-32

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 764.9 TO RK 766.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of four parcels were contacted in November, 2012.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 810.5 to RK 811.5)

Revised the previously proposed pipeline corridor by expanding it to the north to account for the site being considered for the proposed Black Pines Pump Station. Table 1.12A.2-33 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 810.5 to RK 811.5).

TABLE 1.12A.2-33

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 810.5 TO RK 811.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Presented to Thompson Nicola Regional District in Kamloops, BC on March 6, 2014. Senior Staff, Board Chair and Area Director present	• No new issues identified	• Engagement complete for this phase
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of two parcels initially contacted in September 2012 and August 2013.	• Concerns with access, sale of property, signage, fencing.	• Potential effects on access, including a change in land use patterns and physical disturbance to residential areas are discussed in Section 7.2.4 of Volume 5B. • Regarding property values, under the *NEB Act*, companies are required to compensate landowners for any damages associated with the new pipeline. Any direct effects on individual properties will be managed through individual compensation arrangements • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 820.1 to RK 820.6)

Minor deviation to the previously proposed pipeline corridor to move to the opposite side of TMPL for better creek and road crossing. Table 1.12A.2-34 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 820.1 to RK 820.6).

TABLE 1.12A.2-34

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 820.1 TO RK 820.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of two parcels initially contacted in July and August 2012.	• Concerns with loss of land for development and increased encumbrance	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 820.5 to RK 836.9)

A proposed alternate pipeline corridor which follows the existing TMPL 24" and 30" pipelines to the extent practical through the built up community of Westsyde south from the Jamison Creek Forest Service Road. South from the Dunes Golf Course the proposed pipeline would be installed beneath the travel surface of Westsyde Road and Serle Road before rejoining the existing TMPL right-of-way. Table 1.12A.2-35 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 820.5 to RK 836.9).

TABLE 1.12A.2-35

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 820.5 TO RK 836.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• The proposed alternative pipeline corridor deviation has been consistently presented in public consultation sessions, stakeholder meetings and local government meetings since it was identified in consultation with the City of Kamloops. Documentation of consultation has been filed in the Application Volume 3A and Update No. 1 • City of Kamloops meeting on March 19, 2014 with senior staff • Lac du Bois Parks Workshop on April 2, 2014	• Impact to Westsyde neighbourhood • Westsyde Road traffic flow • Impact on landowners • Impact on recreational activity at the Dunes golf course. • Impact to existing in-ground utilities in Westsyde Road	• Potential effects on residential use, including physical disturbance to residential areas, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on transportation infrastructure, including increased traffic and disturbance to roads, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on outdoor recreation use are discussed in Section 7.2.4 of Volume 5B. • Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • These issues were documented and addressed in Volume 3A and Update No. 1 • Additional consultation will be completed with the City of Kamloops if this proposed alternative pipeline corridor deviation is implemented • Additional issues will be documented and filed in subsequent updates.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants and owners of 4 private parcel initially contacted in August 2012 and March 2013.	• Concerns with loss of land for development and increased encumberance, routing and noxious weed control.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 825.0 to RK 825.8)

Revised the previously proposed pipeline corridor requested by the landowner. Table 1.12A.2-36 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 825.0 to RK 825.8).

TABLE 1.12A.2-36

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 825.0 TO RK 825.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of three parcels and Crown occupant contacted in March 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 868.2 to RK 868.9)

Revised the location of the previously proposed pipeline corridor to the west to avoid rocky terrain associated with a ravine. Table 1.12A.2-37 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 868.2 to RK 868.9).

TABLE 1.12A.2-37

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 868.2 TO RK 868.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of two parcels initially contacted in October 2012 and February 2013.	• Concerns about trespassing.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 870.6 to RK 871.1)

Revised the location of the proposed pipeline corridor to the west to avoid rocky terrain. Table 1.12A.2-38 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 870.6 to RK 871.1).

TABLE 1.12A.2-38

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 870.6 TO RK 871.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants contacted in October 2012 and, April and July 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 911.9to RK 913.0)

Proposed alternate pipeline corridor to follow the east and south boundaries of the Zoht Indian Reserve No. 4. Table 1.12A.2-39 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 911.9 to RK 913.0).

TABLE 1.12A.2-39

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 911.9 TO RK 913.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Routing options have been reviewed with Lower Nicola Indian Band.	• No specific concerns noted	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Lower Nicola Indian Band if the route is to cross the Zoht Indian Reserve No. 4
Landowner Relations	• Two private landowners contacted October and November 2012, and June 2013	• Spread of noxious weeks, constraints on land development, and residual value, logging access	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 917.0 to RK 918.8)

Proposed alternate pipeline corridor to avoid crossing the Zoht Indian Reserve No. 4 to the north and west towards Highway 5. Table 1.12A.2-40 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 917.0 to RK 918.8).

TABLE 1.12A.2-40

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 917.0 TO RK 918.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Routing options have been reviewed with Nicola Indian Band	• No specific concerns noted	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Lower Nicola Indian Band if the route is to cross the Zoht Indian Reserve No. 4
Landowner Relations	• One private landowner contacted October and November 2012, and June 2013	• Spread of noxious weeks	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 930.3 to RK 931.2)

Proposed alternate pipeline corridor to follow the north and west boundaries of the Joeyaska Indian Reserve No. 2. Table 1.12A.2-41 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 930.3 to RK 931.2).

TABLE 1.12A.2-41

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 930.3 TO RK 931.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Routing options have been reviewed Lower Nicola Indian Band	• No specific concerns noted	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Lower Nicola Indian Band if the route is to cross the Joeyaska Indian Reserve No. 2
Landowner Relations	• Landowners owning twelve private parcels contacted April 2013 and January 2014	• No specific concerns noted	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 937.0 to RK 949.7)

Proposed alternate pipeline corridor follows the TMPL right-of-way through the Coldwater Indian Reserve No. 1 with a deviation to the southeast away from the TMPL around the community of Coldwater. Table 1.12A.2-42 provides information on Public Consultation,

Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 937.0 to RK 949.7).

TABLE 1.12A.2-42

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 937.0 TO RK 949.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Maps showing alternate were provided at Merritt Routing Workshop, June 12, 2013	• No specific concerns raised	• Engagement complete for this phase
Aboriginal Engagement	• Routing options have been reviewed with Coldwater Indian Band	• No specific concerns noted	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Coldwater Indian Band if the route is to cross the Coldwater Indian Reserve No. 1.
Landowner Relations	• Owners of two private parcels and occupant of two Crown parcels contacted July, November 2012, January, February, July 2013	• No specific concerns noted	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list..

Proposed Pipeline Corridor Deviation (RK 944.9 to RK 949.7)

Revised the location of the previously proposed pipeline corridor away from the TMPL right-of-way and the Coldwater Road and closer to Highway 5. Table 1.12A.2-43 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 944.9 to RK 949.7).

TABLE 1.12A.2-43

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 944.9 TO RK 949.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners and crown land occupants of two parcels were contacted in October and November 2012, and July 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 980.6 to RK 981.2)

Revised the previously proposed pipeline corridor to cross to the west side of the existing Spectra Energy pipelines and out of the Highway 5 easement. Table 1.12A.2-44 provides

information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 980.6 to RK 981.2).

TABLE 1.12A.2-44

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 980.6 TO RK 981.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted in October 2012, January, May and July 2013.	• Concerned with interference with livestock, crop loss, fencing and communication.	• Potential effects on agriculture use, including disruption to livestock and crops are discussed in Section 7.2.4 of Volume 5B. Mitigation includes, in consultation with the landowner, the installation of temporary fences and maintains all fences and gates (see Agricultural Management Plan in Appendix C of Volume 6B). • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 982.3 to RK 983.3)

Revised the previously proposed pipeline corridor to the west to avoid crossing a Spectra pipeline and to improve constructability. Table 1.12A.2-45 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 982.3 to RK 983.3).

TABLE 1.12A.2-45

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 982.3 TO RK 983.3)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted in October 2012 and May 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list..

Proposed Pipeline Corridor Deviation (RK 986.4 to RK 987.0)

Revised the previously proposed pipeline corridor to the west to improve the terrain encountered by the proposed revised pipeline corridor and follow an existing fibre-optic line. Table 1.12A.2-46 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 986.4 to RK 987.0).

TABLE 1.12A.2-46

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 986.4 TO RK 987.0)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted in October 2012, May 2013.	• Concerned with interference with livestock, crop loss, fencing and communication.	• Potential effects on agriculture use, including disruption to livestock and crops are discussed in Section 7.2.4 of Volume 5B. Mitigation includes, in consultation with the landowner, the installation of temporary fences and maintains all fences and gates (see Agricultural Management Plan in Appendix C of Volume 6B). • Additional information related to these issues can be found in Volume 5D Agricultural Assessment Technical Report • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 995.6 to RK 997.1)

Revised the width of the previously proposed pipeline corridor across the Dry Gulch canyon to improve constructability. Table 1.12A.2-47 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 995.6 to RK 997.1).

TABLE 1.12A.2-47

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 995.6 TO RK 997.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted in October 2012, May 2013.	• Concerned with interference with livestock, crop loss, fencing and communication.	• Potential effects on agriculture use, including disruption to livestock and crops are discussed in Section 7.2.4 of Volume 5B. Mitigation includes, in consultation with the landowner, the installation of temporary fences and maintains all fences and gates (see Agricultural Management Plan in Appendix C of Volume 6B). • Additional information related to these issues can be found in Volume 5D Agricultural Assessment Technical Report • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 997.1 to RK 1000.6)

Minor revision to the previously proposed pipeline corridor to improve constructability. Table 1.12A.2-48 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 997.1 to RK 1000.6).

TABLE 1.12A.2-48

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 997.1 TO RK 1000.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land	• N/A	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 997.5 to RK 1000.9)

Proposed alternate pipeline corridor at the Coquihalla Pass, parallel to Highway 5, and at a lower elevation than the proposed pipeline corridor. Table 1.12A.2-49 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 997.5 to RK 1000.9).

TABLE 1.12A.2-49

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 997.5 TO RK 1000.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown land occupants were contacted in October 2012, May 2013.	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list..

Proposed Pipeline Corridor Deviation (RK 1010.3 to RK 1011.5)

Revised the location and configuration of the previously proposed pipeline corridor to provide land for a temporary staging area needed during construction and to improve the crossing location at Highway 5 by avoiding a conflict with a fibre-optic line. Table 1.12A.2-50 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1010.3 to RK 1011.5).

TABLE 1.12A.2-50

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1010.3 TO RK 1011.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land, no new private landowners	• N/A	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1018.6 to RK 1018.8)

Revised the location of the previously proposed pipeline corridor to improve constructability and avoid encroachment of Spectra Energy pipeline right-of-way. Table 1.12A.2-51provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1018.6 to RK 1018.8).

TABLE 1.12A.2-51

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1018.6 TO RK 1018.8)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Vacant Crown land, no private landowners	• N/A	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1039.4 to RK 1042.2)

Revised the location and configuration of the previously proposed pipeline corridor to follow the existing 24" Trans Mountain Pipeline; better terrain is encountered along the proposed revised pipeline corridor than was encountered by the previously proposed pipeline corridor. The revised proposed pipeline corridor has been configured to avoid traversing the Kawkawa Lake Indian Reserve No. 16. Table 1.12A.2-52 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1039.4 to RK 1042.2).

TABLE 1.12A.2-52

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1039.4 TO RK 1042.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Presented to Nestle Waters on January 10, 2014 in Hope, BC • Presented to MLA Laurie Throness on January 10, 2014 in Chilliwack, BC • Presented to District of Hope on January 29, 2014 in Hop,e BC • Workshop with Othello Road neighbours, local government and First Nations in in Hope, BC on March 26, 2014 • Online input sought until April 17, 2014	• Alignment of TMEP through Nestle Waters property • Protection of Nestle Waters surface water spring • Protection of District of Hope's water well	• Information related to these issues can be found in Volume 5A, Section 4.0 and 7.2.3 (Corridor and Facility Site Selection, Water Quality and Quantity); Volume 5C-5 Groundwater Technical Report; and Volume 6B Pipeline Environmental Protection Plan
Aboriginal Engagement	• Routing options have been reviewed with Union Bar First Nation	• None	• Ongoing engagement to continue in regard to route optimizations. Final approval to be provided by the Union Bar First Nation if the route is to cross the Kawkawa Lake No. 16 Indian Reserve.

TABLE 1.12A.2-52

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1039.4 TO RK 1042.2) (continued)

	Engagement Conducted	Issues	Status Update
Landowner Relations	• Owners of 14 private parcels contacted in September and December 2012, and March 2013.	• Concerned with interference with water wells, aquifers, development potential.	• Information related to these issues can be found in Volume 5A, Section 7.2.3 (Water Quality and Quantity); Volume 5C-5 Groundwater Technical Report; and Volume 6B Pipeline Environmental Protection Plan • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1054.4 to RK 1054.7)

Revised the location of the previously proposed pipeline corridor to support the option of trenchless construction to bypass rock face adjacent Highway 1. Table 1.12A.2-53 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1054.4 to RK 1054.7).

TABLE 1.12A.2-53

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1054.4 TO RK 1054.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One private landowner contacted in October and November 2012	• No specific concerns raised.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1057.5 to RK 1058.4)

A proposed alternate pipeline corridor route option is located within the Highway 1 easement. . The alternative pipeline corridor would avoid traversing the Ohamil Indian Reserve No. 1. Table 1.12A.2-54 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1057.5 to RK 1058.4).

TABLE 1.12A.2-54

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1057.5 TO RK 1058.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Routing options have been reviewed with the Siy:am Council	• Sensitive archeological site (pit houses) located on the reserve	• Outstanding: finalize environmental field studies and conduct a results review prior to finalizing route
Landowner Relations	• Two landowners with private parcels contacted in December 2012, February 2013.	• Concerns with subsidence	• Information related to these issues can be found in Volume 5A, Section 7.2.2 (Soil and Soil Productivity); and Volume 6B Environmental Protection Plan • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1061.6 to RK 1065.1)

Revised the previously proposed pipeline corridor to the south and east towards Highway 1 to avoid the Peters Indian Reserve No. 1A. Table 1.12A.2-55 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1061.6 to RK 1065.1).

TABLE 1.12A.2-55

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1061.6 TO RK 1065.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Workshop in Chilliwack, BC on March 27, 2014; Six community members attended • Routing Update Open House in Chilliwack, BC on March 27, 2014; 41 community members attended. • Online input sought until April 17, 2014	• No new issues identified	• Engagement complete for this phase
Aboriginal Engagement	• To date, Peters Band has not engaged with the Project in a substantial way and engagement regarding routing options has been limited	• Highway, railway and pipeline all traverse both reserves	• Routing meeting is pending.

TABLE 1.12A.2-55

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1061.6 TO RK 1065.1) (continued)

	Engagement Conducted	Issues	Status Update
Landowner Relations	• Owners of four parcels initially contacted in November 2012, June 2013.	• Concerned with noxious weeds	• Information related to these issues can be found in Volume 5A, Section 7.2.9 (Vegetation); Volume 5C-9 Vegetation Technical Report; and Volume 6B Pipeline Environmental Protection Plan • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1067.5 to RK 1068.5)

Reconfigured the previously proposed pipeline corridor to provide option for trenchless construction to bypass steep rock faces adjacent Highway 1. Table 1.12A.2-56 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1067.5 to RK 1068.5).

TABLE 1.12A.2-56

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1067.5 TO RK 1068.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Crown and public land, no new private landowners	• N/A	• N/A

Proposed Alternate Pipeline Corridor Deviation (RK 1075.7 to RK 1077.5)

A proposed alternative pipeline corridor option was added in the vicinity of Popkum No. 1 Indian Reserve. Table 1.12A.2-57 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1075.7 to RK 1077.5).

TABLE 1.12A.2-57

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1075.7 TO RK 1077.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Routing options have been reviewed with Popkum Indian Band	• None	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Popkum Indian Band if the route is to cross the Popkum No. 1 Indian Reserve
Landowner Relations	• Owners of two private parcels contacted in October 2012.	• Concerned with sale of property	• Regarding property values, under the *NEB Act*, companies are required to compensate landowners for any damages associated with the new pipeline. Any direct effects on individual properties will be managed through individual compensation arrangements • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1078.7 to RK 1081.4)

Revised the previously proposed pipeline corridor to follow the existing 24" Trans Mountain Pipeline through Bridal Veil Falls Provincial Park and Popkum No. 2 Indian Reserve. The proposed revised pipeline corridor avoids the Cheam Wetland complex and protected area. Table 1.12A.2-58 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1078.7 to RK 1081.4).

TABLE 1.12A.2-58

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1078.7 TO RK 1081.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• BC Parks Workshop in Chilliwack, BC on March 27, 2014; 17 community members attended • Proposed Pipeline Corridor Optimization Workshop in Chilliwack, BC on March 27, 2014; six community members attended • Routing Update Open House in Chilliwack on March 27, 2014; 41 community members attended • Online input sought until April 17, 2014	• Sterilization of other transportation corridors (MOTI) • Risk of TransCanada highway closure during construction, maintenance, flood or spill repair. Pipeline safety would take precedence • Existing drainage systems and waterways are still linked even where distant from the pipe • Protection of salmon spawning channels around/through Bridal Veil Falls during construction and operation of the pipeline	• Potential effects on transportation infrastructure are discussed in Section 7.2.5 of Volume 5B. • Potential effects of tank installation and operations related to human health risk are discussed in Section 7.5.8 of Volume 5B. • A discussion of compatibility with relevant municipal and regional land use plans is found in Table 7.10-1 in Section 7.10 of Volume 5B. • Additional information related to these issues can be found in Volume A ESA – Biophysical; Volume 5C-7 Fisheries (BC) Technical Report; Volume 5D-2 Socio-economic Technical Report; Volume 5D-7 Screening Level Human Health Risk Assessment of Pipeline and Facilities Technical Report; Volume 6B Environmental Protection Plan; and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills • Feedback will form part of BC Parks Stage 2 Boundary Adjustment Application • Ongoing engagement to continue in regard to route optimization • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Routing options have been reviewed with Popkum Indian Band	• None	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Popkum Indian Band if the route is to cross the Popkum No. 2 Indian Reserve

TABLE 1.12A.2-58

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1078.7 TO RK 1081.4) (continued)

	Engagement Conducted	Issues	Status Update
Landowner Relations	• Crown land occupants and owners of seven parcels initially contacted in October, 2012, January 2013.	• Concerned with interference with irrigation systems, parks, and campground.	• Potential effects on parks and protected areas are discussed in Section 7.2.4 of Volume 5B. • Potential effects on agricultural use are discussed in Section 7.2.4 of Volume 5B (see Agricultural Management Plan in Appendix C of Volume 6B). • Additional information related to these issues can be found in Volume 5D-2 Socio-economic Technical Report • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1091.1 to RK 1091.7)

A new proposed alternate pipeline corridor was added to avoid the Grass Indian Reserve No. 15. Table 1.12A.2-59 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1091.1 to RK 1091.7).

TABLE 1.12A.2-59

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1091.1 TO RK 1091.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Chilliwack, BC on March 27, 2014; Six community members participated • Routing Update Open House in Chilliwack, BC on March 27, 2014; 41 community members attended. • Online input sought until April 17, 2014	• No new issues identified	• Engagement complete for this phase

TABLE 1.12A.2-59

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1091.1 TO RK 1091.7) (continued)

	Engagement Conducted	Issues	Status Update
Aboriginal Engagement	• Routing options have been reviewed via Ts'elxweyeqw Tribes Managemement Limited (TTML)	• None	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the TTML if the route is to cross the Grass Indian Reserve No. 15
Landowner Relations	• Owners of three parcels initially contacted in October, November 2012.	• No concerns noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1097.0 to RK 1097.5)

A new proposed alternate pipeline corridor was added to avoid the Tzeachten No. 13 Indian Reserve. Table 1.12A.2-60 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1097.0 to RK 1097.5).

TABLE 1.12A.2-60

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1097.0 TO RK 1097.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Chilliwack, BC on March 27, 2014; six community members participated. • Routing Update Open House in Chilliwack, BC on March 27, 2014; 41 community members attended. • Online input sought until April 17, 2014	• Concern with Tzeachten proposed alternate pipeline corridor and space available given other infrastructure • Air pollution causes $20 million per year in crop damage (Ministry of Agriculture, Figure 3) • Air quality for schools nearby • Vedder Aquifer water source is non-replaceable "high consequence area" and needs to be protected • Existing drainage systems and waterways are still linked even where distant from the pipe	• Potential effects on agricultural use are discussed in Section 7.2.4 of Volume 5B (see Agricultural Management Plan in Appendix C of Volume 6B). • Potential effects on transportation infrastructure are discussed in Section 7.2.5 of Volume 5B. • A discussion of compatibility with relevant municipal and regional land use plans is found in Table 7.10-1 in Section 7.10 of Volume 5B. •

TABLE 1.12A.2-60

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1097.0 TO RK 1097.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	See above	• Additional information related to these issues can be found in Volume 5A ESA – Biophysical; Volume 5B ESA – Socio-economic; Volume 5C-4 Air Quality and Greenhouse Gas Technical Report; Volume 5D-2 Socio-economic Technical Report; Volume 5D-6 Agricultural Assessment Technical Report; Volume 5D-7 Screening Level Human Health Risk Assessment of Pipeline and Facilities Technical Report; Volume 6B Environmental Protection Plan; and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Routing options have been reviewed with Tzeachten Indian Band	• Compensation of land on the Indian Reserve with CP holders	• Ongoing engagement to continue in regard to route optimization. Final approval to be provided by the Tzeachten Indian Band if the route is to cross the Tzeachten Indian Reserve No. 13
Landowner Relations	• Land owners initially contacted in November 2012.	• No concerns noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1098.0 to RK 1098.2)

Revised the previously proposed pipeline corridor to parallel a BC Hydro electrical transmission corridor, avoiding a dense residential area and close proximity to Watson Elementary School.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update

No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.2-61 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1098.0 to RK 1098.2).

TABLE 1.12A.2-61

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1098.0 TO RK 1098.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Chilliwack, BC on March 27, 2014; six community members participated. • Routing Update Open House in Chilliwack, BC on March 27, 2014; 41 community members attended. • Online input sought until April 17, 2014	• Construction - potential ground disruption causing leakage from liquid manure storage pits of Dairy Farms • Construction related stress to chicken, duck and goose farms • Concern with Tzeachten alternate study corridor and space available given other infrastructure • Air pollution causes $20 million per year in crop damage (Ministry of Agriculture, Figure 3) • Air quality for schools nearby • Vedder Aquifer water source is non-replaceable "high consequence area" and needs to be protected • Existing drainage systems and waterways are still linked even where distant from the pipe	• Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Owners of 19 Parcels contacted October and November 2012, and March and June 2013	• Interference with property development, fruit farming, nurseries, strata development	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1099.3 to RK 1099.6)

Minor revision of the previously proposed pipeline corridor to include an additional temporary work space area adjacent the existing TMPL right-of-way.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and

criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.2-62 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1099.3 to RK 1099.6).

TABLE 1.12A.2-62

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1099.3 TO RK 1099.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Chilliwack, BC on March 27, 2014; six community members participated • Routing Update Open House in Chilliwack, BC on March 27, 2014; 41 community members attended. • Online input sought until April 17, 2014	• Concern with Tzeachten alternate study corridor and space available given other infrastructure • Air pollution causes $20 million per year in crop damage (Ministry of Agriculture, Figure 3) • Air quality for schools nearby • Vedder Aquifer water source is non-replaceable "high consequence area" and needs to be protected • Existing drainage systems and waterways are still linked even where distant from the pipe • Reduce restrictions to agricultural use by burying the pipeline deeper	• Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Six private landonwers contacted in October, November 2012, and March, June 2013	• Interference with property development, fruit farming, nurseries, crop and soil damage.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1119.7 to RK 1120.2)

Reconfigured the previously proposed pipeline corridor to provide sufficient workspace for trenchless construction technique (*i.e.*, horizontal directional drill) across portion of Ledgeview Golf Course. Table 1.12A.2-63 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations proposed pipeline corridor deviation (RK 1119.7 to RK 1120.2).

TABLE 1.12A.2-63

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1119.7 TO RK 1120.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Refer to NEB IR No. 1.12b		
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowner contacted October 2012 and March 2013	• Interference with golf course	• Potential effects on outdoor recreation use are discussed in Section 7.2.4 of Volume 5B. • Potential effects on business and livelihood disruption, including the potential for reduced business or commercial income due to disruption of business (*e.g.*, golf courses), is discussed in Section 7.2.7 of Volume 5B. • Additional information related to these issues can be found in Volume 5D-2 Socio-economic Technical Report • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (Range RK 1129.0 to RK 1129.7)

Realigned the previously proposed pipeline corridor to the south and west to bypass the Matsqui Main Indian Reserve No. 2 and developments on lands within the previously proposed pipeline corridor. Table 1.12A.2-64 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1129.0 to RK 1129.7).

TABLE 1.12A.2-64

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1129.0 TO RK 1129.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Chilliwack on March 27, 2014. Six community members participated. • Routing Update Open House in Chilliwack on March 27, 2014. 41 community members attended. • Routing Update Open House in Langley on April 2, 2014. 140 community members attended. • Online input sought until April 17, 2014	• No new issues identified.	• Engagement complete for this phase
Aboriginal Engagement	• Matsqui First Nation has requested Project engagement remain confidential.		
Landowner Relations	• Land owners of four parcels initially contacted in October, December 2012 and again in January 2013.	• No concerns noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1148.0 to RK 1151.5)

Significant feedback on original proposed corridor through Salmon River Valley. Corridor was moved further west along the existing 24" Trans Mountain Pipeline before bending north along 217A Street. The proposed revised pipeline corridor traverses through Redwoods Golf Course and a proposed alternate pipeline corridor is located to the east of the golf course. Table 1.12A.2-65 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1148.0 to RK 1151.5).

TABLE 1.12A.2-65

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1148.0 TO RK 1151.5)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Langley, BC on April 2, 2014; nine community members participated • Routing Update Open House in Langley, BC on April 2, 2014; 140 community members attended. • Online input sought until April 17, 2014	• Revisit more easterly (original proposed corridor through Salmon River Valley) route – less environmental concern; compare environmental issues with Redwoods Nature Park – flood plains easterly route • Go through middle of golf course • Environment concerns on area east of golf course versus land owner concerns west side of golf course • Concern re-routing near homes on 217A • Stay to original right-of-way all the way and avoid wetlands and disturbance to environmentally sensitive areas • North (CN) and west of 216 large wetland – stay to existing right-of-way to Burnaby • Environmentally sensitive area north of Redwoods, (Hope - Redwoods nature area) • West side of Redwoods Golf Course is treed. Maintaining pipeline will require clear of trees. Trenchless = no need to remove trees • Both routes same concerns: environmental values at north end along both corridors • West side of golf course (noise, dust, fumes, exhaust); Highland Creek, Madison Park, 96 and 217th • Additional watercourse crossings connect to east Mundy creek or the west side of golf course	• Potential effects on outdoor recreation use, including physical disturbance to trails and commercial recreation tenures and sensory disturbance, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on business and livelihood disruption, including the potential for reduced business or commercial income due to disruption of business (*e.g.*, golf courses), is discussed in Section 7.2.7 of Volume 5B. • Potential effects on residential use are discussed in Section 7.2.4 of Volume 5B. • Potential effects on agricultural use are discussed in Section 7.2.4 of Volume 5B (see Agricultural Management Plan in Appendix C of Volume 6B). • A discussion of compatibility with relevant municipal and regional land use plans is found in Table 7.10-1 in Section 7.10 of Volume 5B. • Additional information related to these issues can be found in Volume 5A ESA – Biophysical; Volume 5B ESA – Socio-economic; Volume 5C-7 Fisheries (BC) Technical Report; Volume 5C-10 Wildlife Technical Report; Volume 5D-6 Agricultural Assessment Technical Report; Volume 6A Environmental Compliance; Volume 6B Environmental Protection Plan; and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills

TABLE 1.12A.2-65

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1148.0 TO RK 1151.5) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	• 65 kilometers of drain lines in golf course right now and 90% goes to Salmon River – most through north end (need to careful as this area is little more complicated) • Yorkson Creek has salmon (Mundy drains into) • Introducing salmon to East Mundy – oil spill would be detrimental to fish and recreational users • Oil spill on Golf Course will flow into Salmon River if pipeline is on east side • Spill if pipeline is on west side goes to urban area • Balance environment concerns with community concerns • Concern with impact to natural habitat of the area. Good to connect trails but need to maintain habitat	• Engagement on community readiness to host construction workforce planned for Fall 2014. Discussions to include potential identification and mitigation of socio-economic impacts of construction camps. • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of 11 parcels contacted October and November 2012, and in January, February, July, and September 2013	• Interference with golf course, interference with property development, tree removal, opposed to project	• Information related to these issues can be found in Volume 5B, Section 7.2.4 (Human Occupancy and Resource Use); and Volume 5D-2 Socio-economic Technical Report • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1148.2 to RK 1149.1)

A proposed pipeline corridor to provide an alternate connection between the existing TMPL right-of-way and the Redwoods Golf Course. The proposed pipeline corridor leaves the TMPL right-of-way at 224 Street heading north. After crossing 88 Avenue the corridor turns west and rejoins the revised proposed pipeline corridor.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and

criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.2-66 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1148.2 to RK 1149.1).

TABLE 1.12A.2-66

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1148.2 TO RK 1149.1)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Langley, BC on April 2, 2014; nine community members participated • Routing Update Open House in Langley, BC on April 2, 2014; 140 community members attended. • Online input sought until April 17, 2014	• Revisit more easterly (original proposed corridor through Salmon River Valley) route – less environmental concern; compare environmental issues with Redwoods Nature Park – flood plains easterly route • Go through middle of golf course • Environment concerns on area east of golf course versus land owner concerns west side of golf course • Concern re-routing near homes on 217A • Stay to original right-of-way all the way and avoid wetlands and disturbance to environmentally sensitive areas • North (CN) and west of 216 large wetland – stay to existing right-of-way to Burnaby • Environmentally sensitive area north of Redwoods, (Hope - Redwoods nature area) • West side of Redwoods Golf Course is treed. Maintaining pipeline will require clear of trees. Trenchless = no need to remove trees	• Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.

TABLE 1.12A.2-66

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1148.2 TO RK 1149.1) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	• Both routes same concerns: environmental values at north end along both corridors • West side of golf course (noise, dust, fumes, exhaust); Highland Creek, Madison Park, 96 and 217th • Additional watercourse crossings connect to east Mundy creek or the west side of golf course • 65 kilometers of drain lines in golf course right now and 90% goes to Salmon River – most through north end (need to careful as this area is little more complicated) • Yorkson Creek has salmon (Mundy drains into) • Introducing salmon to East Mundy – oil spill would be detrimental to fish and recreational users • Oil spill on Golf Course will flow into Salmon River if pipeline is on east side • Spill if pipeline is on west side goes to urban area • Balance environment concerns with community concerns • Concern with impact to natural habitat of the area. Good to connect trails but need to maintain habitat	See above

TABLE 1.12A.2-66

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1148.2 TO RK 1149.1) (continued)

	Engagement Conducted	Issues	Status Update
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Public land and golf course contacted October and November 2012, and in January, February, July and September 2013	• Interference with golf course, tree preservation	• Potential effects related to outdoor recreation use are discussed in Section 7.2.4 of Volume 5B. • Potential effects on business and livelihood disruption, including the potential for reduced business or commercial income due to disruption of business (*e.g.*, golf courses), is discussed in Section 7.2.7 of Volume 5B. • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1158.6 to RK 1160.6)

Relocated and reconfigured the previously proposed pipeline corridor to improve constructability and avoid congestion in developed urban environment. Table 1.12A.2-67 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1158.6 to RK 1160.6).

TABLE 1.12A.2-67

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1158.6 TO RK 1160.6)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Surrey, BC on April 1, 2014; seven community members participated • Routing Update Open House in Langley, BC on April 2, 2010; 140 community members attended • Online input sought until April 17, 2014	• Loss of mature forest: Land west of G&R Sawmills recently purchased to keep forest intact • Barnston Drive/176th Street (to avoid 173, very active residential construction and is congested) • Infrastructure conflicts • Infrastructure project fatigue (Fraser Heights, alternate)	• Potential effects on land and resource use, including disruption of aggregate extraction activities and managed forest areas are discussed in Section 7.2.4 of Volume 5B. • Potential effects on transportation infrastructure, including roads and traffic, are discussed in Section 7.2.5 of Volume 5B.

TABLE 1.12A.2-67

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1158.6 TO RK 1160.6) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	• Residential impact, construction: Traffic, access, value, noise, lights, views • Traffic impact: Limited access to Highway 15 so challenges accessing where construction will occur • Flooding along Triggs Road and buckling of pipeline in peat bogs • Concern with pipeline integrity during a flood • Flood plain – pipeline design must consider this • Drainage and run off • Disruption to land and individual properties (including ability to sell property) • Residential impact, operations • Impact on tree buffer between residential areas and railway (noise and sight) • Impacts/limiting future utility use in road right-of-way 'sterilization' (alternate)	• Potential effects on residential use, including physical disturbance to residential areas, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on aesthetic attributes, including sensory disturbance such as nuisance noise and air emissions, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • Regarding property values, under the *NEB Act*, companies are required to compensate landowners for any damages associated with the new pipeline. Any direct effects on individual properties will be managed through individual compensation arrangements • Additional iinformation on these issues can be found in Volume 5A ESA – Biophysical; Volume 5B, Section 7.2.4 and 7.2.5 (Human Occupancy and Resource Use, Infrastructure and Services); Volume 5C-5 Groundwater Technical Report; Volume 6A Environmental Compliance; and Volume 6B Environmental Protection Plan • Follow-up meeting with Fraser Heights Community Association to discuss routing planned for June 2014. • Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015.

TABLE 1.12A.2-67

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1158.6 TO RK 1160.6) (continued)

	Engagement Conducted	Issues	Status Update
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of seven private and nine public parcels contacted in October and November 2012, and in May, June, July, September 2013, and February 2014	• Interference with property development and restoration	• Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on access for land and resource users, including change in land use patterns and disruption of outfitting, trapping, hunting and fishing activities, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on land use patterns, including the potential for fragmentation for certain land uses where the route deviates from the existing TMPL, are discussed in Section 7.2.4 of Volume 5B, • A discussion of compatibility with relevant municipal and regional land use plans is found in Table 7.10-1 in Section 7.10 of Volume 5B. • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1158.8 to RK 1162.9)

Proposed alternate pipeline corridor avoids Surrey Bend Regional Park by following the existing TMPL right-of-way between 182a St and 173 St, before running north along 173 St to join the south side of the South Fraser Perimeter Road.

Trans Mountain's intention is to propose a route that minimizes impact to residences and communities (Volume 5A, Section 4). This proposed alternative pipeline corridor is no longer being considered as it does not currently meet Trans Mountain's routing objectives and criteria (Volume 4A, Section 2.8). In Q3 2014, Trans Mountain will file Consultation Update No. 2 which will report on the outcomes of our ongoing engagement activities, including routing, with Aboriginal groups, landowners and stakeholders for the period of January 1, 2014 to April 30, 2014.

Table 1.12A.2-68 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1158.8 to RK 1162.9).

TABLE 1.12A.2-68

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1158.8 TO RK 1162.9)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Surrey on April 1, 2014; seven community members participated. • Routing Update Open House in Langley, BC on April 2, 2014; 140 community members attended • Online input sought until April 17, 2014	• 173rd north of 104th Avenue may have utility conflicts in road – (alternate corridor) • Loss of mature forest: Land west of G&R Sawmills recently purchased to keep forest intact • Alternate: 176 to Colbrook west under 99 connect to Roberts Bank Road (Colbrook Road) • Barnston Drive/176th Street (to avoid 173, very active residential construction and is congested) • South Fraser Perimeter Road alternate would have less impact to municipality and residents, environmental assessment done • Infrastructure conflicts • Impact of pipe construction on truck traffic in area of 173 Street • Approximately 25 homes impacted by construction in Fraser Heights (alternate route) • Infrastructure project fatigue (Fraser Heights, alternate) • Residential access to 173 during construction • Traffic impact: Limited access to Highway 15 so challenges accessing where construction will occur • Flooding along Triggs Road and buckling of pipeline in peat bogs • Flooding in Surrey Bend Park, a non-diked flood plain, impact of expected sea level rise • Concern with pipeline integrity during a flood	• Engagement is complete; this proposed alternative pipeline corridor deviation is no longer being considered as it does not currently meet our routing objectives.

TABLE 1.12A.2-68

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1158.8 TO RK 1162.9) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	• Flood plain – pipeline design must consider this • Drainage and run off • Construction in peat - use different sediment to bury pipe. Concern about subsurface water movement following pipe installation • Impacts on drainages near 173 Street (creek/ditches) • Impacts to water wells on 173 and drainages • Impacts on septic systems around 173 Street • Impact to retention pond at 104 Ave and 173 Street • Disruption to land and individual properties (including ability to sell property) • Devaluation of properties near 173 Street area • Residential impact, operations • Impact on tree buffer between residential areas and railway (noise and sight) • Impacts/limiting future utility use in road right-of-way 'sterilization' (alternate)	See above
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Owners of four private residential and three industrial parcels contacted.	• Development impacts and interference with operations.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1162.6 to RK 1166.7)

Realigned and reconfigured the previously proposed pipeline corridor to avoid congestion in developed urban environment. The proposed revised pipeline corridor follows a transportation corridor adjacent to the CN Rail line and Intermodal yard. The previously proposed corridor was expanded to allow for planned highway development. Table 1.12A.2-69 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1162.6 to RK 1166.7).

TABLE 1.12A.2-69

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1162.6 TO RK 1166.7)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Surrey, BC on April 1, 2014; s Seven community members participated. • Routing Update Open House in Langley, BC on April 2, 2014; 140 community members attended. • Online input sought until April 17, 2014	• Construction and restoration challenges along bluff in upland areas (west) (MOTI back yards) • Alternate: 176 Street to Colbrook west under Highway 99 connect to Roberts Bank Road (Colbrook Road) • South Fraser Perimeter Road alternate would have less impact to municipality and residents, environmental assessment done • Infrastructure conflicts • Infrastructure project fatigue (Fraser Heights, alternate) • Construction noise for Fraser Heights neighbours from directional drill • Flooding along Triggs Road and buckling of pipeline in peat bogs • Flooding in Surrey Bend Park, a non-diked flood plain, impact of expected sea level rise • Concern with pipeline integrity during a flood • Flood plain – pipeline design must consider this • Drainage and run off • Construction in peat - use different sediment to bury pipe. Concern about subsurface water movement following pipe installation • Disruption to land and individual properties (including ability to sell property) • Residential impact, operations • Impact on tree buffer between residential areas and railway (noise and sight) • Impacts/limiting future utility use in road right-of-way 'sterilization' (alternate)	• Potential effects on transportation infrastructure, including roads and traffic, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on residential use, including physical disturbance to residential areas, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on aesthetic attributes, including sensory disturbance such as noise and air emissions from vehicles, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on aesthetic attributes, including sensory disturbance related to nuisance air emissions, noise and construction-related visual effects, are discussed in Section 7.2.4 of Volume 5B. • Additional information related to these issues can be found in Volume 5A ESA – Biophysical; Volume 5B, Section 7.2.4 and 7.2.5 (Human Occupancy and Resource Use, Infrastructure and Services); Volume 5C-5 Groundwater Technical Report; Volume 6A Environmental Compliance; Volume 6B Environmental Protection Plan; and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills

TABLE 1.12A.2-69

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1162.6 TO RK 1166.7) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	See above	• Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015. • Follow-up meeting with Fraser Heights Community Association to discuss routing planned for June 2014.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of 20 parcels contacted October 2012, January, May, June, November 2013, January, Feb 2014	• Environmental conservation and property / infrastructure development restrictions.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Alternate Pipeline Corridor Deviation (RK 1166.8 to RK 1169.4)

Revised the previously proposed pipeline corridor crossing of the Fraser River to the east side of the Port Mann Bridge. Table 1.12A.2-70 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation (RK 1166.8 to RK 1169.4).

TABLE 1.12A.2-70

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1166.8 TO RK 1169.4)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Surrey, BC on April 1, 2014; seven community members participated • Proposed Pipeline Corridor Optimization Workshop in Coquitlam, BC on March 26, 2014; nine community members participated • Routing Update Open House in Langley, BC on April 2, 2014; 140 community members attended • April 17, 2014	• Alternate: 176 Street to Colbrook west under Highway 99 to connect to Roberts Bank Road (Colbrook Road) • South Fraser Perimeter Road alternate would have less impact to municipality and residents, environmental assessment done • Infrastructure conflicts • Infrastructure project fatigue (Fraser Heights, alternate) • Construction noise for Fraser Heights neighbours from directional drill	• Potential effects on transportation infrastructure, including roads and traffic, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on residential use, including physical disturbance to residential areas, are discussed in Section 7.2.4 of Volume 5B.

TABLE 1.12A.2-70

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1166.8 TO RK 1169.4) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Routing Update Open House in Burnaby on April 3, 2014; 146 community members attended • Online input sought until	• Flooding in Surrey Bend Park, a non-diked flood plain, impact of expected sea level rise • Concern with pipeline integrity during a flood • Flood plain – pipeline design must consider this • Drainage and run off • Construction in peat - use different sediment to bury pipe. Concern about subsurface water movement following pipe installation • Impacts/limiting future utility use in road right-of-way 'sterilization' (alternate) • Coordinate pipe construction projects with restoration projects under Port Mann Bridge • Coordinate construction projects to lessen impacts (*i.e.*, Metro Vancouver sewer) • Migratory birds at Colony Farm Regional Park – post breeding season (outside protected bird nesting window) very important time. They eat and stay longer to gain strength for migration • Huge impact on Colony Farm Regional Park – nesting birds, rec users, visitors all year round • Impacts to nesting birds using Forensic Psychiatric Institute (FPI) fields in addition to Colony Farm • Increased maintenance hassle due to pipeline (*i.e.*, Need to call before you dig) • United Boulevard/Pacific Reach residential development in future. Potential development encumbrance (pre-load NEB Safety Zone)	• Potential effects on aesthetic attributes, including sensory disturbance related to nuisance air emissions, noise and construction-related visual effects, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on parks and protected areas and outdoor recreation use are addressed in Section 7.2.4 of Volume 5B. • Potential effects navigation and navigation safety are discussed in Section 7.2.6 of Appendix 5B. • Regarding property values, under the *NEB Act*, companies are required to compensate landowners for any damages associated with the new pipeline. Any direct effects on individual properties will be managed through individual compensation arrangements. • A discussion of compatibility with relevant municipal and regional land use plans is found in Table 7.10-1 in Section 7.10 of Volume 5B. • Additional information related to these issues can be found in Volume 1 Summary; Volume 5A ESA – Biophysical; Volume 5B ESA – Socio-economic; Volume 5C-5 Groundwater Technical Report; Volume 6A Environmental Compliance; Volume 6B Environmental Protection Plan; and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills

TABLE 1.12A.2-70

PROPOSED ALTERNATE PIPELINE CORRIDOR DEVIATION (RK 1166.8 TO RK 1169.4) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	• Pipe installation impact to zoning • Seismic (poor ground next to Fraser River as it's low lands) • Avoid tree loss • Spill Emergency Response Routes – what's the plan? • Noise impacts to Colony Farm Regional Park and along the corridor • Concern about impacts to creeks (multiple crossings run north to south) through Coquitlam • High pressure large diameter water mains in area. Could cause damage to TMPL if ruptured • Water quality impacts on drainage canals at Colony Farm • Potential water quality impacts on Coquitlam River and Mundy Slough • Access to boat launches at Maquabeak Park • Recreational users at Colony Farm Regional Park year round – impact to cyclists, hikers, gardeners, visitors during construction • Ensure access is maintained to Colony Farm Park and Forensic Psychiatric Institute (FPI) • Impacts to wildlife and overall diversity • Impact/loss of green space • Kwikwetlem First Nation	• Engagement on construction plans, impacts and mitigation measures planned for Spring/Summer 2015. • Further engagement on routing with United Boulevard businesses planned for summer 2014.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Railway and Public lands contacted October 2012, and January, May, June, November 2013, and January, February 2014	• Environmental conservation and property / infrastructure development interactions	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation (RK 1172.2 to RK 1178.2)

The proposed revised pipeline corridor alignment is the previous alternate pipeline corridor that was illustrated in the application filed with the National Energy Board on December 16, 2013 (refer to Appendix D of Volume 3A). Slight adjustments were made to the previously proposed pipeline corridor to provide sufficient workspace at crossings (*i.e.,* Trans Canada Highway) and to avoid existing infrastructure owned by the City of Burnaby. Table 1.12A.2-71 provides information on Public Consultation, Aboriginal Engagement and Landowner Relations pertaining to (RK 1172.2 to RK 1178.2).

TABLE 1.12A.2-71

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1172.2 TO RK 1178.2)

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Coquitlam, BC on March 26, 2014; nine community members participated • Proposed Pipeline Corridor Optimization Workshop in Burnaby, BC on April 3, 2014; ten community members participated. • Routing Update Open House in Burnaby, BC on April 3, 2014; 146 community members attended. • Online input sought until April 17, 2014	• Increased maintenance hassle due to pipeline (*i.e.*, Need to call before you dig) • United Boulevard/Pacific Reach residential development in future. Potential development encumbrance (pre-load NEB Safety Zone) • Schools may not be relevant unless there's one at Fraser Mills • Seismic (poor ground next to Fraser River as it's low lands) • Less construction in selected study corridor (United Boulevard) than Bernatchy alternate. • Avoid tree loss • Loss or degradation of green space (frequently targeted) • Land fill – United Boulevard area • As builts for methane collection systems • Concern about impacts to creeks (multiple crossings run north to south) through Coquitlam • Stoney Creek crossing – ensure proper construction method to protect creek	• Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on transportation infrastructure, including roads and traffic, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on residential use, including physical disturbance to residential areas, are discussed in Section 7.2.4 of Volume 5B. • Potential effects on parks and protected areas and outdoor recreation use are addressed in Section 7.2.4 of Volume 5B. • A discussion of compatibility with relevant municipal and regional land use plans is found in Table 7.10-1 in Section 7.10 of Volume 5B.

TABLE 1.12A.2-71

PROPOSED PIPELINE CORRIDOR DEVIATION (RK 1172.2 TO RK 1178.2) (continued)

	Engagement Conducted	Issues	Status Update
Public Consultation	See above	• High pressure large diameter water mains in area. Could cause damage to TMPL if ruptured • Impact to Mackin Park • Impact/loss of green space	• Additional information related to these issues can be found in Volume 1 Summary; Volume 4A, Appendix H (Terrain Mapping and Geohazard Inventory); Volume 5A ESA – Biophysical; Volume 5B, Section 7.2.4 and 7.2.5 (Human Occupancy and Resource Use, Infrastructure and Services); Volume 6B Environmental Protection Plan; and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills • Routing optimization continues for this proposed deviation. • Further engagement required. To be undertaken in June to August 2014. Will be reported in Update No. 2.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• Landowners of six private and 23 public parcels contacted October 2012, in May, June, July, September 2013, and in February 2014	• Environmental conservation and property / infrastructure development restrictions, city infrastructure, parks, access for survey denied.	• Potential effects on infrastructure and services are discussed in Section 7.2.5 of Volume 5B. • Potential effects on linear infrastructure, including limitations to future municipal linear infrastructure planning, are discussed in Section 7.2.5 of Volume 5B. • Potential effects on parks and protected areas, including access, are discussed in Section 7.2.4 of Volume 5B. • Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

Proposed Pipeline Corridor Deviation Westridge Delivery Lines

The proposed revised pipeline corridor has been relocated to the east to avoid disturbance to residential areas. Table 1.12A.2-72 provides information on Public Consultation,

Aboriginal Engagement and Landowner Relations pertaining to proposed pipeline corridor deviation to Westridge Delivery Lines.

TABLE 1.12A.2-72

PROPOSED PIPELINE CORRIDOR DEVIATION WESTRIDGE DELIVERY LINES

	Engagement Conducted	Issues	Status Update
Public Consultation	• Proposed Pipeline Corridor Optimization Workshop in Burnaby, BC on April 3, 2014; ten community members participated. • Routing Update Open House in Burnaby on April 3, 2014; 144 community members attended. • Online input sought until April 17, 2014	• Creation of geotechnical concerns with HDD or tunnel construction (subsidence) • Surface impacts from HDD or tunnel install (trees) • Logistics of moving drill pipe to site (access)	• Information related to these issues can be found in Volume 4A, Appendix H (Terrain Mapping and Geohazard Inventory); Volume 5A, Section 7.2.2 and 7.2.10 (Soil and Soil Productivity, Wildlife and Wildlife Habitat); and Volume 7 Risk Assessment and Management of Pipeline and Facility Spills • Routing optimization continues for this proposed deviation. • Further engagement required. To be undertaken in June to August 2014. Will be reported in Update No. 2. • Continue to seek meetings with City of Burnaby to discuss routing options, permits. Have been unsuccessful to date.
Aboriginal Engagement	• Refer to NEB IR No. 1.12b		
Landowner Relations	• One private landowner contacted, June, 2013.	• No specific concerns noted.	• Contact information, issues raised and information provided recorded and entered into the landowner database for incorporation into the line list.

b) Consultation has taken place to engage the public, Municipalities and Regional Districts, Aboriginal groups and communities, and landowners on routing deviations as described in the response to NEB IR No. 1.12a. For each deviation, conversations were tailored to the specific audience and interest. Landowner conversations have been conducted on each deviation as identified in NEB IR No. 1.12a. Deviations that cross Indian Reserves were the focus of specific Aboriginal groups and community conversations. Deviations with a broad public interest were the focus of conversations at workshops, public open houses and online.

Following the filing of the Application in December 2013, the proposed pipeline corridor was made publicly available online at www.transmountain.com. On May 5, 2014 the online mapping was updated to include the deviations reported in NEB IR No. 1.12a. Maps of the

proposed pipeline corridor and proposed revisions to the pipeline corridor were also available at the workshops and open houses.

Trans Mountain is in the process of analyzing these recent consultation efforts to ensure that the issues raised have either been addressed, or will be addressed, or compile the rationale for not addressing. Ongoing engagement on route optimization is planned throughout 2014. Trans Mountain commits to providing more details to the NEB of the consultation activities related to routing that have occurred since the Application was filed in December 2013 and this consultation update, along with more details on the routing optimization in Q3 2014.

Aboriginal engagement with groups with traditional territories potentially affected by the Project is ongoing. Engagement efforts are currently focused on a number of issues, including route refinements and the potential effect of these refinements on traditional use. The details of consultation with Aboriginal communities will be included in the consultation update to be filed in Q3 2014 and Trans Mountain has also committed to filing a technical update (include traditional ecological knowledge, traditional land use and traditional marine use) in Q3 2014 (see the response to NEB IR No. 1.25.

1.13 Aboriginal consultation

Reference:

i) A3S0U5, Application Volume 3B, Aboriginal Engagement, PDF pages 29 and 48 of 97
ii) A3S1S0, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, PDF page 10 of 64
iii) A53513, A53520, A53522 (letters) and A3K1S9 (attachment), NEB letters dated 12 August 2013 and Attachments to Aboriginal groups regarding the Project, PDF pages 5 and 6 of 6 (Attachment)
iv) A3V3L9, Consultation Update No. 1 Errata, Part 3 - Aboriginal Engagement Update No. 1

Preamble:

Reference i) states that, at the time of filing its application, Trans Mountain was engaged with 105 Aboriginal communities and Aboriginal groups, including two non-land based British Columbia Métis groups. The reference also states that the final list of Aboriginal communities and Aboriginal groups engaged by Trans Mountain was a compilation guided by provincial and federal levels of government as well as an existing list held by Kinder Morgan Canada Inc.

Reference ii) states that, of the 85 Aboriginal communities Trans Mountain engaged on the Project, 62 have been identified as having an interest in the Project or having interests potentially affected by the Project. The reference does not describe how Aboriginal communities were identified by Trans Mountain.

Reference iii) are Project Information Letters sent in August 2013 to 131 Aboriginal groups identified by the Board as groups that may be impacted by the Project.

Reference iv) is an update from Trans Mountain on Aboriginal Engagement activities between 1 October and 31 December 2013.

Request:

Please provide:

a) Trans Mountain's criteria or justification for determining an Aboriginal group's interest in the Project or interests potentially affected by the Project;

b) a description or rationale for each Aboriginal group identified by the Board, but which Trans Mountain has determined does not have an interest in the Project or does not have interests potentially affected by the Project; and

c) clarification of all Aboriginal groups that Trans Mountain has determined to have an interest in the Project or have interests potentially affected by the Project.

Response:

a) Trans Mountain's intent was to take an expansive approach in determining which Aboriginal groups may potentially have an interest in the Project. In that regard, Trans Mountain

invited engagement with groups that were identified by federal and provincial governments, Trans Mountain's internal list, and groups subsequently asking for engagement.

Interests are determined through a variety of methods, including, but not limited to:

- Deliverables agreed to in capacity agreements with Aboriginal groups
- Engagement meetings (or other forms of communication such as letters, phone calls or e-mails)
- Information sessions
- Aboriginal participation in Traditional Ecological Knowledge work
- Findings from Traditional Land Use Studies
- Findings from Traditional Marine Use Studies

Our approach, where possible, is to have the Aboriginal groups clearly identify their interests in relationship to the Project.

Trans Mountain does not set fixed criteria or justify interests based on fixed criteria. However, in addition to the above, Trans Mountain reviews and assesses the following about Aboriginal groups engaged on the Project:

- Proximity (or intersection) of the proposed pipeline corridor to Reserve lands
- Proximity of the proposed pipeline corridor through traditional territory
- Percentage of crown lands versus private lands along the proposed pipeline corridor
- Number of groups with overlap or shared traditional territories
- Population of group

Together, the above information assists Trans Mountain in understanding the interests of Aboriginal groups and the potential impacts of the Project, on interests.

b) All Aboriginal groups identified by the National Energy Board to date have been engaged by Trans Mountain and invited to learn about the Project and discuss interests, potential concerns and potential Project impacts on interests.

Trans Mountain has not yet determined that any Aboriginal groups specifically do not have an interest in the Project, rather Trans Mountain states that a group has an interest or potential interest in the Project once they have affirmatively expressed such to Trans Mountain.

c) To date, Trans Mountain has identified the following Aboriginal groups to have an interest in the Project or have interests potentially affected by the Project. For additional information about those groups engaged in Traditional Ecological Knowledge studies, see the response to NEB IR No.1.26.

Aboriginal communities located in the Edmonton to Alberta/British Columbia border region:

Alexander First Nation
Alexis Nakota Sioux Nation
Aseniwuche Winewak Nation of Canada
Asini Wachi Nehiyawak Traditional Band
Enoch Cree Nation
Ermineskine Cree Nation
Foothills Ojibway First Nation
Gunn Metis Local Council 55
Métis Nation of Alberta Gunn Métis Local 55
Horse Lake First Nation
Louis Bull Tribe
Métis Regional Council Zone IV of the Métis Nation of Alberta
Michel First Nation
Montana First Nation
Nakcowinewak Nation of Canada
O'Chiese First Nation
Paul First Nation
Saddle Lake Cree
Samson Cree Nation
Sturgeon Lake Cree Nation
Sucker Creek First Nation
Sunchild First Nation
Whitefish (Goodfish) Lake First Nation

Aboriginal communities located in the Alberta/British Columbia border to Kamloops region:

Adams Lake Indian Band
Ashcroft Indian Band
Canim Lake Band
Stswecem'c Xgat'tem (Canoe Creek/Dog Creek Indian Band)
Kelly Lake Cree Nation
Kelly Lake First Nation
Kelly Lake Métis Settlement Society
Ktunaxa Nation
Little Shuswap Indian Band
Lheidli T'enneh First Nation
Lhtako Dene Nation
Neskonlith Indian Band
Oregon Jack Creek Band
Shuswap Indian Band
Simpcw First Nation
Skeetchestn First Nation
Splatsin First Nation
Stoney Nakoda First Nation
Tk'emlups te Secwepemc
Toosey Indian Band
T'exelc First Nation (Williams Lake)
Xat'sull First Nation (Soda Creek)

Aboriginal communities located in the Kamloops to Hope region:

Boothroyd Band
Boston Bar Band
Coldwater Indian Bar
Cook's Ferry Indian Band
Llenlleney'ten First Nation (High Bar)
Kanaka Bar
Lower Similkameen Indian Band
Lytton First Nation
Nicomen Indian Band
Nooaitch Indian Band
Penticton Indian Band
Shackan Indian Band
Siska Indian Band
Skuppah Indian Band
Spuzzum First Nation
St'uxwtews (Bonaparte Indian Band)
Upper Similkameen Indian Band

Aboriginal communities located in the Hope to Burnaby terminal/Burrard Inlet region:

Aitchelitz First Nation
Chawathil First Nation
Cheam First Nation
Katzie First Nation
Kwantlen First Nation
Kwaw-kwaw-aplit First Nation
Kwikwetlem First Nation
Leq'a:mel First Nation
Musqueam Indian Band
Peters Band
Popkum First Nation
Qayqayt First Nation (New Westminster)
Scowlitz First Nation
Seabird Island Band
Semiahmoo First Nation
Shxw'ow'hamel First Nation
Shxwha:y Village
Skawahlook First Nation
Skowkale First Nation
Skwah First Nation
Soowahlie Indian Band
Squamish Nation
Squiala First Nation
Sts'ailes Band (Chehalis Indian Band)
Sumas First Nation
Tsawwassen First Nation
Ts'kwaylaxw (Pavillion Indian Band)
Tsleil-Waututh Nation
Tzeachten First Nation
Union Bar First Nations
Yakweakwioose Band
Yale First Nation

Aboriginal communities located in the marine corridor:

Cowichan Tribes
Ditidaht First Nation
Halalt First Nation
Huu-ay-aht First Nation
Hwlitsum First Nation
Lake Cowichan First Nation
Lyackson First Nation
Malahat First Nation
Pacheedaht First Nation
Pauquachin First Nation
Penelakut First Nation
Sechelt Indian Band
Snaw-Naw-As (Nanoose)
Snuneymuxw First Nation
Songhees Nation
Stz'uminus First Nation (Chemainus)
T'Sou-ke First Nation
Tsartlip First Nation
Tseycum First Nation

Aboriginal groups – non-boundary specific:

BC Métis Federation
Métis Nation of BC

Associations, councils and tribes:

Cowichan Nation Alliance
Maa-Nulth First Nations
Nicola Tribal Association
Nuu-chah-nulth Tribal Council
Sencot'en Alliance
St'at'imc Chiefs Council
Stk’emlupsemc te Secwepemc Nation
Ts’elxweyeqw Tribe Management Limited
Tsilhoqot'in National Government

Socio-economic

1.14 Disruption to agricultural land use patterns

Reference:

A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic:

i) PDF page 87 of 245
ii) Table 7.2.4-2 – Potential Effects, Mitigation Measures and Residual Effects of Project Construction and Operations on HORU, Potential Effect 4.1, PDF pages 69 and 70 of 245

Preamble:

Reference i) states that agricultural land use patterns could be disrupted by restrictions in access to certain parts of properties, which may affect cultivation and harvesting. There would also be an inability to use land for crops during specific periods during the construction phase and crops would be lost for specific periods of activity. Access restrictions may also affect livestock on grazing range and in forest used for grazing, and some livestock operations may have paddocks, corrals, or other fenced facilities that may be disturbed, which would disrupt the facility's operations. The reference further states that similar effects regarding reduced access to land due to disturbances for all use types would occur during periods of site-specific maintenance.

Reference ii) discusses various mitigation measures proposed to address these disruptions.

Trans Mountain has not described its plans to communicate these potential disruptions of agricultural land use patterns with landowners during construction and site-specific maintenance activities.

Request:

Please provide:

a) details on Trans Mountain's communication plans with landowners and/or lessees (e.g., notice to agricultural users of route location and construction schedule, attempt to avoid peak activity periods where feasible, incorporate landowners' requests into construction procedures); and

b) confirmation that the plans identified in a) will be included in the Pipeline Environmental Protection Plan.

Response:

a) Trans Mountain's landowner relations program is described in the Application, Volume 3C and the land acquisition program is described in Volume 2, Section 5.0. Both of these sections address Trans Mountain's landowner communication plans.

In accordance with Trans Mountain's landowner relations program, land agents working for Trans Mountain have attempted to contact each potentially affected landowner and lessee within the proposed pipeline corridor to obtain their permission for Trans Mountain survey crews to enter onto properties potentially affected by the Project. Comments, questions, and concerns were collected through those contacts and recorded in contact sheets. Property specific information including farm operations provided by each landowner and lessee was recorded and all of the collected information was filed in individual property files and entered into a Project landowner database.

As part of the land acquisition process, additional property specific information will be collected from each landowner and lessee. Farming and land use information will include details of farming operations, crops, livestock, schedules, crop and production cycles, requirements for notification of construction activities, restoration and soil handling requirements, water well locations and any other property specific information required for construction and restoration planning. Discussions will also address specific pipeline alignment and construction workspace requirements. This information will be placed into each property file and entered into the landowner database. Ongoing discussions will continue between land agents and landowners/lessees during the regulatory, construction planning, construction and restoration processes and the landowner database will be updated as needed with any new information obtained through these discussions.

During the construction contractor selection process, a Line List will be provided to bidders and will form a part of the construction contracts with the successful contractors. The Line List will include contact information for each landowner and lessee, incorporating all comments and company commitments, including notification requirements and any unique or specialized construction practices or schedules agreed to in response to landowner requirements.

Within the construction planning process, any landowner needs around timing, notification and construction practices will be discussed with the successful contractor and each landowner as needed. Any additional information or landowner requirements identified through these ongoing discussions will be recorded and entered into the property file and landowner database. These ongoing contacts will also provide the basis for keeping landowners updated on construction progress, and identifying and addressing any new questions or issues that may arise.

Following Project approval, if granted, and in sufficient time prior to construction commencement, the Trans Mountain Expansion Project land team will review the commitments contained within the landowner database and property files to identify and communicate to Trans Mountain land agents and construction contractor staff any pre-construction commitments for each property. The Trans Mountain land agents, working with the construction contractors will monitor each commitment and ensure it is met. During daily and weekly construction meetings, construction contractor staff and Trans Mountain land agents will review and plan the execution of commitments for notification and construction measures for each property prior to construction entry on that property. The fulfillment of each commitment will be communicated back to the project land administration team to

record in the property file and landowner database. During construction, on a weekly basis, the Project land team will review the commitment listing from the landowner database to ensure any upcoming commitments are identified and communicated to Project land agents and the construction contractor for follow-up and that outstanding commitments from previous weeks will be communicated to the respective project land agent and the construction contractor. On a weekly basis, the land team will provide a commitments status report to the Land Manager and construction contractor to ensure any outstanding commitments are addressed on a timely basis.

b) The general measures designed to mitigate potential effects and disruptions to agricultural land uses are documented within the Pipeline Environmental Protection Plan (Volume 6B), but the plans and procedures that will be followed to ensure appropriate notification is made to each landowner, as required, based on the specific needs of their agricultural land use, will be housed in the Land Program Execution Plan. As indicated in the response to NEB IR No. 1.14a), property specific measures and commitments are contained within the landowner database, individual property files and Line List rather than in the Pipeline Environmental Protection Plan. In the Pipeline Environmental Protection Plan, direction is provided to Trans Mountain and the construction contractor to consult the Line List throughout the pipeline construction activity phases for identification of specialized land uses (e.g., nurseries, poultry farms, organic farms, berry fields, fields with sub-surface drainage, irrigated fields) and landowner requests (e.g., related to the management of these specialized land uses, topsoil handling methods, reducing effects on ornamental trees and shelterbelts, timber salvage, weed control, traffic management and clean-up).

Summary of New Commitments:

- Development of a Line List including landowner contact information and listing of all commitments and agreed upon special construction methods for each property.
- Development of an execution plan that includes review of Line List to determine commitments to landowners and ensure commitments are met.
- Incorporation of Line List and landowner commitments into construction contracts.
- Monitoring and recording of completion of commitments to landowners by the project land program administration.
- Ensure the plans and procedures to be followed to ensure appropriate notification is made to each landowner, as required, based on the specific needs of their agricultural land use, are incorporated into the Land Program Execution Plan.

1.15 Public health and safety

Reference:

A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic:

i) PDF page 94 of 245
ii) PDF page 95 of 245
iii) Table 7.2.4-2 – Potential Effects, Mitigation Measures and Residual Effects and of Project Construction and Operations on HORU, Potential Effects 3.1 and 3.2, PDF page 68 of 245

Preamble:

Reference i) states that, in residential use areas, construction may disturb features such as yards, fences, storage sheds, garages, or other features on residential properties.

Reference ii) states that physical disturbance to community use areas during construction will occur in some places along the proposed pipeline corridor, including schools, playgrounds, outdoor recreation sites, and other public facilities.

Reference iii) discusses various mitigation measures proposed to address these disruptions.

The Board notes that the Project construction area is located in proximity to residences, schools, churches, community centres, halls, and other buildings in urban areas.

Request:

Please provide:

a) details on Trans Mountain's plans to protect public safety by restricting unsupervised access to the right-of-way during construction in urban areas (e.g., signage; fencing to be used around the perimeter of excavations; 24-hour security; notice to residences, schools, and users of playgrounds, outdoor recreation sites, and other public facilities; allowing space for safe crossing by pedestrians and cyclists);

b) confirmation that the plans identified in a) will be included in the Pipeline Environmental Protection Plan; and

c) confirmation that the plans included in the Pipeline Environmental Protection Plan will include evidence of consultation with relevant municipal and regional authorities, including administrators of school and community facilities.

Response:

a) Trans Mountain is committed to the protection of public safety including the restriction of unsupervised public access to the right-of-way during construction. Public safety will be a primary responsibility of all employers and individual workers on the Project, including those directly affiliated with Trans Mountain and Kinder Morgan Canada Inc. (KMC), as well as contractors and subcontractors.

The requirement to ensure adequate controls are in place during construction to protect the public from workplace hazards will be included in the Trans Mountain Expansion Project Health and Safety Management Plan referenced in Volume 4B, 5.1 of the Application. The Prime Contractors will be required to complete Risk Assessments (RAs) and Project-Specific Safety Plans (PSSPs), as referenced in Volume 4B, 5.1.2 of the Application, including the identification of general and site specific risks and the required controls to protect the public.

Controls to ensure public safety will include Communication Plans, including advertisements, public general notices, area specific information handouts, and local signage (Environmental Protection Plan, Volume 6B). Controls to restrict unsupervised access to the right-of-way will include barricades, fencing, security in congested areas, and controlled safe crossings for pedestrians and cyclists. Safe Work Plans (SWPs) will be developed by the Prime Contractor to identify potential hazards to the public and workers, and identify the controls to be implemented prior to construction start. SWPs are expected to be more detailed as public exposure to workplace hazards increase, including local planning in high-density population or high-use public areas.

Similar methods for controlling workplace hazards will be used for schools, playgrounds, outdoor recreation sites, and public facilities. For private property details of construction plans and controls for potential safety hazards will be communicated to the directly to the landowner and tenants in the case of rental property.

Planning for the security and controls at work sites and unsupervised access to the right-of-way for urban areas will include consultation with municipal authorities and stakeholders. Plans for protection of public safety will be determined through detailed construction planning and submitted 90 days prior to construction start in accordance with NEB draft condition 38, Construction Safety Manuals.

b) The specific plans referenced in the response to NEB IR No. 1.15a will not be included in the Pipeline Environmental Protection Plans. The Environmental Protection Plans are specific to environmental protection and mitigation.

   The specific plans referenced in the response to NEB IR No. 1.15a will be detailed in the Trans Mountain Expansion Project Health and Safety Management Plan and the Prime Contractor's Project Specific Safety Plan as identified in the Application, Volume 4B, Section 5.1.

c) Trans Mountain confirms that current plans included in the Pipeline Environmental Protection Plans will include evidence of consultation with relevant municipal and regional authorities, including administrators of school and community facilities. Trans Mountain also commits to provide evidence of consultation specific to the Trans Mountain Health and Safety Management Plan and the Prime Contractor's Project Specific Safety Plans with relevant municipal and regional authorities, including administrators of school and community facilities.

Construction will be executed in accordance with Municipal bylaws where possible, and will require consultation with municipal representatives, school administrators, and community facilities. Meetings, and specific issues or concerns arising within those meetings will continue to be documented. While the evidence of consultation may not necessarily be contained within the Health and Safety Management Plans, or the Project-Specific Safety Plans (PSSPs), the documents will incorporate feedback received and consultation will be tracked through the Project consultation record.

Summary of New Commitments:

- Trans Mountain will submit to the NEB a Construction Safety Manual 90 days in advance of construction commencing.
- Issues and concerns from Municipal, School Administrators, and Community Facilities will be documented and incorporated into Trans Mountain Expansion Project Health and Safety Management Plan and Prime Contractor's Project-Specific Safety Plans (PSSPs).

1.16 Worker Code of Conduct

Reference:

i) A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, PDF page 44 of 245
ii) A3S2H2, Application Volume 5D, Environmental and Socio-Economic Assessment – Socio-Economic Technical Reports, Table 2.1-1 – Summary of Consultation and Engagement Activities Related to Socio-Economics, PDF pages 42 and 50 of 57

Preamble:

Reference i) lists mitigation measures aimed at addressing potential impacts to community life, including developing a Code of Conduct for employees and contractors that provides guidance and policies on appropriate and inappropriate worker behaviour and community interactions.

Reference ii) identifies concerns raised by the Royal Canadian Mounted Police detachments in Upper Fraser Valley, Edson, and Hinton regarding construction worker conduct. The Thompson-Nicola Regional District raised concerns in regards to drug use. The reference further states that Trans Mountain will follow-up with these stakeholders, as required, as the Project proceeds.

Request:

Please provide:

a) a status report on the progress of consultation activities with those stakeholders who expressed concern about conduct of construction workers. Include the following in the report:
   a.1) the persons and groups consulted;
   a.2) the methods, dates, and locations of consultation activities;
   a.3) a summary of the comments and concerns expressed; and
   a.4) a summary of the response made regarding each of the concerns or comments;

b) confirmation that a Code of Conduct or protocols outlining expected behaviours for all Project construction workers and contractors will be developed for the Project prior to commencing construction;

c) confirmation the Code of Conduct will be made available to all workers, and to communities and local authorities where workers will be accommodated or where temporary camps will be located; and

d) confirmation the Code of Conduct will include the measures that Trans Mountain will develop to ensure compliance with the terms or protocols set out in the Code of Conduct.

Response:

a) Trans Mountain is committed to ongoing engagement throughout the life of the system. Trans Mountain documented concerns about Project-related future worker behaviour, community interactions and code of conduct raised during engagement activities up to

July 31, 2013 in the Application filed on December 16, 2013. Engagement and communication initiatives are ongoing and will be documented and provided as updates to the NEB at logical intervals.

Concerns previously raised by the RCMP can be found in Volume 5B of the Application, Environmental and Socio-Economic Assessment – Socio-Economic. Concerns previously raised by potential host communities and regional districts can be found in Volume 5D of the Application, Environmental and Socio-Economic Assessment – Socio-Economic Technical Reports.

Additional consultation where these topics were raised by stakeholders during the period of May 2012 and December 31, 2013 are documented in Table1.16A-1.

Trans Mountain has not undertaken additional consultation specific to worker conduct or worker accommodation since December 31, 2013. However, consultation related to Trans Mountain's Worker Code of Conduct specific to the Project will be conducted once detailed construction planning is finalized. Detailed construction planning includes, but is not limited to, revised workforce estimates, refined construction schedule (seasonality), type of worker accommodation and confirmation of camp locations. This information forms the foundation of the Community Readiness Engagement.

Trans Mountain anticipates initiating Community Readiness Engagement in Q4 of 2014 and will document feedback in a consultation update which will be submitted to the National Energy Board (NEB). Trans Mountain will develop polices related to limiting adverse interactions between Project workers and local communities, and which will inform the Worker Code of Conduct, are discussed in the response to Information Request 1.17d.

Community Readiness Engagement will focus on local First Nations, community interest groups, economic development organizations, local governments, and municipal or provincial authorities in communities most closely linked to workforce hosting.

Community Readiness Engagement will include Worker Code of Conduct as well as worker accommodation. Trans Mountain will identify community-specific concerns and mitigation, as well as prepare communities to maximize opportunities associated with temporary workforce hosting. Trans Mountain will consider the feedback received during engagement activities in the finalization of the Worker Code of Conduct and the Worker Accommodation Strategy.

TABLE 1.16A-1

CONSULTATION ACTIVITIES ON: WORKER CODE OF CONDUCT

Stakeholder / Group Name	Date of Activity	Method / Location of Engagement	Summary of Comments / Concerns Expressed	Summary of Response	Status and any Commitments / Follow-up Actions
MUNICIPAL / REGIONAL GOVERNMENT CONSULTATION					
Town of Stony Plain	10 /10/2012	In-person, Stony Plain AB	Stakeholder made general comment about recent increase in drug use in community. Not specific to TMEP.	Concern documented by appropriate TMEP team	Once established, the employee and contractor Code of Conduct will be shared with host communities and municipal authorities as part of Community Readiness engagement. Code of conduct for employees and contractors will provide guidance and policies on appropriate and inappropriate worker behaviour and community interactions. Code of Conduct will include reference to illicit drug use.
Town of Edson	10/17/2012	In-person, Edson AB	Transient worker use of illegal drugs (methamphetamines) and alcohol have been attributed to an increase in community crime and violence in Edson (not related to TMEP). Community has formed Drug Action Coalition (school focused) and has enhanced policing services to respond to concerns.	Concern documented by appropriate TMEP team	Once established, the employee and contractor Code of Conduct will be shared with host communities and municipal authorities as part of Community Readiness engagement. Code of Conduct will include reference to illicit drug use.

TABLE 1.16A-1

CONSULTATION ACTIVITIES ON: WORKER CODE OF CONDUCT (continued)

Stakeholder / Group Name	Date of Activity	Method / Location of Engagement	Summary of Comments / Concerns Expressed	Summary of Response	Status and any Commitments / Follow-up Actions
PROVINCIAL CONSULTATION					
Alberta Health	4/2/2013	In-person, Jasper AB	Stakeholder noted that Ft. McMurray had experienced issues related to influx of workers including sexually transmitted infections (STI) increases, alcohol and other addictions, drug suppliers, sex workers.	Concern documented by appropriate TMEP team	Once established, the employee and contractor Code of Conduct will be shared with host communities and municipal authorities as part of Community Readiness engagement. TMEP will develop a Code of Conduct for employees and contractors that provides guidance and policies on appropriate and inappropriate worker behaviour and community interactions.
PUBLIC CONSULTATION					
Landowner	11 / 27 / 2013	Email	Concern about behaviour in residence while renting rooms to workers during Anchor Loop project. KMC compensated landowner for damages caused.	TMEP will develop a Code of Conduct for employees and contractors that provides guidance and policies on appropriate and inappropriate worker behaviour and community interactions. TMEP will establish and promote a complaints communications process prior to construction.	Once established, the employee and contractor Code of Conduct will be shared with host communities and municipal authorities as part of Community Readiness engagement. TMEP will establish and promote a complaints communications process prior to construction.

b) Yes, Trans Mountain will develop a Code of Conduct for the Project outlining expected behaviours for all Project construction workers and contractors prior to commencing construction.

c) Yes, Trans Mountain will make the Code of Conduct available to all workers, and to communities and local authorities where workers will be accommodated or where temporary camps will be located.

d) Yes, the Code of Conduct will include the measures that Trans Mountain will develop to ensure compliance with the terms and protocols set out in the Code of Conduct.

Summary of New Commitments:

- Trans Mountain anticipates initiating Community Readiness Engagement in Q4 of 2014, which will focus on engaging local First Nations, community interest groups, economic development organizations, local governments, and municipal or provincial authorities in communities most closely linked to workforce hosting. Trans Mountain will document Community Readiness Engagement in a consultation update which will be submitted to the National Energy Board (NEB).

1.17 Worker Accommodation Strategy

Reference:

A3S1K5, Application Volume 4B, Project Design and Execution – Construction:

i) PDF page 31 of 55
ii) PDF page 37 of 55
iii) A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, PDF pages 51 and 124 of 245

Preamble:

Reference i) states that temporary construction camps will be deployed to house workers where local accommodation will not meet the need and that each construction camp will house anywhere from 500 to 800 personnel.

Reference ii) states that preliminary construction planning indicates that up to three construction camps may be required at the following locations:

- Spread A2 may be constructed using the Edson (RK 234) construction camp; and
- Spread BC1 may be constructed using two construction camps: one at either Valemount (RK 519) or Blue River (RK 615), and the other at either Vavenby (RK 701) or Clearwater (RK 722).

Reference iii) states that Trans Mountain will develop a Worker Accommodation Strategy in collaboration with local municipalities to mitigate against immediate negative residual effects of population growth due to temporary workers on overall community capacity.

Request:

Please provide an update on the development of a Worker Accommodation Strategy for the Project during construction, including:

a) confirmation that the strategy will address potential issues, including but not limited to, accommodation, transportation of workers, water supply capacity, waste management, camp security, impacts on local communities, and proposed mitigative measures;

b) a status report on the progress of consultation activities with the relevant municipalities regarding the housing strategy. Include the following in the report:
   b.1) the groups and authorities consulted;
   b.2) the methods, dates, and locations of consultation activities;
   b.3) a summary of the comments and concerns expressed;
   b.4) a summary of the response made regarding each of the concerns or comments; and
   b.5) how outstanding concerns will be addressed;

c) details about the extent to which the proposed temporary construction camps will be self-contained; and

d) details on the policies Trans Mountain will develop to limit adverse interactions between Project workers and local communities, including the goals and principles of the policies and how they will address the following:
   d.1) substance abuse;
   d.2) community-approved use of local facilities and services by Project workers, including recreation, social, retail, or medical;
   d.3) the use of firearms, or hunting and fishing by Project workers;
   d.4) issues raised by local communities;
   d.5) other elements to be considered in the policies to limit adverse interactions between Project workers and local communities; and
   d.6) proposed monitoring to measure the success of the policies in meeting their intended goals.

Response:

a) Yes, the Worker Accommodation Strategy will address a range of potential issues including accommodation, transportation of workers, water supply capacity, waste management and camp security. Further identification of potential issues, opportunities and mitigation measures related to worker accommodation will continue through ongoing engagement with local municipalities and stakeholders, as discussed in the response to NEB IR No. 1.17b. The Worker Accommodation Strategy will address all of the requirements of draft Condition 12, as outlined in the NEB's Letter – Draft Conditions and Regulatory Oversight (April 16, 2014) (NEB 2014) including the location of any temporary camps, and the anticipated number of workers that will be housed. It will also include a description of how the strategy addresses any concerns or requests raised in consultation with municipal or provincial authorities.

b) Trans Mountain documented consultation activities during which worker housing issues were discussed in the Application. Socio-economic consultation activity with municipalities and regional governments where socio-economic issues including housing were discussed are noted in Table 2.2-1 of Technical Report 5D-2 in Volume 5D, Socio-Economic Technical Report (Vista Strategy and TERA Environmental Consultants December 2013). Feedback and information from relevant municipalities pertaining to housing capacity is also discussed within Section 8.4 of Technical Report 5D-2. Summary information on feedback received from potential construction hub municipalities/regional governments related to housing capacity and worker accommodation is presented in Table 7.2.5-4 of Volume 5B. Summaries of other questions and comments related to worker housing from broader engagement activities (not specific to relevant municipalities) occurring from August 1 to December 31, 2013 are presented in Consultation Update No. 1 & Errata (Trans Mountain, March 2014). A report on consultation activities with relevant municipalities and regional governments during the period of May 2012 to December 2013, providing further detail on comments received, responses and commitments/follow-up actions relevant to worker housing which will be considered in the development of the Worker Accommodation Strategy, is provided in NEB IR No. 1.17b – Attachment 1.

Trans Mountain has not conducted additional consultation specific to worker accommodation since December 31, 2013.

See response to NEB IR No. 1.16a for information on Trans Mountain's future consultation plans related to worker accommodation and worker conduct.

c) Trans Mountain has not yet developed a Worker Accommodation Strategy for the Project during construction. The development of this strategy will occur during the detailed engineering and construction planning phase, which will commence in May 2014 and end in Q4 2015. In addition, the strategy will meet the requirements of NEB draft condition 12. As such, full details about the extent to which any proposed temporary construction camps will be self- contained are not yet available.

As part of the development of the Worker Accommodation Strategy, Trans Mountain will consult with municipalities and other relevant stakeholders where camps may be located about such elements of worker accommodation as camp location, infrastructure (including water supply, waste management), required permits, services and amenities for camp residents, camp security and the extent to which the accommodation will be self-contained. Such consultation is anticipated to take place in parallel with the Community Readiness Engagement program, as discussed in the response to NEB IR No. 1.16a.

d) Trans Mountain will develop a range of policies aimed at limiting adverse interactions between Project workers and local communities. These policies will inform the Worker Code of Conduct. See also the Application, Section 5.1.5 Worker Code of Conduct, Volume 4B.

d.1) Trans Mountain will develop a Project-specific policy pertaining to substance abuse. The overarching goal of the policy will be to assist the Project in maintaining a safe and productive work environment for all workers and the public, and to minimize pressure on regional medical, social and police services related to alcohol and drug related incidents. As noted in the Socio-Economic Management Plan in Appendix C of Volume 6B of the Application, Trans Mountain will adhere to a policy of no tolerance of use or being under the influence of illicit drugs or alcohol during work hours. The policy will also outline guidance and expectations for workers related to medication which may impair their ability to competently carry out job requirements. Also as noted in the Socio-Economic Management Plan, Trans Mountain will develop mandatory minimum driving standards that will include the prohibition of drug and alcohol influence while operating motor vehicles.

d.2) Trans Mountain will develop a policy regarding use of local recreational, social, and retail facilities and services, including outdoor recreation areas, by Project workers in smaller construction hub communities. The goal of the policy will be to reduce the impact on local community use of such facilities and services and outdoor recreation areas, while optimizing opportunities for desirable business opportunities for certain service/facility providers. As discussed in the response to NEB IR 1.16a, additional consultation on the Worker Code of Conduct will be completed once detailed construction planning is finalized. On the basis of the consultation, Trans Mountain will develop guidance for

workers outlining appropriate, as well as prohibited, off-site recreational pursuits, use areas, and services in construction hub communities.

Trans Mountain will develop a policy regarding the use of local and regional medical and social services by workers. The overarching purpose of the policy will be to minimize pressure on local and regional medical, emergency, and social services related to workers' medical and social service needs. Project interaction with local and regional medical facilities will be reduced by Trans Mountain's commitment (as outlined in the Socio-Economic Management Plan in Appendix C of Volume 6B of the Application) to supply medical personnel and equipment to work sites, including construction camps, meeting applicable occupational health and safety regulations, as a minimum, including the use of Emergency Medical personnel, Emergency Transport Vehicles, and First Aid rooms. As also discussed in the Socio-Economic Management Plan, Trans Mountain will communicate with local health authorities, emergency medical service authorities and social service authorities on the timing of the Project, duration of stay in the local community, expected number of people coming into the area, and onsite health care plans. Feedback from this consultation will inform the Project policy about the incidental use of local medical/social services by workers.

d.3) Trans Mountain will develop a Project policy related to the use of firearms and hunting or fishing. The goal of the policy will be to ensure the safety of all workers and the public and to reduce effects on wildlife, local hunting/fishing recreationalists and traditional land users. As noted in the Wildlife Conflict Management Plan (see in Section 15.0 of Appendix C of Volume 6B of the Application), Project workers will be prohibited from hunting and fishing along the right-of-way and at other construction sites during Project construction. Crews staying in construction camps will also not be allowed to hunt or fish during scheduled work cycles at these locations. Trans Mountain will prohibit workers from carrying or transporting any firearm or weapon, whether or not concealed, at a Project worksite, on any Project owned or leased premises (including construction camps), in Project-related vehicles, or in any other vehicle while engaged in Project-related business.

d.4) As noted in the Socio-Economic Management Plan (the Application, Appendix C of Volume 6B), Trans Mountain will establish a process by which community members can raise complaints or concerns related to Project activities or workers. Trans Mountain will ensure this process includes protocols for timely follow-up by Trans Mountain and/or its Contractors and transparent issue resolution. Trans Mountain will communicate this process to communities.

d.5) Other elements that will be considered in the policies or guidance to limit adverse interactions between Project workers and local communities include:

- **After-Hours Conduct**. Trans Mountain will develop a policy related to after-hours worker conduct. The overarching goal of the policy will be to highlight the importance of people living in the vicinity of the Project being treated with respect and consideration during the Project construction and the importance of appropriate after-hours conduct to the Project's reputation and goodwill within communities. Guidance

will outline expectations regarding workers conducting themselves in an appropriate manner at all times, including off hours.

- **Damage to Property.** Trans Mountain will develop a policy outlining expectations regarding the treatment of community, landowner and Project property. The overarching goal of the policy will be to prevent wilful damage to community, landowner or Project property, either on or after hours, as well as damage to property caused by negligence or improper operation.
- **Conduct in Parks and Protected Areas.** Certain portions of the Project are anticipated to occur (depending on final routing) within the boundaries of National, Provincial or municipal/regional parks or other protected areas. Trans Mountain will provide guidance to workers regarding the particular importance of their conduct in parks and protected areas to ensure the protection of the physical environment in these areas.
- **Respectful Behaviour/Harassment.** Trans Mountain will develop a policy outlining worker expectations regarding respectful behaviour/harassment within the workplace and in construction camps. The overarching goal of the policy will be to address the prevention and resolution of harassment, discrimination, bullying and intimidation in the workplace and in construction camps. Workers will be prohibited from harassing, discriminating against, threatening, bullying or intimidating other workers, visitors, community members, supervisors or managers in any way.
- **Minimum Driving Standards**. Local communities will interact with Project-related traffic. The conduct of drivers while operating Project-related vehicles is important to worker safety and the safety of community residents. Policies and guidelines around driving standards will help in reducing the effect of Project-related traffic in local communities. As noted in the Socio-Economic Management Plan (in the Application, Appendix C of Volume 6B), Trans Mountain will develop mandatory minimum driving standards for Contractors that include but are not limited to: submission of driver's abstract for any person driving a Project vehicle; the use of seat belts; the prohibition of drug and alcohol use while operating motor vehicles; no cell phone use, including hands-free use; and driving to road conditions at all times while not exceeding posted speed limits.

d.6) As noted in the Socio-Economic Management Plan in the Application, Appendix C of Volume 6B, Trans Mountain will develop and implement an issues tracking process to monitor and respond to Project-related socio-economic issues and opportunities that emerge during construction and reclamation. As suggested in NEB Draft Condition 11 as outlined in the NEB's Letter – Draft Conditions and Regulatory Oversight (April 16, 2014) (NEB 2014), this will be called a Socio-Economic Effects Monitoring Program.

As part of its ongoing consultation program, Trans Mountain will consult with key stakeholders (e.g., governments, local/regional service providers, Aboriginal communities, municipalities) regarding the socio-economic effects monitoring framework, indicators to be monitored, methods of reporting, and the level of local/regional interest in participating in socio-economic effects monitoring. The monitoring framework and process will then be finalized and shared publically.

While the precise socio-economic effects monitoring framework and indicators are still to be determined, the Socio-Economic Effects Monitoring Program will include monitoring indicators related to worker/community interaction and worker conduct, which will assist Trans Mountain in assessing the success of its policies that relate to worker conduct.

Summary of New Commitments:

- The Worker Accommodation Strategy will include a final summary of all proposed accommodations, including the location of any temporary camps, and the anticipated number of workers that will be housed. It will also include a description of how the strategy addresses any concerns or requests raised in consultation with municipal or provincial authorities.
- Trans Mountain will develop policies and/or guidance in the following areas, related to limiting adverse interactions between Project workers and local communities:
    - the use of local recreational, social, and retail facilities and services, including outdoor recreation areas, in smaller construction hub communities.
    - the use of local and regional medical and social services.
    - the use of firearms, hunting, or fishing by project workers.
    - after-hours worker conduct.
    - damage to property.
    - conduct in parks and protected areas.
    - respectful behaviour/harassment.
- The Environmental Protection Plans, including the Socio-Economic Management and the Wildlife Conflict Management Plan, will be updated 90 days prior to commencing construction.
- Trans Mountain's issues tracking process to monitor and respond to Project-related socio-economic issues and opportunities (as noted in the Application, Appendix C of Volume 6B) will be called a Socio-Economic Effects Monitoring Program.
- Trans Mountain will consult with key stakeholders (*e.g.,* governments, local/regional service providers, Aboriginal communities, municipalities) regarding the socio-economic effects monitoring framework, indicators to be monitored, methods of reporting, and the level of local/regional interest in participating in socio-economic effects monitoring. The monitoring framework and process will then be finalized and shared publically.
- The Socio-Economic Effects Monitoring Program will include monitoring indicators related to worker/community interaction and worker conduct.

Reference:

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014

1.18 Palaeontological resources

Reference:

i) A3S1S0, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, PDF page 10 of 64
ii) A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, PDF page 10 of 245

Preamble:

Reference i) states that British Columbia does not have an equivalent listing of lands with potential palaeontological resources and there is no provincial legislation providing protection for palaeontological sites. It further states that the proposed pipeline corridor crosses lands that have high potential for encountering palaeontological sites, including Valemount through the Monashee Mountains, the North Thompson River Valley to Kamloops, Kamloops to Hope, and Hope to Vancouver.

Reference ii) states that, in British Columbia, the proposed pipeline corridor does not encounter any previously designated palaeontological sites.

The Board notes that palaeontological resources do not have protection as heritage resources under the *British Columbia Heritage Conservation Act*. However, as outlined in the NEB Filing Manual and the *Canadian Environmental Assessment Act, 2012* (section 5), applicants must assess all heritage resources (including palaeontological sites) and include details of the field methodology used in the study, whether the Project will impact the palaeontological site, and, if so, what mitigation measures will be implemented to protect the palaeontological site.

Request:

Please provide the following regarding palaeontological resources within the British Columbia portion of the Project:

a) the methods for surveying or inventorying potentially affected palaeontological resource sites at locations to be disturbed by construction;

b) the results of pre-construction surveys or inventories of palaeontological resource sites;

c) an assessment of the potential effects on identified palaeontological resources;

d) a description of mitigation measures to reduce or eliminate potential effects on identified palaeontological resources; and

e) a description of how Trans Mountain has incorporated mitigation measures into its Pipeline Environmental Protection Plan.

Response:

a) Within British Columbia, the methods used to survey and to inventory potentially affected palaeontological resource sites at locations to be disturbed by construction began with a

desktop overview assessment of the Project area, followed by focused ground reconnaissance by a qualified palaeontologist.

In summer 2013, qualified palaeontologists conducted an overview palaeontological assessment of the entire proposed pipeline corridor in British Columbia, which included a review of relevant literature, an inventory of previously recorded sites of palaeontological sensitivity in the vicinity of the proposed pipeline corridor, and assessments of geological maps and remote sensing data such as aerial photomosaics for new areas of palaeontological potential. Based on the findings of the overview palaeontological assessment, it was recommended that a pre-construction field survey of the proposed pipeline corridor be conducted.

The pre-construction field survey consisted of a helicopter overflight and a ground reconnaissance. A helicopter overflight of the proposed pipeline corridor in British Columbia was conducted in August 2013, and the ground reconnaissance in October 2013 (McNeil 2014). During the overflight, special attention was given to areas that were identified as having higher palaeontological potential. If exposures of the overlying surficial deposits or of the underlying bedrock along the proposed pipeline corridor were noted, ground access was assessed and the site noted for ground reconnaissance. Ground reconnaissance involved examining the exposures for the presence of fossils, identifying and assessing the geology and determining the palaeontological potential. Samples for further evaluation were collected if warranted, and the site was documented through photography.

While the McNeil (2014) palaeontological interim assessment for the Project is referred to in the responses to NEB IR No. 1.18, this document contains sensitive palaeontological resource information and, consequently, is not considered a public document so as to ensure the protection of these resources.

b) Trans Mountain conducted a palaeontological overview of the proposed pipeline corridor as well as a pre-construction field survey (see response to NEB IR No. 1.18a), the results of which are provided below. Areas of palaeontological potential in British Columbia (BC) identified by qualified palaeontologists during the palaeontological overview are listed in Section 5.1.2.2, Volume 5B of the Application.

In BC, the proposed pipeline corridor travels through a diverse range of geological formations (McNeil 2014). These formations have produced notable fossils including: a mantle of Quaternary sediments that has produced vertebrate fossils; Eocene lake deposits; interbedded volcanic and sedimentary Cretaceous rocks; and Jurassic marine deposits. Many of the areas investigated did not have exposure present, or if exposures were present, the exposures were of volcanic rock with no sedimentary component. No exposures were observed in the Fraser lowlands or delta (RK 1040 to RK 1179.7).

All substantive gravel exposures within the proposed pipeline corridor were examined by helicopter. In many cases, the exposures were small and were readily identified from the air as glacial tills with little or no palaeontological potential. Larger exposures and exposures that showed a more complicated geology were noted and later assessed during the ground reconnaissance.

Gravel exposures identified during the August 2013 overflight were visited in October 2013 during the ground reconnaissance to check for the presence of Quaternary fossils. As the glaciers advanced and retreated, they collected regional samples and deposited them in the gravel pits, which serve as an excellent source of regional bedrock to determine if potentially fossiliferous bedrock is present. A diverse variety of Quaternary environments were observed along the proposed pipeline corridor including aeolian sand dunes, deltaic/alluvial fan deposits, fluvial sands, glacial till, and fluvial sand and gravel. No fossils were identified at any of the 22 visited Quaternary sites. In addition, no fossil finds from these pits were known by long term owners and employees. A summary of the sites visited is given in Table 1.18B-1.

TABLE 1.18B-1

SUMMARY OF QUATERNARY SITES VISITED

Site #	RK Range*	Notes
1	507.9 – 509.8	Aeolian dunes.
2	513.2 – 515.0	Aeolian dunes.
3	514.0 -516.0	Deltaic/alluvial fan deposits.
4	527.0 -528.7	Fluvial sand with pebble lags.
5	533.5 – 535.3	Glacial till.
6	544.7 – 546.3	Sub aqueous till.
7	561.0 – 563.0	Glacial till.
8	569.0 – 571.0	Sub aqueous till/fluvial.
9	580.5 – 582.1	Mined out, till?
10	610.0 – 611.8	Glacial till. Discussed with 20 year employee, no fossils found.
11	656.7 – 658.8	Glacial till.
12	667.0 – 669.0	Glacial till.
13	671.0 – 672.8	Pump Station, glacial till.
14	703.0 – 705.0	Fluvial/deltaic sand.
15	727.6 – 729.5	Glacial till.
16	819.0 – 821.8	Glacial till. Family owner, 30+ years, no fossils found.
17	940.5 – 943.0	Sub aqueous till.
18	950.0 – 952.2	Glacial till.
19	963.0 – 965.0	Glacial till/fluvial sand.
20	979.0 – 981.0	Gated off, not visited.
21	981.4 – 983.5	Glacial till.
22	1021.3 – 1023.2	Gated off, not visited.
23	1041.0 – 1043.0	Fluvial sand and gravel. Owner since 1970s, no fossils found.
24	1055.0 – 1057.0	Sub aqueous tills/deltaic deposits.

*Note: RK ranges as presented are purposefully broad to protect the sensitive nature of spatial data relating to palaeontological resources.

The segment of the proposed pipeline corridor through Lemieux Creek canyon (RK 739 to RK 753) is reported to contain Upper Triassic to Lower Jurassic bivalves, brachiopods, ammonite fragments and belemnites (Campbell and Tipper 1971). Very little is known about this formation, referred to as “Map Unit 10” in Campbell and Tipper (1971). Limestone outcrops were investigated in the valley, including a limestone outcrop rich in fossil fragments. A summary of the important outcrops is provided in Table 1.18B-2.

TABLE 1.18B-2

UPPER TRIASSIC/LOWER JURASSIC "MAP UNIT 10" OUTCROPS

Site #	Notes
1	Massive bedded limestone.
2	Interbedded limestone and marine shale.
3	Massive bedded limestone.
4	Rich in fragmentary fossils including brachiopods.

c) The potential effects of the Project on palaeontological resources are described in Table 7.2.1-2, Volume 5B of the Application. Whenever feasible, palaeontological sites will be avoided. As stated in the table, previously unidentified palaeontological sites within the construction footprint may be disturbed during construction. In the unlikely event that a palaeontological site is discovered during construction, the Heritage Resources Discovery Contingency Plan (Volume 6B, Appendix B of the Application) will be implemented (i.e., construction at that location is to stop immediately, notify the Environmental Inspector and consult with the Heritage Resource Specialist). Construction activities may resume only with the permission of the provincial regulatory authority upon review and approval of any mitigation to compensate for the disturbance. As stated in Section 7.2.1.5, Volume 5B of the Application, given that disturbances to heritage resources (including palaeontological resources) by the Project are effectively offset by knowledge gained through the mitigation approved by the provincial regulatory authorities, no residual effects on palaeontological resources have been identified.

d) The mitigation measures proposed to reduce or eliminate potential effects of the Project on palaeontological resources are summarized in the Application, Table 7.2.1-2 of Volume 5B. Avoidance of palaeontological resources is the preferred method of mitigation, when feasible. Monitoring for palaeontological resources will be conducted at select watercourses with high palaeontological potential where a trenched crossing method has been proposed. The Project will also examine salvaged topsoil/root zone material and monitoring trenching activities at four specific limestone outcrop locations during construction for Upper Triassic and Lower Jurassic fossiliferous deposits in the "Map Unit 10" portion of the proposed pipeline corridor in the Lemieux Creek valley (RK 739 to RK 753). No exposures were observed in the Fraser lowlands or delta (RK 1040 to RK 1179.7), but given the potential present, it is recommended that site-specific locations within this section be monitored during construction for palaeontological resources. Site-specific monitoring locations within the Fraser lowlands and delta will be determined once the construction footprint has been finalized. Within the Pipeline Environmental Protection Plan, mitigation measure point 13 of Section 8.3 of Volume 6B captures the above recommendation and the environmental resource-specific mitigation table for Heritage Resources in Appendix M of Volume 6B will be updated prior to construction.

e) Mitigation measures have been developed to address the following issues associated with palaeontological resources in British Columbia:

- Upper Triassic and Lower Jurassic fossiliferous deposits at four specific limestone outcrop locations in the "Map Unit 10" portion of the proposed pipeline corridor in the Lemieux Creek valley (RK 739 to RK 753);
- fossiliferous marls and fossil shells in Fraser lowlands or delta (RK 1040 to RK 1179.7);
- unauthorized collection of palaeontological resources; and
- discovery of palaeontological resources during construction.

With respect to the Lemieux Creek valley (RK 739 to RK 753), monitoring of construction activities is recommended at four site-specific locations. Within the Fraser lowlands or delta (RK 1040 to RK 1179.7), monitoring of construction activities is also recommended at site-specific locations to be determined upon construction footprint finalization. These recommendations are captured in mitigation measure point 13 of Section 8.3 of the Pipeline Environmental Protection Plan (EPP) (Volume 6 B) which provides measures associated with examining topsoil/root zone material prior to trenching and for monitoring trenching activities. The environmental resource-specific mitigation table for palaeontological resources in Appendix M of Volume 6B will be updated prior to construction.

Unauthorized collection of palaeontological resources has been addressed in mitigation measure points 14 and 112 of Section 7.0 of the Pipeline EPP (Volume 6B) which provide measures for prohibiting the collection of any palaeontological resources by Project personnel.

Mitigation measures to address the discovery of palaeontological resources either during ongoing pre-construction Archaeological Impact Assessment and Historical Resource Impact Assessment investigations or during construction, have been provided in mitigation measure points 11, 12 and 108 to 111 of Section 7.0 as well as in the Heritage Resources Discovery Contingency Plan (Section 6.0 of Appendix B) of the Pipeline EPP (Volume 6B).

Summary of New Commitments:

- The Appendix M of the Pipeline Environmental Protection Plan will be updated 90 days prior to commencing construction.
- Appendix M of the Pipeline Environmental Protection Plan will be updated 90 days prior to commencing construction.

References:

Campbell, R.B. and H.W. Tipper. 1971. Geology of the Bonaparte Lake Map-Area, British Columbia. Geological Survey of Canada Memoir 363. 100 pp.

McNeil, P. 2014. Palaeontological Interim Assessment: Trans Mountain Pipeline ULC – Trans Mountain Expansion Project. Calgary, AB.

1.19 Post-construction noise survey at Edmonton Terminal

Reference:

A3S1T7, Application Volume 5C, Environmental and Socio-Economic Assessment – Biophysical Technical Reports, TR 5C-3 - Terrestrial Noise and Vibration Technical Report:

i) PDF pages 120 and 173 of 179
ii) PDF page 175 of 179

Preamble:

Reference i) states that all receptors surrounding the Edmonton Terminal are expected to be in compliance with Alberta Energy Regulator Directive 038 for normal operations based on the prediction model. The reference further states that the operations of both Sumas and Burnaby Terminals were predicted to be in compliance with both Directive 038 and the British Columbia Noise Control Best Practices Guideline (2009).

Reference ii) states that post-construction monitoring for the Sumas and Burnaby Terminals is recommended to verify the results of prediction models. The reference further states that a communication process for residents should be available to allow for issues or concerns to be raised prior to residents registering formal complaints.

Request:

Please provide:

a) a detailed justification for why Trans Mountain does not recommend post-construction noise monitoring for Edmonton Terminal;

b) confirmation that those potentially affected by noise, including residents, land users, and Aboriginal groups, will receive company contact information in the event that there are concerns about noise; and

c) a description of Trans Mountain's ongoing operational consultation program and complaint response process with regards to noise.

Response:

a) Trans Mountain has not recommended post-construction noise monitoring at the Edmonton Terminal based on the absence of noise receptors (residences) within the Acoustic Environment local study area (LSA) (see Section 6.1, Table 6.1-1, Volume 5A, ESA – Biophysical of the Application). The closest residential receptors to the Edmonton Terminal fenceline are approximately 1.9 km to the northwest and southeast. As per Tables 6.1-15 and 6.1-16, Volume 5A, ESA – Biophysical of the Application, residential receptors are identified within the 1.5 km Acoustic Environment LSA for the Sumas Terminal and Burnaby Terminal, respectively.

The area surrounding the Edmonton Terminal is comprised of other Alberta Energy Regulator noise-regulated facilities and other major industries that would mask sound from the Edmonton Terminal at residential receptors. In addition to the number of industrial facilities, the area has several high volume highways and thoroughfares that add to the ambient sound level in the local area. The amount of industrialization (facilities and infrastructure) surrounding the Edmonton Terminal is shown in Figure 4-2, Volume 5C, Biophysical Technical Report 5C-3, Terrestrial Noise and Vibration Technical Report (RWDI December 2013) of the Application. The results summarized in Table 6-4 of Technical Report 5C-3 show the relative contribution from the Edmonton Terminal at 1.5 km from the facility is 9 dBA less than natural nighttime ambient sound levels not including the other local industry or infrastructure. Therefore, sound level measurements at the residential receptors 1.9 km from the facility would not distinguish sound emitted from the Edmonton Terminal from other intervening sound sources.

Control of sound emissions from the Edmonton Terminal will be achieved through the mitigation measures in Section 7.5.6, Table 7.5.6-1, Volume 5A, ESA – Biophysical of the Application, which provides for verification of sound emissions as the design and equipment vendors are finalized.

b) Kinder Morgan Canada Inc. (KMC) will provide company contact information to those potentially affected by noise, including residents, land users, and Aboriginal groups in the event there are noise concerns related to operation of the pipeline system. Company contact information will also be provided to those potentially affected by noise from pipeline construction.

c) Kinder Morgan Canada Inc. (KMC) has a standard notification protocol in place to inform potentially affected people about ongoing operational activities that may impact its neighbours. When a project is anticipated to have increased levels of noise, KMC notifies affected neighbours in advance of work. Notification contains a brief description of work, location of the project, information about potential disruptions, timelines and a KMC representative's contact information to address inquiries/concerns. KMC will use a notification delivery method that best suits the need.

KMC follows up on all noise complaints. As soon as a complaint is received, a KMC representative investigates and if requested by the resident, follows up with the affected resident. KMC aims to abide by municipal by-laws, and when required, KMC applies for a noise variance and will notify those affected by the work.

Summary of New Commitments:

- Kinder Morgan Canada Inc. (KMC) will provide company contact information to those potentially affected by noise in the event there are noise concerns related to operation of the pipeline system, including:
    - residents
    - land users
    - Aboriginal groups.

- Company contact information will also be provided to those potentially affected by noise from pipeline construction including:
    - residents
    - land users
    - Aboriginal groups.

1.20 Elder and community participation and Aboriginal Monitors – construction and post-construction/reclamation

Reference:

i) A3S0U6, Application Volume 3B, Aboriginal Engagement, Appendix A, Engagement Logs
ii) A3S1L3, Application Volume 5A, Environmental and Socio-Economic Assessment, Biophysical, Table 3.2-1, Summary of concerns identified through engagement with Aboriginal communities for the Project, PDF page 135 of 150
iii) A3S2S3, Application Volume 6B, Pipeline Environmental Protection Plan, Table 1.2-1 - Roles and Responsibilities, PDF page 21 of 461

Preamble:

Reference i) notes that a number of Aboriginal groups raised concerns or requests for Elder or community members to be present during construction or involved in reclamation work. In addition, Aboriginal groups raised concerns or requests for Aboriginal Monitors during and after construction.

In Reference ii), Trans Mountain states that it will continue to engage throughout the Project with Aboriginal communities on requests for wildlife monitors during construction and post-construction site visits with Aboriginal communities, and involve Elders in Project reclamation work.

In Reference iii), Trans Mountain describes the responsibilities for the Aboriginal Monitor role, which includes providing Traditional Knowledge to the construction program to ensure protection of the environment, discussing upcoming traditional and western science elements with the environmental inspector to ensure protection and monitoring, and monitoring mitigation success in protecting the environment.

Request:

Please provide Trans Mountain's plan for Aboriginal Monitor participation during construction and post-construction/reclamation activities for the Project, including:

a) a description of the roles for Aboriginal Monitors, including, but not limited to, the scope of activities for monitoring, geographic extent, and how information that will be provided by Monitors will be used by Project staff;

b) a description of how Trans Mountain will identify and communicate monitoring opportunities; and

c) a description of any concerns raised by Aboriginal groups regarding the scope of work or the roles and responsibilities of the Aboriginal Monitors.

Response:

a) Trans Mountain notes that its commitment to retain Aboriginal Monitors is also described in the Application, Volume 6A, Environmental Compliance.

Trans Mountain's plan for Aboriginal Monitor participation during the construction program for the Project will be guided by the policies and practices of Kinder Morgan Canada Inc. (KMC) including the Aboriginal Relations Policy and the Employment Policy.

In general, the roles and responsibilities of the Aboriginal Monitors will include:

- completion of daily reports;
- inspection and tracking of incoming equipment cleanliness;
- monitoring right-of-way for spills, including reporting and documentation of spills;
- flagging and recording by GPS, taking photos and pre-grading the conditions at watercourses;
- marking wildlife trails, and marking and identifying appropriate locations for wildlife gaps;
- recording and reporting wildlife sightings and activities;
- ensuring environmentally sensitive sites such as riparian buffers, rare plant sites, and wildlife sites (*e.g.,* trails, licks, dens, beaver dams, etc.) have signs, flagging or fencing ahead of clearing and grading;
- recording and monitoring any off right-of-way encroachments;
- participating in water quality monitoring program during construction activities (if applicable);
- assisting with monitoring areas for sediment control;
- monitoring fish screens and the use of secondary containment at water bodies;
- identifying and flagging traditional land and resource use sites or issues;
- general reporting – photography, GPS, noted observations;
- willow collection for creek bank reclamation; and
- assisting with watercourse reclamation – installing organic structures (*e.g.,* log cribs, log retaining walls, coir wraps, live willow laying, erosion control structures, etc.).

The geographic extent of Aboriginal Monitor participation for the Project will be finalized prior to construction and will be informed by the following:

- traditional land and resource use as identified in the Application and subsequent supplemental filings for the Project;
- environmental resources and locations of concerns as requested in the Application and identified through biophysical field participation; and
- locations of interest where monitoring may be requested through ongoing engagement with participating Aboriginal communities.

The responsibilities of Monitors are dependent on training, work history, availability and general knowledge.

At the discretion of the Trans Mountain's Chief Environmental Inspector, site or issue-specific training will be undertaken, including on-the-spot reinforcement of awareness of environmental stewardship, special measures pertaining to sensitive areas or activities with a high potential for adverse environmental effects.

Information collected by Aboriginal Monitors will be reported directly to Trans Mountain's Environmental Inspector for environmental matters relating to traditional land and resource use. If the Aboriginal Monitor identifies environmental issues and potential non-compliances, the reasons for the non-compliance and the measures undertaken for the resolution of each issue and non-compliance will be recorded and tracked in daily reports prepared by the Environmental Inspector(s). Serious non-compliances will be immediately reported to Trans Mountain's Compliance Manager who in turn will notify the appropriate regulatory authority. If issues remain unresolved following the implementation of remedial measures, the issue and location(s) in question and measures proposed to resolve the issue will be recorded in an initial post-construction report.

When finalized, the contents of the Aboriginal Monitors plan will also be informed by the following:

- engagement with Aboriginal groups;
- engagement with federal and provincial government agencies;
- feedback obtained from previous monitoring programs;
- industry accepted best practices and procedures; and,
- experience gained from other pipeline projects with similar conditions.

The plan will be developed to align with the practices and programs Trans Mountain has developed to ensure that the protection measures and commitments adopted from the Environmental Socio-Economic Assessment (ESA) for the Project are implemented throughout the construction and operation phases of the Project. This plan will also be developed in accordance with the Environmental Protection Plan (EPP), which outlines all the environmental protection measures to avoid or reduce potential effects during construction of the Project.

b) Trans Mountain will continue to identify and communicate monitoring opportunities during ongoing engagement with interested Aboriginal communities through one or more of the following mechanisms:

- supplemental biophysical field study participation;
- ongoing TLU studies with participating communities;
- issues validation and results review follow-up opportunities either in person, by letter, telephone or email; and,
- Project-based Aboriginal employment programming (capacity inventory, education/training gap analysis).

The methods used to determine how participants will be involved in construction monitoring activities for the Project will be discussed with interested Aboriginal communities. This discussion will include details regarding the type of work to be conducted, the timing and the locations. Based on the described work to be conducted, the Aboriginal communities will choose which of their members would participate as Aboriginal Monitors in construction monitoring activities for the Project.

c) Trans Mountain will review and consider concerns raised by Aboriginal communities regarding the scope of work or the roles and responsibilities of the Aboriginal Monitors in the development of the plan as noted in response to NEB No. IR 1.20a and NEB IR No. 1.20b.

1.21 Local, regional, and Aboriginal capacity inventory

Reference:

A3S0U5, Application Volume 3B, Aboriginal Engagement, PDF page 44 of 97

Preamble:

In the reference, Trans Mountain states that, through its Aboriginal Engagement Program, employment opportunities are being shared with each Aboriginal community and a capacity inventory for employment within the communities is being encouraged. The content will then be used for the realization of employment benefits with both Trans Mountain and prime contractors during the Project.

The Board notes that the Project application does not reference a local and regional capacity inventory.

Request:

Please provide Trans Mountain's plan for developing the local, regional, and Aboriginal capacity inventory for the Project, including:

a) the roles for Trans Mountain; local, regional, and Aboriginal groups; and any other organizations;

b) the potential information sources, including third party and government sources;

c) the criteria that will be used to determine and assess capacity;

d) Trans Mountain's plans for consultation with local, regional, and Aboriginal groups; and other organizations; and

e) a description of how the capacity inventories will be used by Trans Mountain's contractors to support employment and business opportunities for local, regional, and Aboriginal groups.

Response:

a) The roles for Trans Mountain, local, regional and Aboriginal groups to understand capacity are as follows:

<u>Trans Mountain</u>

- Continue to engage with local, regional and Aboriginal communities.
- Identify and communicate the skill requirements, job profiles, and employment information to local, regional and Aboriginal communities.
- Develop for and provide the Accountability and Resource Management System (ARMS), capacity data collection software, to Aboriginal communities for the collection of capacity information. The ARMS is a human resources management system (software tool) which collects individual information on current skill levels and interests including interest in the

Project. The system provides for the development of workforce plans to build capacity in all employment areas, within communities.

- Assess the capacity information provided by the communities to identify training programs.
- Coordinate employment and recruitment opportunities with the Aboriginal Skills and Employment Training Strategy (ASETS).
- Initiate the development of a local community focal point for the dissemination of employment information and coordination of recruitment and employment opportunities.

Aboriginal groups

- Support the development of capacity inventories in their communities.
- Collect information within their communities and provide aggregate information to Trans Mountain for recruitment and training planning.
- For Aboriginal groups who are not utilizing the ARMS, the role for Aboriginal Skills and Employment Training Strategy (ASETS) will be to provide aggregate capacity data for those Aboriginal groups.

Local and Regional

- Registration for Employment updates through the website.
- Attend career fairs to learn of the project and employment opportunities.
- Provide available information on the capacity of the community to participate in the employment on the Project.

b) The potential information sources are as follows:

- Local, regional and Aboriginal communities;
- Aboriginal groups and communities using the Accountability and Resource Management System (ARMS);
- Local and regional municipalities (located along the pipeline corridor);
- Aboriginal Skills and Employment Training Strategy (ASETS);
- Statistics Canada;
- Industry Trades Association;
- British Columbia Skilled Trades Employment Program (STEP);
- British Columbia Construction Association Skilled Trades Employment Program;
- Alberta Ministry of Jobs, Skills, Labour and Training;
  - Skills and Training
  - Aboriginal Development
- Alberta Ministry of Humans Services;
  - Alberta Works
- BC Ministry of Jobs, Tourism and Skills Training;
  - Work BC
- Aboriginal Affairs and Northern Development Canada (AANDC);
- Chambers of Commerce;
- Provincial employment agencies;

- Aboriginal Community Futures;
- Local Community Futures; and,
- Economic development organizations/initiatives such as Venture Kamloops and the North Thompson Economic Development program.

c) For local, regional and Aboriginal groups, the criteria that will be used when determining and assessing capacity is as follows:

- Employment rates;
- Attachment to labour force;
- Interest in working on the Project;
- Occupational requirements;
- Mobility;
- Skill level;
- Barriers to employment;
- Education level (including safety certifications achieved); and,
- Interest in training and education.

Additionally, the results of essential skill assessments will also be considered if applicable.

d) Trans Mountain will continue its consultation with local, regional and Aboriginal groups as outlined in the roles described in NEB IR No. 1.21a.

Local, regional and Aboriginal groups are encouraged to assign an agency or individuals to act as the focal point for gathering capacity information and maintaining communication channels with Trans Mountain in regard to capacity inventories.

e) Trans Mountain construction contracts will include requirements to maximize employment for local, regional and Aboriginal groups.

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 hiring statistics (NEB IR No. 1.24d) 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 a running total of the number of hires from the capacity inventory list.

To ensure business opportunities to local, regional and Aboriginal groups, Trans Mountain construction contracts will include requirements to provide local, regional and Aboriginal procurement opportunities in accordance with the Trans Mountain procurement policy. A procurement database of local, regional and Aboriginal business will be assembled and distributed to Trans Mountain's contractors for use as a procurement sourcing tool. Contractors will be required to report procurement statistics on a monthly basis. The report will include:

- Total dollars spent on goods and services;
- Percentage of total dollars spent for local and regional procurement; and,
- Percentage of total dollars spent for Aboriginal business procurement.

Summary of New Commitments:

- In accordance with NEB draft condition 8, Trans Mountain is prepared to file with the NEB, an Aboriginal, local, and regional skills and business capacity inventory for the Project.
- Trans Mountain will provide requirements to contractors for hiring local, regional and Aboriginal employees on the Project based upon the capacity inventories.
- Trans Mountain will provide requirements to contractors for hiring local, regional and Aboriginal businesses on the Project based upon the procurement database.
- Trans Mountain will provide a list of candidates expressing interest in employment (via the employment registry outlined in NEB_IR_No._1.24b) to contractors at the time of hiring and through consultation with ASETS and community employment agencies.

1.22 Local, regional, and Aboriginal training and education initiatives

Reference:

i) A3S0U5, Application Volume 3B, Aboriginal Engagement, PDF pages 24 and 25 of 97
ii) A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, PDF page 47 of 245
iii) A3S0U5, Application Volume 3B, Aboriginal Engagement, Table 1.5.1 – Summary of Aboriginal Interests and Concerns Identified, PDF page 47 of 97

Preamble:

Reference i) states that Trans Mountain has established a $1.5 million funding program to contribute to education and training initiatives that focus on pipeline construction and related skills that are transferable and allow for employment in many work environments.

In Reference ii), Trans Mountain states that it will be a challenge to find workers with training and skills relevant to construction.

Reference iii) states that Trans Mountain is working to set up a scholarship program for field technical and trades positions for permanent employment opportunities.

Request:

Please provide Trans Mountain's plan for developing and implementing training and education initiatives for local, regional, and Aboriginal groups for the Project, including, but not limited to:

a) an analysis of the gaps in the education and skill capacity for the Project;

b) Trans Mountain's goals and targets for training and education initiatives;

c) Trans Mountain's schedule for implementing training and education initiatives;

d) requests or concerns that have been raised and how Trans Mountain has addressed or proposes to address them; and

e) if Trans Mountain did not take steps to address any concerns or requests raised, an explanation why.

Response:

a) For Aboriginal groups, community information will be derived through the use of Accountability and Resource Management Software (ARMS) and Aboriginal Skills, Employment and Training Strategy (ASETS). The data will provide an overview of the gaps in education and skills by utilizing criteria outlined in NEB IR No. 1.21c against the requirements for work on the Project.

   For local and regional groups, the information derived from the Alberta Ministry of Jobs, Skills, Training and Labour and the BC Ministry of Jobs, Tourism and Skills Training as well as community employment agencies will provide an overview of the gaps in education and

skills by using criteria outlined in NEB IR No.1.21c against the requirements for work on the Project.

b) 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.

The targets for training and education initiatives include providing:

- Support for Project-relevant training programs for Aboriginal participants for the construction of the proposed pipeline including training in construction readiness, orientation, safety and certification; trades introduction and administrator training.
- Support Project-relevant training programs pre-approval, if approval is granted, such as trades orientation, foundations/life skills programs and short term training that provide immediate opportunities such as camp cooks and surveying.
- Collaborate with Aboriginal communities, educational and training institutions, industry and all levels of government to increase the availability of training funds for Aboriginal communities.
- Provide information on the opportunities available during project construction (including pre and post) and during subsequent pipeline operations.
- Identify operating positions that will provide apprentice opportunities to local, regional and Aboriginal groups along the proposed pipeline corridor.
- Collaborate with the Aboriginal Skills, Employment and Training Strategy and Aboriginal communities to identify potential apprentice candidates for apprentice training.

Trans Mountain has not developed a specific goal or target level for training and employment in local and regional communities; the focus is to maximize the employment opportunities for local and regional communities.

c) 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. The focus for training and education is as follows:

- Present to September 2015: foundational trades training, life skills, essential skills and training leading to existing opportunities within the construction and pipeline industries (for example: surveyor or cooks training).
- September 2015 to Project construction: construction readiness training and orientation to construction programs.
- Plans for post Project completion include the development of scholarship and apprentice programs to support ongoing operation activities.

d) The requests and concerns raised by local, regional and Aboriginal groups for training and education initiatives include:

Concern	Proposed Approach
Information on the qualifications for construction related employment will come too late to train community members to take advantage of the employment opportunities.	Job descriptions, a list of jobs on the Project, including requirements and essential skills levels is available and has been distributed to communities and shared with educational institutions.
Aboriginal agencies expressed concerns regarding the difficulty in identifying capacity in their communities in order to train for employment on the project.	Accountability and Resource Management Software (ARMS) is available to Aboriginal communities along the proposed pipeline corridor to assist in the collection of information leading to an understanding of capacity and identifying gaps.
Location of training. Training provided in communities, rather than at a distance, would allow for greater numbers of community members to be trained.	Training programs have been identified that can be offered in communities. In particular, training in trades foundations and introduction to trades are identified as a priority and funding resources may be available through federal and provincial sources.
Training Supports are not readily available when taking training away from the community. Examples of support needed include; child care, transportation and living expenses.	While the needs for training supports cannot be fully addressed by the Project, funding resources are being identified that may be available for participants taking training leading to employment on the Project. Federal and provincial funding agencies have been provided with Project information and training priorities.
Apprentices are unable to secure employment to gain Red Seal hours and further training.	Opportunities for apprenticeships with contractors is encouraged and where possible the Aboriginal Skills, Employment and Training Strategy (ASETS) and communities through the use of ARMS will identify potential apprentices for employment on the Project. Additionally, training funds are available after CPCN to support apprentice training with contractors and Kinder Morgan operations.

e) Trans Mountain will continue to address concerns, requests and interests raised in relation to training and education with local, regional and Aboriginal groups.

The concerns raised that are difficult for Trans Mountain to address are systemic, and larger than the Project. We have heard from Aboriginal communities that there are a number of systemic barriers to obtaining and maintaining employment and training, such as lack of high school completion, lack of scholarships and difficulty in assessing them, lack of drivers license, lack of transportation, lack of adequate funding for living supports when training and education is outside of their community, lack of adequate childcare, and for some, unresolved social issues. While Trans Mountain will work with communities on a one on one basis to address these issues in a Project context where possible, many of these issues must be addressed at the government level.

Summary of New Commitments:

- In accordance with NEB draft condition 13, Trans Mountain is prepared to file with the NEB, at least 6 months prior to commencing construction, and every 6 months thereafter until completing construction, monitoring reports for the implementation and outcomes of Aboriginal, local, and regional training and education measures and opportunities for the Project.

- In accordance with the NEB draft condition 7a, Trans Mountain is prepared to file wit the NEB, at least 1 year prior to commencing construction, a plan for monitoring the implementation and outcomes of Aboriginal, local, and regional training and education measures and opportunities for the Project.

1.23 Aboriginal employment and education

Reference:

i) A3S0V1, Application Volume 3B, Aboriginal Engagement, Appendix H – Training Policy for Aboriginal Peoples, PDF pages 38 and 39 of 39

ii) A3S0U5, Application Volume 3B, Aboriginal Engagement, PDF page 45 of 97

iii) A3S2S3, Application Volume 6B, Pipeline Environmental Protection Plan, Appendix C – Management Plans, Employment and Training Mitigation and Enhancement Measures, PDF page 251 of 461

Preamble:

Reference i) describes the training objectives and initiatives for Trans Mountain's Training Policy for Aboriginal Peoples.

Reference ii) states that Trans Mountain is working to set up a scholarship program for field technical and trades positions for permanent employment opportunities. The reference also states that Aboriginal groups have expressed an interest or concern with training and skill development.

Reference iii) states that Trans Mountain will initiate an Aboriginal Employment and Training Program to support increased access to Aboriginal employment opportunities on the Project.

Request:

Please provide Trans Mountain's plan for developing and implementing training and education opportunities for Aboriginal groups for the Project, including, but not limited to:

a) an analysis of the gaps in the education and skill capacity for the Project;

b) Trans Mountain's goals and targets for training and education initiatives and the schedule for their implementation;

c) a description of the Aboriginal Employment and Training Program;

d) requests or concerns that have been raised and how Trans Mountain has addressed or proposes to address them; and

e) if Trans Mountain has not taken steps to address any concerns or requests raised, an explanation why.

Response:

a) The information derived through Accountability and Resource Management Software (ARMS) and Aboriginal Skills Employment and Training Strategy (ASETS) will provide an overview of the gaps in education and skills by utilizing the criteria outlined in NEB IR No. 1.21c against the requirements for work on the Project.

b) 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 for Aboriginal communities are planned.

The targets for training and education initiatives include providing:

- Support for Project-relevant training programs for Aboriginal participants for the construction of the pipeline; and,
- Support for Project-relevant training programs post-approval, if approval is granted, for participants in construction readiness, orientation, safety and certification, trades introduction and administrator training.

To support the primary goal and to achieve the targets, the following initiatives are underway:

- Support training to employment initiatives that focus on transferable skills related to the construction of the pipeline and facilities;
- Support Project-relevant training programs pre-construction such as trades orientation, foundations/life skills programs and short term training that provide immediate opportunities such as camp cooks and surveying;
- Collaborate with Aboriginal communities, educational and training institutions, industry and all levels of government to increase the availability of training funds for Aboriginal communities;
- Provide information on the opportunities available during Project construction (including pre and post) and during subsequent pipeline operations;
- Identify operating positions that will provide apprentice opportunities to local, regional and Aboriginal groups along the proposed pipeline corridor.
- Collaborate with the Aboriginal Skills, Employment and Training Strategy and Aboriginal communities to identify potential apprentice candidates for apprentice training.
    - Funding opportunities will also be explored to maximize support for apprentices.

The data received with use of Accountability and Resource Management Software will provide an overview of the gaps in education and skills by using criteria outlined in NEB IR No. 1.21c against the requirements for work on the Project.

c) Trans Mountain's Aboriginal Employment and Training program is designed to provide opportunities to Aboriginal communities to maximize education and training initiatives and employment on the Project.

Trans Mountain has developed an integrated program to ensure these goals are met and is committed to the following training objectives:

- Provide Aboriginal peoples with access to opportunities and resources to benefit from the development of the Project.
- Maintain positive, working relationships with Aboriginal communities to foster an understanding of current human resource capacity. Implement the use of Accountability

and Resource Management Software (ARMS) in communities along the proposed pipeline corridor for use in identifying capacity and training opportunities

- Maintain partnerships and exchange information with Aboriginal Skills, Employment and Training Strategy (ASETS) organizations in BC and Alberta to understand capacity and gaps in training.
- Collaborate with Aboriginal organizations, industry partners, educational institutions and all levels of government to access training funds for the provision of relevant and timely training programs.
    - Information has been provided to training institutions and agencies on the employment opportunities (job descriptions and crew sizes) for the construction of the Project in order to identify training priorities.
    - Information sharing with federal and provincial departments in regard to training and employment opportunities is ongoing.
    - Funding partnerships are anticipated with contractors to enhance employment opportunities for Aboriginal participants.
- Manage communication avenues to maintain information flow to Aboriginal communities and relevant organizations on the status of the Project to ensure training is planned, scheduled and implemented to meet Project timelines.
- Continue to meet with communities at their request to identify opportunities and develop long-term training initiatives.
- Plan and host job fairs in local, regional and Aboriginal communities.
- Develop and implement an evaluation plan including tools to assess training and recruitment effectiveness.

Training Initiatives

To achieve the objectives that Trans Mountain has set out, the following training initiatives have been identified:

- Prior to Project approval, if granted, (estimated to be in September 2015), establish training priorities that identify training programs based upon community priorities, employment opportunities during construction and focussing on foundation training programs.
- After Project approval, establish training programs based upon construction and apprentice supports including orientation and safety certifications.

Employment Initiatives:

To achieve the objectives that Trans Mountain has set out, the following employment initiatives have been identified:

- Maximize Aboriginal hiring on the construction of the Project.
    - Trans Mountain is currently assisting Aboriginal communities to identify capacity and once collected Trans Mountain will establish the percentage of hiring, against the employment requirements of the Project, and the available workforce in the area.

  - Trans Mountain will provide contractors and sub-contractors with the Project's expectations for employment, recruitment, reporting, retention standards and policies as outlined in NEB IR No. 1.21e and NEB IR No. 1.24d.
- Provide timely information to Aboriginal groups on potential employment opportunities and requisite qualifications.
  - Individuals and agencies interested in updates on the employment opportunities can register on the website. When information is available, newsletters will be distributed to those registered.
- Collaborate with contractors, sub-contractors and employment service delivery organizations to ensure the recruitment of those qualified to work on the Project.
- Develop a mentoring program for Aboriginal participants during employment on the Project.

d) The requests and concerns raised by Aboriginal groups for training and education initiatives include:

Concerns	Solution
That information on the qualifications would come too late to train community members to take advantage of the employment opportunities.	Job descriptions, a list of jobs on the Project, including requirements and essential skills levels is available and is currently being distributed to communities.
Aboriginal agencies expressed concerns regarding the difficulty in identifying capacity in their communities in order to train for employment on the Project.	Accountability and Resource Management Software (ARMS) is available to Aboriginal communities along the proposed pipeline corridor to assist in the collection of information leading to an understanding of capacity and identifying gaps.
Location of training. Training provided in communities, rather than at a distance, would allow for greater numbers of community members to be trained.	Training programs have been identified that can be offered in communities. In particular, training in trades foundations and introduction to trades are identified as a priority and funding resources may be available through federal and provincial sources.
Training supports are not readily available when taking training away from the community. Examples of support needed include; child care, transportation and living expenses.	While the needs for training supports cannot be fully addressed by the Project, funding resources are being identified that may be available for participants taking training leading to employment on the Project. Federal and provincial funding agencies have been provided with Project information and training priorities.
Apprentices are unable to secure employment to gain Red Seal hours and further training.	Opportunities for apprenticeships with contractors is encouraged and where possible the Aboriginal Skills, Employment and Training Strategy (ASETS) and communities through the use of ARMS will identify potential apprentices for employment on the Project. Additionally, training funds are available after CPCN to support apprentice training with contractors and Kinder Morgan operations.
Transportation to job sites is difficult for many.	Transportation resources will be planned for where needed during construction.

e) Trans Mountain will continue to address concerns, requests and interests raised in relation to training and education with local, regional and Aboriginal groups.

The concerns raised that are difficult for Trans Mountain to address are systemic and larger than the Project. Trans Mountain has heard from Aboriginal communities that there are a number of systemic barriers to obtaining and maintaining employment and training, such as

lack of high school completion, lack of scholarships and difficulty in assessing them, lack of drivers license, lack of transportation, lack of adequate funding for living supports when training and education is outside of their community, lack of adequate childcare, and for some, unresolved social issues. While Trans Mountain will work with communities on a one on one basis to address these issues in a Project context where possible, many of these issues must be addressed at the government level.

Summary of New Commitments:

- The percentage of Aboriginal hiring will be determined in the spring of 2015 and provided to contractors as part of the contracting requirements.

1.24 Local, regional, and Aboriginal employment opportunities – construction and operations

Reference:

A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic:

i) PDF pages 173 and 174 of 245
ii) PDF page 47 of 245
iii) PDF pages 176 to 178 of 245

Preamble:

Reference i) provides the average workforce requirements for regional residents over the 2-year construction period, based on the capacity of the regional labour force. The reference also provides estimates for regional employment numbers during peak construction months when employment is anticipated to be higher.

In Reference ii), Trans Mountain estimates that 5 to 30 per cent of direct construction workers (depending on socio-economic region) will be regional residents, with the remainder of the construction workforce being filled by incoming temporary workers. The reference also states Trans Mountain's Project policies will promote maximizing local labor content from construction hubs.

Reference iii) states that a number of enhancement measures will be implemented by Trans Mountain to support regional employment. Enhancement measures include:

- implementing a program to enhance awareness of pipeline and facilities construction and operations jobs and career opportunities;
- creating an online employment communications tool and maintaining an online procurement registry where interested parties can register to received updates about Project opportunities;
- including regional employment clauses in all Project contracts;
- continuing communications with Aboriginal communities about economic and employment opportunities; and
- giving first consideration for employment opportunities to qualified regional and Aboriginal residents with appropriate skills and qualifications.

Reference iii) also states that, despite the Project's commitment to maximize regional participation in employment and contracting opportunities, it is anticipated that a notable proportion of the labour demand during construction will need to be met by non-regional workers because of the tight labour market.

Reference iii) further states that Trans Mountain will direct contractors to maximize local workers on their crews and to report to Trans Mountain on their levels of local content.

Request:

Please describe Trans Mountain's enhancement measures to maximize local, regional and Aboriginal employment during Project construction and operations, including:

a) a description of the program Trans Mountain has implemented or will implement to enhance awareness of pipeline and facilities construction and operations jobs and career opportunities, and a summary of how Trans Mountain has communicated the program to local, regional, and Aboriginal groups;

b) a description of the online employment communications tool and how it will facilitate employment opportunities for local, regional, and Aboriginal groups;

c) a copy of Trans Mountain's employment policies for the Project; and

d) a description of how contractors will report on local, regional, and Aboriginal employment.

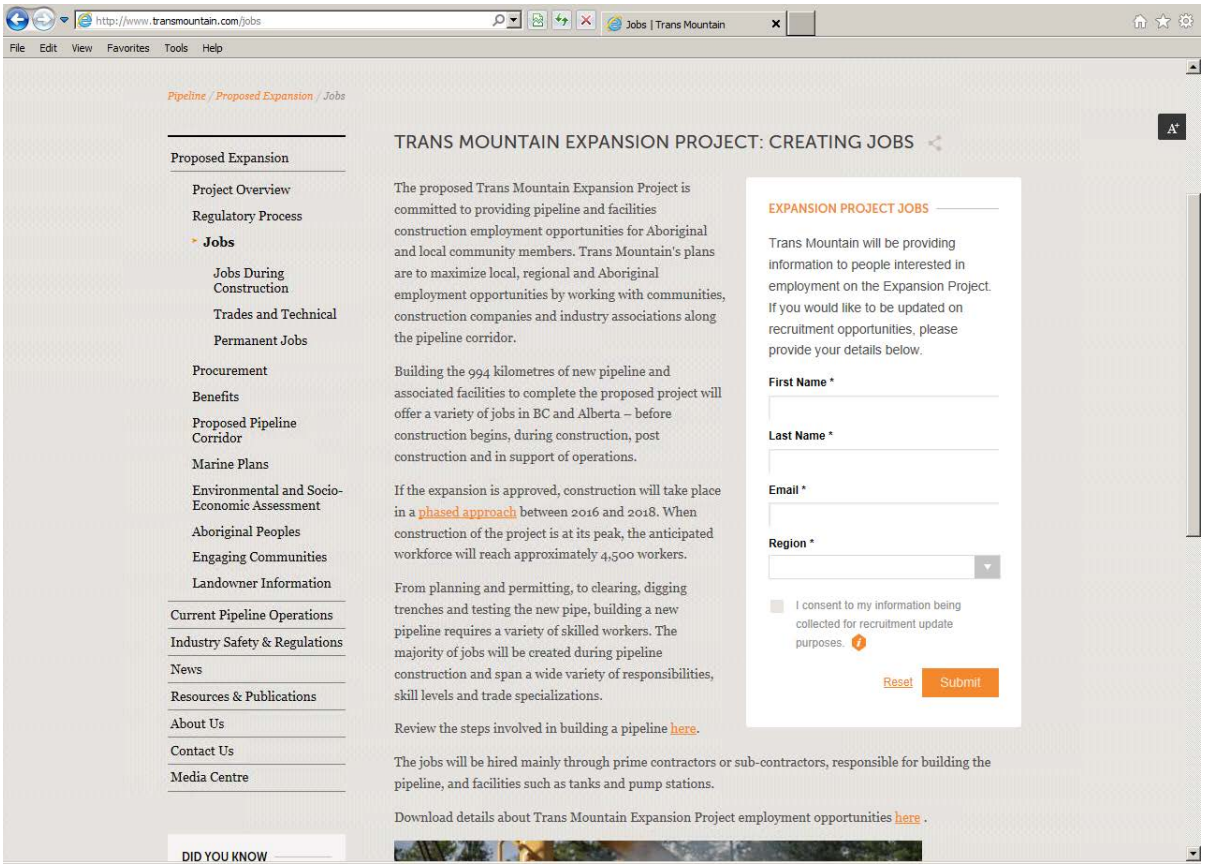
Response:

a) Trans Mountain has developed an integrated communications program to enhance awareness of pipeline and facilities construction and operations jobs and career opportunities. The following list outlines components of the program and communication avenues.

- Ongoing engagement - provide job descriptions and requirements for anticipated positions to local, regional and Aboriginal groups, educational institutions, federal and provincial ministries, industry associations and community employment and training agencies;
- Establish focal and referral points for employment information with local and regional groups;
- Establish an Aboriginal Skills and Employment Training Strategy (ASETS) contact for each interested Aboriginal group to assist with the communication of training and employment initiatives;
- Organize and host job fairs in communities along the proposed pipeline corridor;
- Organize and host job fairs in Aboriginal communities;
- Maintain up-to-date employment content on www.transmountain.com;
- Provide up-to-date Project information to individuals and organizations registered to receive updates through the Project website; and,
- Contractor mandated recruitment fairs proceeding construction start.

b) The online employment communications tool managed by Trans Mountain is a registry of interest in regard to employment opportunities. Individuals and organizations are invited to register online at www.transmountain.com/jobs and as a result will receive updated information as available in regard to employment on the Project.

Figure 1.24B-1 Screen shot of registry taken from www.transmountain.com/jobs



c) See NEB IR No.1.24c – Attachment 1 (Employment Policy).

d) Contractor reporting requirements will be developed to provide information to determine local, regional, and Aboriginal employment content as a total as well as a percentage of the contractor workforce.

Contractors will report to Trans Mountain on a monthly basis:

- Person-hours of employment to local, regional and Aboriginal personnel and for total workforce; and,
- % of total workforce for local, regional and Aboriginal based on total person-hours.

Summary of New Commitments:

- In accordance with NEB draft condition 40, Trans Mountain is prepared to file with the NEB, within 90 days after commencing construction, and every 6 months thereafter until completing construction, monitoring reports for Aboriginal, local, and regional employment and business opportunities for the Project.

- Construction contractors to report monthly to Trans Mountain on:
  - Person-hours of employment to local, regional and Aboriginal personnel and for total workforce; and,
  - % of total workforce for local, regional and Aboriginal based on total person-hours.

1.25 Local, regional, and Aboriginal business opportunities – construction and operations

Reference:

A3S1S7, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic:

i) PDF page 191 of 245
ii) PDF page 163 of 245

Preamble:

Reference i) states that Trans Mountain has developed a Project-specific Procurement Policy, which indicates that the Project is committed to maximize the use of local, regional, Aboriginal, provincial, and Canadian businesses during Project construction and operations. The reference also states that Trans Mountain may rely on existing relationships while providing opportunities to other local, regional, Aboriginal, and provincial qualified businesses through a competitive bidding process.

Reference ii) states that Trans Mountain will work with contractors to give first consideration to qualified regional suppliers of goods and services, where practical, and in conformance with procurement policies. The reference also states that Trans Mountain will establish and implement a process for the use of qualified regional Aboriginal contractors for operations phase contracts.

Request:

Please provide the following for local, regional, and Aboriginal group business opportunities during Project construction and operations:

a) a copy of Trans Mountain's Procurement Policy for the Project; and

b) a description of Trans Mountain's process for the use of qualified Aboriginal contractors for operations phase contracts, including how the process will be communicated and implemented.

Response:

a) Trans Mountain will use the Kinder Morgan Procurement Policy, Procedures and Transaction Guidelines (NEB IR No.1.25a – Attachment 1) for the Project and it was in error that it was referred to as the Project-specific Procurement Policy (Reference i).

   Trans Mountain will also develop a Project-specific policy 6-months prior to construction.

b) Over the past three years, Kinder Morgan has been actively engaged with Aboriginal communities and Aboriginal groups to identify Aboriginal companies with the capacity and interest to undertake operations-based work, project-related work and to provide ancillary products and services to Trans Mountain.

Through engagement, the Aboriginal Engagement Team, in partnership with the Aboriginal Procurement Coordinator ensure all expertise shared (via meetings, e-mails, phone calls, etc.) is documented and a database of Aboriginal companies has been developed and continues to grow as interest in the Trans Mountain Expansion Project increases. Companies that express an interest in working with Kinder Morgan are asked to provide information on services offered, including capacity, number of employees, tickets held and equipment owned. This information is evaluated and if suitable opportunities arise, companies are invited to participate and contracts are awarded once the pre-qualification is complete, including ISNetworld® certification. Aboriginal companies currently complete all of the right-of-way maintenance and clearing activities on the Trans Mountain system.

To further assist with communicating opportunities and supporting the use of qualified Aboriginal contractors for operations phase contracts, as outlined in the Aboriginal Procurement Policy (Volume 3B, Appendix G), Kinder Morgan also provides assistance to Aboriginal companies with setting up an ISNetworld® certificate and in building bidding expertise.

Summary of New Commitments:

- Trans Mountain will develop a Project-specific procurement policy 6 months prior to start of construction.

1.26 Status of traditional use and traditional ecological knowledge studies

Reference:

i) A3S1S0, Application Volume 5B Environmental and Socio-Economic Assessment – Socio-Economic, PDF page 10 of 64
ii) A3S0U5, Application Volume 3B, Aboriginal Engagement, PDF page 24 of 97

A3S2H1, Application Volume 5D, Environmental and Socio-Economic Assessment – Traditional Land and Resource Use Technical Report:

iii) Table 6.1 – Issues or Concerns Identified by Participating Aboriginal Communities PDF pages 52 to 65 of 86
iv) Table 6.2 – Traditional Land Use Sites Identified by Participating Aboriginal Communities, PDF pages 65 to 68 of 86
v) A3S1S0, Application Volume 5B, Environmental and Socio-Economic Assessment – Socio-Economic, Table 5.2-1 – Time Table of Traditional Land and Resource Use Studies for Each Participating Community, PDF pages 15 to 18 of 64

Preamble:

Reference i) states that, since April 2012, Trans Mountain has engaged with Aboriginal communities and Aboriginal groups to provide comprehensive information about, and seek feedback on, the Project, as well as to identify anticipated effects of the Project on their assertion of traditional and cultural use of the land along the proposed pipeline corridor to maintain a traditional lifestyle. The reference states that, of the 85 Aboriginal communities engaged on the Project by Trans Mountain, 62 have been identified as having an interest in the Project or having interests potentially affected by the Project.

In Reference ii), Trans Mountain states that a total of 37 communities have participated in Traditional Land Use (TLU) studies: 9 communities in Traditional Marine Resource Use studies, and 28 communities in Traditional Ecological Knowledge studies.

Reference iii) describes the issues raised by participating Aboriginal communities through identified preliminary interests and TLU studies. It also states that ongoing TLU study work with participating Aboriginal communities is scheduled for completion prior to constructing the Project.

Reference iv) provides TLU site locations and descriptions identified by participating Aboriginal communities within the pipeline corridor.

Reference v) is a timetable of TLU studies for each participating community. The table indicates that some TLU studies are still in progress, or that the interest in a TLU study is to be determined by the participating community.

Request:

Please provide:

a) an update to Table 6.1 (Reference iii)) that notes additional information collected or identified since filing the application on 16 December 2013;

b) an update to Table 6.2 (Reference iv)) that notes additional information collected or identified since filing the application on 16 December 2013; and

c) an update to Table 5.2-1 (Reference v), including all Aboriginal groups identified by the Board as having traditional territory in the Project area (see Information Request No. 1.13 – Aboriginal consultation).

Response:

a) Since filing the Application on December 16, 2013, Trans Mountain has received interim and/or final traditional land and resource use (TLU) study reports from:

- Nicola Tribal Association, (representing Nicomen Indian Band, Nooaitch Indian Band and Shackan Indian Band);
- BC Métis Federation; and
- Chawathil First Nation.

An independent third-party engagement report was also received from BC Métis Federation. Ts'elxwéyeqw Tribal Management (representing Skowkale First Nation, Sumas First Nation, Aitchelitz First Nation, Kwaw Kwaw Apilt First Nation, Shxwha:y Village, Cheam First Nation, Skwah First Nation, Soowahlie First Nation, Squiala First Nation, Tzeachten First Nation and Yakweakwioose First Nation) provided an Integrated Cultural Assessment on November 15, 2013.

Trans Mountain-led TLU studies are currently underway with:

- Saddle Lake Cree Nation;
- Lhtako Dene Nation; and
- Whispering Pines First Nation.

Independent third-party TLU studies are now underway with:

- Alexander First Nation;
- Alexis Nakota First Nation.
- Sunchild First Nation;
- Simpcw First Nation;
- Lower Nicola Indian Band;
- Yale First Nation;
- Semiahmoo First Nation;
- Kwikwetlem First Nation;

Tk'emlúps te Secwépemc and Skeetchestn Indian Band are planning to complete a joint third-party cultural heritage study directly with Trans Mountain. A third party engagement report is underway with Métis Nation of Alberta (Region 4).

Trans Mountain is also providing support to conduct TLU studies with communities that recently identified interests in the Project:

- Michel First Nation;
- Gunn Métis (Lac Ste. Anne Métis); and
- BC Métis Federation.

Details regarding the progress of TLU studies for the Project are provided in updated Table 5.2-1 in the response to NEB IR No. 1.26c.

Additional issues and concerns collected or identified through ongoing TLU studies since Application filing will be provided to the NEB in a supplemental report in Q3 2014.

b) In accordance with the process described in response to NEB IR No. 1.26a, information collected regarding additional traditional use sites or features identified through ongoing TLU studies will be provided to the NEB in a supplemental report in Q3 2014.

c) An update to Table 5.2-1 is included below (Table 1.26C-1) and includes all Aboriginal communities identified by the NEB as having traditional territory in the Project area, with the exception of Aboriginal groups having interests potentially affected by the increased Project-related marine vessel traffic and umbrella organizations that represent more than one Aboriginal community. Aboriginal groups having interests potentially affected by the increased Project-related marine vessel traffic can be found in Section 4.2.10 of Volume 8A. Individual Aboriginal communities are listed in the table rather than umbrella organizations that represent them. Please refer to Trans Mountain's response to NEB IR No. 1.13 regarding all Aboriginal groups identified by the NEB as having traditional territory in the Project area.

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Saddle Lake Cree Nation	Edmonton to Hinton	Rural Alberta Region	TERA-led TLU study (underway).				
Enoch Cree Nation	Edmonton to Hinton	Edmonton Region	June 7, 2013	August 29 to 30, 2013	September 7, 2013	September 18 to 26, 2013	November 28, 2013
Alexander First Nation	Edmonton to Hinton	Edmonton Region	October 4, 2012	October 18 and 19, 2012	October 30, 2012	October 30 to November 1, 2012	November 28, 2013
			Independent, third-party review underway with Alexander First Nation.				
Samson Cree Nation	Edmonton to Hinton	Edmonton Region	September 20, 2012	September 20, 2012	March 22 to 23, 2013	November 6 to 9, 2012 September 25 to October 3, 2013	December 18, 2013
Métis Nation of Alberta (Region 4)	Edmonton to Hinton	Edmonton Region	Independent, third-party engagement report (underway).				
O'Chiese First Nation	Edmonton to Hinton	Rural Alberta Region	Independent, third-party TLU study. Final report received on September 25, 2013.				
Ermineskin Cree Nation	Edmonton to Hinton	Edmonton Region	September 4, 2012	September 4, 2012	September 5 to 7, 2012	September 5 to 7, 2012	October 31, 2013
Montana First Nation	Edmonton to Hinton	Edmonton Region	August 7 to 8, 2013	August 7 to 8, 2013	N/A	To be determined	Interim results review memo sent November 28, 2013
Louis Bull Tribe	Edmonton to Hinton	Edmonton Region	TLU study not requested by Louis Bull Tribe.				
Alexis Nakota Sioux Nation	Edmonton to Hinton	Edmonton Region	October 19, 2012	May 16 to 17, 2013	November 5, 2012	November 6 to 10, 2012	To be determined
			Independent, third-party review underway with Alexis Nakota Sioux Nation.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Foothills Ojibway Society	Edmonton to Hinton	Rural Alberta Region	Declined TLU study participation; identified preliminary interests on June 5, 2013.				
Paul First Nation	Edmonton to Hinton	Edmonton Region	November 14, 2012	November 14, 2012	December 3, 2012	December 3, 2012	November 8, 2013
Nakcowinewak Nation of Canada	Edmonton to Hinton	Edmonton Region	September 19 to 20, 2013	September 19 to 20, 2013	N/A	September 21 to 26, 2013; November 5 to 6, 2013	November 25, 2013
Sunchild First Nation	Edmonton to Hinton	Rural Alberta Region	Independent, third-party TLU study (underway). Preliminary interest letter received November 28, 2013.				
Michel First Nation	Edmonton to Hinton	Rural Alberta Region	Independent, third-party TLU study report (underway).				
Gunn Métis (Lac Ste. Anne Métis)	Edmonton to Hinton	Rural Alberta Region	Independent, third-party TLU information report (underway).				
Aseniwuche Winewak Nation	Edmonton to Hinton	Jasper National Park Region	Independent, third-party TLU study. Final report received on November 18, 2013.				
Lheidli T'enneh	Hargreaves to Darfield	Fraser-Fort George/Thompson-Nicola Region	Independent, third-party TLU study. Interim report received on November 20, 2013.				
Simpcw First Nation	Hargreaves to Darfield	Fraser-Fort George/Thompson-Nicola Region	Independent, third-party TLU study (underway).				
Lhtako Dene Nation	Hargreaves to Darfield	Fraser-Fort George/Thompson-Nicola Region	TERA-led TLU study (underway).				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Canim Lake Band	Hargreaves to Darfield	Fraser-Fort George/Thompson-Nicola Region	May 1, 2013	October 9, 2013	October 9, 2013	October 10, 2013	November 5, 2013
Whispering Pines (Clinton Indian Band)	Hargreaves to Darfield	Fraser-Fort George/Thompson-Nicola Region	Whispering Pines has requested confidentiality.				
Horse Lake First Nation	Hargreaves to Darfield	Rural Alberta Region	No interest communicated to Trans Mountain to date.				
Ktunaxa First Nation	Hargreaves to Darfield	Rural Alberta Region	No interest communicated to Trans Mountain to date.				
Stoney Nakoda Nation	Hargreaves to Darfield	Rural Alberta Region	No interest communicated to Trans Mountain to date.				
Sturgeon Lake Cree Nation	Hargreaves to Darfield	Rural Alberta Region	No interest communicated to Trans Mountain to date.				
Kelly Lake Cree Nation	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
Kelly Lake Métis Settlement Society	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
Kelly Lake Nation	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Llenlleney'ten First Nation (High Bar)	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
Sts'wecem'c/Xgat'tem (Canoe Creek/Dog Creek)	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
St'uxwetews (Bonaparte Indian Band)	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
T'exelc (Williams Lake Indian Band)	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
Toosey Indian Band	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
Tsilhqot'in National Government	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				
Xat'sull First Nation (Soda Creek)	Hargreaves to Darfield	Fraser-Fort George/Thompson Nicola Region	No interest communicated to Trans Mountain to date.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Métis Nation British Columbia	Hargreaves to Darfield Black Pines to Hope Hope to Burnaby Burnaby to Westridge	Metro Vancouver Region	Independent, third-party engagement report (underway).				
BC Métis Federation	Hargreaves to Darfield Black Pines to Hope Hope to Burnaby Burnaby to Westridge	Jasper National Park Region Fraser-Fort George/Thompson-Nicola Region Metro Vancouver Region Fraser Valley Region	Independent, third-party engagement report received on April 24, 2014.				
Tk'emlúps te Secwẻpemc	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Joint third-party Cultural Heritage study underway with Skeetchestn Indian Band.				
Skeetchestn Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Joint third-party Cultural Heritage study underway with Tk'emlúps te Secwẻpemc.				
Penticton Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	TLU study not requested by Penticton Indian Band.				
Upper Nicola Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Upper Nicola Indian Band has requested confidentiality.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Lower Similkameen Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	TLU study not requested by Lower Similkameen Indian Band.				
Upper Similkameen Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	TLU study not requested by Upper Similkameen Indian Band.				
Lower Nicola Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Lower Nicola Indian Band has requested confidentiality.				
Coldwater Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Interest in a TLU study to be determined by Coldwater Indian Band.				
Shackan Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Interim joint third-party TLU study report with Nicomen Indian Band and Nooaitch Indian Band led by Nicola Tribal Association received February 17, 2014.				
Nicomen Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Interim joint third-party TLU study report with Nicomen Indian Band and Nooaitch Indian Band led by Nicola Tribal Association received February 17, 2014.				
Nooaitch Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	Interim joint third-party TLU study report with Nicomen Indian Band and Nooaitch Indian Band led by Nicola Tribal Association received February 17, 2014.				
Yale First Nation	Black Pines to Hope	Fraser Valley Region	Independent, third-party TLU study (underway).				
Adams Lake Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Ashcroft Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Boothroyd Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Boston Bar Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Cook's Ferry Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Kanaka Bar	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Little Shuswap Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Lytton First Nation	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Neskonlith Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Oregon Jack Creek Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Shuswap Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Siska Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Skuppah Indian Band	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Splatsin First Nation	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Spuzzum First Nation	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Ts'kw'aylaxw (Pavilion Indian Band)	Black Pines to Hope	Fraser-Fort George/Thompson-Nicola Region	No interest communicated to Trans Mountain to date.				
Union Bar Band	Hope to Burnaby	Fraser Valley Region	TLU study not requested by Union Bar Band.				
Chawathil First Nation	Hope to Burnaby	Fraser Valley Region	Interim independent, third-party TLU study received February 27, 2014.				
Shxw'ōwhámel First Nation	Hope to Burnaby	Fraser Valley Region	May 28, 2013	Independent, third-party TLU study (underway).			

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Cheam First Nation	Hope to Burnaby	Fraser Valley Region	Joint third-party Integrated Cultural Assessment (ICA) with Sumas First Nation, Aitchelitz First Nation, Kwaw Kwaw Apilt First Nation, Shxwha:y Village, Skowkale First Nation, Skwah First Nation, Soowahlie First Nation, Squiala First Nation, Tzeachten First Nation and Yakweakwioose First Nation led by Ts'elxwéyeqw Tribe Management Limited. Draft indicator report received on November 15, 2013. Final ICA received March 26, 2014.				
Sumas First Nation	Hope to Burnaby	Fraser Valley Region	See above				
Peters Band	Hope to Burnaby Burnaby to Westridge	Fraser Valley Region	TLU study not requested by Peters Band.				
Seabird Island Band	Hope to Burnaby	Fraser Valley Region	Independent, third-party TLU study (underway).				
Popkum First Nation	Hope to Burnaby	Fraser Valley Region	April 24, 2013	April 24, 2013	N/A	November 13 to 14, 2013	Interim results review memo sent November 28, 2013
Scowlitz First Nation	Hope to Burnaby	Fraser Valley Region	May 16, 2013	TLU study not requested by Scowlitz First Nation.			
Skowkale First Nation	Hope to Burnaby	Fraser Valley Region	Joint third-party ICA with Sumas First Nation, Aitchelitz First Nation, Kwaw Kwaw Apilt First Nation, Shxwha:y Village, Cheam First Nation, Skwah First Nation, Soowahlie First Nation, Squiala First Nation, Tzeachten First Nation and Yakweakwioose First Nation led by Ts'elxwéyeqw Tribe Management Limited. Draft indicator report received on November 15, 2013. Final ICA received March 26, 2014.				
Yakweakwioose First Nation	Hope to Burnaby	Fraser Valley Region	See above.				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Aitchelitz First Nation	Hope to Burnaby	Fraser Valley Region	See above.				
Skwah First Nation	Hope to Burnaby	Fraser Valley Region	See above.				
Kwaw-kwaw-apilt First Nation	Hope to Burnaby	Fraser Valley Region	See above.				
Soowahlie First Nation	Hope to Burnaby	Fraser Valley Region	See above.				
Shxwha:y Village	Hope to Burnaby	Fraser Valley Region	See above.				
Tzeachten First Nation	Hope to Burnaby	Fraser Valley Region	See above.				
Squiala First Nation	Hope to Burnaby	Fraser Valley Region	See above.				
Leq'á:mel: First Nation	Hope to Burnaby	Fraser Valley Region	April 23, 2013	September 11 to 13, 2013	September 11, 2013	September 11 to 13, 2013	November 8, 2013
Semiahmoo First Nation	Burnaby to Westridge	Metro Vancouver Region	Independent, third-party TLU/TMRU study (underway). Preliminary interest letter received August 6, 2013.				
Matsqui First Nation	Hope to Burnaby	Fraser Valley Region	Matsqui First Nation has requested confidentiality.				
Kwantlen First Nation	Hope to Burnaby	Fraser Valley Region	Independent, third-party TLU study (underway).				
Skawahlook First Nation	Hope to Burnaby	Fraser Valley Region	No interest communicated to KMC to date				

TABLE 1.26C-1

REVISED TIME TABLE OF TRADITIONAL LAND USE (TLU) STUDIES FOR EACH PARTICIPATING COMMUNITY (MAY 2014) (continued)

Community	Proposed Pipeline Segment(s)	Socio-Economic Study Regions	Map Review	Interviews	Overflight	Ground Reconnaissance	Results Review/ Mitigation Meetings
Sts'ailes (Chehalis Indian Band)	Hope to Burnaby	Fraser Valley Region	No interest communicated to KMC to date				
Katzie First Nation	Burnaby to Westridge	Metro Vancouver Region	TLU study not requested by Katzie First Nation.				
Kwikwetlem First Nation	Burnaby to Westridge	Metro Vancouver Region	Independent, third-party TLU study (underway).				
Qayqayt First Nation	Burnaby to Westridge	Metro Vancouver Region	TLU study not requested by Qayqayt First Nation.				
Squamish Nation	Burnaby to Westridge	Metro Vancouver Region	TLU study not requested by Squamish Nation.				
Tsleil-Waututh Nation	Burnaby to Westridge	Metro Vancouver Region	TLU study not requested by Tsleil-Waututh Nation.				
Musqueam Indian Band	Burnaby to Westridge	Metro Vancouver Region	TLU study not requested by Musqueam Indian Band.				
Tsawwassen First Nation	Burnaby to Westridge	Metro Vancouver Region	No interest communicated to KMC to date.				

Summary of New Commitments:

- Trans Mountain will provide the NEB with the results of ongoing engagement efforts that includes additional issues and concerns collected or identified through ongoing TLU studies in a supplemental report in Q3 2014.
- Trans Mountain will provide the NEB with the results of ongoing engagement efforts that includes TLU site locations and descriptions identified by participating Aboriginal communities within the pipeline corridor collected or identified through ongoing TLU studies in a supplemental report in Q3 2014.

1.27 Mitigation for traditional use sites

Reference:

A3S2H1, Application Volume 5D, Environmental and Socio-Economic Assessment – Traditional Land and Resource Use Technical Report, Table 6.3 – Potential Effects and Mitigation Measures – Traditional Land and Resource Use – Project Construction and Operation, PDF pages 68 to76 of 86

Preamble:

The reference is a table of potential effects on traditional land and resource use indicators associated with pipeline construction and operations that were identified based on the results of the literature review, desktop analysis, the results of engagement with Aboriginal community representatives, collecting traditional ecological knowledge during biophysical field study participation, and TLU studies conducted with potentially affected Aboriginal communities.

The reference states that a comprehensive review of all the issues raised by each Aboriginal community, and the proposed mitigation measures, was conducted with each participating community. Concerns were addressed by mitigation measures described in the Environmental Protection Plan to be implemented for the Project and agreed upon during the field surveys and community results review follow-up.

Request:

Please provide:

a) an update to Table 6.3 that notes additional information collected or identified since filing the application on 16 December 2013;

b) a description of how Trans Mountain plans to provide and discuss its proposed mitigation measures for traditional use impacts with all Aboriginal groups identified by the NEB as having traditional territory in the Project area (see Information Request No. 1.13 – Aboriginal consultation);

c) a summary of any issues and concerns that have been raised and the steps Trans Mountain has taken or will take to address these issues and concerns; and

d) if Trans Mountain will not take steps to address any particular concerns, an explanation why.

Response:

a) As described in response to NEB IR No. 1.26a and NEB IR No. 1.26b, additional issues of concern and traditional use sites or features collected or identified through ongoing TLU studies since Application filing will be provided to the NEB in a supplemental report in Q3 2014 2014.

Trans Mountain is committed to reviewing the results of these TLU studies in the context of the Environmental and Socio-economic Assessment and will report on the findings during the proceedings as previously committed.

b) The progress of each participating community's Traditional Land Use (TLU) study to date is described in response to NEB IR No. 1.26c. Where requested, mitigation review for potential Project-related effects on traditional land and resource use in addition to incorporation into Project planning is noted to include one or more of the following mechanisms:

- field reconnaissance through which the identification of TLU sites and discussions of potential mitigation strategies occurred with the participating community representatives;
- issues validation and results review opportunities by email to confirm the accuracy of the information incorporated as requested;
- letters sent in response to preliminary interests identified by participating communities to outline proposed mitigation measures relevant to the issues raised; and
- ongoing face to face meeting with the Aboriginal Engagement Team.

Trans Mountain will continue to provide opportunities to review proposed mitigation measures with interested Aboriginal communities. As noted in response to NEB IR No. 1.26a, additional issues and concerns collected or identified through ongoing TLU studies since filing of the Application on December 16, 2013 will be provided to the NEB in a supplemental report in May 2014.

c) Please refer to the responses to NEB IR No. 1.27a and NEB IR No.1.27b.

d) Trans Mountain will continue to provide opportunities to review proposed mitigation measures with interested Aboriginal communities. Additional issues and concerns raised since filing the Application on December 16, 2013 and the steps Trans Mountain has taken or will take to address them will be provided to the NEB in a supplemental report in Q3 2014.

Trans Mountain is committed to reviewing the results of these TLU studies in the context of the Environmental and Socio-economic Assessment and will report on the findings during the proceedings as previously committed.

Summary of New Commitments:

- Trans Mountain will provide the NEB with the results of ongoing engagement efforts that include TLU site locations and descriptions identified by participating Aboriginal communities within the pipeline corridor collected or identified through ongoing TLU studies to the NEB in a supplemental report in Q3 2014.
- Trans Mountain will provide the results of ongoing engagement efforts that include additional issues and concerns collected or identified through ongoing TLU studies, to the NEB in a supplemental report in Q3 2014.
- Trans Mountain will provide the results of ongoing engagement efforts that include additional issues and concerns and the steps Trans Mountain has taken or will take to address them to the NEB in a supplemental report in Q3 2014.

1.28 Culturally modified tree (CMT) sites

Reference:

i) A3S0U6, Application Volume 3B, Aboriginal Consultation, Appendix A – Engagement Logs, PDF pages 56, 275, 382, 383, and 395 of 667
ii) A3S2H0, Application Volume 5D, Traditional Land and Resource Use Technical Report, PDF page 21 of 48

Preamble:

Reference i) states that the following Aboriginal groups raised concerns about the impact on CMT sites:

- Aseniwuche Winewak Nation of Canada;
- Cheam First Nation;
- Kwantlen First Nation; and
- Simpcw Nation.

The reference also states that standard mitigation measures reviewed by Trans Mountain included avoidance of CMTs and further archaeology studies to classify CMTs.

In Reference ii), a CMT site is identified by the Alexis Nakota Sioux Nation.

The Board notes that the referenced CMT sites and proposed mitigation are not included elsewhere in the Project application.

Request:

Please provide a description of the activities Trans Mountain has completed or will complete to identify potentially impacted CMT sites along the Project corridor, including:

a) how pre- and post-1846 CMT sites have been or will be identified;

b) a list of any further studies that may be necessary and the expected completion date;

c) a description of the mitigation measures that have been developed to date for CMT sites;

d) a description of Trans Mountain's consultation activities with Aboriginal groups for developing mitigation measures for CMT sites;

e) a summary of any issues and concerns that have been raised and the steps Trans Mountain has taken or will take to address these issues and concerns; and

f) if Trans Mountain will not take steps to address any particular concerns, an explanation why.

Response:

a) Aboriginal communities are engaged in identifying culturally modified tree (CMT) sites through participation in Traditional Ecological Knowledge and Traditional Land Use studies. During these studies, participants contributed to discussions regarding potential Project-

related effects on resources and potential mitigation measures. Please see Sections 3.0 and 5.0 of Volume 5B for more detailed information on Traditional Ecological Knowledge collection and First Nation community participation.

For the Alberta portion of the proposed pipeline corridor, pre- and post-1846 CMTs are identified by qualified archaeologists who commenced a Historical Resources Impact Assessment (HRIA) in May 2013 under Archaeological Research Permit 13-018. For the HRIA, background data was reviewed and then was complemented with ground reconnaissance which targeted areas for more intensive visual inspection and, where warranted, shovel testing. The ground reconnaissance and shovel testing programs focused on the areas along the proposed pipeline corridor that are of moderate to high potential for archaeological (including CMT), historic and palaeontological sites.

Pre- and post-1846 CMTs are identified in British Columbia by qualified archaeologists who commenced an Archaeological Impact Assessment (AIA) for the British Columbia portion of the proposed pipeline corridor in July 2013 under Archaeological Research Permit 2013-165. For the AIA, background data was reviewed and then was complemented with ground reconnaissance which targeted areas for more intensive visual inspection and, where warranted, shovel testing. The ground reconnaissance and shovel testing programs focused on the areas along the proposed pipeline corridor that are of moderate to high potential for archaeological (including CMT), historic and palaeontological sites.

b) Potentially affected CMT sites will continue to be identified during the 2014 Historical Resources Impact Assessment (HRIA)/Archaeological Impact Assessment (AIA) ground reconnaissance, expected to be completed in Q4 2014. Those CMT sites identified during these assessments will be recorded and, where regulatory and permit obligations are required to do so, will be subject to dendrochronological testing.

   The HRIA/AIA will be conducted in accordance with and in fulfilment of all regulatory and permit obligations to Alberta Culture as well as British Columbia Ministry of Forests, Lands and Natural Resource Operations Archaeology Branch and the British Columbia Oil and Gas Commission.

c) Mitigation measures to reduce the potential effects of the proposed pipeline corridor on CMTs and other heritage resources are presented in the Application, Table 7.2.1-2 of Volume 5B and were developed in accordance with Trans Mountain standards as well as industry and provincial regulatory authority guidelines including those listed in the Application, Section 7.2.1.4 of Volume 5B. Proposed mitigation measures applicable to pre-1846 CMTs (i.e., automatically protected under the Heritage Conservation Act in British Columbia) are also described in points 11, 14, 108, 109, 111 and 112 of Section 7.0 of the Pipeline Environmental Protection Plan (Volume 6B) and in the Heritage Resources Discovery Contingency Plan (Appendix B of Volume 6B). Post-1846 CMTs may become protected per First Nation request through designation by the British Columbia Ministry of Forests, Lands and Natural Resource Operations Heritage Branch.

d) Trans Mountain's engagement activities with Aboriginal communities for developing mitigation measures for heritage resources (including CMT sites) occurred through the following:

- field reconnaissance through which the identification of TLU sites and discussions of potential mitigation strategies occurred with the participating community representatives;
- issues validation and results review opportunities by email to confirm the accuracy of the information incorporated as requested;
- letters sent in response to preliminary interests identified by participating communities to outline proposed mitigation measures relevant to the issues raised; and
- ongoing face to face meetings with the Aboriginal Engagement Team.

Trans Mountain's engagement program was designed to provide an open, transparent and inclusive process to address concerns, to incorporate feedback into Project planning and execution, and to provide opportunities to maximize Project benefits to Aboriginal communities. Trans Mountain is committed to continued listening, learning, and working with Aboriginal people to ensure that Aboriginal Traditional Knowledge is considered and incorporated into Project planning.

Based on the Aboriginal engagement conducted in support of the December 2013 Application filing, only four Aboriginal communities had raised concerns about CMTs (see Appendix A of Volume 3B), including Aseniwuche Winewak Nation of Canada, Cheam First Nation, Kwantlen First Nation and Simpcw Nation. As stated in Reference i), standard mitigation measures reviewed during engagement with these communities included avoidance of CMTs and further archaeology studies to classify CMTs.

e) During the engagement process, Trans Mountain has recorded any issues and concerns that have been raised, and has developed comprehensive mitigation measures in order to address these issues and concerns. Please see Table 3.2-2 in Volume 5B for a complete summary of interests or concerns identified through engagement activities with Aboriginal communities for the Project. Since the submission of the Application, fieldwork has been continuing for the Project. To date, seven post-1846 CMTs have been located and recorded. None of these CMTs are designated or under automatic protection and no mitigation measures, issues or concerns regarding these CMTs have been raised by Aboriginal communities. In addition, the Alexis Nakota Sioux Nation did not request any mitigation with respect to the CMT identified in Reference ii).

f) Trans Mountain is committed to addressing any CMT concerns identified during the duration of the Project.

Lands

1.29 Agreement for Easement for the Province of Alberta

Reference:

i) A3S0Q8, Application Volume 2, Project Overview, Economics and General Information, PDF page 42 of 45
ii) A3S0R1, Application Volume 2, Project Overview, Economics and General Information, Appendix E – Agreement for Easement, Province of Alberta, Clause 21, PDF page 182 of 230

Preamble:

Reference i) indicates that one of the major components of the Project is constructing one new pipeline from Edmonton to Hinton, Alberta.

Reference ii) contains a clause in the sample Agreement for Easement for the Province of Alberta stating that Trans Mountain proposes to install two pipelines in the right-of way.

Request:

Please provide an explanation for why the sample Agreement for Easement contains a clause indicating that Trans Mountain proposes to install two pipelines in the Project right-of way. In the explanation please describe how the installation of two pipelines in the right-of-way would be consistent paragraph 86(2)(e) of the *National Energy Board Act*.

Response:

The sample easement agreement included within the Application, A3S0R1, Volume 2, Project Overview, Economics and General Information, Appendix E – Agreement for Easement, Province of Alberta, Clause 21, PDF page 182 of 230 was intended to be a sample agreement. The proposed easement agreements for both Alberta and British Columbia have been further developed and are attached (see NEB IR No. 1.29-Attachment 1 to NEB IR No. 1.29–Attachment 4). These agreements reflect wording granting rights for a single pipeline and are compliant with paragraph 86(2)(e) of the *National Energy Board Act*.

Please see the following attachments:

- NEB IR No. 1.29-Attachment 1 (AB ROW Purchase Agreement)
- NEB IR No. 1.29-Attachment 2 (AB ROW-Final April 29, 2014-AFFADAVIT)
- NEB IR No. 1.29-Attachment 3 (BC ROW Purchase Agreement)
- NEB IR No. 1.29-Attachment 4 (BC ROW-Final April 29, 2014)

1.30 Lease agreements

Reference:

A3S0R0, Application Volume 2, Project Overview, Economics and General Information:

i) PDF pages 35 and 36 of 43
ii) PDF page 41 of 43
iii) NEB Filing Manual, Chapter 4, Guide A.4, Filing Requirements – Lands, PDF page 120 of 258

Preamble:

Reference i) provides a summary of the types of land rights required by the Project, including leased lands for temporary land use for construction and reclamation activities to be acquired from Crown authorities and private landowners.

Reference ii) provides a list of the various sample agreements.

Reference iii) outlines the NEB filing requirements for land acquisition agreements, including providing a sample copy for temporary work space or other agreements for the lands required for projects.

Request:

Please provide a sample lease agreement to be made with Crown authorities and private landowners for temporary land use for construction and reclamation activities.

Response:

A sample lease agreement for temporary use of land for construction on Alberta Crown Lands is attached (see NEB IR No. 1.30 – Attachment 1; AB Agreement for TWS-Crown Occupants draft). British Columbia does not have a standard document for Crown occupants to sign or acknowledge. In an application for use of BC Crown Lands, the applicant is required to advise the Crown of what consultation and notifications have occurred in advising the tenure holders of the proposed project. As part of the ongoing landowner engagement program, prior to Trans Mountain making an application for temporary use of Crown lands, Crown applicants affected by the Project will be notified and any additional input gathered and incorporated into the Project landowner database for incorporation into the construction line list (see response to NEB IR No. 1.14a).

Environment

1.31 Greenhouse gas (GHG) emissions – Carbon Management Plan

Reference:

A3S0R5, Application Volume 3A, Public Consultation, PDF page 5 of 156

Preamble:

The reference states that Trans Mountain is assessing the carbon impact of constructing and operating the proposed expansion of the existing Trans Mountain Pipeline System and its related facilities. The reference further states that a Carbon Management Plan will be developed to mitigate the GHGs as much as possible.

The Board notes that the Project application does not include the carbon management plan or provide details on when it will be filed or what its contents will be.

Request:

Please provide the Carbon Management Plan for the Project. If this plan is currently not available, please describe in detail what the plan would include, and also provide the anticipated timing of when the plan will be filed with the Board.

Response:

Trans Mountain Pipeline ULC (Trans Mountain) has, and will continue to assess the carbon impact of constructing and operating the existing and proposed pipeline system and its related facilities.

The term 'Carbon Management Plan' (CMP) originated during stakeholder consultation activities for the Trans Mountain Expansion Project (the Project). Trans Mountain defines this plan as all measures and programs to quantify and mitigate the emission of greenhouse gases (GHGs) to atmosphere resulting from the direct construction and operation of the Project. The scope of the plan does not include the air emissions resulting from tankers and tug escorts as Trans Mountain does not own or operate these vessels.

For clarity, the use of CMP in the Application refers to the objective for GHG emissions mitigation; opportunities for implementation and development of these initiatives are embedded through Project design, construction, and operations as detailed in the Environmental Protection Plans (EPPs) for Pipeline, Facilities, and Westridge Marine Terminal (Volume 6B, 6C, and 6D) and will not be expressed as a formal stand-alone CMP.

Trans Mountain identified in Section 7.2.5 of Volume 5A of the Application that an increase in GHG emissions will result from the construction and operation of the proposed pipeline and most of the related facilities. One exception is noted - due to an improvement in technology at the Westridge Marine Terminal (WMT), GHG emissions from the operation of the WMT will be reduced.

The following paragraphs describe in greater detail Trans Mountain's approach to managing GHG emissions for all phases of the Project.

Design

Emissions management is embedded in the design of the Project. For example, with respect to the selection of technology at facilities, Trans Mountain will recognize a reduction in GHG emissions at the WMT as a result of the Project. Trans Mountain is proposing to replace the existing Vapour Combustion Unit (VCU) with two new Vapour Recovery Units (VRUs) to address the issue of the increase in tankers loading at the WMT and the associated increase in fugitive emissions of the tankers while at berth. Currently, 90% of the fugitive emissions from tankers at berth are captured and destroyed in a VCU at the WMT, which accounts for a substantial source of GHG emissions during operations at the WMT. Once the VCU is replaced with the new VRU, which, instead of combusting the vapours, captures and re-injects the vapours back into the tanker, GHG emissions at WMT are predicted to decrease by 45 kT CO_{2e} annually. This change in technology at WMT is predicted to contribute to a reduction of 0.05% of British Columbia's total annual GHG emissions.

Equipment selection for pump stations and terminals also includes efforts to reduce GHG emissions through the selection and sourcing of high efficiency equipment, though much of the benefit applies to indirect emissions from electricity providers. Energy-efficient equipment includes variable frequency drives, high-efficiency pumps, high efficiency pump motors, and station transformers. Specification and tender documents will include vendor selection criteria that considers energy efficiency in the bid evaluation. This approach was successfully applied as part of the Trans Mountain Pump Station Expansion Project and was recognized through a BC Hydro Power Smart award.

Construction

The Environmental Protection Plans (EPPs) for Pipeline, Facilities, and Westridge Marine Terminal (Volume 6B, 6C, and 6D) make reference to resource-specific Air Quality mitigation measures. Measures related to air quality during construction will be provided with the updated EPP to be filed with the National Energy Board (NEB) as per draft NEB Conditions 29 and 30 (2014) at least 90 days prior to commencing construction.

The largest source of GHGs during construction (one time) will result from land clearing and operation of construction equipment and vehicles, as identified in the Application in Section 7.2.5, Table 7.2.5-2 of Volume 5A. 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 90% of all estimated construction GHG emissions. These GHGs are direct emissions from activities such as burning of vegetative waste, mulching of vegetative waste, and/or transportation of vegetative waste to approved disposal location.

An example of mitigation strategies under development is described in Section 7.2.4 of Volume 5A:

- 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.

Lesser sources of GHG emissions during construction will be addressed through Trans Mountain policies and tender specifications. Examples of these measures are included in Section 7.0 of Volume 6B, Pipeline EPP and are as follows:

- Restrict the duration that vehicles and equipment are allowed to sit and idle to less than one hour, unless air temperature is less than 0°C.
- Ensure equipment is well-maintained during construction to minimize air emissions and unnecessary noise.
- Use multi-passenger vehicles for the transportation of crews to and from the job sites, to the extent feasible.
- Conduct burning in accordance with burning permit requirements and A Smoke Management Framework for British Columbia (Province of British Columbia 2011), as applicable. Comply with local government bylaws, the *Forest and Prairie Protection Act* (Government of Alberta 2013) and *Open Burning Smoke Control Regulation* (British Columbia Regulation 145/93 1993) and the *Forest Fire Prevention and Suppression Regulation* when burning slash (British Columbia Regulation 169/95 1995).

Operation

Kinder Morgan Canada Inc. (KMC) (as the operator of the existing Trans Mountain Pipeline System to which the Project would be integrated) will continue to explore opportunities to reduce GHG and other air emissions during the operation of its facilities including the Project.

KMC will continue to complete a GHG inventory on an annual basis according to the requirements of the KMC Environmental Manual, 2.1 Environmental Standards, Section 3.0 Air Quality (2013).

Since 2000, Trans Mountain, operating as KMC since 2005, has implemented GHG emissions reductions by upgrading technology at its existing facilities to address the direct GHG emissions created during operations. An example of this is the installation of variable frequency drives at pump stations to reduce energy losses through control valve throttling. As a result of operating experience, Trans Mountain continues to identify and integrate design changes for new projects to improve operating efficiency while reducing GHG and other emissions. An example of design improvements related to the reduction of GHG emissions for the Project was provided previously in this response.

With respect to indirect emissions related to the operation of the Project, Trans Mountain estimates that the largest source of GHG emissions would likely result from the use of electricity at pump stations and terminals particularly in Alberta where most electricity is produced from coal-fired generation. Trans Mountain understands that electrical suppliers in Alberta, most of which are defined as Large Final Emitters under provincial legislation, have established GHG emissions management programs to reduce and/or offset GHG emissions from the electrical power they generate and sell to the grid.

References:

British Columbia Regulation 145/93. 1993. Environmental Management Act. Open Burning Smoke Control Regulations. O.C. 481/93.

British Columbia Regulation 169/95. 1995. Regulation – Forest Practices Code of BC Act. Forest Fire Prevention and Suppression Regulation. O.C. 436/95.

Government of Alberta. 2013. Forest and Prairie Protection Act. Revised Statutes of Alberta 2000 Chapter F-19.

Kinder Morgan Canada Inc. 2013. Environmental Manual. 2.1 Environmental Standards, Section 3.0 Air Quality.

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

Province of British Columbia. 2011. A Smoke Management Framework for British Columbia. A Cross-government Approach to Reduce Human Exposure to Smoke from Biomass Burning.

1.32 GHG emissions – reporting

Reference:

i) A3S1U0, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air Quality and Greenhouse Gas Technical Report, PDF page 31 of 105
ii) A3S1Q9, Application Volume 5A, Environmental and Socio-economic Assessment – Biophysical, PDF page 101 of 403
iii) A3S1R0, Application Volume 5A, Environmental and Socio-economic Assessment – Biophysical, PDF page 157 of 260

Preamble:

Reference i) states that all facilities emitting more than 50,000 tonnes of GHGs are required to submit a report under Environment Canada's Greenhouse Gas Emissions Reporting Program, and that facilities in Alberta emitting more than 50,000 tonnes of GHGs are also required to submit reports under Alberta Environment and Sustainable Development's *Specified Gas Reporting Regulation*. The reference also states that British Columbia's Reporting Regulation under the *Greenhouse Gas Reduction (Cap and Trade) Act* sets out the requirements for reporting GHG emissions from British Columbia facilities emitting 10,000 tonnes of GHGs, and that those facilities with emissions exceeding 25,000 tonnes are required to have emissions reports verified by a third party.

Reference ii) indicates that the total construction emissions from the Project are expected to be 985,800 tonnes of carbon dioxide equivalent (CO_2e) and the annual Project operation emissions are estimated to be 1,083,000 tonnes of CO_2e.

Reference iii) states that temporary GHG emissions (e.g., from fossil fuel combustion in construction equipment or from forest clearing) are typically not considered in the context of local and regional management plans, nor do provincial GHG reporting requirements in British Columbia and Alberta apply to temporary construction emissions. In addition, Reference iii) states that indirect emissions caused by electricity use for the pump assemblies are to be accounted for by the generating facility and; therefore, to avoid double counting, the Project's indirect emissions do not fall under local and regional management plans or provincial GHG reporting requirements in British Columbia and Alberta.

Given these stated exemptions from reporting, it is not clear exactly which GHG emissions, if any, will be reported under federal, provincial, or local requirements.

Request:

Please provide a detailed explanation of which types of GHG emissions from Project construction and operations will be reported in compliance with federal, provincial, and local GHG reporting requirements, and which types will not be reported, including a rationale and supporting documentation in each case.

Response:

The Application for the Trans Mountain Expansion Project includes an assessment of all greenhouse gas (GHG) emissions associated with the Project including emissions from construction and operation phases. The Environmental and Socio-economic Assessment - (ESA) (Volume 5A - Biophysical) filed included estimates of air (and GHG) emissions generated during the construction, operation and decommissioning of the Project. Although the ESA provides estimates of GHG emissions during all three of these phases of a Project, only emissions from normal operations are required to be reported under federal and provincial GHG emission reporting and reduction programs.

Greenhouse gas emissions from normal operations can further be classified as direct or indirect emissions. Direct emissions occur from sources that are owned or controlled by the reporting entity (*e.g.,* from on-site equipment), and indirect emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity (*e.g.,* from consumption of purchased electricity, heat, or steam) (see Section 3.4.3.1 of Technical Report 5C-4 in Volume 5C, Air Quality and Greenhouse Gas Technical Report [RWDI December 2013]). Only direct operational emissions are included in federal and provincial reporting and reduction programs.

TABLE 1.32-1 lists the Project's emission sources and identifies whether or not these emissions are subject to emission reporting.

Facilities emitting GHGs during operations are required to report and verify direct GHG emissions if they exceed thresholds set out by federal and provincial regulations. The Project spans two provinces, Alberta and British Columbia. Trans Mountain complies with all provincial and federal compliance programs that are applicable. For the Project, the applicable GHG reporting programs are shown in TABLE 1.32-2.

Trans Mountain will track GHG emissions in Alberta and British Columbia during the operation of the pipeline once construction has been completed. In compliance with federal and provincial GHG reporting requirements, Trans Mountain will report direct annual operating GHG emissions from facilities which meet or exceed the reporting thresholds.

TABLE 1.32-1

APPLICABILITY OF PROJECT EMISSION SOURCES TO GHG REPORTING

Emission Source	Project Phase	Emission Activity	Emission Type	Subject to GHG Emission Reporting?	Facility Expected to Meet Reporting Threshold?
Pipeline	Construction	Land-clearing	Direct	No	
		Construction Equipment	Direct	No	
	Operation	Maintenance and Inspection activities	Direct	Yes, if meets threshold	No
Pump Stations	Construction	Construction Equipment	Direct	No	
	Operation	Space heating	Direct	Yes, if meets threshold	No
		Fugitive	Direct	Yes, if meets threshold	
		Personal Transportation	Direct	Yes, if meets threshold	
		Electricity	Indirect	No	
Tank Installation and Operation	Construction	Construction Equipment	Direct	No	
	Operation	Personal Transportation	Direct	Yes, if meets threshold	No
		Space heating	Direct	Yes, if meets threshold	
		Fugitive	Direct	Yes, if meets threshold	
		Electricity	Indirect	No	
Westridge Marine Terminal	Construction	Construction Equipment	Direct	No	
	Operation	Personal Transportation	Direct	Yes, if meets threshold	No
		Space Heating	Direct	Yes, if meets threshold	
		Vapour Flaring	Direct	Yes, if meets threshold	
		Electricity	Indirect	No	
Pipeline Reactivation	Operation	Maintenance and Inspection	Direct	Yes, if meets threshold	No

TABLE 1.32-2

FEDERAL AND PROVINCIAL GHG REPORTING PROGRAMS

Reporting Program	Reference	Facility Threshold	Requirement	Exemptions	Does any Facility in the Project Meet Reporting Threshold?
Environment Canada's Greenhouse Gas Emissions Reporting Program	Queen's Printer for Canada (2013)	50,000 tonnes of CO_{2e}	Submit a report	Construction emissions and indirect emissions	No
Alberta Environment and Sustainable Development's *Specified Gas Reporting Regulation*	Alberta Sustainable Resource Development (2014)	50,000 tonnes of CO_{2e}	Submit a report		No
Alberta Environment and Sustainable Development's *Specified Gas Emitters Regulation*	Province of Alberta (2013)	100,000 tonnes of CO_{2e}	Reduce emission intensity by 2% annually over 6 years		No
British Columbia's *Reporting Regulation* under the *Greenhouse Gas Reduction (Cap and Trade) Act*	Province of British Columbia (2010)	10,000 tonnes of CO_{2e}	Submit a report		No
		25,000 tonnes of CO_{2e}	Emissions reports verified by a third party		No

The total construction emissions from the Project, 985,800 tonnes of CO_{2e} as noted in Reference ii), are all construction-related emissions and are not reportable to any federal or provincial GHG reporting or reduction programs. The total Project emissions, 1,083,000 tonnes of CO_{2e} as noted in Reference ii), consist of direct emissions from space heating, fugitive losses, and flaring and indirect emissions from the purchase of electricity. Indirect emissions (from electricity purchase) are not reportable to any federal or provincial GHG reporting programs. Indirect electricity emissions are reportable by the power provider as direct emissions (as noted in Reference iii). The indirect emissions from electricity purchase are 1,127,000 tonnes of CO_{2e} (of the 1,083,000 tonnes of CO_{2e}). The amount of indirect electricity emissions is greater than the total emissions from Project operation, as the Project emissions also includes a net decrease of direct GHG emissions from vapour combustion at the Westridge Marine Terminal. It should be noted that the annual Project-related GHG emissions were based on a very conservative assumption of operating at design capacity from day one of operations and continuing for the duration of the Project life. Actual indirect GHG emissions, that account for most of the Project-related emission totals, are expected to be much less than the estimated totals.

Of the remaining direct emissions, no facilities are expected to meet or exceed the federal or provincial GHG reporting thresholds (as seen in TABLE 1.32-2).

There are currently no municipal (local government) GHG reporting requirements for industrial facilities. As such, Trans Mountain will not report GHG emissions to any local GHG reporting programs.

References:

Alberta Environment and Sustainable Resource Development. 2014. Specified Gas Reporting Standard Version 8. Edmonton, AB.

Province of Alberta, 2013. Specified Gas Emitters Regulation 139/2007 with amendments up to and including Alberta Regulation 89/2013. Edmonton, AB.

Province of British Columbia. 2010. Greenhouse Gas Reduction (Cap and Trade) Act Reporting Regulation Reg. 272/2009 [includes amendments up to B.C. Reg 376/2010, December 20, 2010]. Victoria, BC.

Queen's Printer for Canada. 2013. Canada Gazette Part I Volume 147, No. 44.Ottawa, ON.

1.33 GHG emissions – continuous improvement

Reference:

i) A3S1Q9, Application Volume 5A, Environmental and Socio-economic Assessment – Biophysical, PDF page 101 of 403
ii) National Energy Board Onshore Pipeline Regulations, paragraphs 6.5(1)(a) and 6.5(1)(x)
iii) NEB Filing Manual, Section 3.3 – Management Systems and Programs under the OPR (PDF page 30 of 258) and Table A.2 – Filing Requirements for Biophysical Elements – GHG Emissions (PDF page 102 of 258)
iv) Canadian Environmental Assessment Agency, Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners, prepared by Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, November 2003, PDF pages 7 and 8 of 50
v) Regulating Greenhouse Gas Emissions, Alberta Environment and Sustainable Resource Development
vi) Legislation and Regulations, British Columbia Ministry of Environment
vii) A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical, PDF page 94 of 403
viii) A3S1R0, Application Volume 5A, Environmental and Socio-economic Assessment – Biophysical, PDF page 157 of 260

Preamble:

Reference i) indicates that the total construction emissions from the Project are expected to be 985,800 tonnes of CO_2e and the annual Project operation emissions are estimated to be 1,083,000 tonnes of CO_2e.

Reference ii) requires companies to establish and implement processes for setting objectives and targets, and for ensuring continual improvement in meeting the company's obligations, including protection of the environment.

Reference iii) outlines the importance of a carefully designed and well-implemented management system with measures to evaluate effectiveness and to promote continual improvement. Specific filing requirements include measures to be implemented for the continuous improvement of GHG emissions management.

Reference iv) encourages the consistent consideration of climate change in environmental assessment processes, and suggests that jurisdictional policies and regulations should be the cornerstones of climate change related environmental assessment practice.

Reference v) provides an overview of Alberta's approach to regulating GHG emissions, which includes, under the *Specified Gas Emitters Regulation*, requiring facilities that emit more than 100,000 tonnes of GHGs per year to reduce emissions intensity by 12 per cent. To meet this target, companies can make improvements to their operations, purchase Alberta-based offset

credits, contribute to the Climate Change and Emissions Management Fund, or purchase or use Emission Performance Credits.

Reference vi) provides an overview of British Columbia's legislative framework for its approach to reducing GHG emissions, which includes the *Greenhouse Gas Reduction Targets Act* that sets provincial target levels (*e.g.*, "Under the Act, B.C.'s GHG emissions are to be reduced by at least 33 per cent below 2007 levels by 2020"), and the *Carbon Tax Act* that "puts a price on GHG emissions, providing an incentive for sustainable choices that produce fewer emissions".

In References vii) and viii), Trans Mountain provides an overview of federal, provincial, and local measures related to GHG emissions.

Given the magnitude of the estimated GHG emissions from the Project, further information is needed on the measures to be implemented to demonstrate continuous improvement with respect to GHG emissions, and to demonstrate consistency with the GHG policies, regulations, and targets of relevant jurisdictions.

Request:

Please provide:

a) a description of any objectives, targets, and initiatives that are being or will be undertaken by Trans Mountain to achieve continuous improvement with respect to GHG emissions, as well as an explanation of how they represent improvement over past practices, and how they will apply to the Project; and

b) an explanation of the relevance of existing and planned federal, provincial, and local reduction targets, policies, and requirements related to GHG emissions, including required reductions, offsets, and payments, including a description of:
   b.1) the extent to which such targets, policies, and requirements will apply to GHG emissions from Project construction and operations; and
   b.2) how Project GHG emissions compare to each relevant jurisdiction's reduction targets.

Response:

a) Trans Mountain Pipeline ULC (Trans Mountain) has a systematic approach to health, safety, security and environmental management designed to ensure compliance with the law, to train employees to be aware of and meet their responsibility for protection of health, safety and the environment, and to achieve continuous performance improvement. In addition to the Trans Mountain commitment, contractors and joint ventures under Trans Mountain's operational control are expected to apply this policy.

   Trans Mountain identified in Section 7.2.5 of Volume 5A of the Application that a modest increase in greenhouse gas (GHG) emissions will result from the construction and operation of the proposed pipeline and related facilities. One exception is noted - due to an improvement in technology at the Westridge Marine Terminal (WMT), GHG emissions from

the operation of the WMT will be reduced. The Trans Mountain Expansion Project (Project)-related GHG emissions were based on a conservative assumption of operating at design capacity from day one of operations and continuing for the duration of the Project life. Actual GHG emissions, are expected to be much less than the estimated totals.

To continuously improve GHG emissions, Trans Mountain will address construction and operational GHG emissions through a number of actions as outlined in detail in the response to NEB IR No. 1.31. A summary of the actions are listed below.

- Emissions management is embedded in the design of the Project (*e.g.*, replacement of the existing Vapour Combustion Unit with two new Vapour Recovery Units at the WMT, selection of energy-efficient equipment). This is an improvement over past practices.
- 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 90% of all estimated construction GHG emissions due in in large part to burning of vegetative waste. 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.
- Lesser sources of GHG emissions during Project construction will be addressed through Trans Mountain contract specifications. Several examples are provided in the response to the NEB IR No. 1.31 (*e.g.*, ensure equipment is well-maintained during construction to minimize air emissions and unnecessary noise).
- Kinder Morgan Canada Inc. (KMC) (as the operator of the existing Trans Mountain Pipeline System to which the Project would be integrated) will continue to explore opportunities to reduce GHG and other air emissions during the operation of its facilities including the Project.
- KMC will continue to complete a GHG inventory on an annual basis according to the requirements of the KMC Environmental Manual (2013).

Reference:

Kinder Morgan Canada Inc. 2013. Environmental Manual. 2.1 Environmental Standards, Section 3.0 Air Quality.

b) The annual Project-related GHG emissions presented in Reference i) were based on a very conservative assumption of operating at design capacity from day one of operations and continuing for the duration of the Project life. Actual indirect GHG emissions, that account for most of the Project-related emission totals, are expected to be much less than the estimated totals.

There are a number of existing and planned federal, provincial, and local reduction targets, policies, and requirements related to GHG emissions that are summarized in Table 1.33B-1. Examples would include:

- Canada's proposed economy-wide emissions target of 17% below year 2005 levels by year 2020, as proposed at COP15 as part of the Copenhagen Accord;
- Alberta's strategy to reduce business-as-usual GHG emissions by 50 Mt by year 2020 and by 200 Mt by year 2050; and
- British Columbia's targets to reduce its GHG emissions by 18% by year 2016, 33% by year 2020, and 80% by year 2050, compared to year 2007 levels.

Canada's proposed emission target was presented as part of the COP15 meetings, but has not been ratified or finalized. Environment Canada's Greenhouse Gas Emissions Reporting Program requires industrial facilities that emit more than 50,000 tonnes of CO_{2e} annually to report direct facility annual emissions (Queen's Printer for Canada 2013). The reporting program does not set absolute or facility GHG emission limits. Construction emissions are exempt because they are not direct emissions from the operation of the facility. No facilities associated with this Project will meet the reporting threshold. Environment Canada's National Inventory Report estimates total GHG emissions from Canada to be 702 Mt in year 2011 (Environment Canada 2013). Operational emissions from Trans Mountain's proposed Project will increase total (indirect and direct) GHG emissions in Canada by 0.15% (see Reference i).

Alberta's 2008 Climate Change Strategy outlines actions to reduce GHG emissions by 50 Mt of CO_{2e} by year 2020 over the business-as-usual case. The strategy is supported by Alberta Environment and Sustainable Development's (AESRD) *Specified Gas Reporting Regulation* and *Specified Gas Emitters Regulation.* The *Specified Gas Reporting Regulation* requires facilities emitting more than 50,000 tonnes of CO_{2e} annually to report to the provincial registry (AESRD 2014). New facilities emitting more than 100,000 tonnes of CO_{2e} annually must reduce their emission intensity by 10% over the first eight years of operations. Facilities that cannot achieve the reduction must purchase offsets or provide payments to a provincial fund. Construction emissions are exempt because they are not direct emissions from the operation of the facility. No facilities associated with this Project are expected to meet either threshold. Operational emissions from Trans Mountain's proposed Project will increase GHG emissions in Alberta by 0.46% (see Reference i).

British Columbia's *Greenhouse Gas Reduction Targets Act* legislates emission targets including a reduction in GHG emissions by 33% by year 2020, compared to year 2007 levels. All emissions from all sectors and activities will be included in the target. Specific emission limits and goals have not been set for individual facilities through this legislation.

British Columbia has a series of supporting legislation to progress toward the emission reduction targets. The legislation that will apply to this Project includes:

- *The Greenhouse Gas Reduction (Cap and Trade) Act*;
- *The Greenhouse Gas Reduction (Vehicle Emissions Standards) Act*;
- *The Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements)*;
- *The Carbon Tax Act*;

- *The (Proposed) Emission Trading Regulation*; and
- *Local Government (Green Communities) Statutes Amendment Act.*

British Columbia's *Greenhouse Gas Reduction (Cap and Trade) Act* includes the establishment of a *Reporting Regulation.* The Reporting Regulation requires annual reporting and verification of GHG emissions for facilities with direct emissions above the thresholds. Facilities with direct annual emissions above 10,000 tonnes of CO_{2e} must report their emission totals, and facilities with direct annual emissions above 25,000 tonnes of CO_{2e} must have their emissions verified by a third party (Province of British Columbia, 2010). Construction emissions are exempt because they are not direct emissions from the operation of the facility. None of the facilities associated with the Project are expected to exceed the reporting or verification thresholds. Operational emissions from the Project will decrease GHG emissions in British Columbia by 0.05% (see Reference i).

British Columbia's *Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act* applies to the sale of fuels in the province, and mandates that the total fuel sold within British Columbia meet specified minimum amounts of renewable and low carbon fuel content. All fuels bought in British Columbia for construction and operational equipment will be subject to these regulations. All new construction and operational vehicles bought in British Columbia will be subject to these regulations.

British Columbia's *Carbon Tax Act* sets a tax rate based on the carbon intensity of the fuel used ($30 per tonne of CO_{2e}). The *Carbon Tax Act* applies to the sale and consumption of all fuels in the province. The carbon tax will provide an economic incentive for Project-related vehicles and equipment to operate more efficiently and reduce fuel consumption and emissions.

British Columbia has proposed an *Emission Trading Regulation* which is not yet enacted. The proposed regulation could set emission allowance limits for facilities. Facilities which cannot meet these limits may be required to purchase offsets or allowances. Initial indications are that the regulation would apply to facilities emitting more than 25,000 tonnes of CO_{2e} annually. The regulation is not expected to apply to construction emissions. Operational emissions at all facilities associated with the Project are expected to be below this threshold.

British Columbia's *Local Government (Green Communities) Statutes Amendment Act* requires local governments to include GHG emission targets, policies and actions in their Official Community Plans and Regional Growth Strategies. Some local and regional governments in British Columbia have set community GHG emission targets consistent with the British Columbia targets. For example, Metro Vancouver's Regional Growth Strategy includes a target to reduce regional GHG emissions by 33% by year 2020 (from year 2007). Many local governments in British Columbia and Alberta have plans, bylaws, or strategies which include goals of reducing GHG emissions, but have not set specific

numerical targets. The total direct GHG emissions from Project operations in British Columbia are expected to decrease due to the planned change of the operating status for the vapour combustion unit to stand-by mode; however, the decreases will not occur in all local government regions. Direct GHG emissions from vapour flaring are expected to decrease supporting the GHG emission goals of Metro Vancouver. However, the Project is expected to result in negligible increases of fugitive and space heating operational GHG emissions in many other local municipalities in British Columbia and Alberta. Construction equipment and land clearing will result in increased GHG emissions over the construction phase, along the proposed pipeline corridor. These emissions are not expected to impact the long-term goals of local governments since the emissions will only occur during construction.

b.1) Given that the Project is a federally regulated project, it is not yet clear the extent to which provincial and local targets, policies, and requirements may apply to the Project. Even assuming that the Project is subject to all of these requirements, construction emissions are considered exempt from Environment Canada's Greenhouse Gas Emissions Reporting Program, Alberta's *Specified Gas Reporting Regulation, Alberta's Specified Gas Emitters Regulation* and British Columbia's *Reporting Regulation* under the *Greenhouse Gas Reduction (Cap and Trade) Act*. Further, none of the facilities associated with the Project are expected to exceed the reporting or compliance thresholds for any of these regulations.

b.2) As summarized in Table 7.2.5-9 of Volume 5A, total (indirect and direct) operational GHG emissions from the Project are estimated to:

- increase in Canada by 0.15%;
- increase in Alberta by 0.46%; and
- decrease in British Columbia by 0.05%.

The Project is expected to result in a net increase in GHG emissions in Alberta and Canada. The magnitude of the increase in emissions in these jurisdictions is small. The Project is expected to result in a net decrease in GHG emissions in British Columbia, which is in support of the jurisdiction's target. It should be noted that the annual Project-related GHG emissions were based on a very conservative assumption of operating at design capacity from day one of operations and continuing for the duration of the Project life. Actual indirect GHG emissions, that account for most of the Project-related emission totals, are expected to be much less than the estimated totals.

TABLE 1.33B-1

FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT GHG REGULATIONS, POLICIES AND TARGETS

Regulation, Policy, Target or Requirement	Existing/Planned?	Required Reduction, Offset, and/or Payment?	(Facility) Requirements	Applicability to Project	How Do Emissions Compare to Jurisdictional Reduction Target?
Federal					
Environment Canada's Greenhouse Gas Emissions Reporting Program (Queen's Printer for Canada 2013)	Existing requirement (under *Canadian Environmental Protection Act* regulation)	No absolute GHG limits set. For comparison, Environment Canada's National Inventory Report estimates total GHG emissions from Canada to be 702 Mt in 2011. Alberta: 242.0 Mt, British Columbia: 59.1 Mt.	Report emissions (if over threshold).	Construction emissions are exempt because they are not direct emissions from the operation of the facility. Facilities directly emitting more than 50,000 tonnes of CO_{2e} annually must report. No facilities associated with the Project should meet this threshold.	No target for comparison.
Canada's National Target under the Copenhagen Accord	Proposed target (from COP 15)	Canada has submitted an economy-wide emissions target of 17% below 2005 levels by 2020. There are no specific targets for industry.	None.	All emissions from all sectors and activities will be included in the National total.	Project operation will increase GHG emissions in Canada by 0.15%. (Reference i)
Provincial - Alberta					
Alberta's 2008 Climate Change Strategy (Government of Alberta 2008)	Existing target	Reduce GHG emissions by 50 Mt by 2020 (from business-as-usual scenario). Reduce business-as-usual GHG emissions by 200 Mt by 2050.	Specific regulations for industry.	All emissions from all sectors and activities will be included in the Alberta total.	Project will increase GHG emissions in Alberta by 0.46%. (Reference i)

TABLE 2.33B-1

FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT GHG REGULATIONS, POLICIES AND TARGETS (continued)

Regulation, Policy, Target or Requirement	Exiting/Planned?	Required Reduction, Offset, and/or Payment?	(Facility) Requirements	Applicability to Project	How Do Emissions Compare to Jurisdictional Reduction Target?
Provincial – Alberta (continued)					
Alberta Environment and Sustainable Development's *Specified Gas Reporting Regulation* (Alberta Environment and Sustainable Resource Development 2014)	Existing regulation	No absolute GHG limit.	Facilities emitting more than 50,000 tonnes of CO_{2e} annually must report.	No facilities associated with the Project should meet this threshold. Construction emissions are exempt because they are not direct emissions from the operation of the facility.	No target specific to this legislation.
Alberta Environment and Sustainable Development's *Specified Gas Emitters Regulation* (Province of Alberta 2013)	Existing regulation	GHG Emission Intensity limit for large emitters. Reductions, offsets or compliance payments required.	New facilities emitting more than 100,000 tonnes of CO_{2e} annually must reduce emission intensity by 10% (2% per year over 8 years, starting in the fourth year of operations).	No facilities associated with the Project should meet this threshold. Construction emissions are exempt because they are not direct emissions from the operation of the facility.	Project facilities in Alberta will not meet threshold.

TABLE 3.33B-1

FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT GHG REGULATIONS, POLICIES AND TARGETS (continued)

Regulation, Policy, Target or Requirement	Existing/Planned?	Required Reduction, Offset, and/or Payment?	(Facility) Requirements	Applicability to Project	How Do Emissions Compare to Jurisdictional Reduction Target?
Provincial – British Columbia					
British Columbia's *Greenhouse Gas Reduction Targets Act,* November 2007	Existing regulation	Reduce GHG emissions by - 18% by 2016 - 33% by 2020 - 80% by 2050 (from 2007 levels) Legislation including: · *The Greenhouse Gas Reduction (Cap and Trade) Act* · *The Greenhouse Gas Reduction (Vehicle Emissions Standards) Act* · *The Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements)* · *The Carbon Tax Act* · *The (Proposed) Emission Trading Regulation* · *Local Government (Green Communities) Statutes Amendment Act*	Not specifically addressed in this legislation.	All emissions from all sectors and activities will be included in the British Columbia total.	British Columbia emissions decreased 4.5% from 2007 to 2010 (Live Smart BC 2012). Project will decrease GHG emissions in British Columbia by 0.05%. (Reference i)

TABLE 4.33B-1

FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT GHG REGULATIONS, POLICIES AND TARGETS (continued)

Regulation, Policy, Target or Requirement	Existing/Planned?	Required Reduction, Offset, and/or Payment?	(Facility) Requirements	Applicability to Project	How Do Emissions Compare to Jurisdictional Reduction Target?
Provincial – British Columbia (continued)					
British Columbia's *Reporting Regulation* under the *Greenhouse Gas Reduction (Cap and Trade) Act* (Province of British Columbia 2010)	Existing regulation	No required reduction. Required reporting and verification.	Facilities with direct emissions above 10,000 tonnes of CO_{2e} annually must report.	No facilities associated with the Project should meet this threshold. Construction emissions are exempt because they are not direct emissions from the operation of the facility.	No specific target for this legislation supports the *Greenhouse Gas Reduction Targets Act*. Project will decrease GHG emissions in British Columbia by 0.05%.
British Columbia's *Carbon Tax Act*	Existing regulation	Fuel sold includes an extra tax. Fee applied to purchase of fuel ($30 per tonne of CO_{2e}).	No specific requirements for facilities. Tax paid on purchase of fuels.	All fuels bought in British Columbia for equipment and vehicles will pay this tax.	No specific target for this legislation supports the *Greenhouse Gas Reduction Targets Act*.
British Columbia's Emission Trading Regulation	Proposed regulation	Emission allowance limits for facilities. If limits are not meet, facilities may be required to purchase offsets or allowances.	Facilities emitting more than 25,000 tonnes CO_{2e} annually will have emission allowance limits, emissions beyond these limits will have to be reduced or offset (through purchase of allowances or credits).	Proposed operation at all Project facilities will be below this threshold. Does not apply to construction emissions.	Specific targets (allowances) will be assigned to individual facilities once regulation is enacted. No specific target for this legislation at this time, supports the *Greenhouse Gas Reduction Targets Act*.

TABLE 5.33B-1

FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT GHG REGULATIONS, POLICIES AND TARGETS (continued)

Regulation, Policy, Target or Requirement	Existing/Planned?	Required Reduction, Offset, and/or Payment?	(Facility) Requirements	Applicability to Project	How Do Emissions Compare to Jurisdictional Reduction Target?
Local					
British Columbia's Local Government (Green Communities) *Statutes Amendment Act*	Existing regulation	Local governments are required to include GHG emission targets, policies and actions in their Official Community Plans and Regional Growth Strategies.	No specific requirements for facilities.	Emissions from large sectors and activities will be included in the Local Government totals – Industrial facilities will not be included.	GHG emissions during Project construction will increase local emissions over the construction period. These emissions will not be included in local government GHG inventories.
Metro Vancouver 2040 – Shaping our Future (Metro Vancouver 2011)	Existing plan	Reduce regional GHG emissions by 15% by 2015 and 33% by 2020 (from 2007).	No specific requirements for facilities.	Some operations will occur in this jurisdiction.	Project will decrease GHG emissions in British Columbia by 0.05%.
Municipalities and local governments in British Columbia and Alberta	Several plans in existence.	Most plans include a goal to reduce GHG emissions. Some plans include a numerical target. Some plans include a goal to become carbon neutral (see Reference viii).	No specific requirements for facilities. Facility emissions will not be included in local government inventories.	GHG emissions during Project construction will increase local emissions and be contrary to local reduction goals. These emissions will occur only over the construction phase and will be distributed along the entire pipeline corridor.	Total direct GHG emissions from operations are expected to decrease. Direct GHG emissions from pipeline (129 tonnes of CO_{2e}) and pump station (32 tonnes of CO_{2e}) operation are expected to increase. Direct GHG emissions from vapour flaring are expected to decrease substantially.

TABLE 6.33B-1

FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT GHG REGULATIONS, POLICIES AND TARGETS (continued)

Regulation, Policy, Target or Requirement	Existing/Planned?	Required Reduction, Offset, and/or Payment?	(Facility) Requirements	Applicability to Project	How Do Emissions Compare to Jurisdictional Reduction Target?
Local (continued)					
See above	See above	See above	See above	See above	A small increase (32 tonnes of CO_{2e}) of direct GHG emissions is estimated from Project tank operation (see Table 7.2.5-4 of Volume 5A). Direct GHG emissions from vapour flaring are expected to decrease by 44,740 tonnes of CO_{2e} (see Table 7.2.5-5 of Volume 5A).

References:

Alberta Environment and Sustainable Resource Development. 2014. Specified Gas Reporting Standard Version 8. Edmonton, AB.

Province of Alberta. 2013. Specified Gas Emitters Regulation 139/2007 with amendments up to and including Alberta Regulation 89/2013. Edmonton, AB.

Province of British Columbia. 2010. Greenhouse Gas Reduction (Cap and Trade) Act Reporting Regulation Reg. 272/2009 [includes amendments up to B.C. Reg 376/2010, December 20, 2010]. Victoria, BC.

Environment Canada. 2013. National Inventory Report – Greenhouse Gas Sources and Sinks in Canada: 1990 2011. Gatineau, QC. 539 pp.

Government of Alberta. 2008. Alberta's 2008 Climate Change Strategy Responsibility/ Leadership / Action. Edmonton, Alberta. 32 pp.

Live Smart BC. 2012. Making Progress on B.C.'s Climate Action Plan. Victoria, BC. 58 pp.

Queen's Printer for Canada. 2013. Canada Gazette Part I Volume 147, No. 44.Ottawa, ON.

Metro Vancouver. 2011. Burnaby, BC Metro Vancouver 2040 – Shaping our Future. 73 pp.

1.34 Air emissions monitoring – Edmonton Terminal

Reference:

i) A3S1U1, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air Quality and Greenhouse Gas Technical Report, PDF page 115 of 160
ii) A3S1U0, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air Quality and Greenhouse Gas Technical Report, PDF page 75 of 105
iii) A3S1U1, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air Quality and Greenhouse Gas Technical Report, PDF page 151 of 160

Preamble:

Reference i) states that the estimated total annual volatile organic compounds (VOCs) emissions due to Project operations at the Edmonton Terminal will increase by about 9 per cent as compared to existing operations.

Reference ii) states that, based on preliminary engineering, all proposed tanks at the Burnaby and Sumas Terminals will be installed with tank vapour activation units (TVAU). Reference ii) further states that the TVAUs were assumed to be equally effective on all VOCs and reduced-sulphur compounds.

In Reference iii), Trans Mountain states that post-construction monitoring is not required for Edmonton Terminal. The reference further states that Kinder Morgan Canada Inc. is currently a financially contributing member of the Strathcona Industrial Association, which operates a network of ambient air quality monitoring stations around the industrial park.

It is not clear to the Board why TVAUs are being installed at some terminals, but not at the Edmonton Terminal. More information is needed regarding air emissions mitigation at the Edmonton Terminal.

Request:

Please provide:

a) a detailed justification of why Trans Mountain did not consider TVAUs at the Edmonton Terminal;

b) mitigation measures for minimizing air emissions from the Edmonton Terminal, including any consideration of tank design options;

c) a detailed description of the methods and schedule of ambient air quality monitoring station(s) near the Edmonton Terminal, parameters monitored, and emissions source tracking, including a plan to identify emissions from the Edmonton Terminal as opposed to other emissions sources;

d) a discussion of how Trans Mountain intends to use the results from ambient air quality monitoring stations located in the vicinity of the Edmonton Terminal in mitigating or reducing the operational air emissions from that terminal;

e) confirmation that those potentially affected by air emissions from the Edmonton Terminal, including residents, land users, and Aboriginal groups, will be provided with contact information for use in the event there are concerns about such air emissions; and

f) a description of Trans Mountain's current and ongoing operational consultation program and complaint response process in regards to air emissions.

Response:

a) The need for tank vapour adsorption units (TVAUs) for Project storage tanks at the Edmonton Terminal to reduce emissions was considered; however, due to the low predicted concentrations of reduced sulphur compounds and volatile organic compounds emissions from the Edmonton Terminal, TVAUs were considered to be not necessary, since Project effects were well below Alberta Ambient Air Quality Objectives (AAAQO) and odour detection thresholds. Adequate mitigation will be provided by using external floating roof tanks and with primary and secondary seals.

   TVAUs are designed to minimize fugitive losses of reduced sulphur compounds and volatile organic compounds from storage tanks due to working and standing losses. Dispersion modelling results for the Edmonton Terminal indicated no exceedances of the respective AAAQOs or odour detection thresholds due to the Project (Tables 5.19 and 5.26 of Technical Report 5C-3 in Volume 5C, Air Quality and Greenhouse Gas Technical Report, respectively).

   As shown in the Application, Sections 4.3.1.1 and 5.3.1.1 of Technical Report 5C-3, maximum predicted 1-hour (9th highest) benzene, 24-hour xylenes and hydrogen sulphide; and annual benzene concentrations for the Existing and Application Cases including ambient background exceeded their respective AAAQOs. However, the maximum predicted 1-hour benzene, 24-hour hydrogen sulphide and annual benzene exceeded the AAAQOs near another existing facility (National Pollutant Release Inventory ID 6566), located just northwest of the Edmonton Terminal. The maximum predicted 24-hour xylenes concentration exceeded the AAAQO near another existing storage terminal (National Pollutant Release Inventory ID 6660), located about 2 km south-southeast of the Edmonton Terminal. Modelling of these facilities was based on conservative area source assumptions that would likely over estimate actual effects.

   The first facility contributes about 74%, 84% and 95% of the maximum predicted 1-hour (9th highest) benzene, annual benzene and 24-hour hydrogen sulphide concentrations without ambient background, respectively. The second storage terminal contributes approximately 87% of the maximum predicted 24-hour xylenes concentration without ambient background. By comparison, the Edmonton Terminal contributes only about 2% of the maximum 1-hour average benzene concentration without ambient background. For all other pollutants and averaging periods that exceeded the AAAQOs, the Edmonton Terminal contributes less than 0.1%.

   As demonstrated in Sections 4.3.3 and 5.3.3 of Technical Report 5C-3 for the Existing and Application Cases, respectively; all predicted compounds were found to be below their

respective odour thresholds except for hydrogen sulphide at the Edmonton Terminal, which is primarily due to existing facilities (i.e., other industrial sources and ambient background). Predicted maximum hydrogen sulphide concentrations due to the Project were less than 0.1% of the hydrogen sulphide odour detection threshold.

Based on the modelling results and assessment for odour potential and AAAQO, TVAUs were not recommended for the Project-related storage tanks at the Edmonton Terminal. Use of external floating roof tanks, with primary and secondary seals for the Project, is expected to provide adequate mitigation. No additional mitigation vapour control systems are required by the Canadian Council of the Ministers of Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (CCME 1995) for the tanks with the vapour pressure below 76 kPa at 21.1°C (see Table 5.1.7 of Appendix D in Volume 4A). Also, Kinder Morgan Canada Inc. began formally tracking public odour complains for the Edmonton Terminal since year 2001. There have been no public odour complaints attributed to the Edmonton Terminal operations. Therefore, TVAUs were not recommended for the Project-related storage tanks at the Edmonton Terminal.

b) All new tanks at the Edmonton Terminal are currently designed to be equipped with external floating roofs to minimize the vapour space above the liquid level. All tanks will be equipped with both primary and secondary seals. Tank operations will be continuously monitored and controlled through a computer-based Supervisory Control and Data Acquisition (SCADA) system from the existing Control Centre adjacent to the Edmonton Terminal (the Application, Sections 3.4. and 3.4.1 of Volume 4A).

All tanks will comply with the requirements of the *NEB Onshore Pipeline Regulations*, the Canadian Standards Association (CSA) Z662-03 Oil and Gas Pipelines Systems, the Canadian Council of the Ministers of the Environment (CCME) Standard 1326, *The Environmental Code of Practices for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products* and API Standard 650 *Welded Steel Tanks for Oil Storage* (as per Section 3.4 of Volume 4A).

All tanks at the Edmonton Terminal will have vapour pressures below 76 kPa at 21.1°C (based on the values in Table 5.1.7 of Appendix D in Volume 4A that were adjusted from Reid Vapor Pressure conditions of 37.8 C to 21.1 C to align with the CCME requirement). Therefore, in accordance with the requirements of the CCME *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks* (CCME 1995), use of the external floating roof tanks with primary and secondary seals, is expected to provide adequate mitigation and additional vapour control systems are not required.

Kinder Morgan Canada Inc. has been tracking public odour complaints for the Edmonton Terminal since year 2001. There have been no public complaints attributed to the Edmonton Terminal operations. Therefore, no additional vapour control systems are recommended for the Project tanks at the Edmonton Terminal.

c) A detailed description of the methods and schedule of Clean Air Strategic Air (CASA) and National Air Pollution Surveillance (NAPS) ambient air quality monitoring stations near the Edmonton Terminal (<3 km) along with the monitored parameters and air contaminants are summarized in Table 1.34C-1 (taken from Section 3.4.1.2 of Technical Report 5C-3 of Volume 5C, Air Quality and Greenhouse Gas Technical Report).

At the Edmonton Terminal, Kinder Morgan Canada Inc. has a permanent continuous monitoring system located in the east tank farm measuring real-time hydrocarbon Lower Explosive Levels (LEL) levels. The system is tied into the SCADA control system which would initiate an alarm if an exceedance occured. This system will function as a key tool for attributing air emissions caused by onsite activities. In addition, Kinder Morgan Canada Inc. is currently a financially contributing member of the not-for-profit Strathcona Industrial Association. The Strathcona Industrial Association operates a network of ambient air quality monitoring stations around the industrial park east of Edmonton and Strathcona County. A summary of the Strathcona Industrial Association stations near the Edmonton Terminal (<3 km) is provided in Table 1.34C-2.

As a member of the Strathcona Industrial Association Committee, Kinder Morgan Canada Inc. participates in monthly discussions regarding air quality, air monitoring and emerging air policies that affect the Strathcona Industrial Association and surrounding communities. The data collected at the stations listed in Table 1.34C-2 are available to all Strathcona Industrial Association regional facility operators, local emergency response agencies and Alberta Environment and Sustainable Resource Development (AESRD). The network manager submits validated monthly performance reports to AESRD and Strathcona Industrial Association members that identify substantive events and/or instances where Alberta Ambient Air Quality Objectives were not met. If an exceedance occurs, an investigation is launched by the regional facility operators (including Kinder Morgan Canada Inc.) to assess the cause. If necessary, AESRD completes a supplemental investigation. Through the investigation, the facility causing the exceedance can be identified. The Strathcona Industrial Association also prepares an annual technical report outlining the data gathered during the year that is submitted to AESRD.

TABLE 1.34C-1

CLEAN AIR STRATEGIC AIR (CASA) AND NATIONAL AIR POLLUTION SURVEILLANCE (NAPS) AIR QUALITY MONITORING STATIONS NEAR THE EDMONTON TERMINAL

Station ID	Station Name / Data Source	Longitude Latitude, Location Relative to the Terminal Centre	Parameters Monitored	Contaminants Monitored[1]	Schedule	Methods
1a	Edmonton East / CASA (ID 1029)	-113.368, 53.548 500 m northwest of the Terminal	Wind speed, wind direction, standard deviation of wind direction, outdoor air temperature, relative humidity, coefficient of haze	PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, H_2S, THC, NMHC, CH_4, Ozone	Continuous	Instrumental (for $PM_{2.5}$ variety of TEOM methods)
1b	Edmonton East / NAPS (ID 90121)	-113.368, 53.548 500 m northwest of the Terminal	N/A	Volatile organic compounds including benzene, toluene, ethyl benzene and xylene; polycyclic aromatic hydrocarbons and speciated $PM_{2.5}$ - PM_{10}	Intermittent basis (every sixth day)	Canister for VOCs, IDEF code for PAHs from hi-volume sampler, DEF code for ions and elements from dichotomous sampler for speciated $PM_{2.5}$ - PM_{10}

Note: 1. PM_{10} = particulate matter 10; $PM_{2.5}$ = particulate matter 2.5; CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulphur dioxide; THC = total hydrocarbons; NMHC = non-methane hydrocarbons; CH_4 = methane.

TABLE 1.34C-2

STRATHCONA INDUSTRIAL ASSOCIATION (SIA) AIR QUALITY MONITORING STATIONS NEAR EDMONTON TERMINAL

Station ID	Station Name / Data Source	Longitude, Latitude, Location Relative to the Terminal Centre	Parameters Monitored	Contaminants Monitored[1]	Schedule
1	Sherwood Park	-113.321, 53.532 3 km southeast of the Terminal	Wind speed, wind direction, outdoor air temperature	PM, NO_x, SO_2, H_2S and THC	Continuous
2	Elmjay Station	-113.366, 53.527 2 km south of the Terminal	Wind speed, wind direction, outdoor air temperature	SO_2, H_2S	Continuous
3	Gold Bar Station	-113.415, 53.549 3 km west-northwest of the Terminal	Wind speed, wind direction, outdoor air temperature	PM, NO_x, SO_2, H_2S	Continuous
4	Beverly Station	-113.394, 53.563 3 km northwest of the Terminal	Wind speed, wind direction, outdoor air temperature	PM, SO_2, H_2S and THC	Continuous

Source: Strathcona Industrial Association (2014).
Note: 1. PM = particulate matter; NO_x = oxides of nitrogen; SO_2 = sulphur dioxide; H_2S = hydrogen sulphide; THC = total hydrocarbons.

d) As a member of the Strathcona Industrial Association, Kinder Morgan Canada Inc. will work in conjunction with other members of the association along with Alberta Environment and Sustainable Resource Development to identify if any mitigation measures or reductions of the operational air emissions from the Edmonton Terminal are necessary. This will come as a result of the monthly performance reports prepared by the Strathcona Industrial Association network manager identifying substantive events and/or instances, the responsible facility and where Alberta Ambient Air Quality Objectives were not met.

e) Confirmed. Those potentially affected by air emissions from the Edmonton Terminal, including residents, land users, and Aboriginal groups, will be provided with contact information for use in the event there are concerns about such air emissions.

f) Kinder Morgan Canada Inc. (KMC) has a standard notification protocol in place to inform potentially affected people about ongoing operational activities that may impact its neighbours. When a project is anticipated to have increased levels of air emissions (often recognized by an increased odour level), KMC notifies affected neighbours in advance of work. Notifications contain a brief description of work, location of the project, information about potential disruptions, timelines and a KMC representative's contact information to address inquiries/concerns. KMC will use a notification delivery method that best suits the need.

   As a member of the Strathcona Industrial Association (SIA), the Trans Mountain Edmonton Terminal is part of a collective that manages and operates an Air Quality Management network. The SIA manages a Stakeholder Relations program that ensures the SIA and each of its members is regularly connecting with the community. Through the SIA website, social media, newsletters, community events and presentations, engagement with stakeholders and community is promoted to create a platform for sharing information and responding to inquiries, including any concerns from local residents.

   KMC operates a documented Odour Complaint Investigation and Response Program (including a 24 hour telephone number to report odours). A formal procedure is initiated when an odour complaint is received. KMC employees who respond to odour complaints undergo prescribed training regarding the use of appropriate procedures and equipment outlined in the program's training module. KMC's odour complaint responders are immediately dispatched to the location of the odour complaint with the appropriate air monitoring equipment in order to respond and investigate in a timely manner. Every odour complaint incident is investigated internally by reviewing meteorological data, onsite operations activity and any other information applicable to odourous emissions. The outcome of each odour complaint is used to assist in the management of onsite odours. Compilation of this data allows KMC to trend potential causes and adjust operations to minimize future odours.

Summary of New Commitments:

- Those potentially affected by air emissions from the Edmonton Terminal, including residents, land users, and Aboriginal groups, will be provided with contact information for use in the event there are concerns about such air emissions.

Reference:

Canadian Council of the Ministers of Environment. 1995. Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks PN 1180.

1.35 Air emissions monitoring – Burnaby and Sumas Terminals

Reference:

A3S1U1, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air Quality and Greenhouse Gas Technical Report:

i) PDF page 119 of 160
ii) PDF page 151 of 160

Preamble:

Reference i) states that the estimated total annual VOC emissions due to Project operations at the Burnaby Terminal will increase by about 7 per cent as compared to existing operations.

Reference ii) states that post-construction monitoring is not required for both Burnaby and Sumas and Terminals. The reference further states that the Burnaby and Sumas Terminals currently have continuous ambient air quality monitoring stations that report hydrogen sulphide (H_2S), sulphur dioxide (SO_2), and total VOC measurements, in addition to wind speed and wind direction, and that Kinder Morgan Canada has access to this data in real-time.

The Board requires more details concerning existing ambient air quality monitoring stations at Burnaby and Sumas Terminals to understand how Trans Mountain is monitoring and mitigating emissions from both the Burnaby and Sumas Terminals.

Request:

Please provide:

a) the location of the existing ambient air monitoring stations within the Burnaby and Sumas Terminals on a map or diagram in relation to the proposed new tanks;

b) a technical description of the existing ambient monitoring stations that demonstrates their ability to capture emissions from the proposed new tanks at the Burnaby and Sumas Terminals;

c) the methods and schedule of ambient monitoring for SO_2, H_2S, and VOCs, and emissions source tracking;

d) the rationale for not monitoring criteria air contaminant (CAC) emissions;

e) procedures for monitoring station data recording, assessment, and reporting details;

f) the criteria or thresholds that, if triggered or exceeded, will require implementing additional mitigation measures;

g) additional mitigation measures that could be implemented in response to monitoring data or concerns raised by residents, land users, and Aboriginal groups;

h) confirmation that those potentially affected by Project air emissions, including residents, land users, and Aboriginal groups will be provided with contact information for use in the event there are concerns about air emissions; and

i) a description of Trans Mountain's current and ongoing operational consultation program and complaint response process in regards to air emissions.

Response:

a) The locations of the Automated Monitoring System (SAM[1]) units at the Burnaby and Sumas terminals in relation to the existing and proposed new tanks are shown in NEB IR No. 1.35a – Attachment 1 and NEB IR No. 1.35a – Attachment 2, respectively. For both terminals, SAM units are located in the northwest corners of the facilities.

b) The locations of the Automated Monitoring System (SAM[2]) units within the boundaries of the Burnaby and Sumas terminals were strategically selected based on the air dispersion modelling results conducted by the monitoring equipment provider. For both terminals, the SAM units were placed in the northwest corner of the facilities. This location is based on the wind direction condition (wind blowing from southeast) causing potentially adverse impact due to the contribution from the existing and proposed tanks, which can affect the nearby communities. The nearby communities include:

- Auguston community, Abbotsford, BC located less than 1 km northwest of the Sumas Terminal; and
- Burnaby Mountain community, Burnaby, BC located less than 0.5 km west and northwest of the Burnaby Terminal.

The SAM units collect the sulphur dioxide (SO_2), hydrogen sulphide (H_2S), total volatile organic compounds (VOCs), wind direction and wind speed data. Emissions from the Burnaby and Sumas terminals are tracked by identifying onsite activity *(i.e.,* tank product movement, tank cleaning) at the time when odour complaints are received. By comparing onsite investigation results, SAM units' data and operational activities, the cause of odours can be determined and problematic emission sources can be identified.

SAM unit specifications for both Burnaby and Sumas Terminals are provided in Table 1.35B-1.

[1] Système Automatisé de Monitoring
[2] Système Automatisé de Monitoring

TABLE 1.35B-1

SAM UNIT SPECIFICATIONS FOR THE BURNABY AND SUMAS TERMINALS

Target Chemical	Technology	Detection Range	Detection Limit	Accuracy
H_2S	Electrochemical	0-300 ppb	2 ppb	±10%
SO_2	Electrochemical	0-5 ppm	20 ppb	±10%
Total VOC	Photo Ionization Detectors	0-50 ppm	5 ppb	±5%

The SAM units are enclosed in weatherproof cabinets, and are heated or ventilated when required. SAM units have been designed to operate under Canadian weather conditions. Each SAM unit includes a weather monitoring system for the measurement of wind speed and direction along with the pollutants of interest. SAM is a web-based monitoring system. The monitoring data are wirelessly logged and can be viewed in real time via the secure website. Real time and historical data can be downloaded from the website in Excel and PDF formats. An automated email notification will be sent out to the designated individuals within minutes if the SAM units detect exceedances of the pre-set levels, or if an equipment malfunction occurs. The SAM units are calibrated annually.

c) The Automated Monitoring System (SAM[3]) units are installed in the northwest corners of the Burnaby and Sumas terminals. The SAM units collect the sulphur dioxide (SO_2), hydrogen sulphide (H_2S) and total volatile organic compounds (VOCs), wind speed and wind direction data based on 1-minute averages. These data are continuously logged via wireless transmission. Historical and real time data can be viewed at any time online for as far back as the SAM units have been installed on sites (2013 for Burnaby and 2012 for Sumas). The program durations for the SAM units are indefinite or until the need for ambient monitoring on the two sites no longer exists. The SAM units use electrochemical technology for the H_2S and SO_2 monitoring and photo ionization detectors for the VOC monitoring.

In addition to the SAM units being installed directly on the grounds of the Sumas and Burnaby terminals, there are also Metro Vancouver (MV) and National Air Pollution Surveillance (NAPS) stations in the proximity of the terminals, which monitor SO_2, total reduced sulphur (TRS) and VOCs (see the Application, Section 3.4.1.2 of Technical Report 5C-3 in Volume 5C, Air Quality and Greenhouse Gas Technical Report). Summaries from the MV and NAPS stations, which monitor SO_2, TRS and VOCs and corresponding methods and schedules are shown in Tables 1.35C-1 and 1.35C-2 for the Burnaby and Sumas terminals, respectively. The data from these stations may be used for the comparison and confirmation of measurements from the SAM units' data and as supplemental data.

[3] Système Automatisé de Monitoring

TABLE 1.35C-1

METRO VANCOUVER (MV) AND NATIONAL AIR POLLUTION SURVEILLANCE (NAPS) AIR QUALITY MONITORING STATIONS NEAR BURNABY TERMINAL

Station ID	Station Name / Data Source	Longitude, Latitude, Location Relative to the Terminal Centre	Contaminants Monitored[1]	Schedule	Methods
Burnaby Terminal					
26a	Burmount / NAPS (ID 100133)	-122.936, 49.267 500 m southwest of the Terminal	Volatile organic compounds including benzene, toluene, ethyl benzene and xylene	Intermittent basis (every sixth day)	Canister
26b	Burnaby-Burmount / MV (ID T22)	-122.936, 49.267 500 m southwest of the Terminal	TRS	Continuous	Instrumental
27	Burnaby-Capitol Hill / MV (ID T23)	-122.986, 49.2878 4.5 km northwest of the Terminal	SO_2, TRS	Continuous	Instrumental
29	Burnaby Kensington Park / MV (ID T04)	-122.971, 49.279 3 km northwest of the Terminal	SO_2, TRS	Continuous	Instrumental
30	Port Moody / MV (ID T09)	-122.849, 49.281 6 km northeast of the Terminal	SO_2	Continuous	Instrumental
33	Second Narrows / MV (ID T06)	-123.020, 49.302 7 km northwest of the Terminal	SO_2	Continuous	Instrumental
34	Burnaby South / MV (ID T18)	-122.986, 49.215 7 km southwest of the Terminal	SO_2	Continuous	Instrumental

Note: 1. SO_2 = sulphur dioxide; TRS = total reduced sulphur (only SO_2, TRS and volatile organic compounds are shown)

TABLE 1.35C-2

METRO VANCOUVER (MV) AND NATIONAL AIR POLLUTION SURVEILLANCE (NAPS) AIR QUALITY MONITORING STATIONS NEAR SUMAS TERMINAL

Station ID	Station Name / Data Source	Longitude, Latitude, Location Relative to the Terminal Centre	Contaminants Monitored[1]	Schedule	Methods
Sumas Terminal					
23	Abbotsford Airport / NAPS (ID 101004)	-122.353, 49.033 12 km southwest of the Terminal	Volatile organic compounds including benzene, toluene, ethyl benzene and xylene	Intermittent basis (every sixth day)	Canister
24	Abbotsford Airport / MV (ID T34)	-122.343, 49.024 12 km southwest of the Terminal	SO_2	Continuous	Instrumental
25	Abbotsford Central / MV (ID T45)	-122.310, 49.043 9 km west-southwest of the Terminal	SO_2	Continuous	Instrumental

Note: 1. SO_2 = sulphur dioxide (only SO_2, total reduced sulphurs and volatile organic compounds are shown)

d) Burnaby and Sumas terminals do not have continuous sources of criteria air contaminant (CAC) emissions. The only CAC emission sources at both terminals are the emergency diesel generators and fire water pumps, which operate intermittently (testing and emergency events). Total CAC emissions from the diesel generators and fire water pumps represent less than 0.1% of the total CAC emissions in the Air Quality Local and Regional Study Areas for both terminals. This is demonstrated in Sections 4.2.1.3 and 4.2.1.4 (existing operations at Sumas Terminal and Burnaby Terminal, respectively); and Sections 5.2.3 and 5.2.4 (project operations at Sumas Terminal and Burnaby Terminal, respectively) of Technical Report 5C-3 in Volume 5C, Air Quality and Greenhouse Gas Technical Report, in the Application. Therefore, the monitoring of CAC emissions at the Burnaby and Sumas terminals was considered to be not necessary.

e) The Automated Monitoring System (SAM[4]) units collect the sulphur dioxide (SO_2), hydrogen sulphide (H_2S), total volatile organic compounds (VOCs), wind direction and wind speed data based on 1-minute averages and these data are logged via wireless transmission. Historical and real time data can be viewed at any time online on the secure website. The reported data are subjected to the Quality Assurance (QA) and Quality Control (QC) procedures. Monthly reports are produced to show maximum recorded levels for each parameter and whether any exceedances occurred. Internal quarterly reports are produced summarizing odour complaint history, SAM unit readings, onsite activities and outcome of odour investigations. These quarterly reports are shared with the stakeholders upon request.

   Along with the SAM units installed directly on the sites of the Sumas and Burnaby terminals there are also Metro Vancouver and National Air Pollution Surveillance (NAPS) stations in the proximity of the terminals, which monitor SO_2, total reduced sulphur (TRS) and VOCs. The data from the Metro Vancouver and NAPS stations can be used for the confirmation of the SAM units' data and as supplemental data along with the SAM units' data. All data undergo standard QA/QC procedures by Metro Vancouver and are reported annually in the Lower Fraser Valley Air Quality Monitoring Reports. Data are also provided to Environment Canada for inclusion in the NAPS database.

f) The Automated Monitoring System (SAM[5]) units at the Burnaby and Sumas terminals collect the sulphur dioxide (SO_2), hydrogen sulphide (H_2S) and total volatile organic compounds (VOCs) data based on 1-minute averages. An automated email will be sent by the SAM control system to the designated Kinder Morgan Canada Inc. individuals within minutes if the following threshold concentrations are met:

   - **H_2S:** 25 ppb (~35 µg/m^3) for 1-minute average (odour detection threshold for 3-minute average H_2S is 9 ppb (~13 µg/m^3) based on Table 4.46 of Technical Report 5C-3 in Volume 5C, Air Quality and Greenhouse Gas Technical Report of the Application;

[4] Système Automatisé de Monitoring
[5] Système Automatisé de Monitoring

- **SO_2:** 170 ppb (450 µg/m^3) for 1-hour average (British Columbia Ambient Air Quality Objective); and
- **TVOCs:** the threshold is not set as there is no regulatory level for total VOCs.

These thresholds are set for emergency response purposes. However, Trans Mountain's Odour Complaint Investigation and Response Program outlines that ambient air monitoring data, meteorological data and tank activity information are collected for each odour complaint and retained for trending analyses. The data are analyzed to identify specific tanks and/or products that may be causing recurring odours. Mitigative measures would then be investigated and potentially implemented to reduce the occurrence of nuisance odours. Elevated readings of odours are investigated even when no complaint is filed.

g) mitigation measures that could be implemented in response to monitoring data or concerns raised by residents, land users, and Aboriginal groups if feasible are:

- allocating odourous products to alternative tanks;
- replacing tank seals;
- installing domed tank roofs;
- installing portable or fixed air emissions "scrubbers"; and
- installing incinerator or vapour combustion unit or adsorption units.

h) Confirmed. Those potentially affected by Project air emissions, including residents, land users, and Aboriginal groups, will be provided with contact information for use in the event there are concerns about such air emissions.

i) Kinder Morgan Canada Inc. (KMC) has a standard notification protocol in place to inform potentially affected people about ongoing operational activities that may impact its neighbours. When a project is anticipated to have increased levels of air emissions (often recognized by an increased odour level), KMC notifies affected neighbours in advance of work. Notifications contain a brief description of work, location of the project, information about potential disruptions, timelines and a KMC representative's contact information to address inquiries/concerns. KMC will use a notification delivery method that best suits the need.

KMC operates a documented Odour Complaint Investigation and Response Program (including a 24 hour telephone number to report odours). A formal procedure is initiated when an odour complaint is received. KMC employees who respond to odour complaints undergo prescribed training regarding the use of appropriate procedures and equipment outlined in the program's training module. KMC's odour complaint responders are immediately dispatched to the location of the odour complaint with the appropriate air monitoring equipment in order to respond and investigate in a timely manner. Every odour complaint incident is investigated internally by reviewing meteorological data, onsite operations activity and any other information applicable to odorous emissions. The outcome of each odour complaint is used to assist in the management of onsite odours. Compilation of this data allows KMC to trend potential causes for odorous nuisances and adjust operations to minimize future odours.

Summary of New Commitments:

- Those potentially affected by Project air emissions, including residents, land users, and Aboriginal groups, will be provided with contact information for use in the event there are concerns about such air emissions.

1.36 Marine air and GHG emissions

Reference:

A3S4J7, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-3 - Marine Air Quality and Greenhouse Gas Marine Transportation Technical Report:

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ii) PDF page 89 of 97
iii) PDF pages 93 and 94 of 97

Preamble:

Reference i) estimates the changes in annual marine combustion emissions associated with Project expansion and states that the annual marine combustion emissions associated with Project expansion represent only 9 per cent of marine SO_2 emissions in the Regional Study Area (RSA), but over 200 per cent of the marine carbon monoxide (CO) emissions in the RSA. The reference recognizes that the Corbett emission inventory may underestimate existing marine emissions in the RSA.

Reference ii) states that marine transportation associated with Project expansion is estimated to represent an increase of about 200 per cent in marine GHG emissions in the RSA, 2.7 per cent in marine GHG emissions in British Columbia, and 1.1 per cent in marine GHG emissions in Canada.

Reference iii) states that all Project-related tankers are required to adhere to federal standards that may reduce air emissions, including standards for bunker fuel.

Given the predicted increase in air and GHG emissions within the RSA resulting from marine transportation associated with the Project, it is unclear what mitigation measures Trans Mountain intends to implement to reduce the emissions associated with the Project to meet the applicable federal standards.

Request:

Please provide detailed information on the mitigation measures that will be applied to meet applicable federal standards to reduce air and GHG emissions from marine transportation associated with the Project.

Response:

Trans Mountain does not own or operate the marine vessels associated with existing operations nor will it directly own or operate the marine vessels associated with the Project. Trans Mountain's tanker acceptance criteria require tankers and barges to be of modern build and to be equipped and maintned in accordance with international and Federal regulations and operated to best practices. Regular surveys and maintenance of the vessel, including such equipment such as the vessel's propulsion and auxiliary machinery, boilers and oil handling equipment will ensure that design parameters, including emission limits, are met during operation of the vessel. The vessel shall carry an International Air Pollution Prevention

Certificate in the form set out in appendix I to Annex VI to MARPOL and must keep on board a Ship Energy Efficiency Management Plan that meets the requirements of regulation 22 of Annex VI to MARPOL and is meant to guide the crew to operate the vessel and equipment in an energy efficient manner, thus mitigating emissions during her operations in Canadian waters.

All marine vessels operating as part of the Project are required to adhere to the federal requirements including:

- Canada's *Vessel Pollution and Dangerous Chemicals* Regulations (SOR/2012-69) under the *Canada Shipping Act* (2001;); and
- Environment Canada's *Sulphur in Diesel Fuel Regulations.*

The *Vessel Pollution and Dangerous Chemicals Regulations* set varying requirements for Canadian vessels, vessels operating in Canadian waters, and vessels operating in waters deemed to be Emission Control Areas. The International Maritime Organization officially designated the North American Emission Control Area, which includes waters within 200 nautical miles of the coast of British Columbia as noted in Port of Seattle *et al.* (2013).

Marine vessels operating as part of the Project will include the following mitigation measures within the Emission Control Areas as required by the *Vessel Pollution and Dangerous Chemicals Regulations* (described in Minister of Justice 2012):

- marine tankers and barges will use fuel oil with sulphur content of less than 10,000 ppm (1.0%) before January 1, 2015;
- marine tankers and barges will use fuel oil with sulphur content of less than 1,000 ppm (0.1%) after January 1, 2015;
- foreign tankers and barges constructed after December 31, 1999 but before January 1, 2011 will meet Tier I standards. This includes foreign tankers and barges with power outputs of more than 130 kilowatts and rated engine speeds less than 130 revolutions per minute constructed after December 31, 1999 but before January 1, 2011 which will emit less than 17.0 g of nitrogen dioxide (NO_2) per kilowatt-hour;
- tankers and barges constructed after January 1, 2011 will meet Tier II standards. This includes tankers and barges with power outputs of more than 130 kilowatts and rated engine speeds less than 130 revolutions per minute constructed after January 1, 2011 which will emit less than 14.4 g of NO_2 per kilowatt-hour;
- tankers and barges constructed after 2016 may also be required to follow Tier III oxides of nitrogen (NO_X) requirements; however, the applicable ship construction date is not currently known as the International Maritime Organization implementation dates are undergoing a technical review;
- the authorized representative of an oil tanker that use a vapour collection system for volatile organic compounds must ensure that the vessel is fitted with a vapour collection system that meets the requirements of Regulation 15.5 of Annex VI to MARPOL; and
- the authorized representative of a crude oil tanker must ensure that a volatile organic compounds management plan that meets the requirements of Regulation 15.6 of Annex VI to MARPOL is implemented.

- a vessel must not emit and a person must not permit the emission of an ozone-depleting substance from an installation on a vessel except in circumstances permitted under the regulation.

Tugboats that are classified as large marine vessels will adhere to Environment Canada's *Sulphur in Diesel Fuel Regulations* (Environment Canada 2013). These vessels will meet marine diesel sulphur content requirements of less than 1000 mg/kg (0.1%) starting in June 2014 as noted in Environment Canada (2013).

References:

Environment Canada. 2013. Sulphur in Diesel Fuel Regulations – Maximum Sulphur Limits for Diesel Fuel.

Minister of Justice. 2012. Vessel Pollution and Dangerous Chemicals Regulations. SOR/2012-69. Last amended: December 6, 2013.

Port of Seattle, Port of Tacoma and Port Metro Vancouver. 2013. Northwest Ports Clean Air Strategy: 2012 Implementation Report.

1.37 Air quality indicators

Reference:

i) A3S1U0, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 – Air and Greenhouse Gas Technical Report, PDF pages 42 and 43 of 105
ii) A3S4J7, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-3 – Marine Air Quality and Greenhouse Gas Marine Transportation, PDF page 27 of 97
iii) A3S1U0, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air and Greenhouse Gas Technical Report, PDF page 65 of 105
iv) A3S2L1, Application Volume 5D, Environmental and Socio-Economic Assessment – Socio-Economic Technical Reports, TR 5D-7 – Screening Level Human Health Risk Assessment of Pipeline and Facilities, PDF page 26 of 109
v) A3S1U0, Application Volume 5C, Biophysical Technical Reports, TR 5C-4 - Air and Greenhouse Gas Technical Report, PDF page 103 of 105

Preamble:

Reference i) identifies that the indicators selected for the air quality assessment for pipelines and facilities include primary emissions of CACs (particulate matter [PM], CO, nitrogen dioxide, and SO_2) and VOCs (BTEX), secondary smog-related products (ozone and $PM_{2.5}$), H_2S and mercaptans, and fugitive emissions from pump stations. Reference ii) states that the Project will result in CACs, VOCs, and GHGs.

Reference iii) notes that Cold Lake Blend was selected to represent heavy crude and it is expected to be one of the major products transported in the proposed pipeline. In Reference iv), Table 3.3 identifies polycyclic aromatic hydrocarbons (PAHs) in the list of contaminants of potential concern (COPCs) for the assessment of the potential health risks associated with the additional tanks to be installed at the Edmonton, Sumas, and Burnaby Terminals.

Reference v) states that it was impractical to model each of the COPCs directly in CALPUFF and, instead, maximum predicted concentrations of individual COPCs were estimated by scaling the VOC and total suspended particulate concentrations predicted by CALPUFF for each source category, using the indicated speciation profiles.

The Board notes that PAHs were not considered as one of the indicators for the air quality assessment for the Project, though it is identified as one of the COPCs for evaluating human health effects.

Request:

Please provide:

a) the rationale for not considering PAHs as one of the indicators for the air quality assessment for the Project;

b) the ambient concentrations of PAHs in the selected study area for the air quality assessment for the Project and a comparison to the relevant provincial and federal ambient air quality guidelines; and

c) the maximum predicted PAH concentrations considered in the Screening Level Human Health Risk Assessment.

Response:

a) Polycyclic aromatic hydrocarbons (PAHs) were not selected as an air quality indicator for the Project since there are very few applicable ambient objectives, few emission sources that discharge PAHs, and low level of concern among the regulatory authorities that were consulted. There are no federal or British Columbia Ambient Air Quality Objectives for the PAHs. The only Alberta Ambient Air Quality Objective for PAHs is benzo(a)pyrene (0.0003 µg/m^3 or 2.9x10^{-5} ppb) for the annual averaging period (Alberta Environment and Sustainable Resource Development 2013). Without relevant air quality objectives to compare to, PAHs were not considered as an air quality indicator for the Project. As well, there are no substantial PAH emission sources associated with the Trans Mountain facilities. The primary concern associated with PAHs is human health and PAHs were considered as an indicator for the human health risk assessment (see the Application, Technical Report 5D-7 in Volume 5D, Screening Level Human Health Risk Assessment). The air quality assessment estimated PAH emissions and provided predicted concentrations for evaluation in the human health risk assessment.

   As noted in the Application, Section 7.2.4.1, Volume 5A, indicators for the air quality assessment were presented and were found to be appropriate during stakeholder engagement and public consultation, including consultation with key regulatory authorities such as Environment Canada, the British Columbia Ministry of Environment, Fraser Valley Regional District and Metro Vancouver.

b) The maximum (1st highest) predicted 1-hour and annual ambient concentrations for the polycyclic aromatic hydrocarbons (PAHs) along with the aromatics C_9-C_{16} and C_{17}-C_{34}, which include the PAHs, for the Project are presented in Tables 1.37B-1 and 1.37B-2, respectively. There are no federal or British Columbia Ambient Air Quality Objectives for PAHs. The only Alberta Ambient Air Quality Objective for PAHs is benzo(a)pyrene (0.0003 µg/m^3 or 2.9x10^{-5} ppb) for the annual averaging period (Alberta Environment and Sustainable Resource Development 2013). There are no emissions of benzo(a)pyrene associated with the Project at the Edmonton, Sumas and Burnaby terminals.

TABLE 1.37B-1

MAXIMUM (1st HIGHEST) PREDICTED 1-HOUR AMBIENT CONCENTRATIONS FOR POLYCYCLIC AROMATIC HYDROCARBONS AT THE MAXIMUM POINT OF IMPINGEMENT FOR THE PROJECT CASE (in µg/m^3)

Chemical of Potential Concern	Edmonton Terminal	Sumas Terminal	Burnaby Terminal	Westridge Marine Terminal	Westridge Marine Combined[2]	Applicable Objectives
Aromatics C_9-C_{16}	2.80E+00	2.20E-03	6.70E+00	8.40E-01	6.70E+00	Not Applicable
Aromatics C_{17}-C_{34}	0	0	0	1.10E-04	1.20E-04	
Acenaphthene	5.70E-07	1.70E-07	1.70E-07	7.10E-05	6.30E-05	
Acenaphthylene	0	0	0	2.10E-05	2.20E-05	
Anthracene	0	0	0	2.10E-05	2.20E-05	
Benzo(a)anthracene	0	0	0	2.30E-05	2.40E-05	
Benzo(a)pyrene	0	0	0	7.50E-06	7.90E-06	
Benzo(b)fluoranthene	0	0	0	1.50E-05	1.60E-05	
Benzo(g,h,i)perylene	0	0	0	5.10E-06	5.40E-06	
Benzo(k)fluoranthene	0	0	0	3.90E-06	4.20E-06	
Biphenyl	1.40E-04	4.00E-05	4.20E-05	1.50E-02	1.50E-02	
Chrysene	0	0	0	4.00E-06	4.20E-06	
Dibenzothiophene	0	0	0	0	0	
Fluoranthene	0	0	0	1.30E-05	1.30E-05	
Fluorene	0	0	0	2.80E-05	3.00E-05	
Indeno(1,2,3,c,d)pyrene	0	0	0	1.50E-05	1.60E-05	
Naphthalene	2.00E-05	5.80E-06	6.10E-06	2.80E-03	2.50E-03	
Phenanthrene	0	0	0	3.20E-05	3.40E-05	
Pyrene	0	0	0	2.20E-05	2.40E-05	

Notes:
1. With scientific notation, values are expressed either to the negative power (*i.e.,* E-x) or to the positive power (*i.e.,* E+x). For example, the peak predicted air concentration of aromatics C_9-C_{16} in the Screening Level Human Health Risk Assessment Local Study Area (SLHHRA LSA) for the Westridge Marine Terminal is 8.40E-01 or 0.84 µg/m^3.
2. The Project (Combined) represents the predicted air concentrations associated with the Burnaby Terminal (if applicable), Westridge Marine Terminal and the Project-related increase in marine vessel traffic combined.

TABLE 1.37B-2

MAXIMUM (1st HIGHEST) PREDICTED ANNUAL AMBIENT CONCENTRATIONS FOR POLYCYCLIC AROMATIC HYDROCARBONS AT THE MAXIMUM POINT OF IMPINGEMENT FOR THE PROJECT CASE (in µg/m^3)[1]

Chemical of Potential Concern	Edmonton Terminal	Sumas Terminal	Burnaby Terminal	Westridge Marine Terminal	Westridge Marine Combined	Applicable Objectives
Aromatics C_9-C_{16}	0	4.30E-06	7.30E-02	4.00E-02	7.30E-02	Not Applicable
Aromatics C_{17}-C_{34}	0	0	0	2.20E-03	2.30E-03	
Acenaphthene	1.20E-08	3.20E-10	1.60E-09	1.00E-06	1.10E-06	
Acenaphthylene	0	0	0	2.60E-07	3.60E-07	
Anthracene	0	0	0	2.60E-07	3.60E-07	
Benzo(a)anthracene	0	0	0	2.80E-07	3.90E-07	
Benzo(a)pyrene	0	0	0	9.10E-08	1.30E-07	3.00E-04
Benzo(b)fluoranthene	0	0	0	1.80E-07	2.60E-07	Not Applicable
Benzo(g,h,i)perylene	0	0	0	6.30E-08	8.80E-08	
Benzo(k)fluoranthene	0	0	0	4.80E-08	6.70E-08	
Biphenyl	3.00E-06	7.90E-08	3.90E-07	2.50E-04	2.50E-04	
Chrysene	0	0	0	4.90E-08	6.90E-08	
Dibenzothiophene	0	0	0	0	0	
Fluoranthene	0	0	0	1.50E-07	2.20E-07	
Fluorene	0	0	0	3.40E-07	4.80E-07	
Indeno(1,2,3,c,d)pyrene	0	0	0	1.80E-07	2.60E-07	
Naphthalene	4.30E-07	1.10E-08	5.60E-08	6.00E-05	6.50E-05	
Phenanthrene	0	0	0	3.90E-07	5.50E-07	
Pyrene	0	0	0	2.70E-07	3.80E-07	

Notes:
1. With scientific notation, values are expressed either to the negative power (i.e., E-x) or to the positive power (i.e., E+x). For example, the peak predicted air concentration of aromatics C_9-C_{16} in the SLHHRA LSA for the Westridge Marine Terminal is 4.00E-02 or 0.04 µg/m^3.
2. The Project (Combined) represents the predicted air concentrations associated with the Burnaby Terminal (if applicable), Westridge Marine Terminal and the Project-related increase in marine vessel traffic combined.
3. Annual Alberta Ambient Air Quality Objective for benzo(a)pyrene is 0.0003 µg/m^3 (2.9x10^{-5} ppb).

c) The peak (1st highest) predicted 1-hour air concentrations and maximum predicted annual air concentrations of the polycyclic aromatic hydrocarbons (PAHs) identified as chemicals of potential concern (COPC) in the Application, Technical Report 5D-7 in Volume 5D, Screening Level Human Health Risk Assessment of Pipeline and Facilities Technical Report, are presented below in Tables 1.37C-1 and 1.37C-2, respectively. Although the NEB specifically referred to the PAHs identified in Table 3.3 of Technical Report 5D-7 for the tank terminals (*i.e.*, Edmonton, Sumas and Burnaby terminals) in Reference iv, the peak predicted 1-hour and maximum predicted annual air concentrations of the PAHs identified as COPC in Table 3.5 of Technical Report 5D-7 for the Westridge Marine Terminal are also provided in Tables 1.37C-1 and 1.37C-2.

All of these PAHs were evaluated either as individual chemicals (*e.g.*, biphenyl) and/or as chemical constituents within a pre-defined chemical group (*i.e.*, aliphatic and aromatic petroleum hydrocarbon fractions or benzo(a)pyrene [and equivalents]) in the screening level assessment. On this basis, in addition to the PAHs, the peak predicted 1-hour and maximum predicted annual air concentrations of the aromatics C_9-C_{16} and aromatics C_{17}-C_{34}, which include the PAHs, also are provided.

TABLE 1.37C-1

PEAK (1st HIGHEST) PREDICTED 1-HOUR AIR CONCENTRATIONS FOR POLYCYCLIC AROMATIC HYDROCARBONS AT THE MAXIMUM POINT OF IMPINGEMENT

Chemical of Potential Concern	Peak (1st Highest) Predicted Air Concentrations (µg/m^3)[1]				
	Base Case	Application Case	Cumulative Case[2]	Project	Project(Combined)[3]
Edmonton Terminal					
Aromatics C_9-C_{16}	1.2E+02	1.2E+02	n/a	2.8E+00	n/a
Acenaphthene	5.1E-02	5.1E-02	n/a	5.7E-07	n/a
Biphenyl	1.3E-04	1.7E-04	n/a	1.4E-04	n/a
Naphthalene	1.9E+00	1.9E+00	n/a	2.0E-05	n/a
Sumas Terminal					
Aromatics C_9-C_{16}	9.9E-04	2.3E-03	n/a	2.2E-03	n/a
Acenaphthene	7.4E-08	1.7E-07	n/a	1.7E-07	n/a
Biphenyl	1.8E-05	4.2E-05	n/a	4.0E-05	n/a
Naphthalene	5.7E-01	5.7E-01	n/a	5.8E-06	n/a
Burnaby Terminal					
Aromatics C_9-C_{16}	9.9E+02	9.9E+02	9.9E+02	6.7E+00	6.7E+00
Acenaphthene	9.6E-05	1.0E-04	1.0E-04	1.7E-07	6.3E-05
Biphenyl	1.1E-03	1.5E-02	1.5E-02	4.2E-05	1.5E-02
Naphthalene	2.3E+00	2.3E+00	2.3E+00	6.1E-06	2.5E-03
Westridge Marine Terminal					
Aromatics C_9-C_{16}	9.9E+02	9.9E+02	9.9E+02	8.4E-01	6.7E+00
Aromatics C_{17}-C_{34}	8.2E+01	8.2E+01	8.2E+01	1.1E-04	1.2E-04
Acenaphthene	9.6E-05	1.0E-04	1.0E-04	7.1E-05	6.3E-05
Acenaphthylene	1.5E-04	1.5E-04	1.5E-04	2.1E-05	2.2E-05
Anthracene	1.5E-04	1.5E-04	1.5E-04	2.1E-05	2.2E-05
Benzo(a)anthracene	1.6E-04	1.6E-04	1.6E-04	2.3E-05	2.4E-05
Benzo(a)pyrene	5.2E-05	5.2E-05	5.2E-05	7.5E-06	7.9E-06
Benzo(b)fluoranthene	1.0E-04	1.0E-04	1.0E-04	1.5E-05	1.6E-05
Benzo(g,h,i)perylene	3.6E-05	3.6E-05	3.6E-05	5.1E-06	5.4E-06
Benzo(k)fluoranthene	2.7E-05	2.7E-05	2.7E-05	3.9E-06	4.2E-06
Biphenyl	1.1E-03	1.5E-02	1.5E-02	1.5E-02	1.5E-02
Chrysene	2.8E-05	2.8E-05	2.8E-05	4.0E-06	4.2E-06
Fluoranthene	8.8E-05	8.8E-05	8.8E-05	1.3E-05	1.3E-05
Fluorene	2.0E-04	2.0E-04	2.0E-04	2.8E-05	3.0E-05
Indeno(1,2,3,c,d)pyrene	1.0E-04	1.0E-04	1.0E-04	1.5E-05	1.6E-05
Naphthalene	2.3E+00	2.3E+00	2.3E+00	2.8E-03	2.5E-03
Phenanthrene	2.2E-04	2.2E-04	2.2E-04	3.2E-05	3.4E-05
Pyrene	1.6E-04	1.6E-04	1.6E-04	2.2E-05	2.4E-05

Notes: n/a = not applicable

1 With scientific notation, values are expressed either to the negative power (*i.e.*, E-x) or to the positive power *(i.e.*, E+x). For example, the peak predicted air concentration of aromatics C_9-C_{16} in the Screening Level Human Health Risk Assessment Local Study Area (SLHHRA LSA) for the Edmonton Terminal under the Base Case is 1.2E+02 or 120 µg/m^3. Note that addition of the predicted air concentrations under the Base Case and for the Project alone might not equate to the predicted air concentrations under the Application Case because the values presented in the table are based on the maximum point of impingement (MPOI) for each assessment case, the location of which might differ between the cases.

2 A Cumulative Case was not completed for the Edmonton Terminal or the Sumas Terminal since the chemical emissions associated with these tank terminals are not expected to interact with the chemical emissions associated with any other reasonably foreseeable developments in the Air Quality Regional Study Area (RSA). The Cumulative Case for the Burnaby Terminal and the Westridge Marine Terminal included chemical emissions from both of these tank terminals as well as marine vessel traffic within the combined Air Quality RSA.

3 The Project (Combined) represents the predicted air concentrations associated with the Burnaby Terminal (if applicable), Westridge Marine Terminal and the Project-related increase in marine vessel traffic combined.

TABLE 1.37C-2

MAXIMUM PREDICTED ANNUAL AIR CONCENTRATIONS FOR POLYCYCLIC AROMATIC HYDROCARBONS AT THE MAXIMUM POINT OF IMPINGEMENT

Chemical of Potential Concern	Maximum Predicted Air Concentrations (µg/m^3)[1]				
	Base Case	Application Case	Cumulative Case[2]	Project	Project(Combined)[3]
Edmonton Terminal					
Aromatics C_9-C_{16}	7.9E+00	7.9E+00	n/a	0.0E+00	n/a
Acenaphthene	3.9E-03	3.9E-03	n/a	1.2E-08	n/a
Biphenyl	1.8E-06	3.9E-06	n/a	3.0E-06	n/a
Naphthalene	1.5E-01	1.5E-01	n/a	4.3E-07	n/a
Sumas Terminal					
Aromatics C_9-C_{16}	2.4E-05	1.2E-05	n/a	4.3E-06	n/a
Acenaphthene	1.8E-09	9.1E-10	n/a	3.2E-10	n/a
Biphenyl	4.3E-07	2.2E-07	n/a	7.9E-08	n/a
Naphthalene	6.2E-02	6.2E-02	n/a	1.1E-08	n/a
Burnaby Terminal					
Aromatics C_9-C_{16}	5.7E-01	5.8E-01	5.8E-01	7.3E-02	7.3E-02
Acenaphthene	9.8E-08	1.1E-06	1.1E-06	1.6E-09	1.1E-06
Biphenyl	1.2E-05	2.5E-04	2.5E-04	3.9E-07	2.5E-04
Naphthalene	1.1E-01	1.1E-01	1.1E-01	5.6E-08	6.5E-05
Westridge Marine Terminal					
Aromatics C_9-C_{16}	5.7E-01	5.8E-01	5.8E-01	4.0E-02	7.3E-02
Aromatics C_{17}-C_{34}	4.7E-02	4.8E-02	4.8E-02	2.2E-03	2.3E-03
Acenaphthene	9.8E-08	1.1E-06	1.1E-06	1.0E-06	1.1E-06
Acenaphthylene	9.0E-08	4.4E-07	4.4E-07	2.6E-07	3.6E-07
Anthracene	9.0E-08	4.4E-07	4.4E-07	2.6E-07	3.6E-07
Benzo(a)anthracene	9.8E-08	4.7E-07	4.7E-07	2.8E-07	3.9E-07
Benzo(a)pyrene	3.2E-08	1.6E-07	1.6E-07	9.1E-08	1.3E-07
Benzo(b)fluoranthene	6.4E-08	3.1E-07	3.1E-07	1.8E-07	2.6E-07
Benzo(g,h,i)perylene	2.2E-08	1.1E-07	1.1E-07	6.3E-08	8.8E-08
Benzo(k)fluoranthene	1.7E-08	8.2E-08	8.2E-08	4.8E-08	6.7E-08
Biphenyl	1.2E-05	2.5E-04	2.5E-04	2.5E-04	2.5E-04
Chrysene	1.7E-08	8.3E-08	8.3E-08	4.9E-08	6.9E-08
Fluoranthene	5.4E-08	2.6E-07	2.6E-07	1.5E-07	2.2E-07
Fluorene	1.2E-07	5.8E-07	5.8E-07	3.4E-07	4.8E-07
Indeno(1,2,3,c,d)pyrene	6.4E-08	3.1E-07	3.1E-07	1.8E-07	2.6E-07
Naphthalene	1.1E-01	1.1E-01	1.1E-01	6.0E-05	6.5E-05
Phenanthrene	1.4E-07	6.6E-07	6.6E-07	3.9E-07	5.5E-07
Pyrene	9.5E-08	4.6E-07	4.6E-07	2.7E-07	3.8E-07

Notes: n/a = not applicable

1 With scientific notation, values are expressed either to the negative power (*i.e.*, E-x) or to the positive power (*i.e.*, E+x). For example, the maximum predicted annual air concentration of acenaphthene in the SLHHRA LSA for the Edmonton Terminal under the Base Case is 3.9E-03 or 0.0039 µg/m^3. Note that addition of the predicted air concentrations under the Base Case and for the Project alone might not equate to the predicted air concentrations under the Application Case because the values presented in the table are based on the MPOI for each assessment case, the location of which might differ between the cases.

2 A Cumulative Case was not completed for the Edmonton Terminal or the Sumas Terminal since the chemical emissions associated with these tank terminals are not expected to interact with the chemical emissions associated with any other reasonably foreseeable developments in the Air Quality Regional Study Area (RSA). The Cumulative Case for the Burnaby Terminal and the Westridge Marine Terminal included chemical emissions from both of these tank terminals as well as marine vessel traffic within the combined Air Quality RSA.

3 The Project (Combined) represents the predicted air concentrations associated with the Burnaby Terminal (if applicable), Westridge Marine Terminal and the Project-related increase in marine vessel traffic combined.

Reference:

Alberta Environment and Sustainable Resource Development. 2013. Alberta Ambient Air Quality Objectives and Guidelines Summary.

1.38 Trans Mountain's commitment to consultants' recommendations

Reference:

i) A3S2S3, Application Volume 6B, Pipeline Environmental Protection Plan, PDF page 16 of 461
ii) A3S2S6, Application Volume 6C, Facilities Environmental Protection Plan, PDF page 16 of 305
iii) A3S2S9, Application Volume 6D, Westridge Marine Terminal Environmental Protection Plan, PDF page 11 of 165
iv) A3S4J5, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-1 - Marine Resources, PDF page 96 of 173

Preamble:

References i), ii), and iii) state that the Environmental Protection Plan (EPP) is based on, among other things, the Environmental and Socio-Economic Assessment - Volumes 5A and 5B for the Project; results of the biophysical and engineering field programs completed to date; and commitments made in the Environmental and Socio-Economic Assessment, to regulatory authorities and to the public.

The Board notes that Trans Mountain has filed numerous technical reports that have been prepared by different consultants in support of its application. Throughout these technical reports, there are many recommendations by the authoring consultants.

It is unclear whether Trans Mountain is in agreement with all the recommendations made in the technical reports. The Board notes that Trans Mountain has differed from the recommendation provided by the consultant in Reference iv). The Reference states that, although Stantec recommended considering contracting mechanisms to require the implementation of a maximum speed restriction for all Project-related vessels operating in association with Project activities within the Marine RSA, Trans Mountain is not proposing any speed-related mitigation at this time.

Request:

Please confirm that Trans Mountain commits to follow all of the recommendations provided in the technical reports filed in support of the Project application. If Trans Mountain does not agree with any of the recommendations, please provide a list of areas where there is any disagreement, and the supporting rationale for that disagreement.

Response:

Trans Mountain Pipeline ULC (Trans Mountain) has reviewed all of the recommendations made in the Application and in the supporting technical reports prepared by its consultants and confirms that it agrees to follow all of the recommendations provided in these technical reports with the exception of one.

In TR8B-1, Volume 8B of the Application, *Marine Resources, Marine Transportation Technical Report for the Trans Mountain Pipeline ULC Trans Mountains Expansion Project*, prepared by

Stantec Consulting Ltd., Stantec identifies speed restrictions on marine vessels as a measure to mitigate underwater noise and to reduce the potential for injury to marine mammals from vessel strikes (see Section 5.2 of TR8B-1).

As noted in the Application, Tables 2.21 and 2.2.2 of Volume 8A, if the Project is approved and once operational, Project-related tankers are predicted to account for 16.4% of large vessel movements in Burrard Inlet and 6.6% of large vessel movements in the Strait of Juan de Fuca. Trans Mountain recognizes that the Project-related increase in tankers would take place within the context of increasing marine traffic in the Burrard Inlet and Strait of Juan de Fuca. Trans Mountain would also like to note that it does not own or operate the vessels calling at the Westridge Marine Terminal.

As demonstrated in the responses to NEB IR No. 1.55 and 1.56, Trans Mountain strongly supports a regionally-based collaborative industry-government approach to the protection of marine mammals in the Salish Sea. Through the proposed Marine Mammal Protection Program and other regional collaborative initiatives, Trans Mountain commits to implementing mitigation measures that are within its control to implement to manage potential environmental effects (both Project-related and cumulative) on marine mammals. These commitments are further described in the response to NEB IR No. 1.55 and 1.56.

With respect to the recommended speed restriction, as Trans Mountain does not own or operate the vessels that call at Westridge Marine Terminal, Trans Mountain supports speed restrictions on vessels as part of an industry-wide solution. With respect to the tankers calling at Westridge Marine Terminal, tug escort does, by default, result in reduced tanker speeds so the tankers keep pace with the tug escort.

1.39 Alternative means of carrying out the Project – alternative marine terminal locations

Reference:

i) A3S0R0, Application Volume 2, Project Overview, Economics and General Information, PDF page 17 of 43
ii) NEB Filing Manual, Section 4.2.2 - Filing Requirements - Alternatives, PDF page 47 of 258

Preamble:

In Reference i), Trans Mountain states that it did not consider fundamentally different alternatives, such as pipeline concepts to different destinations.

Specifically, Trans Mountain states that the RH-001-2012 proceeding demonstrated the need and benefits of expanding the existing Trans Mountain Pipeline and, for these reasons, no effort was made to consider the economic feasibility or environmental effects of these or other conceptual alternatives.

Reference ii) outlines NEB filing requirements for the selection and justification of a proposed route and site, including a comparison of the options evaluated using appropriate selection criteria.

Request:

Please provide an assessment of technically and economically feasible alternative marine terminal locations in Canada and the United States, including associated pipeline concepts to those alternative locations, in addition to the proposed Westridge Marine Terminal location. The assessment must include:

a) alternatives considered and selection criteria for the alternatives;

b) an assessment of environmental and socio-economic constraints or potential effects; and

c) Trans Mountain's rationale for selecting the Westridge Marine Terminal as the preferred alternative.

Response:

a) The Trans Mountain Expansion Project (the Project) is a proposal to expand the *existing* Trans Mountain Pipeline System, including the existing terminal facilities. Paralleling and expanding existing facilities reduces new disturbance, uses existing infrastructure and minimizes environmental effects. This is consistent with good project planning and best environmental practices.

   While good planning and best practices favour using existing facilities, this does not reduce the rigour of conducting an assessment of the potential impacts associated with the expansion. Early in project planning Trans Mountain Pipeline ULC (Trans Mountain) tested the basic premise that expanding existing facilities is the most responsible approach to the

development. Potential alternative marine terminal locations were, considered based on the feasibility of coincident marine and pipeline access, and screened based on technical, economic and environmental considerations. These alternative locations included Kitimat, BC and Roberts Bank in Delta, BC. Trans Mountain ultimately concluded that constructing and operating a new marine terminal and new supporting infrastructure would result in significantly greater cost, larger footprint and additional environmental effects, as compared to expanding existing facilities. Accordingly, Trans Mountain did not continue with a further assessment of alternative termini for the Project.

b) Please see response to NEB IR No. 1.39a.

c) Please see response to NEB IR No. 1.39a.

1.40 Alternative means of carrying out the Project – alternative pipeline route

Reference:

i) A3S0R0, Application Volume 2, Project Overview, Economics and General Information, PDF page 20 of 43
ii) A3S0Z6, A3S0Z7, A3S0Z8, A3S0Z9, A3S1A0, A3S1A1, A3S1A2, A3S1A3, and A3S1A4, Application Volume 4A, Project Design and Execution - Engineering, Appendix E – Route Maps, Proposed Line 2 Pipeline Corridor Route Maps
iii) A3S2T6 to A3S2Y0, Application Volume 6E, Environmental Alignment Sheets
iv) A3S1L4, Application Volume 5A, Environmental and Socio-Economic Assessment - Biophysical, PDF pages 3 to 5, and 12 to 14 of 39
v) A3S1L4, Application Volume 5A, Environmental and Socio- Economic Assessment - Biophysical, PDF page 14 of 39
vi) NEB Filing Manual, Section 4.2.2 - Filing Requirements - Alternatives, PDF page 47 of 258

Preamble:

Reference i) indicates that Trans Mountain decided to study and apply for a corridor of generally 150 metres in width along the entire length of the pipeline.

References ii) and iii) illustrate the proposed pipeline corridor.

Reference iv) refers to several deviations in pipeline routing being considered by Trans Mountain. These include, but are not limited to, the following deviations:

- through Wabamun Lake Provincial Park;
- avoiding Zoht 5 and Zoht 4 Indian Reserves;
- avoiding Joeyaska Indian Reserve No. 2;
- avoiding Cheam Lake Wetland Regional Park;
- avoiding Ohamil Indian Reserve No. 1, Peters Indian Reserve No. 1A and Popkum Indian Reserve No. 1;
- avoiding Grass Indian Reserve No. 15 and Tzeachten Indian Reserve No. 13;
- avoiding Matsqui Main Indian Reserve No. 2;
- avoiding a local natural area in the Salmon River area;
- traversing Surrey Bend Regional Park;
- east side of the Port Mann Bridge; and
- avoiding Lougheed Highway by traversing existing industrial land and railway easement within Brunette River Conservation Area.

Reference v) states that, in the Burnaby to Westridge segment of the proposed pipeline corridor, other direct alternatives involving partial or total trenchless methods of construction (horizontal directional drilling or tunnel) are under consideration.

Reference vi) outlines NEB filing requirements for the selection and justification of a proposed route including a comparison of the options evaluated using appropriate selection criteria.

Request:

a) Please provide an itemized table of all alternative route deviations from the proposed pipeline corridor being considered by Trans Mountain. In the response, please include:
   a.1) deviation adjustment name;
   a.2) deviation reference kilometre start and end;
   a.3) distance of the deviation from the existing Trans Mountain pipeline and proposed Project study corridor, if applicable;
   a.4) confirmation that the alternative route deviations are within the scope of Trans Mountain's consultation program and environmental and socio-economic assessment filed with the Board on 16 December 2013; and
   a.5) details of, and timing for, a proposed consultation program and environmental and socio-economic assessment of the alternative route deviations, if Trans Mountain is unable to provide the confirmation requested in a.4) at this time.

b) Please list the alternative routes under consideration for the Burnaby to Westridge segment of proposed pipeline corridor, the environmental and socio-economic effects of each of the alternative routes under consideration, and Trans Mountain's preferred alternative route, along with a rationale for that preferred alternative route.

Response:

a) The following is a response to parts a.1, a.2 and a.3.

   Please refer to Table 1.40A-1 at the end of this response for a list of all alternative route deviations from the previously proposed pipeline corridor and the revised proposed pipeline corridor that are currently being considered by Trans Mountain.

   a.4) Confirmed. The alternate route deviations that were being considered prior to the filing of the Application in December 2013 were included within the scope of the consultation program described in Volumes 3A, 3B, and 3C. Revisions to the proposed pipeline corridor that are being considered by Trans Mountain since filing of the Application in December have been discussed with interested stakeholders through a series of Open Houses and Routing Workshops in select communities during March and April 2014. Land agents have also contacted landowners that are affected by the proposed revised pipeline corridor. See the response to NEB IR No. 1.12 for further details regarding consultation completed during the pipeline corridor optimization process.

   The alternative pipeline corridor route deviations identified in Table 1.40A-1, while located outside of the 150 m wide proposed pipeline corridor, are located in biophysical and socio-economic environs similar to those discussed in the Environmental and Socio-economic Assessment (Volumes 5A and 5B). Through desktop reviews, it is anticipated that the potential environmental and socio-economic effects associated with these deviations are comparable to those which have been previously identified and evaluated in the Environmental and Socio-economic Assessment. The response to NEB IR No. 1.40 a.5 below provides details regarding future environmental and socio-economic studies to be conducted along the proposed revised pipeline corridor to confirm the predicted effects remain unchanged.

a.5) Environmental and cultural desktop and baseline field studies including aquatics, soils, wetlands, wildlife, vegetation and archaeology are scheduled to be conducted along the segments of the proposed revised pipeline corridor that are currently being considered by Trans Mountain throughout 2014. Baseline field studies will only be conducted on lands where permission to access the lands have been granted by landowners and authorities having jurisdiction over public lands.

Trans Mountain will refer to the Pipeline Environmental Protection Plan (Volume 6B) as well as the contingency plans for wildlife species of concern discovery, rare ecological communities or rare plant species discovery, fish species of concern, heritage resources discovery and traditional land use sites discovery that are appended to the Pipeline Environmental Protection Plan for potential mitigation measures to implement should environmental and/or cultural features be identified during the additional desktop and field studies that are being conducted during 2014. Information gathered from desktop and field studies conducted along the proposed revised pipeline corridor will be evaluated following the same methodology used for the Environmental and Socio-economic Assessment for the proposed pipeline corridor that was filed with the NEB on December 16, 2013 (Section 7.2 of Volume 5A/5B) to confirm that the anticipated effects are consistent with the conclusions reached in the Environmental and Socio-economic Assessment.

Consultation with landowners, government representatives and Aboriginal communities regarding the revisions to the proposed pipeline corridor has remained ongoing since the Application was filed in December 2013 and will continue through the regulatory and construction phases of the Project. Refer to the response to NEB IR 1.12 for additional information pertaining to Trans Mountain's ongoing consultation program regarding the pipeline corridor optimization process.

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[1] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
Alberta					
2.8 - 13.6	Edmonton East Transportation Utility Corridor	Proposed Corridor	420 m	3,000 m	Realigned the previously proposed pipeline corridor in the Transportation Utility Corridor; reconfigured the shape of the previously proposed pipeline corridor to provide options for crossings of Highway 14 and the Anthony Henday Highway.
14.3 - 14.8	14.3 - 14.8	Proposed Corridor	80 m	7,000 m	Increased the width of the previously proposed pipeline corridor to provide options for crossing highway interchange.
21.7 - 23.5	21.7 - 23.5	Proposed Corridor	135 m	5,000 m	Increased the width of the previously proposed pipeline corridor to provide options for crossing highway interchange.
27.1 - 27.9	27.1 - 27.9	Proposed Corridor	280 m	6,000 m	Increased the width of the previously proposed pipeline corridor to examine the possibility of using a trenchless crossing method for Whitemud Creek.
43.1 - 45.9	Whitemud Corridor to TMPL Corridor	Proposed Corridor	430 m	430 m	Relocated the previously proposed pipeline corridor along 215th Street as per discussions with City of Edmonton.
62.0 - 62.8	62.0 - 62.8	Proposed Corridor	70 m	Previously adjacent to TMPL	Realigned the previously proposed pipeline corridor to the northeast to avoid a conflict with an existing high pressure gas pipeline.
93.3 - 99.6	Wabamun Provincial Park	Proposed Corridor	600 m	Adjacent to TMPL	Rerouted the previously proposed pipeline corridor to parallel the existing TMPL through Wabamun Provincial Park.
134.0 - 135.8	Pembina River Open Cut Alternative Crossing	Alternate Corridor	480 m	Adjacent to TMPL	Revised the previously proposed pipeline corridor to provide a suitable crossing for an open cut contingency of the Pembina River.
247.5 - 248.0	Sundance Creek	Proposed Corridor	120 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor due to a change in crossing technique to be implemented at Sundance Creek.
248.4 - 249.4	248.4 - 249.4	Proposed Corridor	250 m	Adjacent to TMPL	Realigned the previously proposed pipeline corridor to parallel the existing TMPL.
327.0 - 328.3	Muskuta Creek	Proposed Corridor	220 m	200 m	Revised the previously proposed pipeline corridor to avoid conflicts with existing utilities and infrastructure and provide workspace for a conventional crossing of Muskuta Creek.
329.3 - 335.2	329.3 - 335.2	Proposed Corridor	80 m	Previously adjacent to TMPL	Increased the width of the previously proposed pipeline corridor to the south and east to avoid congestion with existing infrastructure.
339.4	Hinton Pump Station	Proposed Corridor	20 m	Previously adjacent to TMPL	Hinton Pump Station – increased the size of the previously proposed pipeline corridor surrounding the pump station site to account for land required for facility expansion.

[1] Trans Mountain Pipeline (TMPL)

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR (continued)

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[2] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
British Columbia					
496.6 - 497.3	Fraser River	Proposed Corridor	50 m	Previously adjacent to TMPL	Revised the configuration of the previously proposed pipeline corridor to improve the crossing of the Fraser River.
498.2	Rearguard Pump Station	Proposed Corridor	40 m	40 m	Rearguard Pump Station - increased the size of the previously proposed pipeline corridor surrounding the pump station site to account for land required for facility expansion.
500.8 - 504.5	CN Rail Corridor at Rearguard	Proposed Corridor	70 m	900 m	Revised the previously proposed pipeline corridor to improve alignment and provide workspace for construction through difficult mountainous terrain.
541.9 - 542.2	541.9 - 542.2	Proposed Corridor	60 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor to improve crossing locations for a water course and a forestry road.
556.0 - 557.0	556.0 - 557.0	Proposed Corridor	250 m	320 m	Revise the previously proposed pipeline corridor to avoid Coho spawning habitat in the North Thompson River.
572.2 - 575.3	572.2 - 575.3	Proposed Corridor	55 m	300 m	Several small adjustments were made to the previously proposed pipeline corridor to improve constructability in congested areas with difficult mountainous terrain.
584.5 - 584.9	584.5 - 584.9	Proposed Corridor	80 m	Previously adjacent to TMPL	Revised the location of the previously proposed pipeline corridor to the west to avoid a debris (rock/mud) slide area.
608.4 - 613.0	608.4 - 613.0	Proposed Corridor	10 m	Previously adjacent to TMPL	Increased the width of the previously proposed pipeline corridor to the east to overlap the CN Rail right-of-way west of the tracks.
626.6 - 627.3	626.6 - 627.3	Proposed Corridor	240 m	200 m	Revised the previously proposed pipeline corridor to improve the Highway 5 crossing and to improve the constructability of the pipeline right-of-way.
633.5 - 635.7	633.5 - 635.7	Proposed Corridor	340 m	2,000 m	Realigned the previously proposed pipeline corridor for geotechnical reasons to avoid potentially unstable terrain.
636.6 - 638.1	636.6 - 638.1	Proposed Corridor	150 m	400 m	Revised the previously proposed pipeline corridor to parallel an existing electrical transmission line (rather than a fibre-optic line) and to improve constructability.
637.8 - 639.5	Finn Creek North East Alternate	Alternate Corridor	850 m	850 m	Alternate proposed pipeline corridor avoids Finn Creek Provincial Park to the north and east of the park.
643.6 - 644.4	643.6 - 644.4	Proposed Corridor	40 m	40 m	Revised the previously proposed pipeline corridor to avoid highly sensitive fish habitat.
658.6 - 658.9	658.6 - 658.9	Proposed Corridor	70 m	Previously adjacent to TMPL	Revised the location and width of the previously proposed pipeline corridor to improve a CN Rail crossing.

[2] Trans Mountain Pipeline (TMPL)

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR (continued)

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[3] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
British Columbia					
660.7 - 661.1	660.7 - 661.1	Proposed Corridor	50 m	Previously adjacent to TMPL	Revised the location and configuration of the previously proposed pipeline corridor to improve the location and constructability at a crossing of Highway 5.
663.0 - 663.4	663.0 - 663.4	Proposed Corridor	40 m	Previously adjacent to TMPL	Revised the location and configuration of the previously proposed pipeline corridor to improve constructability at a creek crossing.
663.8 - 663.9	663.8 - 663.9	Proposed Corridor	20 m	Previously adjacent to TMPL	Minor revision to the previously proposed pipeline corridor to improve constructability.
688.0 - 689.1	688.0 - 689.1	Proposed Corridor	50 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor to improve constructability by avoiding steep terrain and avoiding congestion with existing linear facilities; improves the location of a crossing of Highway 5.
689.2 - 689.3	689.2 - 689.3	Proposed Corridor	20 m	Previously adjacent to TMPL	Minor revision to the previously proposed pipeline corridor to improve constructability.
692.5 - 692.6	692.5 - 692.6	Proposed Corridor	8 m	Previously adjacent to TMPL	Minor revision to the previously proposed pipeline corridor to improve constructability.
716.9 - 717.5	716.9 - 717.5	Proposed Corridor	80 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor to improve constructability and avoid congestion with existing linear facilities; improves the location of a crossing of Highway 5.
717.5 - 718.7	Raft River Crossing Contingency Alternate	Alternate Corridor	410 m	Adjacent to TMPL	Alternate pipeline corridor follows existing TMPL right-of-way.
726.2 - 728.1	North Thompson Provincial Park	Proposed Corridor	550 m	Adjacent to TMPL	The proposed revised pipeline corridor follows the existing TMPL through North Thompson Provincial Park and improves constructability of the pipeline.
726.9 - 727.9	RK 727 Highway 5 Alternate	Alternate Corridor	235 m	450 m	An alternative crossing of Highway 5 for the proposed alternative pipeline corridor west of the North Thompson Provincial Park.
734.5 - 735.0	Mann River	Proposed Corridor	140 m	105 m	Revised the previously proposed pipeline corridor to provide work space needed for a trenchless watercourse crossing of the Mann River.
757.8 - 758.0	757.8 - 758.0	Proposed Corridor	55 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor to improve a crossing of Highway 5 and account for needed workspace at the crossing and to avoid potential conflicts with existing buildings.

[3] Trans Mountain Pipeline (TMPL)

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR (continued)

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[4] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
British Columbia					
760.0 - 761.0	760.0 - 761.0	Proposed Corridor	50 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor to improve a crossing of Highway 5 and account for needed workspace at the crossing.
762.7 - 762.9	762.7 - 762.9	Proposed Corridor	15 m	Previously adjacent to TMPL	Revised the previously proposed pipeline corridor to the opposite side of the existing TMPL to avoid steep side slope.
763.5 - 763.7	763.5 - 763.7	Proposed Corridor	20 m	Previously adjacent to TMPL	Minor deviation to the previously proposed pipeline corridor to improve crossing of Highway 5.
764.9 - 766.3	764.9 - 766.3	Proposed Corridor	35 m	Previously adjacent to TMPL	Revised the location and configuration of the previously proposed pipeline corridor to provide sufficient workspace and avoid congestion with existing facilities and buildings and to improve constructability.
810.5 - 811.5	Black Pines Pump Station	Proposed Corridor	1,000 m	Adjacent to TMPL	Revised the previously proposed pipeline corridor by expanding it to the north to account for the site being considered for the proposed Black Pines Pump Station.
820.1 - 820.6	820.1 - 820.6	Proposed Corridor	35 m	Previously adjacent to TMPL	Minor deviation to the previously proposed pipeline corridor to move to opposite side TMPL for better creek and road crossing.
820.5 - 836.9	Westsyde TMPL Alternate	Alternate Corridor	2,120 m	300 m	A proposed alternative pipeline corridor which follows the existing TMPL to the extent practical through the Community of Westsyde south of the Jamison Creek Forest Service Road. The proposed alternative pipeline corridor would be installed beneath Westsyde Road and Serle Road south of the Dunes Golf Course before rejoining TMPL.
825.0 - 825.8	825.0 - 825.8	Proposed Corridor	40 m	1,400 m	Revised the previously proposed pipeline corridor as requested by the landowner.
868.2 - 868.9	868.2 - 868.9	Proposed Corridor	140 m	140 m	Revised the location of the previously proposed pipeline corridor to the west to avoid rocky terrain associated with a ravine.
870.6 - 871.1	870.6 - 871.1	Proposed Corridor	50 m	50 m	Revised the location of the previously proposed pipeline corridor to the west to avoid rocky terrain.
911.9 - 913.0	Zoht IR 5 SE Alternate	Alternate Corridor	450 m	400 m	The proposed alternative pipeline corridor is adjacent to the east and south boundaries of the Zoht IR[5] No. 5
917.0 - 918.8	Zoht IR 4 NW Alternate	Alternate Corridor	660 m	620 m	The proposed alternative pipeline corridor avoids the Zoht IR No. 4 by routing to the north and west closer to Highway 5.

[4] Trans Mountain Pipeline (TMPL)
[5] Indian Reserve (IR)

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR (continued)

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[6] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
British Columbia					
930.3 - 931.2	Joeyaska IR 2 NW Alternate	Alternate Corridor	400 m	360 m	The proposed alternative pipeline corridor is adjacent to the north and west boundaries of the Joeyaska IR No. 2.
937.0 – 949.7	Coldwater TMPL Modified Alternate	Alternate Corridor	1,700 m	600 m	The proposed alternative pipeline corridor follows TMPL through Coldwater IR with a deviation to the southwest away from TMPL around the Community of Coldwater.
944.9 - 949.7	944.9 - 949.7	Proposed Corridor	850 m	700 m	Revised the location of the previously proposed pipeline corridor away from the TMPL right-of-way and the Coldwater Road and closer to Highway 5.
980.6 - 981.2	980.6 - 981.2	Proposed Corridor	60 m	140 m	Revised the previously proposed pipeline corridor to cross to the west side of the existing Spectra Energy pipelines and out of the Highway 5 easement.
982.3 - 983.3	982.3 - 983.3	Proposed Corridor	55 m	530 m	Revised the previously proposed pipeline corridor to the west to avoid crossing Spectra Energy pipelines and to improve constructability.
986.4 - 987.0	986.4 - 987.0	Proposed Corridor	140 m	570 m	Revised the previously proposed pipeline corridor to the west to improve the terrain encountered by the proposed revised pipeline corridor and follow an existing fibre-optic line.
995.6 - 997.1	Dry Gulch	Proposed Corridor	220 m	1,120 m	Revised the width of the previously proposed pipeline corridor across the Dry Gulch canyon to improve constructability.
997.1 - 1000.6	997.1 - 1000.6	Proposed Corridor	65 m	1,200 m	Minor revision to the previously proposed pipeline corridor to improve constructability.
997.5 - 1000.9	Coquihalla Summit Lower Alternate	Alternate Corridor	620 m	675 m	Proposed alterative pipeline corridor at the Coquihalla Pass, parallel to Highway 5 that is at a lower elevation than the previously proposed pipeline corridor.
1010.3 - 1011.5	1010.3 - 1011.5	Proposed Corridor	150 m	5,000 m	Revised the location and configuration of the previously proposed pipeline corridor to provide land for a staging area needed during construction and improve the crossing location at Highway 5 by avoiding a conflict with a fibre-optic line.
1018.6 - 1018.8	1018.6 - 1018.8	Proposed Corridor	40 m	220 m	Revise the location of the previously proposed pipeline corridor to improve constructability and avoid encroachment of Spectra Energy pipeline right-of-way.
1039.4 - 1042.2	1039.4 - 1042.2	Proposed Corridor	400 m	85 m	Revised the location and configuration of the previously proposed pipeline corridor to follow the existing TMPL; better terrain is encountered along the proposed revised pipeline corridor than was encountered by the previously proposed corridor. The revised proposed pipeline corridor has been configured to avoid traversing the Kawkawa Lake IR No. 16.

[6] Trans Mountain Pipeline (TMPL)

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR (continued)

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[7] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
British Columbia					
1054.4 - 1054.7	1054.4 - 1054.7	Proposed Corridor	45 m	120 m	Revised the location of the previously proposed pipeline corridor to support the option of trenchless construction to bypass rock face adjacent Highway 1.
1057.5 - 1058.4	Ohamil 1 North Alternate	Alternate Corridor	20 m	160 m	A proposed alternate pipeline corridor route option is located within the Highway 1 easement. The alternative pipeline corridor would avoid traversing the Ohamil IR No. 1.
1061.6 - 1065.1	Peters 1A	Proposed Corridor	260 m	105 m	Revised the previously proposed pipeline corridor to the south and east towards Highway 1 to avoid the Peters No. 1A IR.
1067.5 - 1068.5	1067.5 - 1068.5	Proposed Corridor	140 m	300 m	Reconfigured the previously proposed pipeline corridor to provide option for trenchless construction to bypass steep rock faces adjacent Highway 1.
1075.7 - 1077.5	Popkum 1 North Alternate	Alternate Corridor	160 m	200 m	A proposed alternate pipeline corridor option was added in the vicinity of Popkum No. 1 Indian Reserve.
1078.7 - 1081.4	1078.7 - 1081.4	Proposed Corridor	840 m	Adjacent to TMPL	Revised the previously proposed pipeline corridor to follow the existing TMPL through Bridal Veil Provincial Park and Popkum No. 2 Indian Reserve. The proposed revised pipeline corridor avoids the Cheam Lake Wetland Regional Park.
1091.1 - 1091.7	Grass 15 SE Alternate	Alternate Corridor	280 m	260 m	A new proposed alternate pipeline corridor was added to avoid the Grass Indian Reserve No. 15.
1097.0 - 1097.5	Tzeachten 13 NW Alternate	Alternate Corridor	190 m	260 m	A new proposed alternate pipeline corridor was added to avoid the Tzeachten No. 13 IR.
1119.7 - 1120.2	1119.7 - 1120.2	Proposed Corridor	60 m	70 m	Reconfigured the previously proposed pipeline corridor to provide sufficient workspace for trenchless construction technique (*e.g.*, horizontal directional drill).
1129.0 - 1129.7	1129.0 - 1129.7	Proposed Corridor	210 m	400 m	Realigned the previously proposed pipeline corridor to the south and west to bypass the Matsqui Main IR No. 2 and developments on lands within the previously proposed pipeline corridor.
1148.0 - 1151.5	1148.0 - 1151.5	Proposed Corridor	1,500 m	2,130 m	Stakeholder opposition on the previously proposed corridor line through the Salmon River valley. The proposed revised pipeline corridor was moved farther west along the existing TMPL before bending to the north along 217A Street. The proposed revised pipeline corridor traverses a golf course and a proposed alternate pipeline corridor is located to the east of the golf course.

[7] Trans Mountain Pipeline (TMPL)

TABLE 1.40A-1

ALTERNATIVE ROUTE DEVIATIONS FROM THE PROPOSED PIPELINE CORRIDOR (continued)

Approximate RK Range	Alternate Corridor Name	Corridor Deviation Status	Distance to Previously Proposed Pipeline Corridor	Distance to TMPL[8] Right-of-Way	Change(s) to the Previously Proposed Pipeline Corridor
British Columbia					
1158.6 - 1160.6	1158.6-1160.6	Proposed Corridor	260 m	915 m	Relocated and reconfigured the previously proposed pipeline corridor to improve constructability and avoid congestion in developed urban environment.
1162.6 - 1166.7	1162.6 - 1066.7	Proposed Corridor	210 m	1,800 m	Realigned and reconfigured the previously proposed pipeline corridor to avoid congestion in developed urban environment and to reduce the length that the proposed pipeline corridor traverses Surrey Bend Regional Park. The proposed revised pipeline corridor follows a transportation corridor adjacent to the CN Rail line and Intermodal yard. The previously proposed corridor was expanded to allow for planned highway development.
1166.8 - 1169.4	1166.8 - 1169.4	Proposed Corridor	1,260 m	2,100 m	Revised the previously proposed pipeline corridor crossing of the Fraser River to the east side of the Port Mann Bridge.
1172.2 - 1178.2	Coquitlam-Burnaby Highway 1 and Rail Corridor	Proposed Corridor	600 m	2,600 m	The proposed revised pipeline corridor alignment is the previous alternate pipeline corridor that was illustrated in the application filed with the NEB on December 16, 2013 (Appendix D of Volume 3A). Slight adjustments were made to the previously proposed pipeline corridor to provide sufficient workspace at crossings (*e.g.,* Trans Canada Highway) and to avoid existing infrastructure owned by the City of Burnaby.
Westridge Delivery Lines	Westridge Delivery Lines	Proposed Corridor	900 m	950 m	The proposed revised pipeline corridor has been relocated to the east to avoid disturbance to residential areas. The Burnaby Mountain Parkway, Hastings Street, and Cliff Avenue route remains as the Alternate Corridor (see response NEB Information Request No. 1.40 b).

[8] Trans Mountain Pipeline (TMPL)

b) The information requested in NEB IR No. 1.40b is presented in three separate subheadings that are based on the key topics outlined in the request, those being:

- the alternative routes under consideration for the Burnaby to Westridge Segment of proposed pipeline corridor;
- the environmental and socio-economic effects of each of the alternative routes under consideration; and
- Trans Mountain's preferred alternative route, along with a rationale for that preferred alternative route.

As noted in the response to NEB IR No. 1.12b, Trans Mountain will provide additional details on the outcomes of consultation activities that have influenced the refinement of the proposed pipeline corridor and alternatives in Consultation Update No. 2, which will be submitted to the NEB in Q3 2014. Due to the recent timing of consultation activities related to the proposed deviations (i.e., in March and April 2014), Trans Mountain has not processed the results of all the consultation activities to determine how to address all the issues raised. The information in Consultation Update No. 2 will provide further support to the information presented in this response.

Alternative Routes under Consideration for the Burnaby to Westridge Segment of the Proposed Pipeline Corridor

The existing Trans Mountain Pipeline corridor from the Burnaby Terminal to the Westridge Marine Terminal contains a single 610 mm outside diameter (O.D.) (NPS 24) pipeline which passes under boulevards and streets and through green areas. Approximately 2 km of the existing pipeline is buried under City of Burnaby streets and the pipeline is located directly in front of 11 residences. The Trans Mountain Expansion Project proposes two 762 mm O.D. (NPS 30) pipelines to supply the expanded Westridge Marine Terminal. The alternative pipeline corridor options have been further examined since the Application was filed with the NEB in December 2013. The results of this further study indicate that the route options where trenchless construction methodologies would be used are preferred over the previously proposed pipeline corridor and an alternative to the previously proposed pipeline corridor. Currently, two corridors that include three route options are being studied, as outlined below:

- The Previously Proposed Pipeline Corridor that exits the north end of the Burnaby Terminal and enters the Burnaby Mountain Parkway and follows it west to Hastings Street and then to Cliff Avenue. This pipeline corridor follows Cliff Avenue to the north to the end of the road and then turns east into the Westridge Marine Terminal. This corridor option would use conventional pipeline construction techniques, modified for work within a limited footprint, city streets, and urban setting, to install the pipelines between the Burnaby and Westridge Marine Terminals.
- The Burnaby Mountain Horizontal Directional Drill (HDD) route option (within the proposed revised pipeline corridor) that would follow a direct route from the north end of the Burnaby Terminal to the Kask industrial property where it would then turn west and

continue into the Westridge Marine Terminal. This alternative corridor would use two separate horizontal directional drills to install the pipelines between the Burnaby Terminal and the Westridge Marine Terminal.

- The Trenchless Direct route option (within the proposed revised pipeline corridor, which is the same corridor under consideration for the Burnaby Mountain HDD) that exits the north end of the Burnaby Terminal where a tunnel would be used to install the pipelines through Burnaby Mountain directly to the west of the Kask Industrial. The pipeline corridor then turns west and enters the Westridge Marine Terminal.

These three alternatives between the Burnaby and Westridge terminals that are currently being considered by Trans Mountain are evaluated in Table 1.40B-1 and are shown on the maps that are provided in response to NEB IR No. 1.84a (see Map Sheet 54 of 54; NEB IR No. 1.84a – Attachment 1).

TABLE 1.40B-1

STUDY OF ALTERNATIVE CORRIDORS–BURNABY to WESTRIDGE RK 0 TO RK 3.6

Factors	Previously Proposed Pipeline Corridor	Proposed Revised Pipeline Corridor	
		Burnaby Mountain HDD Alternative	Trenchless Direct Alternative
LENGTHS			
1. Length of pipeline corridor (km)	3.6	3.3	3.4
2. Length following existing Trans Mountain Pipeline right-of-way (km)	0.4	0.6	0.6
3. Length following other linear features (other pipelines, power lines, highways, roads, fibre-optic lines, railways, etc.) (km)	3.2	0.4	0.4
4. Length of “new” corridor (km)	0	2.3	2.4
5. Total parallels (km)	3.6	1.0	1.0
CROSSINGS			
6. No. of highway crossings (#)	0	0	0
7. No. of road (arterial, collector, local) crossings (#)	10	3	3
8. No. of forestry roads crossings (#)	0	0	0
9. No. of TMPL crossings (#)	1	1	1
10. No. of foreign line crossings (#)	18	8	8
11. No. of fibre-optic / other cable crossings (#)	11	2	2
12. No. of main power line crossings (#)	1	1	1
13. No. of distribution power line crossings (#)	4	1	1
14. No. of railway crossings (#)	0	0	0
15. Crossings of named rivers (#)	0	0	0
16. Crossings of named creeks (#)	0	0	0
17. Crossings of other watercourses (#)	0	0	0
18. Total watercourses (#)	0	0	0

TABLE 1.40B-1

STUDY OF ALTERNATIVE CORRIDORS–BURNABY to WESTRIDGE RK 0 TO RK 3.6 (continued)

Factors	Previously Proposed Pipeline Corridor	Proposed Revised Pipeline Corridor	
		Burnaby Mountain HDD Alternative	Trenchless Direct Alternative
GEOTECHNICAL			
19. Length crossing slopes > 50% on the fall line (km)	0	0	0
20. Length crossing slopes > 50% on sidehill (km)	0	0	0
21. Natural hazard potential (km)	High:0.0 Med: 0.8 Low: 2.9	High:0.0 Med: 0.04 Low: 3.3	High:0.0 Med: 0.04 Low: 3.4
22. Length of thin veneer of overburden or exposed bedrock (km)	0.0	0.3	0.4
HYDRAULICS			
23. Minimum elevation (m)	21	18.3	18.5
24. Maximum elevation (m)	209.2	167.8	168
25. Acceptability	Yes	Yes	Yes
LAND			
26. Indian Reserve (km)(name)	0	0	0
27. Provincial Crown (km)	0	0	0
28. Private (km)	2.59	2.79	2.5
29. Unknown Parcels (km)	1.01	0.6	0.8
30. No. of private parcels (#)	17	12	9
31. Length within Riparian Reserve Zone (km)	0	0	0
32. Wetlands crossed (km)	0	0	0
SOCIO-ECONOMIC			
33. Parks and protected areas (km)(name)	0	0.7	0.73
34. Agricultural Land Reserve (km)	0	0	0
35. Community watersheds (#)	0	0	0
36. Municipalities crossed (km)	Burnaby (3.6)	Burnaby (3.3)	Burnaby (3.4)
ABORIGINAL AND STAKEHOLDER ENGAGEMENT			
37. Aboriginal Support	To be determined through ongoing engagement	To be determined through ongoing engagement	To be determined through ongoing engagement

TABLE 1.40B-1

STUDY OF ALTERNATIVE CORRIDORS–BURNABY to WESTRIDGE RK 0 TO RK 3.6 (continued)

Factors	Previously Proposed Pipeline Corridor	Proposed Revised Pipeline Corridor	
		Burnaby Mountain HDD Alternative	Trenchless Direct Alternative
38. Stakeholder Support	Strong opposition to this pipeline corridor given the dense urban setting, including development which has occurred since the original pipeline was constructed. Additional opposition due to 2007 Westridge spill, property value concerns, viewscape impacts, traffic congestion during construction and in event of a pipeline issue (only one way in/out of the neighbourhood which would be impacted by construction).	This pipeline corridor was preferred over the previously proposed pipeline corridor. However, there is concern due to the possible creation of geotechnical issues resulting from horizontal directional drilling (*i.e.*, potential subsidence, loss of trees during construction at sampling sites and entry and exit locations).	This pipeline corridor was preferred over the previously proposed pipeline corridor. However, there is concern due to the possible creation of geotechnical issues resulting from tunnelling (*i.e.*, potential subsidence, loss of trees during construction at sampling sites and entry and exit locations).
CONSTRUCTABILITY AND COST			
47. Constructability	Congested construction of two 762 mm O.D. (NPS 30) pipelines within Hastings street combined with conventional construction in open areas east of Hastings Street (within Burnaby Mountain Conservation Area), and west of Cliff Avenue.	Construction of two 762 mm O.D. (NPS 30) pipelines via horizontal directional drill from the Burnaby Terminal to a point on the Kask property north of the Barnet Highway. A second horizontal directional drill from the Kask property west to the Westridge Marine Terminal.	Construction of two 762 mm O.D. (NPS 30) pipelines via a tunnel from the Burnaby Terminal to the Westridge Marine Terminal.
48. Estimated Cost ($ millions)	$20.0	$23.8	$46.6

The Previously Proposed Pipeline Corridor will:

- have the lowest cost.
- have the least risk due to construction techniques.
- involve traffic disruptions along Burnaby Mountain Parkway, Hastings Street and Cliff Avenue.
- impact a number of residential parcels, particularly in the North Cliff subdivision.
- present challenging construction through city streets given limited space and multiple existing utilities.

Proposed Revised Pipeline Corridor Options:

1. The Burnaby Mountain HDD option will:

    - be the shortest of the three alternatives.
    - have no disruptions to residences or traffic.
    - avoid conflict with existing utilities.
    - have no impact on the Burnaby Mountain Conservation Area (aside from some required geotechnical study boreholes).
    - be more expensive than the previously proposed corridor.
    - have the highest risk of construction execution.

2. The Trenchless Direct option will:

    - have no disruptions to residences or traffic.
    - avoid conflict with other existing utilities.
    - have very low construction impact.
    - have no impact on the Burnaby Mountain Conservation Area (aside from some required geotechnical study boreholes).
    - have the highest cost.

Environmental and Socio-Economic Effects of each of the Alternative Routes under Consideration

The environmental and socio-economic effects of each of the two corridors that are currently being considered by Trans Mountain are provided in Table 1.40B-1 above. The assessment of the potential environmental and socio-economic effects identified for the previously proposed pipeline corridor for the Burnaby to Westridge Segment of the proposed pipeline corridor are provided in the Application that was filed with the NEB in December 2013 (Section 7.2 of Volume 5A/5B).

Assuming access is granted for Trans Mountain representatives to conduct surveys on City-owned lands, environmental and cultural baseline studies including vegetation, soils, archaeology and wildlife are scheduled to be conducted along the proposed revised pipeline corridor throughout 2014. Trans Mountain will refer to the Pipeline Environmental Protection Plan (Volume 6B) as well as the contingency plans for wildlife species of concern discovery, rare ecological communities and rare plant species discovery, heritage resources discovery and traditional land use sites discovery that are appended to the Pipeline Environmental Protection Plan for potential mitigation measures to implement should environmental and/or cultural features be discovered during the additional studies that are planned to be conducted along the proposed revised pipeline corridor. Information gathered from baseline studies conducted for the proposed revised pipeline corridor will be assessed following the same criteria that were used for the assessment of the proposed pipeline corridor in the Environmental and Socio-economic assessment that was included in the Application filed on December 16, 2013 (Section 7.2 of Volume 5A/5B) to confirm that the anticipated effects are consistent with the conclusions reached in the Environmental and Socio economic Assessment.

Trans Mountain's Preferred Pipeline Corridor for Burnaby to Westridge Delivery Lines

The currently proposed revised pipeline corridor includes both the Burnaby Mountain HDD and the Trenchless Direct options because it would avoid impacts to residences and other urban infrastructure (e.g., roads). Of the two options that would involve trenchless construction techniques, the Burnaby Mountain HDD option is preferred due to the lower construction cost. However, additional geotechnical studies in this area are needed to complete and confirm the feasibility of installing the pipelines using either of the trenchless construction options. To date, the City of Burnaby has not entered into a dialogue with Trans Mountain regarding these routing options nor has the City allowed access onto City-owned land for Trans Mountain's engineers and other specialists to conduct the necessary studies (e.g., geotechnical, constructability, environmental, cultural) needed to complete the assessment of these pipeline corridors.

1.41 Caribou habitat assessment

Reference:

A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

i) PDF pages 257 and 258 of 403
ii) PDF page 266 of 403

Preamble:

Reference i) states that Table 7.2.10-7 provides a summary of predicted change in disturbance within caribou ranges and approved ungulate winter range encountered by the proposed pipeline corridor.

Reference ii) includes Table 7.2.10-7 - Predicted Change in Habitat for Mammal Indicators in the Wildlife LSA, but does not include predicted change in habitat for woodland caribou.

Request:

Please provide an assessment of predicted change in habitat within caribou ranges and approved ungulate winter range of caribou potentially affected by the Project.

Response:

Reference i) refers to an error in the Application. Rather than Table 7.2.10-7, reference i) should refer to Table 8.9-9, Section 8.9.6.1 of Volume 5A. Table 8.9-9 provides the predicted change in habitat for woodland caribou, including the predicted change in disturbance within caribou ranges and approved ungulate winter range encountered by the proposed pipeline corridor. An assessment of predicted change in habitat within caribou ranges and approved ungulate winter range of caribou potentially affected by the Project is provided in the Application, Section 8.9.6.1 of Volume 5A.

1.42 Cumulative effects assessment of woodland caribou mortality risk

Reference:

i) A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical, PDF page 222 of 403

A3S1R2, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

ii) PDF page 75 of 148
iii) PDF page 86 of 148
iv) A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical, PDF page 269 of 403

Preamble:

Reference i) states that qualitative changes in mortality risk were selected as a measurement endpoint for Project effects on woodland caribou.

Reference ii) states that, given the linear nature of the primary components of the Project, effects on mammal mortality risk during operations are expected to result largely from access. The reference further states that linear feature density is a metric that can be used to provide insight into the potential cumulative effects of development on habitat effectiveness and mortality risk.

Reference iii) states that caribou are sensitive to human disturbance, and that research has demonstrated adverse interactions between linear disturbance, primary prey and predator response, and caribou mortality.

Reference iv) states that studies suggest the influence of anthropogenic linear feature density on predation rates may be as important in mortality of ungulates (particularly caribou) as the density of predators.

The Board notes that a cumulative effects measurement endpoint for woodland caribou mortality risk does not appear to be defined in Trans Mountain's Project application.

Request:

Please provide a quantitative assessment of cumulative mortality risk to woodland caribou resulting from the Project that includes:

a) existing conditions, existing conditions and Project conditions combined, and cumulative conditions (existing physical facilities or activities, the Project, and reasonably foreseeable physical facilities or activities);

b) mitigation proposed to reduce cumulative effects on woodland caribou mortality risk; and

c) a prediction of significance of cumulative effects on woodland caribou mortality risk.

Response:

a) As noted in references ii) to iv), caribou research has demonstrated adverse interactions between linear disturbance, primary prey and predator response, and caribou mortality. Linear feature density is a metric that can be used to provide insight into the potential overall effects of land use on habitat effectiveness and mortality risk. More specifically, linear feature density has been used as an indicator to relate caribou population response to land use. The observed relationship between linear feature density and caribou population response is thought to result primarily from predation (sometimes called apparent competition), which arises from the complex interaction of early seral vegetation, numeric response of primary prey (i.e., ungulates other than caribou) and predators, predator access and efficiency, access into remote locations historically preferred by caribou and predator/caribou encounters (Environment Canada 2014).

A number of linear feature density thresholds have been proposed in the available literature for woodland caribou. For example, a corridor density threshold of 1.8 km/km² was suggested for boreal woodland caribou (Salmo and Diversified 2003). Model simulations of boreal woodland caribou predicted a decline in caribou populations where the linear corridor (road and seismic line) density exceeded a threshold of 1.2 km/km² and moose densities were low (Weclaw and Hudson 2004). When the simulation was run with reduced wolf densities rather than reduced moose densities, the results indicated a linear density threshold of 0.8 km/km² (Weclaw and Hudson 2004). The Athabasca Landscape Team (2009) reports linear feature density strata based on risk to boreal woodland caribou population persistence, where there is a low risk when the linear density is less than 0.6 km/km², a moderate risk when the linear density is between 0.6 km/km² and 1.2 km/km² and a high risk when the density exceeds 1.2 km/km².

For the purposes of a quantitative assessment of cumulative mortality risk to woodland caribou, a corridor density analysis (*i.e*., a linear feature density analysis) for the Caribou Regional Study Area (RSA) is provided below. Since the potential effects of the Project on woodland caribou (*i.e*., change in habitat, movement and mortality risk) are related and interact, the results presented in Section 8.9.6.1 of Volume 5A regarding functional habitat disturbance in the Caribou RSA also form part of the quantitative assessment of cumulative mortality risk to woodland caribou. Within the Caribou RSA, the Project parallels the existing Trans Mountain Pipeline right-of-way, Highway 5 and an existing railway.

The methods for the corridor density analysis for caribou are the same as described for the motorized access density analysis for grizzly bear in Section 8.9.6.3 of Volume 5A (*i.e.*, a moving window analysis with a 500 m circular window radius and 30 m^2 pixels), with the addition of cutlines to the spatial data features. To evaluate the potential cumulative effects on caribou in the Caribou RSA, the corridor density was quantified and reported with reference to the risk levels applied by the Athabasca Landscape Team (2009). The corridor density analysis was completed for the proposed revised pipeline corridor rather than the previously proposed pipeline corridor (*i.e.,* the latter as filed in December 2013).

Cutblocks are the only reasonably foreseeable development identified within the Caribou RSA. Spatial data were not available for future cutblocks or their associated access roads at

the time of the assessment; therefore, the quantitative assessment of corridor density includes only the interaction of the Project with existing activities in the Caribou RSA, and results for the cumulative scenario (*i.e.*, existing physical facilities or activities, the Project, and reasonably foreseeable physical facilities or activities) are the same as the Project scenario (*i.e.* existing conditions and Project conditions combined). Future forest harvest was considered qualitatively in the significance assessment of cumulative effects on caribou.

Results of the corridor density analysis show that average corridor density in the Caribou RSA is 0.40 km/km² under existing conditions (*i.e.,* existing scenario) and 0.40 km/km² under the Project and cumulative scenarios (differences occur in digits not shown here due to rounding). Therefore the average corridor density under the existing, Project and cumulative scenarios is in the low risk category (*i.e.,* < 0.6 km/km²) (Athabasca Landscape Team 2009). As mortality risk is most appropriately represented at the landscape or caribou range scale, the average corridor density within the Caribou RSA is an appropriate metric for significance evaluation.

Localized changes from existing conditions to Project conditions in the corridor density in the Caribou RSA will occur but are predicted to be small (NEB IR No. 1.42a – Attachment 1). Within the Caribou RSA, the proposed revised pipeline corridor primarily traverses land that is already within the high risk linear density category (*i.e.*, corridor density is > 1.2 km/km²) and does not traverse any land within the low risk linear density category (*i.e.*, < 0.6 km/km²) (Athabasca Landscape Team 2009). Since the corridor density analysis was completed using a moving window method (and therefore each location is affected by linear features within a 500 m radius), the proposed revised pipeline corridor will increase the risk category in a few locations near but not directly on the proposed revised pipeline corridor (see NEB IR No. 1.42a – Attachment 1).

- NEB IR No. 1.42a – Attachment 1 (Corridor Density in the Caribou RSA)

References:

Athabasca Landscape Team. 2009. Athabasca Caribou Landscape Management Options Report.

Environment Canada. 2014. Recovery Strategy for the Woodland Caribou, Southern Mountain Population (Rangifer tarandus caribou) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Ottawa, ON. 68 pp.

Salmo Consulting Inc., Diversified Environmental Services, GAIA Consultants Inc., Forem Technologies Ltd. and Axys Environmental Consulting Ltd. 2003. Volume 2: Cumulative Effects Indicators, Thresholds, and Case Studies. Calgary, AB. Prepared for British Columbia Oil and Gas Commission and Muskwa Kechika Advisory Board. Calgary, AB.

Weclaw, P. and R.J. Hudson. 2004. Simulation of conservation and management of woodland caribou. Ecological Modelling 177:75-94.

b) Mitigation proposed to reduce the Project's residual and incremental contribution to cumulative effects on woodland caribou mortality risk is provided in Section 7.2.10.6 of Volume 5A and includes:

- Align route to parallel existing corridors (existing Trans Mountain Pipeline [TMPL] right-of-way, Highway 5, existing power line) to the extent feasible to reduce habitat disturbance.
- Implement line-of-sight breaks every 500 m along segments not sharing a right-of-way boundary with another linear corridor such as a road or power line. Line-of-sight measures may include: bends in the right-of-way; doglegs at intersections with access roads; woody debris or earth berms; tree or shrub planting to create vegetation screens across the right-of-way; avoiding clearing on the right-of-way (*e.g.*, horizontal directional drilling [HDD] or bored crossings of watercourses, roads or other rights-of-way).
- Avoid creating early seral habitat that will provide forage for moose (*e.g.*, do not plant willow or red osier dogwood) (Surgenor pers. comm.).
- Avoid creation of new access within caribou range where feasible. Use existing roads/linear corridors for access whenever practical (BC Oil and Gas Commission 2013). Where practicable, avoid building roads within 100 m of an existing trail (Kamloops Land and Resource Management Plan [LRMP] Mountain Caribou Subcommittee 2006).
- Deactivate and reclaim all temporary construction access within caribou range (Kamloops LRMP Mountain Caribou Subcommittee 2006).
- Coordinate any new access with all users and consider caribou management issues (*i.e.*, seasonal use of the road) (Kamloops LRMP Mountain Caribou Subcommittee 2006).
- Minimize winter road use and, where feasible, coordinate with other activities such as winter logging (Kamloops LRMP Mountain Caribou Subcommittee 2006).
- Where segments of the right-of-way require rollback for access management or erosion control, ensure sufficient timber is set aside for this purpose during final clean-up.
- Implement measures to reduce access (human and predator) along the pipeline right-of-way following construction. Measures include using woody debris as rollback, mounding, planting trees and/or shrubs for visual screens, and rock piles or berms across the right-of-way. The locations of access control measures along the pipeline right-of-way will be determined in consideration of consultation with provincial regulatory authorities.
- Consider the following at the proposed crossing of roads, other pipelines or watercourses: extend the length of HDD or bored crossings where this crossing method has been proposed to leave a vegetated screen for line-of-sight and/or narrow the right-of-way width, if feasible.
- Monitor the effectiveness of access control measures and reclamation during post-construction environmental monitoring. Implement remedial measures if warranted.

Schedule remedial work outside of the period of early to mid-winter when caribou are more likely to be in the area.

As discussed in Section 8.9.6 of Volume 5A, mitigation beyond standard measures is warranted to address the Project's residual and incremental contribution to cumulative effects on woodland caribou, given the sensitivity of woodland caribou, regulatory guidelines and management objectives. As suggested in NEB Draft Condition 10, in the NEB's *Letter – Draft Conditions and Regulatory Oversight* (April 16, 2014), Trans Mountain will develop and file a Preliminary Caribou Habitat Restoration Plan at least six months prior to commencing construction of any project component potentially affecting each caribou range, as well as a Final Caribou Habitat Restoration Plan on or before November 1 after the first complete growing season after commencing operations.

References:

British Columbia Oil and Gas Commission. 2013. Environmental Protection and Management Guide. June 2013 (Version 1.9). 96 pp. Website: http://www.bcogc.ca/document.aspx?documentID=927&type=.pdf. Accessed: April 2013.

Kamloops Land and Resource Management Plan Mountain Caribou Subcommittee. 2006. Kamloops LRMP appendix 10: objectives and considerations for managing mountain caribou. Draft February 15, 2006. 24 pp.

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

Surgenor, J. Wildlife Biologist. BC Ministry of Forests, Lands and Natural Resource Operations. Kamloops, BC.

c) As described in Section 7.2.10.7 of Volume 5A, the combined suite of potential effects of the Project on habitat, movement and increased mortality risk constitute the potential residual effect on woodland caribou. Rather than evaluating change in habitat, movement and mortality risk separately, this approach was determined to be the most appropriate method of evaluating Project effects since wildlife populations and individuals would potentially experience influences of all three effects pathways. Evaluation of the combined residual effect results in a realistic representation of the expected Project effects on the indicators for wildlife and wildlife habitat.

After incorporating the results of the corridor density analysis and the proposed mitigation (parts a) and b) of the response to NEB IR 1.42, respectively), the criteria ratings and rationale for magnitude and confidence for woodland caribou have been updated as follows:

- Magnitude: medium – the Wells Gray and Groundhog caribou herds are Threatened under Schedule 1 of the Species at Risk Act. The Project is predicted to contribute to the cumulative disturbance of functional habitat in the Caribou Regional Study Area (RSA) by a negligible amount (< 0.01%) and will not change the existing area of functional habitat disturbance in the UWR (Section 8.9.6.1, Table 8.9-9 of Volume 5A). Results of

the corridor density analysis suggest that the Project will have a minimal effect on corridor density in the Caribou RSA and that the risk to caribou population persistence from activities associated with corridor density is low (*i.e.*, the average corridor density in the Caribou RSA is predicted to be less than 0.6 km/km² under existing, Project and cumulative scenarios). Although the Project is expected to have a negligible effect on caribou habitat value and mortality risk, caribou are sensitive to human disturbance, and research has demonstrated adverse interactions between linear disturbance, primary prey and predator response and caribou mortality. Given the sensitivity of woodland caribou, regulatory guidelines and management objectives, mitigation beyond standard measures is warranted to address the Project's residual and incremental contribution to cumulative effects on woodland caribou. Trans Mountain will develop a Caribou Habitat Restoration Plan in consultation with regulatory authorities to address the Project's residual and cumulative effects on caribou. Implementation of the measures in the plan, in addition to the proposed mitigation provided in Section 7.2.10 of Volume 5A, is expected to reduce the magnitude of the Project's contribution to cumulative effects on caribou to medium.

- Confidence: moderate – the assessment is based on a reasonable understanding of the cause-effect relationship; limitations are associated with the absence of models, measures or thresholds specific to mountain ecotype woodland caribou.

The criteria ratings for the other significance criteria (*i.e.*, spatial boundary, duration, frequency, reversibility and probability) are not materially affected by the woodland caribou quantitative mortality risk assessment results and therefore not discussed further here.

After inclusion of the quantitative mortality risk assessment results for woodland caribou, the Project's contribution to cumulative effects on woodland caribou is not expected to have a high probability of occurrence of a permanent or long-term cumulative effect of high magnitude that cannot be technically or economically mitigated. Consequently, the Project's contribution to cumulative effects on woodland caribou is concluded to be not significant.

Summary of New Commitments:

- Submit Caribou Habitat Restoration Plan in accordance with draft NEB condition 10.
- Submit Preliminary Caribou Habitat Restoration Plan in accordance with draft NEB condition 10.

1.43 Length of pipeline corridor traversing caribou range

Reference:

A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

i) PDF page 257 of 403
ii) PDF page 264 of 403

Preamble:

Reference i) states that the proposed pipeline corridor traverses the Groundhog caribou range for approximately 10.3 km, of which 9.1 km is contiguous with existing linear disturbance, and 1.2 km is new cut.

Reference ii) states that the proposed pipeline corridor deviates from the existing Trans Mountain pipeline right-of-way and Highway 5 for approximately 6.1 km in the Groundhog caribou range.

Request:

Please reconcile the reported lengths of new cut (1.2 km) identified in Reference i) versus a corridor deviation from existing Trans Mountain pipeline right-of-way and Highway 5 (6.1 km) in Reference ii), both of which are through the Groundhog caribou range.

Response:

Since the filing of the Project Application, there have been minor modifications to the proposed pipeline route within the Groundhog caribou range. The length has been reduced by 1.2 km from 10.3 km to 9.1 km. Refer to Table 1.43-1 below for more detail.

TABLE 1.43-1

PROPOSED REVISED PIPELINE CORRIDOR IN THE GROUNDHOG CARIBOU RANGE

Detail	Length (km)
Total Length in Groundhog caribou range	9.1
Length of revised pipeline corridor contiguous with existing linear disturbances within the Groundhog caribou range (*i.e.*, TMPL right-of-way, Highway 5, roads, powerlines).	7.5
Length of new cut	1.6

Note: All distances are approximate

1.44 Pacific water shrew, Townsend's mole, and Pacific giant salamander critical habitat

Reference:

A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

i) PDF pages 261 and 302 of 403
ii) PDF pages 272 and 308 of 403

Preamble:

Reference i) states that the proposed corridor crosses proposed critical habitat for Pacific water shrew, early candidate critical habitat for Townsend's mole, and early critical habitat for Pacific giant salamander.

Reference ii) states that consultation with Environment Canada has been initiated and is ongoing regarding the Project's interaction with proposed critical habitat for Pacific water shrew, and early candidate critical habitat for Townsend's mole and Pacific giant salamander, and an appropriate approach for mitigating effects on these species. The reference further states that, if warranted, a mitigation strategy will be developed to reduce the magnitude of residual Project effects on coastal riparian small mammals and stream-dwelling amphibians.

Request:

Please provide:

a) the status of Trans Mountain's consultation with Environment Canada on Project effects on proposed critical habitat for Pacific water shrew, and early candidate critical habitat for Townsend's mole and Pacific giant salamander;

b) options considered for avoiding proposed critical habitat for Pacific water shrew, and early candidate critical habitat for Townsend's mole and Pacific giant salamander, and a rationale if those habitats cannot be avoided by the Project;

c) details of Trans Mountain's proposed mitigation strategy for Pacific water shrew, including proposed mitigation measures beyond standard fish habitat mitigation measures, or, if unavailable at this time, when such details will be filed with the Board; and

d) details of Trans Mountain's proposed mitigation strategy for Townsend's mole and Pacific giant salamander, or, if unavailable at this time, when such details will be filed with the Board.

Response:

a) A brief summary of key dates of consultation with Environment Canada related to candidate critical habitat is provided below:

- April 17, 2013: during this meeting Environment Canada was asked whether any critical habitat was in the process of being identified in order to identify these areas early in the planning process.
- August 1, 2013: Environment Canada was asked again about critical habitat, specifically about potential critical habitat for Pacific water shrew at Surrey Bend Regional Park.
- September 9, 2013: a data sharing agreement is finalized and hard-copy maps of critical habitat (including the categories of proposed, candidate and early candidate – herein collectively referred to as candidate critical habitat) for those species potentially affected by the Project are provided by Environment Canada for review (Environment Canada 2013a).
- November 25, 2013: the biophysical attribute descriptions are provided by Environment Canada for Pacific water shrew, Oregon forestsnail and Williamson's sapsucker.
- December 23, 2013: Environment Canada provides a *Summary of Draft Critical Habitat Information for TMEP – Dec. 2013* (Environment Canada 2013b), which includes draft biophysical attribute descriptions for all the candidate critical habitat (Pacific water shrew, Williamson's sapsucker, Oregon forestsnail, toothcup, coastal giant salamander, barn owl [western population], American badger, Townsend's mole, whitebark pine), as well as activities likely to result in the destruction of critical habitat for each species.
- April 3, 2014: Environment Canada provides updated hard-copy maps of candidate critical habitat (Environment Canada 2014a), as well as an updated version of *Summary of Draft Critical Habitat Information for TMEP – March 2014*" (Environment Canada 2014b).

A meeting with Environment Canada to discuss the Project's interaction with, and mitigation for, Pacific water shrew, Townsend's mole and Pacific giant salamander is scheduled for June 2014. This meeting will also provide the opportunity to review the routing in relation to the candidate critical habitat and routing constraints, as well as to discuss the 2014 supplemental wildlife field work in candidate critical habitat locations to identify the occurrence of biophysical attributes in relation to the proposed pipeline corridor.

References:

Environment Canada. 2013a. Proposed, Candidate and Early Candidate Critical Habitat Maps for the Proposed Trans Mountain Expansion Project. Hard Copy Maps provided by the Canadian Wildlife Service, Pacific and Yukon Region.

Environment Canada. 2013b. Summary of Draft Critical Habitat Information for TMEP – December 2013. 23 pages.

Environment Canada. 2014a. Proposed, Candidate and Early Candidate Critical Habitat Maps for the Proposed Trans Mountain Expansion Project. Hard Copy Maps provided by the Canadian Wildlife Service, Pacific and Yukon Region. April 2014.

Environment Canada. 2014b. Summary of Draft Critical Habitat Information for TMEP – March 2014. 26 pages.

b) Routing is a primary mechanism to avoid or reduce Project effects on wildlife habitat; however, in some cases no other practical alternatives are available due to factors such as terrain, landscape features or density of development. In these cases, it may not be possible to avoid areas identified as candidate critical habitat. In other cases, candidate critical habitat may be avoided, depending on the placement of the pipeline right-of-way within the proposed pipeline corridor. Please see response to NEB IR 1.46b for more information on the pipeline corridor and the route selection process for the Project.

A meeting is scheduled with Environment Canada in June 2014 and the proposed pipeline corridor in relation to candidate critical habitat will be discussed in detail. In order to properly review the location of candidate critical habitat in relation to Project routing, Environment Canada has been requested to provide shapefiles of the candidate critical habitat to identify more precisely where conflicts occur and whether routing alternatives exist. In the absence of more detailed mapping, a preliminary discussion on the routing in relation to proposed critical habitat for Pacific water shrew, and early candidate critical habitat for Townsend's mole and Pacific giant salamander is provided below, using the hard-copy maps provided by Environment Canada on April 3, 2014 (Environment Canada 2014). The outcome of consultation with Environment Canada and information on options for avoiding candidate critical habitat and a rationale if avoidance is not possible, will be updated in the filing of NEB IR Round 2 responses in Q3 2014.

Pacific Water Shrew

Locations of proposed critical habitat for Pacific water shrew occur near Bridal Veil Falls Provincial Park, Sumas Mountain, Surrey Bend Regional Park and Burnaby Lake. These areas are described below.

<u>Bridal Veils Provincial Park</u>

The pipeline corridor in this area has been revised since the Application was submitted in December 2013. The proposed revised pipeline corridor now crosses through Bridal Veil Falls Provincial Park and avoids the proposed critical habitat for Pacific water shrew. The proposed revised pipeline corridor will parallel the existing Trans Mountain Pipeline (TMPL) right-of-way in the Park.

<u>Sumas Mountain</u>

Proposed critical habitat for Pacific water shrew appears to be associated with a forested area located west of Straiton and the Sumas Pump Station, as well as the area of the Ledgeview Golf and Country Club. Along this segment, the proposed pipeline corridor parallels the existing TMPL right-of-way. Avoidance of the proposed critical habitat would create a longer linear corridor with new clearing requirements.

A short segment located west of the Ledgeview Golf and Country Club has been revised since the Application was submitted in December 2013. The proposed revised pipeline

corridor deviates from the existing TMPL right-of-way in order to establish a suitable alignment for a proposed trenchless installation to avoid a residential community (approximately AK 1119.4 to AK 1120.3).

Surrey Bend Regional Park

Proposed critical habitat for Pacific water shrew appears to be located outside of the Surrey Bend Regional Park boundary and located on the southwest side of the railway tracks and the South Fraser Perimeter Road. The pipeline corridor in this area has been revised since the Application was submitted in December 2013. The length of the proposed revised pipeline corridor within Surrey Bend Regional Park has been reduced to the extent feasible to address concerns raised by the City of Surrey. The area outside of the Park is highly congested and future development plans for other infrastructure (*e.g.*, highway development) need to be considered. Avoidance of the proposed critical habitat for Pacific water shrew is challenging in this area given the surrounding land use.

Burnaby Lake

Proposed critical habitat for Pacific water shrew is associated with the area surrounding Burnaby Lake. The pipeline corridor in this area has been revised since the Application was submitted in December 2013, and the proposed revised pipeline corridor avoids the area of Burnaby Lake, as well as the Brunette River. Improved mapping from Environment Canada is needed to determine if the proposed pipeline corridor encounters the proposed critical habitat. This area is highly congested and avoidance of any proposed critical habitat for Pacific water shrew will be challenging given the surrounding land use.

Townsend's Mole

Early candidate critical habitat for Townsend's mole is located in the area of the Ledgeview Golf and Country Club and overlaps the proposed critical habitat for Pacific water shrew described above.

Pacific Giant Salamander

Early candidate critical habitat for Pacific giant salamander appears to be located near the proposed pipeline corridor's crossing of the Sumas River near RK 1114.6 and adjacent areas. Currently, the proposed crossing technique for the Sumas River is a horizontal directional drill (HDD or trenchless). Another location of early candidate critical habitat is within an agricultural area along Stewart Slough (approximately RK 1105 to RK 1108), as well as Bridal Veil Falls Provincial Park. In all locations, the pipeline corridor will parallel the existing TMPL right-of-way. Improved mapping is needed to determine if the proposed pipeline corridor encounters early candidate critical habitat for Pacific giant salamander in these locations.

Reference:

Environment Canada. 2014. Proposed, Candidate and Early Candidate Critical Habitat Maps for the Proposed Trans Mountain Expansion Project. Hard Copy Maps provided by the Canadian Wildlife Service, Pacific and Yukon Region. April 2014.

c) Ongoing consultation with Environment Canada and BC Ministry of Forests, Lands and Natural Resource Operations, along with improved mapping of candidate critical habitat and information collected from the 2014 supplemental wildlife field work will further refine the mitigation measures proposed for Pacific water shrew. Details of mitigation strategies for Pacific water shrew will be provided with the filing of NEB IR Round 2 responses in Q3 2014.

d) Ongoing consultation with Environment Canada and BC Ministry of Forests, Lands and Natural Resource Operations, along with improved mapping of candidate critical habitat and information collected from the 2014 supplemental wildlife field work will further refine the mitigation measures proposed for Townsend's mole and Pacific giant salamander. Details of mitigation strategies will be provided with the filing of NEB IR Round 2 responses in Q3 2014.

Summary of New Commitments:

- Provide results of meeting with Environment Canada during NEB Round 2.

1.45 Lewis's woodpecker and Williamson's sapsucker critical habitat

Reference:

A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

i) PDF pages 280 and 281of 403
ii) PDF pages 297 and 298 of 403

Preamble:

Reference i) states that the proposed pipeline corridor crosses early candidate critical habitat for Lewis's woodpecker and intersects proposed critical habitat for Williamson's sapsucker.

Reference ii) states that consultation has been initiated and is ongoing with Environment Canada and the British Columbia Ministry of Forests, Lands, and Natural Resource Operations (BC MFLNRO) regarding the Project's interaction with early candidate critical habitat for Lewis's woodpecker and proposed critical habitat for Williamson's sapsucker, and an appropriate approach for mitigating effects on these species.

Request:

Please provide:

a) the status of Trans Mountain's consultation with Environment Canada and BC MFLNO regarding the Project's interaction with, and appropriate mitigation for, each of Lewis's woodpecker and Williamson's sapsucker;

b) options for avoiding early candidate critical habitat for Lewis's woodpecker and proposed critical habitat for Williamson's sapsucker, and a rationale if these habitats cannot be avoided by the Project; and

c) details of Trans Mountain's proposed mitigation strategy for Lewis's woodpecker and Williamson's sapsucker, or, if unavailable at this time, when such details will be filed with the Board.

Response:

a) A brief summary of key dates of consultation with Environment Canada related to candidate critical habitat is provided below:

- April 17, 2013: during this meeting Environment Canada was asked whether any critical habitat was in the process of being identified in order to identify these areas early in the planning process.
- August 1, 2013: Environment Canada was asked again about critical habitat, specifically about potential critical habitat for Pacific water shrew at Surrey Bend Regional Park.
- September 9, 2013: a data sharing agreement is finalized and hard-copy maps of critical habitat (including the categories of proposed, candidate and early candidate – herein collectively referred to as candidate critical habitat) for those species potentially affected

by the Project are provided by Environment Canada for review (Environment Canada 2013a).

- November 25, 2013: the biophysical attribute descriptions are provided by Environment Canada for Pacific water shrew, Oregon forestsnail and Williamson's sapsucker.
- December 23, 2013:Environment Canada provides a *Summary of Draft Critical Habitat Information for TMEP – Dec. 2013* (Environment Canada 2013b), which includes draft biophysical attribute descriptions for all the candidate critical habitat (Pacific water shrew, Williamson's sapsucker, Oregon forestsnail, toothcup, coastal giant salamander, barn owl [western population], American badger, Townsend's mole, whitebark pine), as well as activities likely to result in the destruction of critical habitat for each species.
- April 3, 2014: Environment Canada provides updated hard-copy maps of candidate critical habitat (Environment Canada 2014a), as well as an updated version of *Summary of Draft Critical Habitat Information for TMEP – March 2014*" (Environment Canada 2014b).

A meeting with Environment Canada to discuss the Project's interaction with, and mitigation for, Lewis's woodpecker and Williamson's sapsucker is scheduled in June 2014. This meeting will also provide the opportunity to review the routing in relation to the candidate critical habitat and routing constraints, as well as to discuss the 2014 supplemental wildlife field work in candidate critical habitat locations to identify the occurrence of biophysical attributes in relation to the proposed pipeline corridor.

Consultation with BC MFLNRO (Thompson/Okanagan Region) related to the Project's interaction with Lewis's woodpecker and Williamson's sapsucker was conducted early on in the Project as part of the review and selection of wildlife indicator species (see the Application, Table 2.2.1, Section 2.0 in Technical Report 5C-10 in Volume 5C, Wildlife Technical Report) (TERA Environmental Consultants December 2013). BC MFLNRO also reviewed and provided feedback on the recommended wildlife mitigation measures and conservation strategies for Lewis's woodpecker and Williamson's sapsucker provided in Technical Report 5C-10. Additional discussions were conducted in regards to Wildlife Habitat Area (WHA) 3-143 for Williamson's sapsucker that is encountered along the proposed Kingsvale power line. In advance of the 2014 supplemental wildlife field work, BC MFLNRO was contacted on April 14, 2014 to discuss the proposed field program and survey locations, including visiting candidate critical habitat locations to identify the occurrence of biophysical attributes in relation to the proposed pipeline corridor. Further discussions with BC MFLNRO specific to Lewis's woodpecker and Williamson's sapsucker will be conducted pending the outcome of the meeting with Environment Canada and the results of the 2014 supplemental field work.

References:

Environment Canada. 2013a. Proposed, Candidate and Early Candidate Critical Habitat Maps for the Proposed Trans Mountain Expansion Project. Hard Copy Maps provided by the Canadian Wildlife Service, Pacific and Yukon Region.

Environment Canada. 2013b. Summary of Draft Critical Habitat Information for TMEP – December 2013. 23 pages.

Environment Canada. 2014a. Proposed, Candidate and Early Candidate Critical Habitat Maps for the Proposed Trans Mountain Expansion Project. Hard Copy Maps provided by the Canadian Wildlife Service, Pacific and Yukon Region. April 2014.

Environment Canada. 2014b. Summary of Draft Critical Habitat Information for TMEP – March 2014. 26 pages.

b) Routing is a primary mechanism to avoid or reduce Project effects on wildlife habitat, however, in some cases no other practical alternatives are available due to factors such as terrain, landscape features or density of development. In these cases, it may not be possible to avoid areas identified as candidate critical habitat. In other cases, candidate critical habitat may be avoided, depending on the placement of the pipeline right-of-way within the proposed pipeline corridor. Please see response to NEB IR 1.46(b) for more information on the route selection process for the proposed pipeline corridor.

   The proposed pipeline corridor does not cross provincially identified Wildlife Habitat Areas (WHA) for Lewis's woodpecker or Williamson's sapsucker. The proposed Kingsvale power line does cross a WHA for Williamson's sapsucker for approximately 950 m. The proposed power line parallels an existing power line along this section. Consultation has been initiated and is ongoing with BC MFLNRO and wildlife field work will be conducted within this WHA in June 2014.

   A meeting is scheduled with Environment Canada in June 2014 to discuss the proposed project in relation to candidate critical habitat. In order to properly review the location of candidate critical habitat in relation to Project routing, Environment Canada has been requested to provide shapefiles of the candidate critical habitat to identify more precisely where conflicts occur and whether routing alternatives exist. Currently, hard-copy maps at the scale provided by Environment Canada cannot be used to effectively determine Project routing in relation to candidate critical habitat. This is particularly relevant for candidate critical habitat for Lewis's woodpecker and Williamson's sapsucker that covers large areas near Kamloops and Merritt.

   The outcome of consultation with Environment Canada and BC MFLNRO, and information on options for avoiding candidate critical habitat for Lewis's woodpecker and Williamson's sapsucker and a rationale if avoidance is not possible, will be provided with the filing of NEB IR Round 2 responses in Q3 2014.

c) Ongoing consultation with Environment Canada and BC MFLNRO, along with improved mapping of candidate critical habitat and information collected from the 2014 supplemental wildlife field work will further refine the mitigation measures proposed for Lewis's woodpecker and Williamson's sapsucker. Details of mitigation strategies for Lewis's woodpecker and Williamson's sapsucker will be provided with the filing of NEB IR Round 2 responses in Q3 2014.

Summary of New Commitments:

- Provide results of meeting with Environment Canada and BC MFLNRO during NEB IR Round 2.
- Provide details of mitigation strategies for Lewis's woodpecker and Williamson's sapsucker in NEB IR Round 2 responses in Q3 2014.

1.46 Sowaqua spotted owl wildlife habitat area

Reference:

A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

i) PDF pages 283 and 284 of 403
ii) PDF pages 298 of 403

Preamble:

Reference i) states that the proposed pipeline corridor crosses the Sowaqua spotted owl wildlife habitat area, which is identified as a long-term owl habitat area, and that a no net loss policy is in place in these areas.

Reference ii) states that spotted owl is vulnerable to extinction and that consultation has been initiated and is ongoing with the BC MFNLO regarding the Project's interaction with the wildlife habitat area and an appropriate approach for mitigating effects. The reference further states that a mitigation plan will be developed, which is anticipated to include measures to avoid, restore, and offset adverse effects on spotted owl habitat.

Request:

Please provide:

a) the status of Trans Mountain's consultation with the BC MFLNO on Project interactions with long-term spotted owl habitat in the Sowaqua spotted owl wildlife habitat area;

b) options for avoiding the Sowaqua spotted owl wildlife habitat area and a rationale if this wildlife habitat area cannot be avoided by the Project; and

c) details of Trans Mountain's proposed mitigation plan for spotted owl, including restoration measures and proposed offsets if habitat cannot be avoided, or, if unavailable at this time, when such details will be filed with the Board.

Response:

a) A summary of consultation with BC MFLNRO is provided in Table 2.2.1, Section 2.0 in Technical Report 5C-10 in Volume 5C, Wildlife Technical Report (TERA Environmental Consultants 2013). Consultation specific to the Sowaqua Spotted Owl Wildlife Habitat Area (WHA) from Table 2.2.1 is summarized in Table 1.46-1 below, as well as any new consultation conducted since the Application was filed.

   Consultation with BC MFLNRO specific to the Sowaqua Spotted Owl WHA and the development of a mitigation plan is ongoing.

TABLE 1.46A-1

CONSULTATION SPECIFIC TO THE SOWAQUA SPOTTED OWL WILDLIFE HABITAT AREA

BC MFLNRO Participant (South Coast Region)	Method of Contact and Date	Discussion
Scott Barrett, Resource Stewardship Manager Ian Blackburn, Spotted Owl Recovery Coordinator	Meeting in Surrey, BC April 16, 2013	Discuss spotted owl surveys and offset requirements for activity in the WHA.
Ian Blackburn, Spotted Owl Recovery Coordinator	Meeting in Surrey, BC May 28, 2013	Discuss spotted owl survey protocols in detail including methods, timing and locations.
Ian Blackburn, Spotted Owl Recovery Coordinator (and others)	Meeting at Mountainview Conservation and Breeding Centre, Langley, BC July 29, 2013	After the tour of the Mountainview Conservation and Breeding Centre, discuss spotted owl habitat model.
Ian Blackburn, Spotted Owl Recovery Coordinator	Email July 31, 2013	Provide a draft spotted owl habitat model (*i.e.*, Draft Species Account/Model Assumptions/TEM ratings) for review.
Ian Blackburn, Spotted Owl Recovery Coordinator	Email October 23, 2013	Provide the results of the spotted owl survey conducted for the Project. Request feedback on draft spotted owl model sent on July 31, 2013.
Scott Barrett, Resource Stewardship Manager	Telephone October 28, 2013	Discuss the General Wildlife Measures set out in the Wildlife Habitat Order and the regulatory requirements for the Project. Request information on other recent Projects in spotted owl WHAs to review the mitigation and offsets applied.
Ian Blackburn, Spotted Owl Recovery Coordinator	Email November 5, 2013	BC MFLNRO provides an example of a "Spotted Owl Mitigation Plan" for a hydroelectric project. It was noted that since the Sowaqua WHA is a Long-term Owl Habitat Area (LTOHA) that any loss of habitat will require an offset of as much as 4:1.
Ian Blackburn, Spotted Owl Recovery Coordinator	Telephone April 2, 2014	Discuss the status of the Application, the requirement for additional spotted owl surveys and timing window in which activity would be preferred within the WHA. Two years of surveys are required prior to the proposed development activity.
Scott Barrett, Resource Stewardship Manager	Telephone April 22, 2014	Discuss the development of a spotted owl mitigation plan, including the contents and possible timeline for delivery of a plan (*e.g.*, winter 2015/2016). It was noted by BC MFLNRO that offset calculations can be adjusted post-construction using the final footprint and as-built surveys.

b) The pipeline corridor and route selection process for the Project is described in Section 2.8 of Volume 4A. In general, the primary objective was to locate the proposed pipeline contiguous to the existing Trans Mountain Pipeline (TMPL) right-of-way wherever possible. Where this was not possible, the hierarchy of routing criteria in descending order of preference, included the following: parallel other linear corridors; identify new routing ("greenfield") to balance a number of engineering, construction, environmental, and socio-economic factors; and, in the case of new routing, minimize the length before returning to

the existing TMPL right-of-way or other linear corridor. A range of factors and other guidelines were used in the selection process including:

- minimize the length;
- avoid areas that have significant environmental value or restrictions;
- minimize routing through areas of extensive urban development;
- be consistent with established land use planning;
- avoid areas of potential geotechnical or geological hazards;
- avoid areas of extremely rough terrain or areas that have limited access;
- minimize the number of watercourse, highway, road, railway and utility crossings;
- establish the crossing of watercourses at as close as is practical to right angles; and
- minimize locating the pipeline within lands where limited rights are available.

Routing through the Sowaqua spotted owl wildlife habitat area (WHA) more completely adheres to the routing criteria compared to avoidance. Routing to avoid the Sowaqua spotted owl WHA (either to the north or south) would result in a significant increase in length, ranging over 30 km, and require new cut across mountainous terrain in areas with no existing access. Refer to Appendix A, Figure 5.2.19 in Technical Report 5C-10 in Volume 5C, Wildlife Technical Report (TERA Environmental Consultants December 2013).

The proposed revised pipeline corridor parallels existing linear corridors (*i.e.,* the existing TMPL right-of-way and Highway 5) to the greatest extent feasible. The total length within the Sowaqua spotted owl WHA is approximately 10.5 km, of which approximately 1.1 km is considered new cut. This short deviation from the existing TMPL right-of-way is necessary to increase the distance from the Coquihalla River from approximately RK 1035 to RK 1036.

c) A spotted owl mitigation plan will be prepared for the Project and developed in consultation with BC MFLNRO. The contents of the mitigation plan were discussed with BC MFLNRO on April 22, 2014 (refer to the response to NEB IR No. 1.46a). Development of the plan will align closely with the recommended mitigation plan template provided in the *Policy for Mitigating Impacts on Environmental Values* (BC Ministry of Environment 2014). A preliminary overview of the information to be provided in the mitigation plan is provided below.

Introduction and Project Description

- Summary of the area within the wildlife habitat area (WHA) potentially impacted by the Project.

Project Effects

- Summary of the Project effects provided in Volume 5A of the Application.

Mitigation

- Discussion of the mitigation hierarchy: measures to avoid; minimize; restore on-site; residual impacts.

Offsets

- A review and evaluation of offset options will be conducted and may include restoration within the Sowaqua spotted owl WHA, restoration outside of the Sowaqua spotted owl

WHA, land securement and/or conservation covenants, and participation in provincial programs for the recovery and management of spotted owl (*i.e.*, captive breeding and release, management of competing species, etc). The review of options will consider input from BC MFLNRO.

Compensation Valuation

- Offsets will be agreed to prior to any Project activity within the Sowaqua spotted owl WHA, and will be reviewed post-construction upon receipt of the as-built survey showing the final footprint.

Monitoring

- Discussion of a monitoring program and program to document the implementation of mitigation measures applied and their effectiveness.

The spotted owl mitigation plan will be filed with the Board 6 months prior to commencing construction of any Project component within the Sowaqua spotted owl WHA. Verification of the final footprint will be completed post-construction and adjustments made to offset calculations as required.

Summary of New Commitments:

- The spotted owl mitigation plan will be filed with the NEB 6 months prior to commencing construction in WHA.
- Post-construction review of final footprint and adjustment to offset calculation.

Reference:

BC Ministry of Environment. 2014. Procedures for Mitigating Impacts on Environmental Values (Environmental Mitigation Procedures): Working Document. Victoria, BC. 68 pp.

1.47 Cumulative effects on grizzly bear mortality

Reference:

A3S1R2, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical:

i) PDF page 76 of 148
ii) PDF page 77 of 148
iii) PDF page 85 of 148

Preamble:

Reference i) states that existing motorized access density in the Columbia-Shuswap, Wells Gray, Robson, and North Cascades Grizzly Bear Population Units currently exceeds the linear density threshold of 0.6 km/km2. The reference further states that the predicted cumulative contribution of the Project and reasonably foreseeable developments to motorized access density will not cause the average density to exceed the linear density threshold for the Grande Cache and Yellowhead Grizzly Bear Population Units.

Reference ii) states that the average motorized access density at the Grizzly Bear Population Unit scale does not change substantially as a result of the Project. Reference ii) further states that the proposed Project route and foreseeable future disturbances are predicted to have a localized effect on the motorized access density within each Grizzly Bear Population Unit intersected by the Project, which will cause localized increases from baseline conditions below 0.6 km/km2 to levels above the linear density threshold.

Reference iii) states that the Project will contribute to grizzly bear mortality risk causing an incremental effect on mortality risk for a threatened population: the North Cascades Grizzly Bear Population Unit. Reference iii) further states that, to address this effect, additional mitigation is warranted, which may include habitat restoration on both the Project footprint and the existing Trans Mountain pipeline right-of-way within this Grizzly Bear Population Unit.

Reference iii) also states that Trans Mountain will work with the appropriate regulatory authorities to develop a mitigation strategy to address the Project's incremental cumulative effect on the North Cascades Grizzly Bear Population Unit.

Request:

a) Please reconcile the statement that the Project and foreseeable future disturbances are expected to cause localized increases from baseline conditions below 0.6 km/km2 to levels above the linear density threshold within each Grizzly Bear Population Unit, with the statement that the Project and reasonably foreseeable developments will not cause the average density to exceed the linear density threshold for the Grande Cache and Yellowhead Grizzly Bear Population Units.

b) Please provide a rationale for not considering additional mitigation measures beyond the standard measures for the other Grizzly Bear Population Units / Bear Management Areas potentially affected by the Project, in addition to the North Cascades Grizzly Bear Population 90

Unit, given that the Project and foreseeable future disturbances combine to contribute to localized increases from baseline conditions below 0.6 km/km2 to levels above the selected linear density threshold for all the Grizzly Bear Population Units / Bear Management Areas.

c) Please provide the status of Trans Mountain's consultation with appropriate regulatory authorities on a mitigation strategy for the North Cascades Grizzly Bear Population Unit and identify which regulatory authorities Trans Mountain is consulting with.

Response:

a) In Geographic Information Systems (GIS), raster datasets can represent geographic features as square cells laid out in a grid (ESRI 2014). Each cell (or 'pixel') can have attributes to represent characteristics of that location. As discussed in the Application, Section 8.9.6.3 of Volume 5A, the linear density analysis for grizzly bear (*i.e.* motorized access) was calculated for each 30 m^2 pixel within each Grizzly Bear Population Unit (GBPU) using a moving window approach. A localized increase in linear density refers to an increase in the linear density for an individual 30 m^2 pixel. The average linear density for each GBPU is the average linear density for all of the pixels in the GBPU.

The Project and foreseeable future disturbances are expected to cause localized increases from baseline conditions below 0.6 km/km^2 to levels above the linear density threshold within each GBPU since the linear density in one or more pixels in each GBPU is predicted to increase above 0.6 km/km^2 relative to existing conditions. Although some pixels may have a linear density above 0.6 km/km^2, the average linear density in a GBPU may be below 0.6 km/km^2 if the distribution of linear density values for each pixel within the GBPU is such that the average linear density value is below 0.6 km/km^2. This is the case for the Grande Cache and Yellowhead GBPUs. Therefore, although localized increases from baseline conditions below 0.6 km/km^2 to levels above the linear density threshold are expected within each GBPU, the Project and reasonably foreseeable developments are not expected to cause the average linear density to exceed the linear density threshold of 0.6 km/km^2 for the Grande Cache and Yellowhead GBPUs.

As mortality risk is most appropriately represented at the landscape or GBPU scale, the average linear density threshold is the most appropriate metric for significance evaluation. As discussed in the Application, Section 8.9.6.3 of Volume 5A, results of the motorized access density analysis indicate that the existing average motorized access density in the Columbia-Shuswap, Wells Gray, Robson and North Cascades GBPUs currently exceeds the threshold of 0.6 km/km^2. The existing average motorized access density in the Grande Cache and Yellowhead GBPUs is below 0.6 km/km^2 and the predicted cumulative contribution of the Project and reasonably foreseeable developments to motorized access density will not cause the average density to exceed 0.6 km/km^2 in these GBPUs. The predicted change in motorized access density from existing to Project and cumulative conditions is minimal for all GPBUs.

Reference:

ESRI. 2014. ArcGIS Server Help: Raster Basics. Website: http://webhelp.esri.com/arcgisserver/9.3/java/index.htm#geodatabases/raster_basics.htm. Accessed: April 2014.

b) The mitigation proposed in the Application, Section 7.2.10.6 of Volume 5A includes measures to reduce the Project's potential residual effects and incremental contribution to cumulative effects on grizzly bear. Trans Mountain anticipates that this mitigation will adequately address the Project's potential residual effects and incremental contribution to cumulative effects on grizzly bear for the Grand Cache and Yellowhead Bear Management Areas, and the Columbia-Shuswap, Wells Gray and Robson Grizzly Bear Population Units (GBPU). Additional mitigation is warranted for the North Cascades GBPU to account for the increased sensitivity of the population due to very low population numbers (see Section 7.2.10.9, Table 7.2.10-5 in Volume 5A for additional information on the status of the North Cascades GBPU).

c) A summary of consultation with BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO) in Surrey (South Coast Region) is provided in Table 2.2.1, Section 2.0 in Technical Report 5C-10 in Volume 5C, Wildlife Technical Report. Discussions included mitigation for the Project including access management. Discussions related to a specific mitigation strategy for grizzly bears for the North Cascades Grizzly Bear Population Unit are ongoing. The regulatory agencies and individuals are listed below. An update on consultation related to the mitigation strategy for the North Cascades Grizzly Bear Population Unit will be provided with the filing of NEB IR Round 2 responses in Q3 2014.

- BC MFLNRO, Scott Barrett, Resource Stewardship Manager, South Coast Region
- BC Ministry of Environment, Tony Hamilton, Large Carnivore Specialist

Summary of New Commitments:

- Provide an update on consultation related to the mitigation strategy for the North Cascades Grizzly Bear Population Unit with the filing of NEB IR Round 2 responses in Q3 2014.

1.48 Length of pipeline corridor traversing Grizzly Bear Population Units / Bear Management Areas

Reference:

A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment – Biophysical, PDF page 256 of 403

Preamble:

The reference states that the Project intersects two Bear Management Areas in Alberta (also referred to as Grizzly Bear Population Units): Grande Cache and Yellowhead, and four Grizzly Bear Population Units in British Columbia (Columbia-Shuswap, Wells Gray, Robson, and North Cascades).

The Board notes that the Project application does not outline the length of proposed pipeline corridor in each of the above Bear Management Areas / Grizzly Bear Population Units that is contiguous to existing disturbance or is new cut.

Request:

Please provide the length of proposed pipeline corridor in each of the above six Bear Management Areas / Grizzly Bear Population Units that is contiguous to existing disturbance and that is new cut.

Response:

The length of proposed pipeline corridor that is contiguous to existing disturbance and that is new cut in the six Bear Management Areas / Grizzly Bear Population Units is provided below.

Bear Management Area / Grizzly Bear Population Unit	Length Contiguous to Existing Disturbance (km)			Length of New Cut (km)			Total Length (km)		
	Proposed	Revised	Change	Proposed	Revised	Change	Proposed	Revised	Change
Grande Cache	21.7	23.1	+1.4	3.9	2.6	-1.3	25.6	25.7	+0.1
Yellowhead	11	8.8	-2.2	5.6	7.7	+2.1	16.6	16.5	-0.1
Columbia-Shuswap	63.3	64.2	+0.9	19.4	19.3	-0.1	82.6	83.5	+0.9
Wells Gray	115.5	115.4	-0.1	6	6.1	+0.1	121.5	121.5	0
Robson	50	52.9	+2.9	8.5	5.7	-2.8	58.4	58.6	+0.2
North Cascades	85.3	85.0	-0.3	15.5	17.9	+2.4	100.8	102.9	+2.1

Notes: All distances are approximate.

Proposed = the previously proposed pipeline corridor (as filed). Revised = is the proposed revised pipeline corridor (see response to NEB IR No. 1.40 and NEB IR No.1.84). Change = is calculated as difference from the previously proposed pipeline corridor and the proposed revised pipeline corridor. - represents a decrease (*i.e.* the length of the proposed revised pipeline corridor in the Bear Management Area / Grizzly Bear Population Unit is shorter than the previously proposed pipeline corridor) and + represents an increase (*i.e.* the length of the proposed revised pipeline corridor in the Bear Management Area / Grizzly Bear Population Unit is longer than the previously proposed pipeline corridor)

1.49 Changes to the *Fisheries Act*

Reference:

i) A3S0Q8, Application Volume 2, Project Overview, Economics and General Information, PDF page 34 of 45
ii) A3S1W6, Application Volume 5C, Environmental and Socio-Economic Assessment – Biophysical Technical Reports, TR 5C-6 - Fisheries (Alberta) Technical Report, PDF page 17 of 50
iii) A3S2S3, Application Volume 6B, Pipeline Environmental Protection Plan, PDF pages 120 to 124 of 461
iv) Fisheries and Oceans Canada (www.dfo-mpo.gc.ca), Fisheries Protection Program
v) Fisheries and Oceans Canada (www.dfo-mpo.gc.ca), Fisheries Protection Program, Measures to Avoid Causing Harm to Fish and Fish Habitat

Preamble:

Reference i) states that Authorizations are issued under subsections 32(2) and 35(2) of the *Fisheries Act* and that Fisheries and Oceans Canada (DFO) Operational Statements (OS) will be used as applicable.

Reference ii) states that, in 2012, amendments to the *Fisheries Act* received Royal Assent and came into force in November 2013, and that new guidance and policy now apply.

Reference iii) states that Trans Mountain will adhere to DFO OSs.

Reference iv) states that the Fisheries Protection Provisions of the *Fisheries Act* came into force on 25 November 2013.

Reference v) provides measures to avoid causing serious harm to fish, which DFO states have replaced all OSs previously produced by DFO for different project types in all regions.

The Board notes that, given the points above, the Project application may contain methodology, decisions, or conclusions that are no longer valid. The Board requires confirmation that the assumptions made and mitigation proposed by Trans Mountain in the Project application are still applicable given recent changes to the *Fisheries Act.*

Request:

a) Please provide an update to all relevant sections or appendices of the application providing any required changes as a result of the amended *Fisheries Act* or DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat.

b) Where work is proposed in fish-bearing watercourses outside of the least risk biological window, or where a least risk biological window is not present for a watercourse where sensitive stages of fish may be present (i.e., eggs, embryos or fry), please provide:
   b.1) a detailed explanation of the potential mortality of fish (individuals, eggs, embryos, or fry) from the proposed activities, as well as a quantitative estimate of fish mortality; and

b.2) a detailed explanation of the localized effects on fish populations within the fish and fish habitat Local Study Area (LSA) as a result of the anticipated fish mortality for species found within the Project area.

c) Please indicate which proposed in-water works are likely to require an authorization under paragraph 35(2)(b) of the *Fisheries Act* and describe the residual serious harm that is anticipated at each location.

d) Where an authorization under paragraph 35(2)(b) of the *Fisheries Act* is anticipated, please provide details on any preliminary offsetting plans that will be required as part of the Authorization.

Response:

a) Within the Application to the NEB, Trans Mountain acknowledged changes to the *Fisheries Act* enacted in the days prior to filing (Technical Report 5C-6 in Volume 5C, Fisheries [Alberta] Technical Report [TERA Environmental Consultants December 2013], and Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). What was not known at the time of filing were the intended changes to the supporting guidance documents, policy statements and tools administered by Fisheries and Oceans Canada (DFO), including Operational Statements (OS) referenced in Volume 5C and Pipeline Environmental Protection Plan (Volume 6B) of the Application.

The amended *Fisheries Act* prohibits serious harm to fish that are part of, or support, a commercial, recreational, or Aboriginal (CRA) fishery unless authorized by DFO. For the purposes of the *Fisheries Act*, serious harm to fish means the death of fish or the permanent alterations or the destruction of fish habitat of such a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their processes. This definition of serious harm replaces the previously used term of a Harmful Alteration, Disruption, or Destruction (HADD) of fish habitat.

Within the Application, the term HADD is referenced twice in:

- Section 7.0 of the Environmental Effects Assessment (Volume 5A of the ESA).

  Update: In the first instance, reference to HADD is used when referring to a previous project and therefore remains valid. In the second instance, reference to “HADD” can be replaced with the term “serious harm”.

Along with changes to the *Fisheries Act*, OS previously developed by DFO have been replaced with *Measures to Avoid Causing Harm to Fish and Fish Habitat* (herein referred to as ‘*Measures to Avoid Harm’*), which provide measures for planning, erosion and sediment control, shoreline revegetation and stabilization, fish protection, and operation of machinery, particularly to help ensure avoidance of serious harm. In most cases throughout the Application, use of the term OS or explanation of an OS can generally be replaced with “Measures to Avoid Harm”. Within the Application, reference to DFO OS can be found in:

- Volume 2 – Project Overview, Economics and General Information;
- Volume 5A – Environmental and Socio-Economic Assessment – Biophysical;
- Volume 5C-6 – Fisheries [Alberta] Technical Report;
- Volume 5C-7 – Fisheries [British Columbia] Technical Report; and
- Volume 6B – Pipeline Environmental Protection Plan.

Requirements for notification and authorization of activities that do not meet standard conditions or mitigation measures have also changed under the new *Fisheries Act*. Under the new *Fisheries Act*, DFO no longer needs to be notified prior to commencing construction on fish-bearing watercourses, unless the proponent determines construction could cause serious harm. Determining whether an activity will cause serious harm requires use of DFO's self-assessment guidance and *Measures to Avoid Harm for Projects Near Water*. If a proponent believes serious harm may result from the activities proposed, then a review by DFO can be requested to confirm the likelihood of serious harm. Upon reviewing the submitted project proposal, should DFO determine serious harm is likely, or if the proponent is confident through their self-assessment that serious harm is unavoidable, an Authorization under the *Fisheries Act* would be required.

In conjunction with changes to the *Fisheries Act*, a Memorandum of Understanding (MOU) between DFO and the NEB was established. The announcement of this MOU coincided with the Application's submission date (December 16, 2013). The MOU outlines responsibilities of the NEB with respect to the review of fish and fish habitat to be crossed by the Project. Under the MOU, it is understood the NEB will determine whether the proposed crossings are likely to cause serious harm, and if so, they will submit the crossing proposal to DFO for further review and ultimately to determine if an Authorization under the *Act* will be necessary. Both the Alberta and British Columbia Fisheries Technical Report(s) (Technical Reports 5C-6 and 5C-7, respectively, of Volume 5C) make reference to a joint decision process (*i.e.,* DFO/NEB) where case-specific review was previously required. In accordance with the MOU between the NEB and DFO, it is understood that the NEB would carry out the initial case-specific review; and then DFO would be involved should further input be deemed necessary. To aid in the determination of serious harm, Trans Mountain is currently developing a series of self-assessment tools with which to screen all proposed crossings. The results of this self-assessment will be provided to the NEB in Q4 2014.

Based on the above considerations and intent of the DFO *Measures to Avoid Harm* to effectively replace previous DFO OS, the mitigation proposed by Trans Mountain in the Project Application remains valid, despite the recent changes to the *Fisheries Act.*

Updates to the following specific OS references, and/or identified need for notification or case-specific review are outlined below:

Technical Report 5C-6 in Volume 5C, Fisheries [Alberta] Technical Report

- Definition and Acronym Table

  Update: Remove definition of Operational Statements as they are no longer applicable.

- *Section 1.5.1.1 Fisheries and Oceans Canada* – General definition of regional DFO OS is provided, along with the need to provide advanced notification to DFO.

  Update: Delete paragraph that provides explanation of regional OS and refer instead to compliance with DFO *Measures to Avoid Harm*. Reference of requirement to notify DFO is no longer applicable.
- *Section 6.1.1 Recommended Pipeline Crossing Methods* – Reference made to DFO's Alberta OS for High-Pressure Directional Drilling and for Punch and Bore Crossings as being the most preferred crossing method. Reference also to DFO notification requirements.

  Update: References to DFO's Alberta OS should be read as references to DFO *Measures to Avoid Harm*. Reference of requirement to notify DFO is no longer applicable.

- *Section 6.1.2 Fish-Bearing Watercourses, Wetlands and Non-Classified Drainages* – Reference made to DFO's Alberta OS for Isolated and Dry Open-Cut Stream Crossing. Reference also to DFO notification requirements and need for case-specific review for crossings not meeting conditions of OS.

  Update: Reference to DFO's Alberta OS should be read as reference to DFO *Measures to Avoid Harm*. Reference of requirement to notify DFO is no longer applicable. Need for case-specific review by DFO for crossings not meeting conditions of OS should be replaced with - "...may require a case-specific review by NEB where DFO Measures to Avoid Harm cannot be met."

- *Section 6.1.5 Beaver Dam Removals* – Reference to DFO's Alberta OS for Beaver Dam Removal and notification requirements or need for case-specific review if conditions within the OS cannot be met.

  Update: Reference to DFO's Alberta OS should be read as reference to DFO *Measures to Avoid Harm*. Need for case-specific review by DFO for crossings not meeting conditions of OS should be replaced with - "…may require a case-specific review by NEB where DFO Measures to Avoid Harm cannot be met."

- *Section 6.1.8 Recommended Temporary Vehicle and Equipment Crossing Methods* – Reference to DFO's Alberta OS for Ice Bridges and Snow Fills, Temporary Stream Crossings, Clear Span Bridges, and required notification for these.

  Update: References to DFO's Alberta OS should be read as references to general DFO *Measures to Avoid Harm*. Reference of requirement to notify DFO is no longer applicable. Need for case-specific review by DFO where conditions of OS cannot be met, should be replaced with - "…may require a case-specific review by NEB where DFO *Measures to Avoid Harm* cannot be met."

Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report

- Definition and Acronym Table

  Update: Remove definition of Operational Statements as they are no longer applicable.

- *Section 1.5.1.1 Fisheries and Oceans Canada* – General definition of regional DFO OS is provided, along with the need to provide advanced notification to DFO.

  Update: Delete paragraph that provides explanation of regional OS and refer instead to compliance with DFO *Measures to Avoid Harm*. Reference of requirement to notify DFO is no longer applicable.

- *Section 3.4 Fish and Fish Habitat Sensitivity* – Reference to DFO OS as part of mitigation.

  Update: References to DFO OS should be read as references to DFO *Measures to Avoid Harm*.

- *Section 6.1.1 Pipeline Crossing Methods* – Reference to BC and Yukon OS for High-Pressure Directional Drilling or Punch and Bore Crossings. Reference for need to notify DFO/NEB.

  Updates: Remove reference to BC and Yukon DFO OS and replace with DFO *Measures to Avoid Harm*. Reference of requirement to notify DFO is no longer applicable. Reference of need to notify NEB may still be required.

- *Section 6.1.2 Fish-Bearing Watercourses or Wetlands* – Reference to BC and Yukon OS for Dry Open-Cut Crossings. Reference to need for case-specific review by DFO/NEB if conditions of OS cannot be met.

  Updates: Remove reference to BC and Yukon DFO OS and replace with DFO *Measures to Avoid Harm*. Replace reference to need for case-specific review by DFO/NEB with – "… may require a case-specific review by NEB where DFO *Measures to Avoid Harm* cannot be met."

- *Section 6.1.4 Beaver Dam Removal* – Reference to requirement for case-specific review by DFO for the removal of beaver dams.

  Updates: Amend to read – "…beaver dam removal in BC no longer requires a case-specific review by DFO, but may require a case-specific review by NEB where DFO *Measures to Avoid Harm* cannot be met."

- *Section 6.1.6 Recommended Temporary Vehicle and Equipment Crossing Methods* – Reference to BC and Yukon DFO OS for Clear Span, Ice Bridges and Snow Fills, and Temporary Ford Stream Crossings. Reference for need to notify NEB/DFO.

  Updates: Remove reference to BC and Yukon DFO OS and replace with DFO *Measures to Avoid Harm*. Replace reference to need for case-specific review by DFO/NEB with –

"… may require a case-specific review by NEB where DFO *Measures to Avoid Harm* cannot be met."

- *Section 6.1.7 Recommended Pipeline and Vehicle Crossing Methods for Non-Classified Drainages and Isolated Ponds* – Reference for need to notify NEB/DFO.

  Updates: Reference of requirement to notify DFO is no longer applicable. Reference of need to notify NEB may still be required.

- *Sections 6.2 through 6.8* – Summary tables for potential pipeline crossing methods along each pipeline and power line segment. Reference to previously applicable DFO OS.

  Update: References to DFO OS should be read as references to DFO *Measures to Avoid Harm*.

- *Section 7.1.2 Best Management Practices* – Reference to previously applicable DFO OS.

  Update: References to DFO OS should be read as references to DFO *Measures to Avoid Harm*.

- *Section 7.13 Recommended General Mitigation Measures* and *Table 7.1 Pathway of Effects for Pipeline Construction and Operation* – References to previously applicable DFO OS.

  Update: References to DFO OS should be read as references to DFO *Measures to Avoid Harm*.

In addition to the specific references noted above, further general references to DFO OS also occur within Appendices A and B of the Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report.

- *Appendix A – Watercourse Crossing Summary Table.* General references to DFO OS under crossing recommendations. Footnotes reference DFO case-specific review.

  Update: References to relevant DFO OS should be read as references to DFO *Measures to Avoid Harm*. Within the superscript notes (3) *Timing Variance Required (DFO case-specific review)* and (4) *DFO case-specific review required*… replace DFO with NEB (*i.e.,* NEB to carry out any initial case-specific review).

- *Appendix B – Fish-Bearing Atlas*

  Update: References to relevant DFO OS should be read as references to DFO *Measures to Avoid Harm*.

Volume 6B – Pipeline Environmental Protection Plan

- The Pipeline Environmental Protection Plan contains specific references to Alberta and British Columbia DFO OS and instances that require case-specific review if conditions of the OS cannot be met.

Update: References to relevant DFO OS should be read as references to DFO *Measures to Avoid Harm*. Previous references to the need for case-specific review by DFO should read as "…may require a case-specific review by NEB where DFO *Measures to Avoid Harm* cannot be met."

b) Experience with previous pipeline watercourse crossings has shown the potential for fish mortality to be low and that the potential for mortality can be substantially reduced through the application of appropriate mitigation measures.

b.1) Overall, there is little potential for the mortality of fish from proposed Project activities as a result of the application of mitigation identified in Table 7.2.7-2 of Section 7.2.7 of Volume 5A and the Pipeline Environmental Protection Plan (EPP) (Volume 6B). If fish mortality were to occur during construction, it would likely result from an accident or malfunction, or from a failure to salvage all individuals from within an isolated section of channel, and the number of fish killed would likely be in the range of a few individuals. Mitigation applied to Project construction and operations is designed to protect fish from serious harm, including mortality. In addition to the mitigation measures outlined in the Pipeline EPP, measures successfully used on other projects will be implemented to deter fish from spawning within the isolated section of channel or within the immediate zone-of-influence when work is proposed outside least risk biological windows and has the potential to overlap with potential spawning species (*e.g.,* laying down snow fence over spawning substrate).

b.2) Localized fish mortality through disturbance to instream habitat and burial of alevin or eggs embedded within substrates can potentially occur at fish-bearing watercourse crossings where an open cut or isolated crossing method is proposed, and spawning habitat is available at the crossing location or within the immediate zone-of-influence, and the timing of the crossing coincides directly with spawning or the incubation of eggs. Although loss of an individual fish is a permanent loss, should the loss of a small number of fishes occur during construction, this will not affect the overall sustainability or productivity of fish populations in the Fish and Fish Habitat LSA.

c) Trans Mountain will be undertaking a review of the watercourse crossings with respect to potential for serious harm. Tools to assist with the self-assessment of serious harm (as required by Fisheries and Oceans Canada) have been developed. However, use of these self-assessment tools requires more detailed engineering and design, including the results of geotechnical investigations, which are to be completed in the fall 2014. Trans Mountain will complete its review of the potential for serious harm at all fish-bearing sites and file the findings with the NEB in Q4 2014, which will also form part of NEB draft condition 26.

d) Trans Mountain will be undertaking a review of the watercourse crossings with respect to potential for serious harm. If Authorization under the *Fisheries Act* will be required (*i.e.,* serious harm is anticipated) then measures to offset the serious harm will be developed. As stated in the response to NEB IR No. 1.49c), until the self-assessment of serious harm has been completed, the quantity of offset required will not be known. However, Trans Mountain is proceeding on the basis that some quantity of offsetting will be required for works instream; as such, work has commenced on a Conceptual Fish Habitat Offset Plan for both

Alberta and British Columbia (the Offset Plan). Development of the Offset Plan will involve working closely with federal and provincial regulatory agencies, Aboriginal communities and other key stakeholder groups to identify and develop offset projects.

Summary of New Commitments:

- Submit results of the serious harm self-assessment for all fish-bearing watercourses associated with the Project to the NEB in Q4 2014.
- Include measures to deter fish from spawning within the immediate zone-of-influence during construction in the final Pipeline EPP to be filed with the NEB 90 days prior to construction in accordance with NEB draft condition 29.
- Provide results of the serious harm self-assessment for all fish-bearing watercourses associated with the Project to the NEB in Q4 2014.

1.50 Westridge Marine Terminal dredging

Reference:

A3S2R7, Application Volume 5C, Environmental and Socio-Economic Assessment – Biophysical Technical Reports, TR 5C-13 - Marine Resources Westridge Marine Terminal Technical Report, PDF page 12 of 109

Preamble:

The reference states that marine terminal construction activities include potential dredging of two small areas of subtidal substrate adjacent to the new loading berths, and that dredging along the foreshore might be required to support the geotechnical stability of proposed infill area.

As part of its assessment of potential impacts to the marine environment, the Board requires details regarding any potential dredging activities that may be undertaken as a part of the Project.

Request:

Please provide a detailed overview of potential dredging activities that may be required for construction at the Westridge Marine Terminal, including:

a) duration of dredging;

b) sediment dispersion modelling; or

c) if this information is not currently available, indicate when this information will be filed with the Board.

Response:

a) Based on preliminary geotechnical assessment work conducted to date, Trans Mountain believes that there is some structurally unsuitable material present in the area of the proposed foreshore extension, which will need to be removed by dredging. Trans Mountain should be able to establish a preliminary quantity and a conceptual determination of the duration of dredging after further evolution of the scope of the foreshore extension and a site geotechnical (borehole) investigation, both of which are expected to be complete by September 30, 2014. Follow-up site geotechnical investigation may be required later in 2014 or in 2015.

   If dredging is determined to be necessary, Trans Mountain's intent will be to complete the dredging within the Fisheries and Oceans Canada (DFO) least-risk work window for Burrard Inlet, from August 16 to February 28, unless otherwise authorized by DFO. All dredging will be in accordance with DFO, Environment Canada, and other regulatory requirements. Trans Mountain provided information on conducting dredging within the least-risk work window for Burrard Inlet in Section 7.6.9.4, Volume 5A of the Application.

b) Sediment dispersion modelling has not yet been completed for the proposed dredging activities at the Westridge Marine Terminal. Details of the dredge footprint, methods and duration of dredging will be developed during detailed engineering, design, and construction execution planning. In addition, sediment chemistry information will be available once site geotechnical investigation work has been completed. This information is required to complete sediment dispersion modelling.

c) A more definitive determination of the duration of dredging will be established by Trans Mountain after substantive progress is made on the detailed engineering and design of the foreshore extension and comprehensive construction planning. This is expected to be complete by July, 2015. Sediment dispersion modelling will follow. Trans Mountain will submit the duration of dredging and the results of the sediment dispersion modelling to the NEB no later than 60 days prior to the start of dredging activities.

Summary of New Commitments:

- Trans Mountain will submit the duration of dredging and the results of the sediment dispersion modelling to the NEB no later than 60 days prior to the start of dredging activities.

1.51 Westridge Marine Terminal fish compensation/offset measures

Reference:

A3S1R0, Application Volume 5A, Environmental and Socio-Economic Assessment - Biophysical, PDF pages 45 to 48 of 260

Preamble:

The reference states that compensation/offset measures (i.e., rock reefs) will be used to offset any negative impact balance to riparian, intertidal, and subtidal marine habitat from construction activities at the Westridge Marine Terminal and that there will be no net loss of the productive capacity of marine fish habitat.

Request:

Please provide preliminary marine fish habitat offset plans for the expansion of the Westridge Marine Terminal.

Response:

The in-water works associated with the expansion of the Westridge Marine Terminal are expected to result in serious harm to fish that are part of, or support, a commercial, recreational or Aboriginal (CRA) fishery. Serious harm to fish is defined by Fisheries and Oceans Canada (DFO) as "the death of fish or any permanent alteration to, or destruction of, fish habitat". Based on preliminary engineering and design plans for the Westridge Marine Terminal, the total area of permanent alteration or destruction of marine fish habitat is estimated to be 25,255 m^2. This includes 2,685 m^2 of marine riparian habitat, 5,470 m^2 of intertidal habitat, and 17,100 m^2 of subtidal habitat. As detailed design of the marine infrastructure has not yet been completed, these values should be considered approximate.

The majority of marine fish habitat that will be lost due to the expansion of the Westridge Marine Terminal is subtidal. According to DFO's hierarchy of offsetting options, it is preferable to compensate 'in-kind', whereby the lost habitat is replaced with the same type of habitat. Although intertidal habitat and marine riparian habitats will also be lost as a result of construction, the marine riparian habitat in the area is considered to be of relatively low quality and intertidal habitat losses will be partially offset by the creation of riprap habitat through the foreshore extension (i.e., infilling). As such, the preferred approach to offsetting involves the creation and enhancement of subtidal habitat in the vicinity of the Westridge Marine Terminal.

To satisfy DFO's guiding principle of 'maintaining' or 'improving' the ongoing productivity of CRA fisheries through habitat creation, restoration or enhancement, Trans Mountain is investigating the feasibility of constructing subtidal rock reef habitat. Given that the Westridge Marine Terminal is located within the Eastern Burrard Inlet Rockfish Conservation Area, the subtidal reef would be specifically designed to provide habitat for juvenile and adult rockfish. However, the reef would also provide high value habitat for a variety of other species targeted by CRA fisheries in the area, including lingcod, red rock crab and Dungeness crab. Pacific salmon would

also benefit from the reef, as it would provide refuge and foraging habitat for juveniles during their outbound migration from Burrard Inlet.

Trans Mountain is committed to working with DFO, participating Aboriginal communities, Port Metro Vancouver and other stakeholders to identify the most appropriate means of offsetting serious harm to marine fish and fish habitat. While the construction of a subtidal reef is currently the preferred approach to offsetting, other measures may be recommended by DFO, participating Aboriginal communities, and other stakeholders. Trans Mountain will endeavour to meet with these parties to obtain feedback on the proposed subtidal reef option, and to solicit recommendations for other suitable offsetting measures. Following these meetings, Trans Mountain will prepare a preliminary marine fish habitat offsetting plan and will submit this to the NEB in Q3 2014.

Summary of New Commitments:

- Trans Mountain will submit a preliminary marine fish habitat offsetting plan to the NEB in Q3 2014.

1.52 Freshwater aquatic species at risk

Reference:

i) A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment - Biophysical, PDF page 315 of 403
ii) A3S2C1, Application Volume 5C, Environmental and Socio-Economic Assessment – Biophysical Technical Reports, TR 5C-7 - Fisheries (British Columbia) Technical Report, PDF pages 97 to 100 of 106

Preamble:

Reference i) states that indicator species for fish and fish habitat were carefully selected to ensure that the full range of potential Project effects on fish species, including species at risk, were addressed.

Reference ii) indicates the watercourse crossings where aquatic species at risk under the *Species at Risk Act* (SARA) have been previously recorded along the proposed British Columbia pipeline corridor.

The Board requires species-specific information on aquatic species at risk in order to assess potential effects from Project-related activities.

Request:

Please provide a discussion of the potential effects resulting from pipeline construction activities on each of the following individual SARA Schedule 1-listed species at risk found along the British Columbia pipeline corridor:

a) white sturgeon (Upper Fraser River population);

b) green sturgeon;

c) westslope cutthroat trout (British Columbia population);

d) nooksack dace; and

e) salish sucker.

Each species-specific discussion must include, but not be limited to:

- potential habitat usage by the individual species at the proposed crossing sites and in the fish and fish habitat LSA;
- potential Project-related mortality of fish, fry, eggs, and/or embryos at watercourse crossings;
- any additional mitigation to be undertaken at these locations;
- identification of any critical habitat in the fish and fish habitat LSA; and
- records of consultation with relevant government agencies, stakeholders, and Aboriginal groups.

Response:

a) The Fish and Fish Habitat LSA of relevance is associated with crossing BC-10 of the Upper Fraser River (see Appendix A of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]), which is more than 80 km upstream from McBride and 3.3 km upstream from Rearguard Falls. There is anecdotal evidence that the geographic distribution of white sturgeon (SG4) may include the Upper Fraser River mainstem, upstream from the City of Prince George past the Morkill River and up to Rearguard Falls (Hatfield *et al.* 2004, McPhail 2007). White sturgeon abundance in the Upper Fraser mainstem may be naturally low but stable (near historic levels); population estimates and abundance past the Morkill River and near Rearguard Falls has not been confirmed in the literature (Hatfield *et al*. 2004, McPhail 2007). In general, movement patterns of white sturgeon in the upper Fraser River are not well known (Fraser River White Sturgeon Working Group 2005). Data from capture and tagging studies indicate that key habitat use for Upper Fraser River white sturgeon stock includes the Fraser River section between the Willow River and Nechako River confluences; congregation of white sturgeon have also been noted at the Bowron River confluence (Fraser River White Sturgeon Working Group 2005). The Lheidli T'enneh First Nation initiated a multi-year capture and tagging study of white sturgeon within the Region 7 portions of the Fraser River. For the purposes of that study, the range of the Upper Fraser River white sturgeon was defined as the section of river upstream from the Blackwater River confluence to the community of McBride (Lheidli T'enneh First Nation 2008).

   Based on existing scientific literature, and an understanding of current white sturgeon distribution, the Fish and Fish Habitat LSA for the BC-10 crossing is considered to be upstream from the uppermost distribution point in the studies mentioned and, therefore, not considered to be critical habitat for Upper Fraser River white sturgeon. As such, potential Project-related effects to white sturgeon (including mortality, fry, eggs, and/or embryos) are anticipated to be low. In addition, smaller tributaries to the Upper Fraser (BC-1 to BC-18) crossed by the Project do not have any confirmed records of white sturgeon and are not expected to directly affect Upper Fraser River white sturgeon populations.

   An assessment of the Upper Fraser River focused on fish and fish habitat potentially affected by the Project. By developing environmental mitigation measures to reduce or eliminate effects on overall fish and fish habitat, the protection of federally and provincially-listed species and the overall health of the aquatic ecosystem can be maintained.

   Wherever feasible, watercourse crossing construction activities will be timed to occur within the reduced-risk timing windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A and the Pipeline Environmental Protection Plan (Volume 6B). Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration, and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

The proposed crossing method for the Upper Fraser River (BC-10) is an open cut with water quality monitoring inside the least risk biological window (July 15 – August 15), with a contingency open cut with water quality monitoring during low flow (outside the least risk biological window). A geotechnical evaluation has determined that horizontal directional drilling (HDD) is not feasible for this crossing location. Trans Mountain is currently undertaking a review of this watercourse crossing with respect to potential for serious harm (Fisheries and Oceans Canada [DFO] Self-Assessment) and will provide a summary of these results to the NEB in Q4 2014.

Federal and provincial regulatory authorities, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with regulatory authorities (particularly, DFO Species At Risk) on all relevant species at risk. A summary of consultation that has occurred post-filing will be provided as part of the Consultation Update No. 2, to be provided to the NEB in Q3 2014.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution - Engineering) in Q4 2014. This includes a further review of potential effects to species at risk. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Fraser River White Sturgeon Working Group. 2005. Fraser River white sturgeon conservation plan. Prepared for the Fraser River Sturgeon Conservation Society by Solander Ecological Research. Victoria, BC. 77 pp.

Hatfield, T., S. McAdam and T.C. Nelson. 2004. Impacts to abundance and distribution of Fraser River white sturgeon: a summary of existing information and presentation of impact hypotheses. Prepared for the Fraser River Sturgeon Conservation Society and the Fraser River White Sturgeon Working Group. 26 pp.

Lheidli T'enneh First Nation. 2008. 2007 Assessment of Upper Fraser White Sturgeon: Critical Habitat Identification, Population Assessment and Capacity Development. Prepared for the Aboriginal Funds for Species at Risk Program. Prince George, BC. 35 pp.

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

b) The Fish and Fish Habitat LSA of relevance is associated with crossing BC-780 of the Lower Fraser River (see Appendix A of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]), which is approximately 23 km downstream from Fort Langley, British Columbia (BC). There are anecdotal records of green sturgeon in the Lower Fraser River; the most recent record was reported near Fort Langley, BC in 2005 (McPhail 2007). Green sturgeon observations

are rare in freshwater and there are no known spawning sites in BC rivers (McPhail 2007); records are generally limited to irregular reports from sport fishers and researchers conducting white sturgeon tagging programs (Committee on the Status of Endangered Wildlife in Canada 2004). Adult fish tend to aggregate in the estuaries of major non-natal rivers in the late summer and fall, which may include the Fraser River estuary (McPhail 2007). Most of the recent BC records are from the ocean off the west coast of Vancouver Island, or from northern estuaries (*e.g.,* Skeena, Nass, and Taku rivers). Although migratory behaviour is not well understood, adult green sturgeon may occasionally migrate into the Lower Fraser River for feeding.

Based on existing scientific literature and an understanding of green sturgeon distribution, the Fish and Fish Habitat LSA for the BC-780 crossing is not considered to be critical habitat for green sturgeon (*i.e.,* occasional feeding and migration corridor only). As such, potential Project-related effects to green sturgeon (including mortality, fry, eggs, and/or embryos) are anticipated to be low. In addition, crossings of tributaries to the Lower Fraser River do not have any confirmed records of green sturgeon and are not expected to directly affect green sturgeon populations.

An assessment of the Lower Fraser River focused on fish and fish habitat potentially affected by the Project. By developing environmental mitigation measures to reduce or eliminate effects on overall fish and fish habitat, the protection of federally and provincially-listed species and the overall health of the aquatic ecosystem can be maintained.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the reduced-risk timing windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in the Application, Table 7.2.7-2 of Section 7.2.7 of Volume 5A and the Pipeline Environmental Protection Plan (Volume 6B). Mitigation measures are also incorporated within the Project design to reduce the spatial scale, duration, and intensity of effects so as to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling with water quality monitoring is the proposed crossing method for the Lower Fraser River (BC-780); the contingency method would be another regulatory approved trenchless method. These methods will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark. Trans Mountain is currently undertaking a review of this watercourse crossing with respect to potential for serious harm (Fisheries and Oceans Canada [DFO] Self-Assessment) and will provide a summary of these results to the NEB in Q4 2014.

Federal and provincial regulators, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with regulatory authorities (particularly,

DFO Species At Risk) on all relevant species at risk. A summary of consultation that has occurred post-filing will be provided as part of the Consultation Update No. 2, to be provided to the NEB in Q3 2014.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution - Engineering) in Q4 2014. This includes a further review of potential effects to species at risk. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Committee on the Status of Endangered Wildlife in Canada. 2004. COSEWIC assessment and update status report on the green sturgeon *Acipenser medirostris* in Canada. Ottawa, ON. Vii + 31 pp.

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

c) Native BC westslope cutthroat populations are listed in Schedule 1 of *SARA*, although endangered populations are restricted to southeastern BC (primarily the Upper Kootenay and Upper Columbia drainages) and southwestern Alberta (Species at Risk Act Public Registry 2014). Additionally, because of its introduced status within the Project area, non-native westslope cutthroat trout are not considered to be a priority sub-species of special conservation concern.

Native westslope cutthroat trout are most common in the Kootenay and Pend d'Oreille river systems (Columbia Drainage) in the southeastern portion of BC; however, they do occur in the Fraser River system, including tributaries to the Eagle River (*e.g.,* Yard, Crazy and Frog creeks) and Mabel Lake (South Thompson River Watershed). Westslope cutthroat have not been widely introduced outside the Columbia River system, although a few rare introductions of westslope cutthroat have been made in the Lower Fraser River system and some lakes in the Lower Peace River system (McPhail 2007). Anecdotal records of introduced westslope cutthroat trout relative to the Fish and Fish Habitat LSA include the Lower Fraser (BC-780), Salmon (BC-753) and Sumas (BC-726) rivers (see Appendix A of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). With respect to the Aquatics RSA, there is also one historic record from Garcia Lake, which is located in the upper headwaters to Godey Creek (BC-512), approximately 8 km upstream from the proposed crossing location and outside the Fish and Fish Habitat LSA.

Based on existing scientific literature and an understanding of native westslope cutthroat distribution, the Fish and Fish Habitat LSA for the Lower Fraser River (BC-780), Salmon River (BC-753) and Sumas River (BC-726) crossings is not considered to be critical habitat for native westslope cutthroat. As such, potential Project-related effects to native westslope cutthroat (including mortality, fry, eggs, and/or embryos) are anticipated to be low.

The assessments for pipeline watercourse crossings focused on fish and fish habitat potentially affected by the Project, and on recommendations for suitable mitigation measures. Overall, the implementation of environmental mitigation measures and best management practices can eliminate or reduce potential project-related effects to fish and fish habitat, protect federally and provincially-listed species, and maintain the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the reduced-risk timing windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in the Application, Table 7.2.7-2 of Section 7.2.7 of Volume 5A and the Pipeline Environmental Protection Plan (Volume 6B). Mitigation measures are also incorporated within the Project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling with water quality monitoring is the proposed crossing method for the Lower Fraser River (BC-780) and the Sumas River (BC-753); the contingency method for both these crossings would be another regulatory approved trenchless method. These methods will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark. The proposed crossing method for the Salmon River (BC-753) is isolation with fish salvage and water quality monitoring during low flow, which is anticipated to coincide with the provincial recommended least risk biological window (August 1 – August 31). The contingency is an open cut crossing with water quality monitoring inside the least risk biological window. Trans Mountain is currently undertaking a review of these watercourse crossings with respect to potential for serious harm (Fisheries and Oceans Canada [DFO] Self-Assessment) and will provide a summary of these results to the NEB in Q4 2014.

Federal and provincial regulatory authorities, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with regulatory authorities (particularly, DFO Species At Risk) on all relevant species at risk. A summary of consultation that has occurred post-filing will be provided as part of the Consultation Update No. 2, to be provided to the NEB in Q3 2014.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution - Engineering) in Q4 2014. This includes a further review of potential effects to species at risk. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

Species at Risk Act Public Registry. 2014. Government of Canada. Website: http://www.sararegistry.gc.ca/default_e.cfm. Accessed: April 2014.

d) The understanding of the current distribution of nooksack dace populations was based on published document sources and provincial databases (Fisheries Information Summary System [FISS] 2014, Habitat Wizard 2014). Confirmed presence included four streams in the Fraser Valley of British Columbia (BC), including Bertrand Creek, Pepin Creek, Fishtrap Creek and the Brunette River (Committee on the Status of Endangered Wildlife [COSEWIC] 2007). FISS also indicated previous records of nooksack dace in the Salmon River (BC-753) (see Appendix A of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]), and they were also assumed to be present in the lower reaches of Stoney Creek (BC-785), which is a tributary to the Brunette River (COSEWIC 2007). Sites with known nooksack dace presence are considered critical or proposed critical habitat (Nantel, O'Meara pers. comm.).

During recent consultation with DFO, a number of new and unpublished reference documents were provided (*e.g.*, Bonamis 2011, Pearson *et al*. 2008, Pearson 2013). These reports and other supplemental data will be used by Trans Mountain to update the Site-Specific Mitigation Measures for Watercourses Encountered Within the Pipeline Corridor in BC table (Table I-2, Appendix I of the Pipeline Environmental Protection Plan [Volume 6B]), and to develop more comprehensive site-specific mitigation measures and fish salvage protocols for watercourse crossings identified as critical nooksack dace habitat. Additionally, fish and fish habitat assessments for supplemental watercourse crossings will be completed in 2014, including Stoney Creek (BC-785) and tributaries to the Brunette and Fraser rivers. These results will provide a more complete representation of potential nooksack dace habitat in watercourse crossings in the Lower Mainland region.

Based on existing scientific literature and an understanding of current nooksack dace distribution, the Fish and Fish Habitat LSA for the Stoney Creek (BC-785) and Salmon River (BC-753) crossings may be considered critical habitat for nooksack dace. Trans Mountain is currently working with a local provincial expert to confirm the extent of proposed critical habitat and other historical (unpublished) nooksack dace habitat use within the Fish and Fish Habitat LSA, and to identify other watercourse crossings with a potential to have critical habitat for nooksack dace.

The assessment method for pipeline watercourse crossings focused on fish and fish habitat potentially affected by the Project, and on recommendations for appropriate mitigation measures. Overall, the implementation of suitable environmental mitigation measures and best management practices can eliminate or reduce potential project-related effects to fish and fish habitat, protect federally and provincially-listed species and maintain the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the reduced-risk timing windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A and the Pipeline Environmental Protection Plan (Volume 6B). Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

The proposed crossing method for Stoney Creek (BC-785) is isolation with fish salvage and water quality monitoring inside the least risk biological window (August 1 – September 15). The recommended crossing method for the Salmon River (BC-753), which has higher discharge, is isolation with fish salvage and water quality monitoring during low flow, which is anticipated to coincide with the provincial recommended least risk biological window (August 1 – August 31). The contingency for both is an open cut crossing with water quality monitoring inside the least risk biological window. Trans Mountain is currently undertaking a review of these watercourse crossings with respect to potential for serious harm (Fisheries and Oceans Canada [DFO] Self-Assessment) and will provide a summary of these results to the NEB in Q4 2014.

Federal and provincial regulatory authorities, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with regulatory authorities (particularly, DFO Species At Risk) on all relevant species at risk. A summary of consultation that has occurred post-filing will be provided as part of the Consultation Update No. 2, to be provided to the NEB in Q3 2014.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution - Engineering) in Q4 2014. This includes a further review of potential effects to species at risk. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

e) The understanding of the current distribution of salish sucker populations was based on published document sources and provincial databases (Committee on the Status of Endangered Wildlife [COSEWIC] 2012, Fisheries Information Summary System 2014, Habitat Wizard 2014). Confirmed presence included three streams in the Project area, including Semmihault Creek (BC-714), Chilliwack Creek (BC-715) and Salmon River (BC-753) (see Appendix A of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). Sites with known salish sucker presence are considered critical or proposed critical habitat (Nantel, O'Meara pers. comm.).

During recent consultation with DFO, a number of new and unpublished reference documents were provided (*e.g.,* Fisheries and Oceans Canada 2012, Pearson 2013). These will be used by Trans Mountain to update the Site-Specific Mitigation Measures for Watercourses Encountered Within the Pipeline Corridor in BC table (Table I-2, Appendix I of the Pipeline Environmental Protection Plan [Volume 6B]), and to develop more comprehensive site-specific mitigation measures and fish salvage protocols for watercourse crossings identified as critical salish sucker habitat. Additionally, fish and fish habitat assessments for supplemental watercourse crossings will be completed in 2014. These include watercourses listed in unpublished data that have the potential for salish sucker. These results will provide a more complete representation of potential salish sucker habitat in watercourse crossings in the Lower Mainland region.

Based on existing scientific literature and an understanding of current salish sucker distribution, the Fish and Fish Habitat LSA for Semmihault Creek (BC-714), Chilliwack Creek (BC-715) and Salmon River (BC-753) crossings may be considered critical habitat for salish sucker. Trans Mountain is currently working with a local provincial expert to confirm the extent of proposed critical habitat and other historical (unpublished) salish sucker habitat use within the Fish and Fish Habitat LSA, and to identify other watercourse crossings with a potential to have critical habitat for salish sucker.

The assessment method for pipeline watercourse crossings focused on fish and fish habitat potentially affected by the Project, and on recommendations for appropriate mitigation measures. Overall, the implementation of suitable environmental mitigation measures and best management practices can eliminate or reduce potential project-related effects to fish and fish habitat, protect federally and provincially-listed species, and maintain the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the reduced-risk timing windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in the Application, Table 7.2.7-2 of Section 7.2.7 of Volume 5A and the Pipeline Environmental Protection Plan (Volume 6B). Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

The proposed crossing method for Semmihault Creek (BC-714) and Chilliwack Creek (BC-715) is isolation with fish salvage and water quality monitoring inside the least risk biological window (August 1 – September 15). The proposed crossing method for the Salmon River (BC-753), which has higher discharge, is isolation with fish salvage and water quality monitoring during low flow, which is anticipated to coincide with the provincial recommended least risk biological window (August 1 – August 31). The contingency for each is an open cut crossing with water quality monitoring inside the least risk biological window. Trans Mountain is currently undertaking a review of these watercourse crossings

with respect to potential for serious harm (Fisheries and Oceans Canada [DFO] Self-Assessment) and will provide a summary of these results to the NEB in Q4 2014.

Federal and provincial regulatory authorities, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with regulatory authorities (particularly, DFO Species At Risk) on all relevant species at risk. A summary of consultation that has occurred post-filing will be provided as part of the Consultation Update No. 2, to be provided to the NEB in Q3 2014.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution - Engineering) in Q4 2014. This includes a further review of potential effects to species at risk. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Committee on the Status of Endangered Wildlife. 2012. COSEWIC assessment and status report on the salish sucker *Catostomus sp. cf. catostomus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON.

Fisheries and Oceans Canada. 2012. Proposed Recovery Strategy for the Salish Sucker (*Catostomus sp*.) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series, Fisheries and Oceans Canada. Vancouver. BC. viii + 64 pp.

Fisheries Information Summary System. 2014. BC Ministry of Environment. Website: http://www.env.gov.bc.ca/fish/fiss/. Accessed: April 2014.

Habitat Wizard. 2014. BC Ministry of Environment. Website: http://www.env.gov.bc.ca/habwiz/. Accessed: April 2014.

Nantel, M. Species at Risk Biologist, Fisheries and Oceans Canada. Vancouver, BC.

O'Meara, S. Species at Risk Program Officer, Fisheries and Oceans Canada. Vancouver, BC.

Pearson, M.P. 2013. Catch per Unit Effort. Unpublished Data. Vancouver, BC.

Summary of New Commitments:

- If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.
- Include a summary of recent consultation with relevant government agencies, stakeholders and Aboriginal groups in Consultation Update No. 2, to be filed with the NEB in Q3 2014.
- Update Project Pipeline Environmental Protection Plan with additional site-specific mitigation measures for watercourses identified as critical nooksack dace habitat, to be filed at least 90 days prior to construction.

1.53 Provincial species of concern

Reference:

i) A3S1Q9, Application Volume 5A, Environmental and Socio-Economic Assessment - Biophysical, PDF page 3 of 403
ii) A3S1W6, Application Volume 5C, Environmental and Socio-Economic Assessment – Biophysical Technical Reports, TR 5C-6 - Fisheries (Alberta) Technical Report, PDF page 26 of 50

Preamble:

Reference i) provides assessment indicators and measurement endpoints.

Reference ii) lists some provincially protected species that are used as indicator species.

The Board requires species-specific information on provincially protected species in order to assess potential effects from Project- related activities.

Request:

Please provide a discussion of the potential effects resulting from pipeline construction activities on each of the provincially listed species of concern along the pipeline corridor. Species must include:

a) lake sturgeon – Alberta
b) sauger – Alberta
c) northern redbelly dace - Alberta
d) spoonhead sculpin - Alberta
e) chiselmouth - British Columbia
f) eulachon (Fraser River population) - British Columbia
g) mountain sucker – British Columbia
h) sockeye salmon (Cultus Lake population) - British Columbia; and
i) white sturgeon (Lower and Middle Fraser River population) - British Columbia.

Each species-specific discussion must include, but not be limited to:

- effects to the population;
- habitat availability; and
- species-specific mitigation.

Response:

a) Lake sturgeon are known to occur in the North Saskatchewan River Basin, within the general vicinity of the proposed pipeline corridor (Fish and Wildlife Management Information System 2014). However, within the Fish and Fish Habitat Regional Study Area (RSA), the species is only known to occur in the North Saskatchewan River. Lake sturgeon was not encountered during field investigations for crossing AB-14 of the North Saskatchewan River

carried out for the Project (see Appendix A and B of Technical Report 5C-6 in Volume 5C, Fisheries [Alberta] Technical Report [TERA Environmental Consultants December 2013]).

Although not listed under the *Species at Risk Act* (SARA) (*Species at Risk Act* Public Registry 2013), Saskatchewan River populations of lake sturgeon are listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2013). The Endangered listing by COSEWIC indicates that these populations are "*facing imminent extirpation or extinction*" (COSEWIC 2013). In Alberta, the general status of lake sturgeon has been recently downgraded from At Risk to its current listing of Undetermined (Alberta Sustainable Resource Development 2010); however, Alberta's Endangered Species Conservation Committee has designated lake sturgeon as a Threatened species (Alberta Environment and Sustainable Resource Development [AESRD] 2012).

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of lake sturgeon is expected to be no different than for other fish species at the North Saskatchewan River (AB-14) crossing location as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for the North Saskatchewan River (AB-14), with a contingency of open cut outside the restricted activity period (inside the least risk biological window). An HDD crossing will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark on the North Saskatchewan River.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-6 and in Volume 3B. Trans Mountain continues to work with federal and provincial regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators (*i.e.,* AESRD).

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Alberta Environment and Sustainable Resource Development. 2012. Species Assessed by Alberta's Endangered Species Conservation Committee: Short List. Updated November 6, 2012. 2 pp.

Alberta Sustainable Resource Development. 2010. The General Status of Alberta Wild Species. Fish and Wildlife Division. Website: http://srd.alberta.ca/FishWildlife/SpeciesAtRisk/WildSpeciesStatusSearch.aspx. Accessed: January 2013.

Committee on the Status of Endangered Wildlife in Canada. 2013. Wildlife Species Search. Database of Wildlife Species Assessed by COSEWIC. Website: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed: October 2013.

Fisheries and Wildlife Management Information System. 2014. Fish and Wildlife Division, Alberta Sustainable Resource Development. Area-Specific Search Request and Website: http://xnet.env.gov.ab.ca/imf/imf.jsp?site=fw_mis_pub. Accessed: March 2014.

Species at Risk Act Public Registry. 2012. Species Profile Lake Sturgeon Saskatchewan River Populations. Website: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=955. Accessed: April 2013.

b) Sauger are known to occur in the North Saskatchewan River Basin, within the general vicinity of the proposed pipeline corridor (Fish and Wildlife Management Information System 2014). However, within the Fish and Fish Habitat Regional Study Area (RSA), the species is only known to occur in the North Saskatchewan River. Sauger was not encountered during field investigations for crossing AB-14 of the North Saskatchewan River carried out for the Project (see Appendices A and B of Technical Report 5C-6 in Volume 5C, Fisheries [Alberta] Technical Report [TERA Environmental Consultants December 2013]).

Sauger is not listed under the *Species at Risk Act* (*SARA*) (*Species at Risk Act* Public Registry 2013) or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2013). In Alberta, sauger has a general status listing of Sensitive (Alberta Sustainable Resource Development 2010) but has not been assessed by Alberta's

Endangered Species Conservation Committee (Alberta Environment and Sustainable Resource Development [AESRD] 2012).

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of sauger is expected to be no different than for other fish species at the North Saskatchewan River (AB-14) crossing location as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for the North Saskatchewan River (AB-14), with a contingency of open cut outside the restricted activity period (inside the least risk biological window). An HDD crossing will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark on the North Saskatchewan River.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-6 and in Volume 3B. Trans Mountain continues to work with federal and provincial regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators (*i.e.,* AESRD).

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2

assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Alberta Environment and Sustainable Resource Development. 2012. Species Assessed by Alberta's Endangered Species Conservation Committee: Short List. Updated November 6, 2012. 2 pp.

Alberta Sustainable Resource Development. 2010. The General Status of Alberta Wild Species. Fish and Wildlife Division. Website: http://srd.alberta.ca/FishWildlife/SpeciesAtRisk/WildSpeciesStatusSearch.aspx. Accessed: January 2013.

Committee on the Status of Endangered Wildlife in Canada. 2013. Wildlife Species Search. Database of Wildlife Species Assessed by COSEWIC. Website: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed: October 2013.

Fisheries and Wildlife Management Information System. 2014. Fish and Wildlife Division, Alberta Sustainable Resource Development. Area-Specific Search Request and Website: http://xnet.env.gov.ab.ca/imf/imf.jsp?site=fw_mis_pub. Accessed: March 2014.

Species at Risk Act Public Registry. 2012. Species Profile Lake Sturgeon Saskatchewan River Populations. Website: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=955. Accessed: April 2013.

c) Northern redbelly dace are known to occur in the North Saskatchewan and Athabasca River basins, within the general vicinity of the proposed pipeline corridor (Fish and Wildlife Management Information System 2014). However, within the Fish and Fish Habitat Regional Study Area (RSA), the species is only known to occur in the North Saskatchewan River and Bench Creek. Northern redbelly dace was not encountered during field investigations for crossings of the North Saskatchewan River (AB-14) and Bench Creek (AB-132 and AB-136) for the Project (see Appendices A and B of Technical Report 5C-6 in Volume 5C, Fisheries [Alberta] Technical Report [TERA Environmental Consultants December 2013]).

Northern redbelly dace is not listed under the *Species at Risk Act* (*SARA*) (*Species at Risk Act* Public Registry 2013) or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2013). In Alberta, northern redbelly dace has a general status listing of Sensitive (Alberta Sustainable Resource Development 2010) but has not been assessed by Alberta's Endangered Species Conservation Committee (Alberta Environment and Sustainable Resource Development [AESRD] 2012).

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were

not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of northern redbelly dace is expected to be no different than for other fish species at the North Saskatchewan River (AB-14) and Bench Creek (AB-132 and AB-136) crossing locations as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for the North Saskatchewan River (AB-14), with a contingency of open cut outside the restricted activity period (inside the least risk biological window). An HDD crossing will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark on the North Saskatchewan River. An isolated crossing method with fish salvage, outside the restricted activity period (inside the least risk work window) is currently proposed at both crossings of Bench Creek (AB-132 and AB-136) and at other watercourse crossings with a high habitat potential for northern redbelly dace, but where northern redbelly dace were not captured during field investigations. The contingency crossing method currently proposed for Bench Creek, and at other crossings with a high habitat potential for northern redbelly dace where a contingency crossing method is indicated, is an isolated trenched method with fish salvage outside the restricted activity period.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-6 and in Volume 3B. Trans Mountain continues to work with federal and provincial regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators (*i.e.,* AESRD).

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2

assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Alberta Environment and Sustainable Resource Development. 2012. Species Assessed by Alberta's Endangered Species Conservation Committee: Short List. Updated November 6, 2012. 2 pp.

Alberta Sustainable Resource Development. 2010. The General Status of Alberta Wild Species. Fish and Wildlife Division. Website: http://srd.alberta.ca/FishWildlife/SpeciesAtRisk/WildSpeciesStatusSearch.aspx. Accessed: January 2013.

Committee on the Status of Endangered Wildlife in Canada. 2013. Wildlife Species Search. Database of Wildlife Species Assessed by COSEWIC. Website: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed: October 2013.

Fisheries and Wildlife Management Information System. 2014. Fish and Wildlife Division, Alberta Sustainable Resource Development. Area-Specific Search Request and Website: http://xnet.env.gov.ab.ca/imf/imf.jsp?site=fw_mis_pub. Accessed: March 2014.

Species at Risk Act Public Registry. 2012. Species Profile Lake Sturgeon Saskatchewan River Populations. Website: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=955. Accessed: April 2013.

d) Spoonhead sculpin are known to occur within the general vicinity of the proposed pipeline corridor (Fish and Wildlife Management Information System 2014). However, within the Fish and Fish Habitat Regional Study Area (RSA), spoonhead sculpin is only known to occur in the North Saskatchewan, Pembina and McLeod rivers and Carrot, Wolf, Little Sundance, Sundance and Maskuta creeks. Spoonhead sculpin was encountered during field investigations for crossings of Carrot Creek (AB-119) and Maskuta Creek (AB-188) for the Project (see Appendices A and B of Technical Report 5C-6 in Volume 5C, Fisheries [Alberta] Technical Report [TERA Environmental Consultants December 2013]). The habitat potential for spoonhead sculpin was rated moderate to high overall.

Alberta populations of spoonhead sculpin are not listed under the *Species at Risk Act* (*SARA*) (*Species at Risk Act* Public Registry 2013) and are listed as Not at Risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2013). Provincially, spoonhead sculpin has a general status listing of May be at Risk (Alberta Sustainable Resource Development 2010) but has not been assessed by Alberta's Endangered Species Conservation Committee (Alberta Environment and Sustainable Resource Development [AESRD] 2012).

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a

result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of spoonhead sculpin is expected to be no different than for other fish species at each of the crossing locations listed above as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential Project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Trenchless crossing methods with water quality monitoring are the primary methods proposed for the crossings of the North Saskatchewan (AB-14), Pembina (AB-66) and McLeod (AB-131) rivers, and Wolf Creek (AB-129). An isolated crossing method with fish salvage, outside the restricted activity period (inside the least risk work window) is currently proposed at the remaining crossings with documented presence of spoonhead sculpin. The proposed crossing methods and timing for watercourses with spoonhead sculpin present (or the potential to be present) will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark at each respective watercourse. A contingency crossing method of open cut outside the restricted activity period (inside the least risk biological window) is proposed for the North Saskatchewan River (AB-14), and an isolated trenched method inside the restricted activity period, or open cut with water quality monitoring outside the restricted activity period are the contingency methods proposed for the Pembina (AB-66) and McLeod (AB-131) rivers. The contingency method proposed for Wolf Creek (AB-129) is an isolated trenched method with water quality monitoring, inside the restricted activity period.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-6 and in Volume 3B. Trans Mountain continues to work with federal and provincial regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators (*i.e.,* AESRD).

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Alberta Environment and Sustainable Resource Development. 2012. Species Assessed by Alberta's Endangered Species Conservation Committee: Short List. Updated November 6, 2012. 2 pp.

Alberta Sustainable Resource Development. 2010. The General Status of Alberta Wild Species. Fish and Wildlife Division. Website: http://srd.alberta.ca/FishWildlife/SpeciesAtRisk/WildSpeciesStatusSearch.aspx. Accessed: January 2013.

Committee on the Status of Endangered Wildlife in Canada. 2013. Wildlife Species Search. Database of Wildlife Species Assessed by COSEWIC. Website: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed: October 2013.

Fisheries and Wildlife Management Information System. 2014. Fish and Wildlife Division, Alberta Sustainable Resource Development. Area-Specific Search Request and Website: http://xnet.env.gov.ab.ca/imf/imf.jsp?site=fw_mis_pub. Accessed: March 2014.

Species at Risk Act Public Registry. 2012. Species Profile Lake Sturgeon Saskatchewan River Populations. Website: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=955. Accessed: April 2013.

e) The Fish and Fish Habitat LSA of relevance is associated with crossing BC-504 of the Nicola River (see Appendices A and B of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). Chiselmouth were captured downstream from the proposed crossing during the 2013 fish and fish habitat assessments. This location was rated as moderate to high habitat value for chiselmouth, which was attributed to high water temperatures, low velocity habitat units with deep pools and runs, coarse substrate material with a mixture of fines and gravel substrates and cover provided by deep pools and dense overhanging vegetation.

Chiselmouth have a fairly fragmented and narrow distribution in British Columbia; however, their populations appear to be stable (BC Conservation Data Centre 2014, McPhail 2007). Relative to the Project area, chiselmouth occur in Thompson River drainages, including populations in Nicola, Vidette and Mara lakes (McPhail 2007, Scott and Crossman 1998). There is also a northern distribution of chiselmouth within the Fraser River system, above the Fraser Canyon (*e.g.*, Chilcotin, Nazko and Euchiniko rivers). This northern population is located outside the study area and is not relevant to the Aquatics RSA (Lower Fraser River).

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each

individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of chiselmouth is expected to be no different than for other fish species at the Nicola River (BC-504) crossing location as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential Project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for the Nicola River (BC-504), with a contingency of isolation with fish salvage during low flow or open cut with water quality monitoring inside the least risk biological window. An HDD crossing will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark on the Nicola River.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with federal and provincial (Region 3) regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

BC Conservation Data Centre. 2014. BC Ministry of Environment. Website: http://www.env.gov.bc.ca/cdc/. Accessed April 2014.

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

Scott, W.B. and E.J. Crossman. 1998. Freshwater Fishes of Canada. Galt House Publications Ltd. Oakville, ON. 966 pp.

f) Eulachon are common to the Lower Fraser River mainstem. The Fish and Fish Habitat LSA of relevance is associated with crossing BC-780 of the Lower Fraser River (see Appendices A and B of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). This crossing location is an important migratory corridor for eulachon. Fisheries and Oceans Canada (DFO) also reports that most eulachon spawning areas are confined to the lower 110 km of the Fraser River (limit of tidal influence) (DFO 2013). Additionally, McPhail (2007) states that eulachon populations typically spawn within a few kilometres of the ocean, but most spawning in the Lower Fraser River occurs approximately 60-120 km upstream between Mission and Chilliwack. In this section of the Lower Fraser (upstream from the Fish and Fish Habitat LSA), the substrate generally shifts from silt and sand to gravel, which is more suitable spawning habitat for eulachon. The BC-780 crossing location is approximately 34 km upstream from the ocean and substrate is 100% fines.

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of eulachon is expected to be no different than for other fish species at the Lower Fraser River (BC-780) crossing location as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential Project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) as well as the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale,

duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling with water quality monitoring is the proposed crossing method for the Lower Fraser River (BC-780), with a contingency of another regulatory approved trenchless method. These methods will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark of the Lower Fraser River.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with federal and provincial (Region 3) regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

References:

Fisheries and Oceans Canada. 2013. Fraser River Eulachon Egg/larval Abundance Surveys. Website: http://www.pac.dfo-mpo.gc.ca/science/species-especes/pelagic-pelagique/herring-hareng/herspawn/pages/river1-eng.html. Accessed: April 2014.

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

g) The mountain sucker has a scattered distribution in southern British Columbia. Relative to the Project area, they occur mostly in the gravel deposition reaches of the Lower Fraser River (near the District of Hope downstream to roughly the mouth of the Sumas River), and the North Thompson River near the region of Heffley (approximately 20 km north of Kamloops) (McPhail 2007). The Fish and Fish Habitat LSAs of relevance are associated with the following pipeline crossings: BC-780 in the Lower Fraser River; BC-111, BC-182 and BC-236 in the Upper North Thompson River; and Black Pines power line crossing (BCT-2) of the North Thompson River (see Appendices A and B of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]).

Based on existing literature and an understanding of current mountain sucker distribution and habitat preference (gravel depositional areas in large rivers), crossings of the Lower Fraser River (BC-780) and Upper North Thompson River (BC-111, BC-182 and BC-236) are

not considered to be in the preferred habitat range for mountain sucker. Mountain sucker is not common to upper portions of the North Thompson River, and they are more likely to occur upstream from the proposed crossing of the Lower Fraser River (*i.e.*, outside the Fish and Fish Habitat LSA). The Black Pines power line crossing of the Lower North Thompson River is 11.5 km upstream from the region of Heffley, and although there is high potential for mountain sucker, power line construction is not likely to result in a disturbance to instream habitat.

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of mountain sucker is expected to be no different than for other fish species at the Fraser River (BC-780) and Upper North Thompson River (BC-111, BC-182, BC-236 and BCT-2) crossing locations as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential Project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for both the Lower Fraser River (BC-780) and North Thompson River (BC-111, BC-182 and BC-236). The contingency for the North Thompson River is open cut with water quality monitoring inside the least risk biological window, and the contingency for the Lower Fraser River is another approved trenchless method. An HDD method will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark of the Lower Fraser and North Thompson rivers. The proposed crossing method for the Lower North Thompson River (BCT-2) for the Black Pine power line is to install transmission poles outside of the riparian management area, spanning the river.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with federal and provincial (Regions 2 and 3) regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

Reference:

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

h) Cultus Lake sockeye have unique genetic and biologic characteristics, whereby they spawn exclusively in Cultus Lake and juveniles remain throughout the limnetic zone for one to two years before migrating towards the Fraser estuary (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2003). The Fish and Fish Habitat LSAs of relevance are associated with crossing BC-780 of the Lower Fraser River and BC-717 of the Chilliwack/ Vedder River (see Appendices A and B of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). Based on existing literature review and an understanding of current sockeye (Cultus population) distribution, the BC-780 and BC-717 crossing Fish and Fish Habitat LSAs are important migratory corridors for this population. Peak spawning migration through these systems occurs in September to December (COSEWIC 2003).

The assessment method for pipeline and watercourse crossings of the Project focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the Project's effects assessment. Effects on the population of sockeye salmon (Cultus Lake population) is expected to be no different than for other fish species at the Lower Fraser River (BC-780) and the Chilliwack/ Vedder River (BC-717) crossing locations as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential Project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for the Lower Fraser River (BC-780) and Chilliwack/Vedder River (BC-717), and the contingency is open cut with water quality monitoring inside the least biological window (BC-717) or another regulatory approved trenchless method (BC-780). An HDD method will assist with avoidance of direct disturbance to the streambed and banks and will reduce construction activities within riparian areas and below the high-water mark of the Lower Fraser and Chilliwack/ Vedder rivers.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with federal and provincial regulatory authorities on all relevant species at risk and species of concern.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

Reference:

Committee on the Status of Endangered Wildlife in Canada. 2003. COSEWIC assessment and status report on the sockeye salmon *Onchorynchus nerka*, (Cultus Population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. xi + 57 pp.

i) White Sturgeon (Lower Fraser River population) (stock group SG1) distribution includes the Lower Fraser River from the estuary to Hells Gate. This population is stable and not listed in Schedule 1 of the *Species at Risk Act* (*SARA)* but is listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Threatened. The Middle Fraser River population (stock group SG2) includes the Fraser River upstream from Hells Gate to Prince George and the Thompson River; this population is not listed in Schedule 1 of *SARA* and listed as Non-active by COSEWIC (*SARA* Public Registry 2014).

The Fish and Fish Habitat LSA of most relevance is associated with crossing BC-780 of the Lower Fraser River (see Appendices A and B of Technical Report 5C-7 in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consulting Ltd. December 2013]). Based on existing literature and an understanding of current white sturgeon distribution, the BC-780 crossing Fish and Fish Habitat LSA can be considered a potential rearing and migratory corridor for Lower Fraser white sturgeon populations. However, spawning potential at the proposed crossing location has not been identified as critical. Other proposed crossing locations with historical white sturgeon records include Anderson Creek (BC-705), Chilliwack Creek (BC-715), Chilliwack/Vedder River (BC-717), Sumas River (BC-726) and McLennan Creek (BC-734). These watercourses are likely used for occasional feeding and migration corridors only, and have not been addressed in the literature as critical habitat for white sturgeon.

With respect to Lower Fraser River populations, Fisheries and Oceans Canada (DFO) (2013) reports that white sturgeon are known to feed intensively on eulachon and there is a significant correlation between eulachon spawning habitat and white sturgeon spawning and rearing habitat in the lower 110 km section of the Fraser River (DFO 2013). McPhail (2007) notes that most eulachon spawning in the Lower Fraser River occurs approximately 60-120 km upstream between Mission and Chilliwack (upstream from the Fish and Fish Habitat LSA). Key spawning and rearing areas for white sturgeon have been identified between Mission and Yale (Perrin *et al.* 2000). One important spawning site is the Fraser mainstem downstream (0.5 km) from the confluence with the Coquihalla River (COSEWIC 2003). White sturgeon spawning and rearing in the Herrling side channel (near Waleach Pump Station) was documented during fish surveys for the Project (see Technical Report 5-7).

With respect to Middle Fraser River populations, white sturgeon is known to occur in larger tributaries to the Fraser River, which may include the Thompson River as far upstream as Kamloops (unconfirmed reports) (McPhail 2007). However, information from radio-tagging studies suggests that most habitat use by this sub-population (SG2) likely includes the Fraser River mainstem between Hells Gate and Prince George. There has been one documented white sturgeon record in Kamloops Lake, by the Kamloops Indian Band (Tk'emlups te Secwepemc), although other capture efforts targeting white sturgeon in Kamloops Lake have been unsuccessful (Rublee pers. comm.). The Fish and Fish Habitat LSA of most relevance is associated with crossing BC-413 of the Thompson River, located upstream from Kamloops Lake. Based on existing literature and an understanding of current white sturgeon distribution, the BC-413 crossing Fish and Fish Habitat LSA is not considered to be critical habitat for white sturgeon (SG2).

The assessment method for pipeline and watercourse crossings of the Lower Fraser River and Thompson River focused on fish and fish habitat with the greatest potential to be affected by the Project at each individual crossing location. Where warranted, additional consideration was given for sensitivity, rarity and habitat availability for species of provincial management concern. As a result, recommendations were made for the most suitable construction methods and associated mitigation measures for a broad range of species, including species that were not selected as indicator species for the purposes of the

Project's effects assessment. Effects on the population of white sturgeon is expected to be no different than for other fish species at each of the crossing locations listed above as described in Section 7.2.7 of Volume 5A. Overall, the implementation of environmental mitigation measures and best management practices provided are expected to eliminate or reduce potential Project-related effects to fish and fish habitat, and protect fish species, including those that are federally and provincially-listed for conservation consideration, while maintaining the overall health and productivity of the aquatic ecosystem.

Wherever feasible, watercourse crossing construction activities will be timed to occur within the least risk biological windows to avoid causing serious harm to fish in compliance with the *Fisheries Act*. Mitigation measures considered in the assessment for fish, fish habitat and surface water quality are provided in Table 7.2.7-2 of Section 7.2.7 of Volume 5A as well as Section 8.7.3 of the Pipeline Environmental Protection Plan (Volume 6B) and the Fish Species of Concern Contingency Plan in Appendix B of the same volume. Mitigation measures are also incorporated within the project design to reduce the spatial scale, duration and intensity of effects to manage the potential for serious harm to fishes and their habitat. These measures include, for example, limiting disturbance areas within riparian areas and implementing minimum riparian setback distances for temporary and permanent facilities.

Horizontal directional drilling (HDD) with water quality monitoring is the proposed crossing method for the Lower Fraser River (BC-780), Thompson River (BC-413), Sumas River (BC-726) and Chilliwack/Vedder River (BC-717) and the contingency is another regulatory approved trenchless method (BC-780, BC-726) or open cut with water quality monitoring inside the least risk biological window (BC-413, BC-717). An HDD method will assist with avoidance of direct disturbance to the streambed and banks and reduce construction activities within riparian areas and below the high-water mark of these rivers. Given the size of the watercourses, the presence of white sturgeon in Anderson (BC-705), Chilliwack (BC-715) and McLennan (BC-734) creeks is unlikely. However, all of these watercourses are to be crossed using isolation with fish salvage.

Federal and provincial regulatory agencies, along with key stakeholders and Aboriginal communities have been actively involved in the consultation and engagement processes to date. Records of this consultation and engagement can be found in Section 2.0 of Technical Report 5C-7 and in Volume 3B. Trans Mountain continues to work with federal (DFO *Species at Risk Act*) and provincial regulatory authorities on all relevant species at risk and species of concern, particularly provincial regulators.

Trans Mountain will complete its review of Stage 2 watercourse crossing sites (as outlined in Volume 4A, Project Design and Execution – Engineering) in Q4 2014. This includes a further review of potential effects to species at risk and species of concern. If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

Personal Communication:

Rublee, B. Senior Fish Biologist, Triton Environmental Consultants Ltd. Kamloops, BC.

References:

Committee on the Status of Endangered Wildlife in Canada. 2003. COSEWIC assessment and update status report on the white sturgeon *Acipenser transmontanus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. vii + 51 pp.

Fisheries and Oceans Canada. 2013. Fraser River Eulachon Egg/larval Abundance Surveys. Website: http://www.pac.dfo-mpo.gc.ca/science/species-especes/pelagic-pelagique/herring-hareng/herspawn/pages/river1-eng.html. Accessed: April 2014.

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, AB. 696 pp.

Perrin, C.J., A. Heaton and M.A. Laynes. 2000. White Sturgeon (*Acipenser transmontanus*) spawning habitat in the Lower Fraser River, 1999. Report prepared by Limnotek Research and Development Inc. for BC Fisheries. 72 pp.

Species at Risk Act Public Registry. 2014. Government of Canada. Website: http://www.sararegistry.gc.ca/default_e.cfm. Accessed: April 2014.

Summary of New Commitments:

- If the results of the Stage 2 assessment change any of the conclusions presented in the Environmental and Socio-Economic Assessment (Volume 5A of the Application), Trans Mountain will submit an update to the NEB in Q4 2014.

1.54 Fish habitat enhancement measures

Reference:

A3S2C2, Application Volume 5C, Environmental and Socio-Economic Assessment – Biophysical Technical Reports, TR 5C-7 - Fisheries (British Columbia) Technical Report:

i) PDF pages 46 to 68 of 175
ii) PDF pages 68 to 70 of 175
iii) A3S2S3, Application Volume 6B, Pipeline Environmental Protection Plan, PDF pages 120 to 126 of 461

Preamble:

Reference i) describes mitigation measures to be used at the various watercourse crossings in British Columbia.

Reference ii) states that the primary objective of watercourse reclamation is to stabilize the channel and re-establish both the morphology and integrity of each watercourse to a similar condition that existed prior to construction. The reference describes reclamation methods for various watercourse classifications.

Reference iii) provides mitigation and reclamation measures for trenchless and trenched methods of watercourse construction.

Request:

Please provide:

a) any instream fish habitat enhancement measures that Trans Mountain will implement at trenched watercourse crossings; and

b) the supporting rationale for where and when fish habitat enhancement measures will be implemented.

Response:

a) If the enhancement of instream habitat is necessary, Trans Mountain may implement any one or combination of instream enhancement measures typically used to add complexity to instream habitat (Canadian Association of Petroleum Producers et al. 2005). Methods typically used, include:

- addition of large woody debris;
- addition of large boulders or boulder clusters;
- placement of gravel suitable for spawning;
- creation of undercut banks;
- excavation of pools; and
- removal of barriers (if existing).

Reference:

Canadian Association of Petroleum Producers, Canadian Energy Pipeline Association and Canadian Gas Association. 2005. Pipeline Associated Watercourse Crossings, 3rd Edition. October, 2005. Prepared by TERA Environmental Consultants and Salmo Consulting Inc. Calgary, AB.

b) Following each trenched watercourse crossing, Trans Mountain will restore the instream habitat. If opportunities for habitat enhancement are identified as part of the overall strategy to avoid or offset serious harm, the implementation of additional instream features such as those outlined in the response to NEB IR No. 1.54a may be implemented at the specific watercourses identified in the Conceptual Fish Habitat Offset Plan. In addition to instream enhancement measures, opportunities may exist to enhance adjacent riparian habitat. Final determination of the need for instream fish habitat enhancements will be based on the self-assessment of serious harm and resulting determination provided by the NEB and Fisheries and Oceans Canada (DFO).

1.55 Support to Port Metro Vancouver marine mammal study

Reference:

A3S4Y3, Application Volume 8A, Marine Transportation:

i) PDF page 85 of 294
ii) PDF pages 92 and 93 of 294
iii) A3S4Y3, Application Volume 8A, Marine Transportation, PDF pages 93 to 94 of 294

Preamble:

Reference i) states that Trans Mountain is strongly supportive of an industry-government approach, led by the Port Metro Vancouver (PMV), to developing viable solutions that could be applied to the marine transportation industry as a whole. Reference i) also states that PMV is in the midst of developing a program to look at the current levels of underwater noise and the potential effects of marine traffic on marine mammals. Trans Mountain further states that it met with PMV in 2013 to express interest in contributing in a meaningful capacity to the development and implementation of the proposed program and that Trans Mountain will be furthering their conversation in early 2014 to establish how to best support and participate in current and future endeavours.

Reference ii) states that there are no quantitative Canadian thresholds or any recommended Canadian standards or guidelines for assessing the potential effects of underwater noise on marine mammals. DFO's Recovery Strategy for Northern and Southern Resident Killer Whale states that both physical and acoustic disturbance from human activities may be key factors causing depletion or preventing recovery of resident killer whale populations.

Reference iii) states that the potential effects of increased Project-related marine traffic on the southern resident killer whales are predicted to be significant.

Request:

Please provide:

a) a summary of any consultation that has taken place with the PMV since Trans Mountain filed its Project application;

b) a detailed outline of the PMV program, including:
   - b.1) the program's duration and schedule;
   - b.2) persons/organizations involved;
   - b.3) goals and objectives;
   - b.4) expected program outcomes;
   - b.5) how the outcomes will address the impacts of marine shipping on marine mammals identified in the Project Aquatic Marine RSA; and
   - b.6) how the results of the program will be implemented and monitored;

c) a detailed plan describing how Trans Mountain proposes to support the PMV program; and

d) any other research initiatives that Trans Mountain may lead or contribute to that will focus on the effects of marine shipping on marine mammals.

Response:

a) The Application filed with the National Energy Board (NEB) on December 16, 2013, included a summary of consultation activities up to July 31, 2013 in Volumes 3A, 3B, and 3C.

Consultation activities continued throughout the preparation of the Application and after the Application was submitted to the NEB.

Trans Mountain submitted Consultation Update No. 1 and Errata to the NEB on March 20, 2014, which included a summary of consultation activities from August 1 to December 31, 2014.

Since August 1, 2013, Trans Mountain has continued to engage with Port Metro Vancouver staff in over a dozen meetings about the following topics:

- Marine Terminal – siting and design
- Marine ESA
  - ESA Approach
  - Study Areas
  - Air Emissions
  - Noise
  - View Impact Assessment
  - Geotechnical and dredging requirements for Westridge marine terminal
  - Heritage Resources (First Nations – Archeological Impact Assessment)
  - Ecological Risk Assessment
  - Human Health Risk Assessment
  - Habitat Compensation
- TERMPOL
- Emergency Response
- Vessel traffic analysis through Second Narrows Movement Restricted Area
- Marine mammals
  - Exploration of PMV Marine Mammal Monitoring Program
  - Exploration of data sharing agreement with Roberts Bank Terminal 2 expansion project regarding ambient noise recordings in Salish Sea

In addition to bilateral meetings, between August 1 and April 30, 2014 Trans Mountain has engaged with Port Metro Vancouver in other formats, including:

- Maritime community meetings (held October 25, 2013, December 6, 2013 and March 28, 2014) to discuss marine issues to inform TERMPOL, the NEB facilities application and continued refinement of terminal design and marine operations. Included in these meetings is the BC Chamber of Shipping, Pacific Pilotage Authority, Western Canada Marine Response Corporation, Seaspan, SMIT Marine, and BC Coast Pilots.

- Port Metro Vancouver participation at the Trans Mountain Expansion Project public information sessions: Burnaby Terminals Open House, September 25, 2013 and Burnaby Routing Open House, April 4, 2014.
- Trans Mountain Expansion Project presentation at Port Metro Vancouver stakeholder engagement workshop for the members of the PMV North Shore Waterfront Liaison Committee.

b) The following response is provided for sub points b.1 to b.6.

Port Metro Vancouver (PMV) is playing a coordinating role for the program, engaging with federal agencies such as Fisheries and Oceans Canada (DFO) and Transport Canada. They have stated that discussions with lead groups are still underway and are not in a position to provide further details until an Memorandum of Understanding (MOU) is in place.

To date, Trans Mountain, the BC Chamber of Shipping, the Pacific Pilotage Authority, BC Ferries, BC Wharf Operators and other maritime community members have expressed interest in participating in the program. Academic, environmental and First Nations representatives are also anticipated to play a role.

Trans Mountain understands based on the last meeting with PMV that the terms of reference will be defined in the next few months so details of the program will start to emerge this fall. Trans Mountain will advise the NEB when this information is available from PMV.

c) As described in section 5.2 of Volume 8 of the Application "Trans Mountain will work collaboratively with industry and government to understand and minimize the effects on marine mammals and supports a regional and collaborative industry-government approach." The Port Metro Vancouver (PMV) marine mammal monitoring program requirements have not been defined by the program steering committee, therefore it is not yet possible for Trans Mountain to confirm how it will support the program. Examples of the support Trans Mountain is willing to provide include the following:

- Purchase of hydrophones for deployment in Southern Resident Killer Whale (SRKW) habitat.
- Funding for independent research required for the program.
- Third party technical review of proposed monitoring design and protocols by the Trans Mountain marine mammal specialist.
- Providing detailed underwater noise modeling results to PMV.
- Access to vessel traffic calling at Westridge Marine Terminal where this would benefit PMV study objectives (for example, support inspections, education initiatives, monitoring of real time vessel noise signatures or other opportunities currently undefined).

d) The Project-specific Marine Mammal Protection Program and Marine Mammal Environmental Monitoring program are described in responses to NEB IR No. 1.56 and IR No. 1.57, respectively.

Summary of New Commitments:

- Trans Mountain will advise the NEB when an update on the marine mammal monitoring program from PMV is available.

1.56 Marine Mammal Protection Program framework

Reference:

A3S4Y3, Application Volume 8A, Marine Transportation:

i) PDF page 90 of 294
ii) PDF page 199 of 294
iii) PDF pages 93 to 94 of 294
iv) PDF page 96 of 294

Preamble:

Reference i) provides the potential residual effects of increased Project-related marine vessel traffic on marine mammals.

Reference ii) states that a vessel strike with a marine mammal may result in either physical injury or direct or indirect mortality.

Reference iii) states that the potential effects of increased Project-related marine traffic on the southern resident killer whales are predicted to be significant.

Reference iv) states that the increase in Project-related marine vessel traffic will contribute to additional underwater noise to the Marine RSA and, at this time, no scientific study has established a causal link between increased vessel noise and population-level effects on humpback whales.

Request:

Please provide a detailed framework for a Marine Mammal Protection Program to mitigate the effects of increased marine vessel traffic.

Response:

All vessels calling at the Westridge Marine Terminal must operate according to rules established by the International Maritime Organization (IMO), Transport Canada, the Pacific Pilotage Authority, and Port Metro Vancouver (PMV). Trans Mountain is responsible for ensuring the safety of the terminal operations but does not own or operate the vessels calling at the Westridge Marine Terminal. 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 specific measures to mitigate the effects of increased marine vessel traffic. However, as other components of the Project constructed and operated by Trans Mountain have the potential to contribute to cumulative effects on marine mammals in the Salish Sea, Trans Mountain believes there is merit in developing a Marine Mammal Protection Program that addresses both potential Project-specific effects on marine mammals and combined stressors on the endangered southern resident killer whale population. This reflects Trans Mountain's ongoing interest in working with British Columbia (BC) maritime agencies to promote best practices and facilitate

improvements to ensure the safety and efficiency of tanker traffic in the Salish Sea, thereby minimizing potential risks to, and effects on, killer whales and other marine species.

The Marine Mammal Protection Program framework provided below outlines the approach that Trans Mountain will take to address potential Project-specific effects on marine mammals and cumulative effects on the endangered southern resident killer whale population. Within six months following Project approval, a preliminary Marine Mammal Protection Program will be developed and submitted to the National Energy Board for review. This preliminary program will include further details on the construction mitigation and monitoring programs, as well as an update on the status of the marine transportation collaborative initiatives, including a summary of all consultation activities to date, and planned 'next steps'. Copies will also be made available to appropriate regulatory authorities, Aboriginal communities, and other interested stakeholders for comment. The Marine Mammal Protection Program will be a living document and, therefore, may go through multiple iterations over the life of the Project as the various programs develop over time; all updates will be filed with the National Energy Board.

MARINE MAMMAL PROTECTION PROGRAM FRAMEWORK

Purpose

The purpose of the Marine Mammal Protection Program is to outline Project-specific measures and regional collaborative initiatives that will be implemented by Trans Mountain and other operators along the marine shipping lanes to mitigate and manage potential environmental effects (both Project-related and cumulative) on marine mammals. Regional collaborative initiatives will be developed through discussions with various parties and updates will be provided in future drafts of the Marine Mammal Protection Program as details become available.

Objectives

The objectives of the Marine Mammal Protection Program include:

1. Implement measures that avoid or reduce potential Project effects on marine mammals in Burrard Inlet during Westridge Marine Terminal expansion.
2. Implement measures that avoid or reduce potential Project effects associated with Westridge Marine Terminal expansion on marine fish in Burrard Inlet that provide food sources for marine mammals.
3. Implement measures that avoid or reduce potential Project effects on freshwater and marine salmon habitat during pipeline and facility construction.
4. Encourage and assist further development of shared best practices amongst industry stakeholders involved in marine transportation activities.
5. Continue to apply best operating practices in marine transportation at Westridge Marine Terminal and promote those amongst all users of the terminal.
6. Implement additional measures that reduce risk of marine spills.
7. Actively encourage and participate in multi-stakeholder or independent initiatives that contribute to southern resident killer whale recovery strategies identified by Fisheries and Oceans Canada (DFO).

CONSTRUCTION PHASE

Pending detailed design, construction of the marine loading berths at the Westridge Marine Terminal will involve the installation of large diameter steel piles (*i.e.,* pile driving) and may involve a small amount of dredging. Pile driving can result in the generation of high energy pressure waves that radiate outward from the sound source. While mobile marine organisms such as marine mammals are generally expected to avoid very loud in-water construction activities, noise from these activities could still result in temporary or permanent auditory damage (*i.e.,* temporary threshold shift [TTS] or permanent threshold shift [PTS]) to individuals in close proximity to pile driving (Richardson *et al.* 1995). The production of loud underwater construction noise (*i.e.,* from pile driving, pile drilling, or dredging) could also cause sensory disturbance to marine mammals. Potential disturbance responses include temporary displacement, startle responses, increased energy expenditure, reduced foraging efficiency, communication masking, change in activity state, and/or increased stress. The extent of sensory disturbance depends on a number of factors, including: the source level, frequency, and duration of the underwater noise, the context and the species in question.

The Westridge Marine Terminal marine mammal mitigation area corresponds to the 500 m radius Marine Mammals Local Study Area adopted for the Environmental and Socio-economic Assessment (Volume 5A). The 500 m radius has been recommended for numerous other marine terminal development projects in BC.

Construction Mitigation Measures

To reduce the likelihood and extent of adverse effects on marine mammals during construction and decommissioning of the Westridge Marine Terminal (primarily associated with underwater noise), Trans Mountain will implement a variety of best industry practices and mitigation measures. The current frameworks of these commitments are outlined below.

Pile Installation

A vibratory method of pile installation will be used instead of an impact hammer if feasible.

- Use of a vibratory driver generally produces sound pressure levels (SPLs) that are roughly 25 dB lower (sound exposure levels [SELs] of 10-15 dB lower), on average, than those produced by an impact hammer in a comparable setting, and vibratory drivers do not produce the high impulse signatures of impact pile driving (Illingworth and Rodkin Inc. 2007, McCauley and Salgado Kent 2008). The preferred installation method is therefore vibratory driver, for its decreased noise production.
- In the event that the vibratory driver cannot be used due to engineering and geotechnical constraints (*i.e.*, unfavourable substrate conditions), and a hydraulic hammer is required for pile installation, Trans Mountain will implement several mitigation measures in accordance with Best Management Practices (BMPs) for Pile Driving and Related Operations for driving steel pipe piles with a diameter greater than 61 cm (24 inches). The BMPs were developed by the BC Marine and Pile Driving Contractors Association (2003) to minimize impact to fish habitat. Further details on these are provided below.

Bubble Curtain

If an impact hammer is required for pile installation, bubble curtains will be deployed during pile installation to reduce underwater noise levels.

- In the event an impact hammer will be used, bubble curtains will be deployed over the full length of the wetted pile to assist in attenuating sound levels. While there are a variety of styles of bubble curtains, they all rely on the same basic principle: surrounding the pile with air assists in attenuating the noise produced during impact. When designed and used effectively, bubble curtains have generally been shown to provide a reduction in SPLs and SELs of between 10 and 15 dB (Illingworth and Rodkin Inc. 2007). Actual attenuation values will vary depending on factors such as design of the bubble curtain, installation, current velocity, water depth, and substrate type (Koschinski 2011). Lucke *et al.* (2011) showed that installation of a bubble curtain during pile driving of wooden piles reduced mean SEL values (over a continuous sequence of 95 strikes) by 13 dB (standard deviation 2.5 dB), and resulted in the termination of avoidance reactions by harbour porpoises. Should use of a vibratory driver not be technically feasible, details concerning appropriate type and usage of bubble curtains will be discussed with DFO.

Acoustic Monitoring

An acoustic survey will be conducted in order to establish the effectiveness of the bubble curtain.

- A hydrophone will be used to monitor pressure levels during pile-driving, so as to reduce potential for fish injury or mortality. This hydrophone will also be used for the Marine Mammal Protection Program to monitor SPLs at the onset of pile-driving and confirm the assumptions concerning source levels, potential exceedance of marine mammal auditory injury levels, and effectiveness of mitigation measures.

Marine Mammal Monitoring

A marine mammal survey will be completed prior to any marine activities (*i.e.,* dredging of the marine environment from onshore and/or in the marine environment, drilling, pile installation, infilling), by trained personnel to determine the presence of marine mammals within the area. If any cetaceans or species at risk are observed in or within close proximity to the predetermined exclusion zone, all marine operations will be temporarily suspended (or rescheduled if deemed necessary) until the marine mammal(s) has left the exclusion zone and does not reappear within 30 minutes.

- A marine mammal monitoring program will be implemented to enforce a pre-determined exclusion zone during pile driving operations. The area of the exclusion zone (generally set at 500 m from the sound source) will be confirmed through discussion with DFO. Observers will monitor the exclusion zone and surrounding waters for all marine mammals during loud underwater construction activities. Pile driving will only occur during daylight hours to ensure that marine mammals can be seen if they approach or enter the exclusion zone. If cetaceans or species at risk are detected within the exclusion zone, the underwater

construction activity will be immediately stopped until the marine mammal has been observed to exit the exclusion zone, or has not been re-sighted for 30 minutes. This additional mitigation measure is expected to reduce potential residual effects for all species of marine mammals with the exception of harbour seals. While the marine mammal monitoring program has been designed as an additional safeguard to protect cetaceans and species of conservation concern, current Canadian practice (*e.g.,* the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment) (DFO 2013) does not generally mitigate for effects of loud underwater noise for non-listed pinnipeds.

- Sound levels will be monitored both onshore and in-water, during loud underwater construction activities (*e.g.,* pile installation activities) in order to allow for adjustments to the radius of the exclusion zone based on changes in field conditions. The number of personnel required for monitoring will depend on the size and extent of the pre-determined exclusion zone. Monitoring will take place for 30 minutes prior to and during marine construction activities.

OPERATIONS PHASE

Contribution to Southern Resident Killer Whale Recovery Strategies

Southern resident killer whales in the Salish Sea are currently affected by a number of stressors including reduced prey abundance, contaminants and physical and acoustic disturbance. These stressors will continue to affect these species with or without the Project. A challenge facing resource managers, regulatory authorities, and those in the maritime community is that these stressors can interact, and the relative contribution of each stressor is not clear. This makes it difficult to identify practical Project-specific mitigation measures that are likely to restore the endangered southern resident killer whale population along shipping lanes in the Salish Sea.

The recently released 'Action Plan for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada [DRAFT]' (DFO 2014) (the Draft Action Plan) identifies a number of recovery measures designed to ensure the long-term viability of southern (and northern) resident killer whales. These measures demonstrate that recovery of at-risk whale populations in the Salish Sea is a complex and multi-faceted problem, and that integrated, multi-party solutions are required. As cumulative effects management is most effective when all parties contribute to solutions, Trans Mountain proposes the following actions and intended actions as part of a Marine Mammal Protection Program to support southern resident killer whale recovery. These actions are organized under three broad strategies, in keeping with three of the four objectives outlined in the Draft Action Plan.

Strategy 1: Ensure that resident killer whales have an adequate and accessible food supply to allow recovery

Trans Mountain understands that the decline in southern resident killer whale survival was strongly correlated with Chinook salmon abundance (Ford *et al.* 2010), and ensuring adequate abundance of Chinook salmon should be a priority in recovery planning. Trans Mountain will contribute directly to this strategy by continuing to work with stakeholders, Aboriginal communities, and regulatory authorities such as DFO and the National Energy Board to protect,

preserve and where possible enhance the freshwater habitat of important Fraser River salmon stocks.

There are currently 393 defined watercourse crossings within the BC portion of the proposed pipeline corridor for the Project, of those 116 are salmon-bearing. The primary salmon species found in these salmon bearing streams is Coho, second most prevalent is Chinook. By mitigating environmental effects during construction, and by conducting Project activities in accordance with federal and provincial regulations, the Project is not expected to interfere with goals and objectives of government management plans for salmon and salmon habitat.

Trans Mountain has met with the Pacific Salmon Foundation to discuss salmon enhancement opportunities and was advised of an initiative being proposed by them. Their multi-year comprehensive 'Salish Sea Marine Survival Project' (psf.ca) is a program of ecosystem research and habitat restoration intended to determine the factors limiting production of Chinook and Coho in the Strait of Georgia and its tributaries, and the management actions needed to restore sustainable fisheries in these waters. Because this program focuses on salmon production, 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.

Strategy 2: Ensure that chemical and biological pollutants do not prevent the recovery of Resident Killer Whale populations

The southern resident killer whale population has high body contaminant levels that may increase susceptibility to disease or reduce recruitment, and spill minimization and response was identified as a recovery measure in the Draft Action Plan. As demonstrated by Trans Mountain's near 60-year history of loading oil tankers, the transport of petroleum products can be done safely and responsibly. Though its legal responsibility for the transport of the products ends once the product leaves the pipeline and is loaded onto a tanker, Kinder Morgan Canada Inc. (KMC) has been an active participant in the marine shipping community in BC. Trans Mountain is working with industry associations, including BC Chamber of Shipping, Pacific Pilotage Authority, BC Coast Pilots, escort tug operators, PMV and Western Canada Marine Response Corporation to continuously improve navigational practices and minimize accidental releases of any hydrocarbons through a focus on ship safety and spill response. Trans Mountain has also engaged with United States (US) authorities and safety organizations based in Puget Sound, which include Washington State Department of Ecology, US Coast Guard and Puget Sound Harbour Safety Committee.

Trans Mountain and marine shipping industry stakeholders have recently completed an evaluation of oil spill response capability that identified a number of opportunities to improve spill response time and capability. These and a number of recommended enhancements to marine safety are outlined in Section 5.5.2 of Volume 8A and include the following:

- extending tug escorts;
- implementing a Moving Exclusion Zone around laden tankers; and
- improvements to the oil spill response regime including five new response bases on BC's south coast which are designed to reduce response times.

When these measures are implemented, this will reduce the risk of introducing chemical pollutants from both existing and future shipping activity in southern resident killer whale habitat.

Strategy 3: Ensure that disturbance from human activities does not prevent the recovery of Resident Killer Whales

The issue of ship-associated underwater noise is one that is best dealt with at the southern resident killer whale population scale by regional, national, and international groups or organizations that represent the commercial shipping industry and recreational marine industries such as whale-watching.

While the use of common, established shipping lanes is believed to be beneficial to ensure marine traffic sticks to these existing lanes, further collaborative work to determine baseline natural and anthropogenic noise profiles and changes in exposure as well as development of other measures to reduce or eliminate physical and acoustic disturbance would be beneficial for managing cumulative marine transportation effects. The response to NEB IR 1.55 discusses the PMV initiative to look at the current levels of underwater noise in the Strait of Georgia and surrounding waters and to consider options for reducing potential environmental effects of noise from marine traffic on marine mammals.

<u>International Efforts</u>

Despite the concern and local action to address potential effects of shipping on marine mammals, this is acknowledged to be an international issue. The shipping industry under the auspice of the IMO has initiated multiple efforts to examine how shipping-related acoustic effects can be mitigated through ship design and operational aspects. Ship design guidelines for designers, shipbuilders and ship operators have recently been released by an IMO Design and Equipment Sub-Committee (IMO n.d.). In these non-mandatory guidelines, ship quieting measures are associated with propeller design, hull form, onboard machinery and operational aspects.

International workshops are also being convened by the Convention on Biodiversity (the CBD Conference of Parties) to better understand the impacts of anthropogenic underwater noise on marine and coastal biodiversity. At a convention hosted in London, UK (February 25-27, 2014) there was a draft background document that highlighted that “new international voluntary guidelines to reduce underwater noise from commercial vessels should encourage the shipping industry to use more efficient and quieter ships.” Expert workshops have been occurring to develop guidelines for mitigating underwater noise effects so that going forward, other parties (such as industry) and government can apply standardized management measures.

Trans Mountain engagement efforts to date have identified a number of other initiatives directly and indirectly related to the study of marine mammals in the Salish Sea. Conversations are ongoing with the organizers of these initiatives, the most relevant of which is Ocean Networks, (based at the University of Victoria), that is participating in an International Quiet Ocean Experiment to learn what noise levels can be tolerated by large marine mammals and how marine noise affects their behavior.

Summary of New Commitments:

- Three months prior to the start of pile installation, a draft Marine Mammal Protection Program will be developed and submitted to the NEB for review. This draft will include further details on construction mitigation and the monitoring program, as well as an update on the status of the marine transportation collaborative initiatives, including a summary of all consultation activities to date, and planned 'next steps'. Copies will also be made available to appropriate regulatory authorities, Aboriginal communities, and other interested stakeholders for comment. The Marine Mammal Protection Program will be a living document and, therefore, may go through multiple iterations over the life of the Project as the various programs develop over time; all updates will be filed with the NEB.
- Trans Mountain will consult with DFO to determine whether the Pacific Salmon Foundation multi-year comprehensive 'Salish Sea Marine Survival Project' 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.

References:

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

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Koschinski, S. 2011. Underwater noise pollution from munitions clearance and disposal, possible effects on marine vertebrates, and its mitigation. Marine Technology Society Journal 45(6):80-88.

Lucke, K., P.A. Lepper, M. Blanchet and U. Siebert. 2011. The use of an air bubble curtain to reduce the received sound levels for harbor porpoises (Phocoena phocoena). Journal of Acoustic Society of America 130(5):3406-3412.

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Richardson, W.J., C.R. Greene Jr., C.I. Malme and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press. San Diego, CA. 576 pp.

1.57 Marine Environmental Monitoring Program framework

Reference:

A3S4Y3, Application Volume 8A, Marine Transportation:

i) PDF pages 214 to 278 of 294
ii) PDF pages 243 to 245 of 294
iii) PDF page 233 of 294
iv) PDF pages 259 and 260 of 294

Preamble:

Reference i) provides the marine transportation cumulative effects assessment on biophysical elements.

Reference ii) indicates that the Project's contribution to potential cumulative effects on sensory disturbance was determined to be significant for southern resident killer whales.

Reference iii) states that the Project's contribution to a cumulative increase in emissions and decrease in visibility within the Marine Air Quality RSA and Lower Fraser Valley Photochemical Model domain is considered to have a negative impact balance, is reversible in the long term, and is of low magnitude.

Reference iv) provides an evaluation of the combined cumulative effects of increased sensory disturbance on marine birds in the Marine RSA. It further states that contributions to sensory disturbance to marine birds from marine shipping are considered to have a negative impact balance.

Request:

Please provide a Marine Environmental Monitoring Program framework for how Trans Mountain will monitor the bio-physical elements of the marine environment.

Response:

Trans Mountain Pipeline ULC (Trans Mountain) is responsible for operations of the Westridge Marine Terminal in Burrard Inlet but does not own or operate the vessels transiting to or from the terminal. As described more fully below, Trans Mountain's proposed Marine Environmental Monitoring Program focuses on potential marine effects directly related to its terminal operations in Burrard Inlet. The Salish Sea is home to a long established and busy marine transportation network. As existing and proposed vessel traffic associated with the Westridge Marine Terminal represents a comparatively small portion of this marine transportation network, the environmental effects of shipping activities are most effectively monitored and managed at the regional scale by regulatory authorities, resource managers, or multi-stakeholder groups. Trans Mountain has, and will continue to, participate in regional shipping industry environmental initiatives designed to minimize effects on marine resources. Trans Mountain is also supportive of a collaborative approach to long-term monitoring for marine birds in Burrard Inlet and will

endeavour to meet with Environment Canada in May 2014 to discuss the potential for development of a long-term marine bird monitoring program as a partnership with others.

With respect to monitoring at the Westridge Marine Terminal in Burrard Inlet, Technical Reports 5C-12, 5C-13 and 5C-14 provided in Volume 5C summarize the baseline sediment and water quality, marine riparian and intertidal habitat, marine fish and marine bird information collected in the vicinity of the Westridge Marine Terminal. Trans Mountain will also implement a construction monitoring program for Westridge Marine Terminal expansion, as outlined in Volume 6D, Westridge Marine Terminal Environmental Protection Plan.

The Trans Mountain marine mammal mitigation program was previously described in the response to NEB IR No. 1.56 and marine mammal monitoring program in Volume 6D, Westridge Environmental Protection Plan.

Trans Mountain will monitor air quality in the vicinity of the Westridge Marine Terminal using an existing framework that includes continuous measurements, emissions reporting, predictive modeling and adherence to municipal, provincial and federal regulatory requirements for facility operations. Specifically, Metro Vancouver created the *Integrated Air Quality and Greenhouse Gas Management Plan* (Metro Vancouver 2011) as part of a sustainability framework which provides the foundation for air quality management actions such as:

- reducing emissions in the face of regional growth in the Greater Vancouver; and
- meeting the Metro Vancouver health-based ambient air quality objectives that apply across the Lower Fraser Valley air shed including the marine environment.

Metro Vancouver works with government, industry, institutions and residents to collaboratively plan and implement initiatives and Trans Mountain is committed to supporting these initiatives. For example, Trans Mountain:

- undertakes ambient air quality measurements at their Burnaby and Sumas Terminals;
- contributes financially to the operation of the Metro Vancouver Burnaby Mountain ambient air quality station;
- monitors and reports air emissions to appropriate regulatory authorities, where required;
- incorporates emission control technology into facility design and supports Port Metro Vancouver and International Marine Organization initiatives to reduce marine emissions and improve energy efficiency;
- undertakes predictive modelling to demonstrate that operational emissions comply with Metro Vancouver ambient air quality objectives; and
- complies with the Metro Vancouver air quality management bylaw via an operating permit that typically lists emission limits for photochemical smog pre-cursors such as volatile organic compounds and oxides of nitrogen, stack sampling, acceptable hours of operation, annual emissions reporting and other related requirements.

Reference:

Metro Vancouver. 2011. Integrated Air Quality and Greenhouse Gas Management Plan. October 2011. 41 pp.

1.58 Marine transportation assessment indicator selection

Reference:

i) A3S4J5, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-1 - Marine Resources Marine Transportation Technical Report, PDF page 22 of 173
ii) A3S4J6, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-2 - Marine Birds Marine Transportation Technical Report, PDF page 18 of 90

Preamble:

Reference i) states that the assessment of potential residual and cumulative effects of Project-related marine vessel traffic on marine resources will focus on indicator species and habitats. It also states that intertidal habitat, Pacific salmon, and Pacific herring were selected to represent marine fish and fish habitat.

The Board notes that a benthic, local resident indicator species was not used to determine potential effects on marine fish and fish habitat from increased marine vessel traffic.

Reference ii) states that five indicator species were selected to represent potential effects from the increase in Project-related vessel traffic, namely: fork-tailed storm-petrel, Cassin's auklet, surf scoter, pelagic cormorant, and glaucous-winged gull.

The Board notes that the selected indicators do not represent shorebirds.

Request:

Please provide:

a) an assessment of the environmental effects on marine fish and fish habitat from increased marine vessel traffic using a benthic, non-migrating (local resident) indicator species found in the Marine RSA; and

b) an assessment of the environmental effects from Project-related marine vessel traffic using shorebird indicator species.

Response:

a) The assessment of environmental effects of increased marine vessel traffic on marine fish and fish habitat focused on potential interactions between wake waves produced by transiting Project-related tankers and tugs and marine species occupying the nearshore marine environment (Section 4.3.6 of Volume 8A). Pacific salmon were chosen as an indicator because juvenile salmon are known to migrate along shoreline habitats where they may interact with wake waves (Groot and Margolis 2001, Pearson *et al.* 2006). Pacific herring was chosen as an indicator because adults spawn on intertidal and shallow subtidal substrates, and eggs may interact with wake waves (Hart 1973, Rooper *et al.* 1999). Inshore rockfish (*Sebastes* spp.) were considered as a potential indicator for the assessment of

increased marine vessel traffic; however, it was determined that there would be little or no interaction between these benthic, non-migrating species and wake waves generated by Project-related vessels. While some species of rockfish do occur in relatively shallow nearshore habitats (*e.g.,* copper rockfish [*Sebastes caurinus*] and black rockfish [*S. melanops*]), most are found in deeper water, well away from the influence of wake waves generated by transiting vessels. The life history of most other benthic, non-migrating fish species similarly precludes interaction with routine Project-related marine transportation activities. Nevertheless, an assessment of the potential effects of increased marine vessel traffic on inshore rockfish is provided below.

Marine Fish and Fish Habitat Indicator – Inshore Rockfish

There are approximately 102 species of rockfish belonging to the genus *Sebastes*, of which 36 are known to occur in Canadian Pacific waters (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2009). Rockfish range from the shallow subtidal zone to several thousands of metres in depth, are generally long-lived and slow to mature, and are live-bearing (Lea *et al.* 1999, Love *et al.* 2002). Most adult rockfish inhabit benthic habitats with high structural complexity, such as rocky outcrops, boulder fields, and kelp beds (Love *et al.* 2002). Parturition (*i.e*., larval release) typically occurs in the winter and spring, and larvae undergo a pelagic phase lasting between one and six months (Love *et al.* 2002, Moser and Boehlert 1991). Settlement habitats for juvenile rockfish differ according to species, but are generally shallower than the depth range occupied by adults (Love *et al.* 1991, Love *et al.* 2002).

The life history traits of rockfish (*i.e*., late age-at-maturity, slow growth, episodic recruitment) make them inherently vulnerable to overexploitation (Berkeley *et al.* 2004, Parker *et al.* 2000). In British Columbia (BC), rockfish are targeted in commercial, recreational, and Aboriginal fisheries, and are also caught incidentally in the hook and line fishery and as by-catch in the prawn trap, groundfish trawl, and shrimp trawl fisheries (COSEWIC 2009, Fisheries and Oceans Canada [DFO] 2012, Yamanaka and Logan 2010). Decades of heavy fishing pressure have led to the decline of numerous rockfish stocks in both Canada and the United States (Berkeley *et al.* 2004, Parker *et al.* 2000). In BC, eight species of rockfish have been identified as species of conservation concern by the Committee on the Status of Endangered Wildlife in Canada and three are listed under the *Species at Risk Act.*

In 2002, in an effort to protect vulnerable rockfish stocks and promote population recovery, DFO developed a *Rockfish Conservation Strategy* (DFO 2002, Yamanaka and Logan 2010). The strategy is focused on monitoring catch levels, reducing harvest levels, stock assessment, and the establishment of Rockfish Conservation Areas (RCAs). RCAs are areas where commercial and recreational fishing activities that negatively affect rockfish are prohibited year-round (DFO 2011, Yamanaka and Logan 2010). A total of 164 RCAs have been established in BC, which together account for an estimated 30% of inshore rockfish habitat in the province (COSEWIC 2009, Yamanaka and Logan 2010). The focus of the RCAs is on the protection of 'inshore' rockfish, which consist of the following six species (COSEWIC 2009, DFO 2006): copper rockfish (*Sebastes caurinus*); quillback rockfish (*S. maliger*); china rockfish (*S. nebulosus*); yelloweye rockfish (*S. ruberrimus*); tiger rockfish

(*S. nigrocinctus*); and black rockfish (*S. melanops*). All six of these species occur within the Marine Regional Study Area (RSA).

For more information on inshore rockfish, please refer to Technical Report 5C-13 in Volume 5C, Marine Resources Westridge Marine Terminal Technical Report (Stantec December 2013) and Technical Report 8C-3 in Volume 8C, TERMPOL 3.3 – Fisheries Resources Survey (TERA Environmental Consultants and Stantec October 2013).

Assessment of Injury or Mortality of Inshore Rockfish due to Vessel Wake from Project-Related Marine Vessels

As discussed in Section 4.3.6.6.1 of Volume 8A, Project-related vessels transiting along the shipping lanes will create wake waves that may interact with shoreline habitats within the Marine Local Study Area (LSA). It is predicted that wake waves will be less than 0.1 m when reaching the shore, which is well within the range of natural wave heights. As a result, most shoreline habitats along the shipping lanes will experience little or no change from current conditions. For inshore rockfish to be injured or killed by vessel wake, the wake wave at the shoreline would need to be sufficiently high to strand the fish in the intertidal zone. This is considered unlikely, given the low predicted wake wave heights and the fact that shoreline habitats throughout the Marine LSA and Marine RSA are routinely exposed to natural waves of considerably greater magnitude.

Most rockfish are found well below the surface and are not likely to interact with shoreline waves generated by transiting vessels. During the larval phase, rockfish are distributed pelagically in the upper mixed layer of the water column, typically in offshore areas (Boehlert *et al.* 1985, Lenarz *et al.* 1991). Adult rockfish of most species occur in close association with the seafloor, moving to progressively deeper habitats as they age (Love *et al.* 1991, Love *et al.* 2002). Juvenile rockfish inhabit a variety of habitats, including nearshore rock piles, deep-water reefs, gravel and cobble slopes, kelp beds, eelgrass beds and other structurally-complex habitat types (Love *et al.* 1991, Love *et al.* 2002). Some species, such as copper and black rockfish, do recruit to shallow-water habitats (Love *et al.* 1991, Love *et al.* 2002). However, juveniles of these species are typically distributed along exposed or semi-exposed shoreline habitats that are routinely affected by wind-generated waves. Juvenile rockfish in these habitats would be accustomed to natural wave conditions, and it is unlikely that they would be adversely affected by the small waves generated by transiting vessels.

Based on the predicted heights of wake waves that will be generated by Project-related vessels, and considering the life history characteristics of the six species of inshore rockfish, it is considered unlikely that any rockfish will be injured or killed due to stranding. Therefore, the effect of injury or mortality of inshore rockfish due to vessel wake is predicted to be of negligible magnitude (Table 1.58A-1). A summary of the rationale for all of the significance criteria is provided below.

- **Spatial Boundary** – Marine LSA – residual effects to inshore rockfish, if any, will be limited to shoreline habitats within the Marine LSA due to the low magnitude of the predicted wake wave heights outside of the Marine LSA.

- **Duration** – long-term – vessel transits along the shipping lanes will be initiated during the operations phase and will extend for the life of the Project.
- **Frequency** – periodic – the event causing vessel wake is the transit of Project-related tankers and tugs, which will occur, on average, two times per day (one inbound and one outbound) for the operational life of the Project.
- **Reversibility** – medium-term – in the unlikely event that a small number of juvenile inshore rockfish are killed as a result of vessel wake, this effect will be reversible at the population level within one cycle of successful dispersal and recruitment; this can occur on an annual basis but may take up to 5-10 years for some species due to episodic recruitment.
- **Magnitude** – negligible – residual effects of vessel wake on inshore rockfish will not be detectable from existing conditions.
- **Probability** – low – wake waves generated by Project-related marine vessel traffic are not likely to interact with inshore rockfish due to the low predicted wave heights and the benthic distribution of most rockfish species.
- **Confidence** – high – based on a good understanding by the assessment team of the cause-effect relationships between vessel wake and the potential for stranding of inshore rockfish.

TABLE 1.58A-1

SIGNIFICANCE EVALUATION OF POTENTIAL RESIDUAL EFFECTS FROM INCREASED PROJECT-RELATED MARINE VESSEL TRAFFIC ON INSHORE ROCKFISH

Potential Residual Effects	Impact Balance	Spatial Boundary[1]	Temporal Context			Magnitude	Probability	Confidence	Significance[2]
			Duration	Frequency	Reversibility				
1. Marine Fish and Fish Habitat Indicator – Inshore Rockfish									
1(a) Injury or mortality to inshore rockfish.	Negative	LSA	Long-term	Periodic	Medium-term	Negligible	Low	High	Not significant

Notes: 1. LSA: Marine LSA.

2. **Significant Residual Environmental Effect:** A high probability of occurrence of a permanent or long-term residual effect of high magnitude that cannot be technically or economically mitigated.

As identified in Table 1.58A-1, the effect of wake waves generated by Project-related marine vessel traffic is not expected to result in a permanent or long-term residual environmental effect of high magnitude on the inshore rockfish indicator. Consequently, it is concluded that the residual environmental effects of operation activities associated with increased Project-related marine vessel traffic on inshore rockfish will be not significant.

As the effect of vessel wake on inshore rockfish is predicted to be of negligible magnitude, no mitigation measures are considered necessary.

References:

Berkeley, S.A., M.A. Hixon, R.J. Larson and M.S. Love. 2004. Fisheries sustainability via protection of age structure and spatial distribution of fish populations. Fisheries 29(8):23-32.

Boehlert, G.W., D.M. Gadomski and B.C. Mundy. 1985. Vertical distribution of icthyoplankton off the Oregon coast in spring and summer months. Fishery Bulletin 83(4):611-621.

Committee on the Status of Endangered Wildlife in Canada. 2009. COSEWIC assessment and status report on the Quillback Rockfish *Sebastes maliger* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 71 pp.

Fisheries and Oceans Canada. 2002. Toward an Inshore Rockfish Conservation Plan. A Structure for Continued Consultation. 34 pp.

Fisheries and Oceans Canada. 2006. Rockfish Conservation Areas - Protecting British Columbia's Rockfish. Fisheries and Oceans Canada, Pacific Region. 180 pp.

Fisheries and Oceans Canada. 2011. Integrated Fisheries Management Plan, Groundfish, February 21, 2011 to February 20, 2013. Fisheries and Oceans Canada, Pacific Region. 224 pp.

Fisheries and Oceans Canada. 2012. Stock Assessment and Recovery Potential Assessment for Quillback Rockfish (*Sebastes maliger*) Along the Pacific Coast of Canada. DFO Canadian Science Advisory Secretariat Research Document 2011/072.

Groot, C. and L. Margolis, Eds. 1991. Pacific Salmon Life Histories. UBC Press, Vancouver, BC. 564 pp.

Hart, J.L. 1973. Pacific Fishes of Canada. Fisheries Research Board of Canada. Ottawa, ON. 740 pp.

Lea, R.N., R.D. McAllister and D.A. Ventresca. 1999. Biological aspects of the nearshore rockfishes of the genus *Sebastes* from central California. California Department of Fish and Game Bulletin 177:1-109.

Lenarz, W.H., R.J. Larson and S. Ralston. 1991. Depth distributions of late larvae and pelagic juveniles of some fishes of the California Current. CalCOFI Report 32:41-46.

Love, M.S., M.H. Carr and L.J. Haldorson. 1991. The ecology of substrate-associated juveniles of the genus *Sebastes*. Environmental Biology of Fishes 30:225-243.

Love, M.S., M. Yaklovich and L. Thorsteinson. 2002. The Rockfishes of the Northeast Pacific. University of California Press, Berkeley and Los Angeles, CA. 414 pp.

Moser, H.G. and G.W. Boehlert. 1991. Ecology of pelagic larvae and juveniles of the genus *Sebastes*. Environmental Biology of Fishes 30:203-224.

Parker, S.J., S.A. Berkeley, J.T. Golden, D.R. Gunderson, J. Heifetz, M.A. Hixon, R.J. Larson, B.M. Leaman, M.S. Love, J.A. Musick, V.M. O'Connell, S. Ralston, H.J. Weeks and M.M. Yaklovich. 2000. Management of Pacific rockfish. Fisheries 25(3):22-30.

Pearson, W.H., G.E. Johnson, J.R. Skalski, G.D. Williams, K.L. Sobocinski, J.A. Southard, M.C. Miller and R.A. Buchanan. 2006. A Study of Stranding of Juvenile Salmon by Ship Wakes Along the Lower Columbia River Using a Before-and-After Design: Before-Phase Results. Prepared for the US Army Corps of Engineers, Portland District. Portland, OR. 206 pp.

Rooper, C.N., L.J. Haldorson and T.J. Quinn II. 1999. Habitat factors controlling Pacific herring (*Clupea pallasii*) egg loss in Prince William Sound, Alaska. Canadian Journal of Fisheries and Aquatic Sciences 56:1133-1142.

Yamanaka, K.L. and G. Logan. 2010. Developing British Columbia's inshore rockfish conservation strategy. Marine and Coastal Fisheries: Dynamics, Management and Ecosystem 2010:28-46.

b) The assessment of environmental effects of increased marine vessel traffic on marine birds focused on sensory disturbance, behavioural alteration, and risk of injury or mortality (Section 4.3.2 of Volume 8A). The selection of key indicators took into consideration the input of regulatory authorities, Aboriginal communities, and other stakeholders, as well as the professional judgment of the assessment team. It concentrated on species regularly occurring in the Marine Bird Local Study Area (LSA) and Marine Regional Study Are (RSA), and potentially susceptible to effects from the Project-related increase in shipping traffic. The five species selected were surf scoter, fork-tailed storm-petrel, pelagic cormorant, glaucous-winged gull and Cassin's auklet.

The potential for effects on coastal species such as great blue heron and black oystercatcher was discussed in Section 4.3.2.7.5 of Volume 8A. These were not carried forward as key indicators because they are limited to coastal habitat, which is within 2 km of the shoreline for less than 5% of the shipping route. Effects to such species would be limited to wake effect, while the key indicators selected are potentially exposed to a greater variety of effects at closer range. However, an assessment of potential effects of increased marine vessel traffic on black oystercatcher (representing the shorebird guild) is provided below.

Marine Birds Indicator – Black Oystercatcher

Black oystercatcher is found regularly along rocky coastal habitat on the Pacific coast of North America, often in association with other shorebirds including black turnstone (*Arenaria melanocephala*), surfbird (*Calidris virgata*) and rock sandpiper (*Calidris ptilocnemis*). Black oystercatcher is described because it occurs in the Marine RSA year-round.

Black oystercatchers nest on shorelines, usually between 1 and 38 m above high tide, and forage on invertebrates in intertidal zones, often in areas exposed to waves (Andres and Falxa 1995). Key conservation concerns are direct human disturbance, predation by introduced predators such as rats and cats, and oil spills (Andres and Falxa 1995). Black oystercatcher is not listed under the *Species at Risk Act* (*SARA*), nor has its status been

assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2013).

For more information on black oystercatcher and other shorebirds, please refer to Technical Report 8B-2 in Volume 8B, Marine Birds Transportation Technical Report (Stantec December 2013).

Assessment of Injury or Mortality of Black Oystercatcher due to Vessel Wake from Project-Related Vessels

Black oystercatcher is adapted to living on coastal shorelines, where natural wave action can be substantial. Low-lying nests close to the high tide mark may be vulnerable to loss, but the risk from waves during storms is far greater than inundation from vessel wake, since such waves are expected to be less than 0.1 m at shore, well within the range of natural wave heights (see Section 4.3.6.6.1 of Volume 8A). Adult oystercatchers are mobile and routinely avoid waves while foraging; for juveniles to be at risk of injury or mortality, the wake wave at shoreline would need to be sufficiently high to sweep them away. This is considered unlikely, given the low predicted wake wave heights and the fact that shoreline habitats throughout the Marine Bird LSA and Marine RSA are routinely exposed to natural waves of considerably greater magnitude.

Based on the predicted heights of wake waves that will be generated by Project-related marine vessels, and considering the life history characteristics of black oystercatcher, it is considered unlikely that this key indicator will be injured or killed as a result of Project-related effects. Therefore, the effect of injury or mortality of black oystercatcher due to vessel wake is predicted to be of negligible magnitude (Table 1.58B-1). A summary of the rationale for all of the significance criteria is provided below.

- **Spatial Boundary** – Marine Bird LSA – residual effects to black oystercatcher, if any, will be limited to shoreline habitats within the Marine Bird LSA due to the low magnitude of the predicted wake wave heights outside of the Marine Bird LSA.
- **Duration** – long-term – vessel transits along the shipping lanes will be initiated during the operations phase and will extend for the life of the Project.
- **Frequency** – occasional – the event leading to a potential injury or mortality will occur intermittently and sporadically for the life of the Project.
- **Reversibility** – medium-term – in the unlikely event that black oystercatchers are injured or killed as a result of vessel wake, this effect will be reversible within one generation.
- **Magnitude** – negligible – residual effects of vessel wake on black oystercatcher will not be detectable from existing conditions.
- **Probability** – low – wake waves generated by Project-related marine vessel traffic are not likely to interact with black oystercatcher due to the low predicted wave heights and tendency of black oystercatcher to nest at least 1 m above high tide level.
- **Confidence** – high – based on a good understanding by the assessment team of the cause-effect relationships between vessel wake and the potential for effects on black oystercatcher.

TABLE 1.58B-1

SIGNIFICANCE EVALUATION OF POTENTIAL RESIDUAL EFFECTS FROM INCREASED PROJECT-RELATED MARINE VESSEL TRAFFIC ON BLACK OYSTERCATCHER

Potential Residual Effects	Impact Balance	Spatial Boundary[1]	Temporal Context			Magnitude	Probability	Confidence	Significance[2]
			Duration	Frequency	Reversibility				
1. Marine Birds Indicator – Black Oystercatcher									
1(a) Injury or mortality to black oystercatcher.	Negative	LSA	Long-term	Occasional	Medium-term	Negligible	Low	High	Not significant

Notes: 1. LSA: Marine Bird LSA.

2. **Significant Residual Environmental Effect:** A high probability of occurrence of a permanent or long-term residual effect of high magnitude that cannot be technically or economically mitigated.

As identified in Table 1.58B-1, the effect of wake waves generated by Project-related marine vessel traffic is not expected to result in a permanent or long-term residual environmental effect of high magnitude on black oystercatcher. Consequently, it is concluded that the residual environmental effects of operation activities associated with increased Project-related marine vessel traffic on black oystercatcher will be not significant.

As the effect of vessel wake on black oystercatcher is predicted to be of negligible magnitude, no mitigation measures are considered necessary.

References:

Andres, B.A. and G.A. Falxa. 1995. Black Oystercatcher (Haematopus bachmani), The Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, NY. Available at: http://bna.birds.cornell.edu/bna/species/155. (Accessed 28 April 2014; note that “Birds of North America” is an online encyclopedia that is not optimized for printing or saving offline.)

Committee on the Status of Endangered Wildlife in Canada. 2013. Canadian Wildlife Species at Risk. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. 105 pp.

Marine shipping safety

1.59 Tug escort for tanker traffic

Reference:

i) A3S4X3, Application Volume 8A, Marine Transportation, PDF page 45 of 53
A3S4Y4, Application Volume 8A, Marine Transportation:
ii) PDF page 6 of 7
iii) PDF pages 6 and 7 of 7
iv) A3S5G0, Application Volume 8C, TERMPOL Reports, TR 8C-12, S3 – An Evaluation of Local Escort and Rescue Tug Capabilities in Juan de Fuca Strait, PDF pages 5, 38 to 43, and 47 of 67

Preamble:

In References i) and ii), Trans Mountain states that it is seeking endorsement from Transport Canada regarding its proposed measures to improve navigational safety as Trans Mountain has no regulatory authority to implement the proposed measures.

In Reference iii), Trans Mountain discusses its proposed additional tug escort requirements for laden tankers and states that this new requirement would be included in Trans Mountain's Tanker Acceptance Criteria. Trans Mountain further states that its discussions with tug operators indicate that there are escort tugs available with sufficient capability to control a laden oil tanker under conditions prevailing in the study area to provide this service. In support of this position, Trans Mountain refers to its escort and rescue tug capability assessment noted in Reference iv).

Reference iv) indicates that tugs of a sufficient length, and with sufficient Bollard pull, capable of both escort and rescue towing, are very limited within the Project area. For example:

- at PDF page 5, it states that there are "only three tugs in BC which have the combined capability of performing escort and rescue towing in Juan de Fuca Strait";
- at PDF page 43, it states that "it cannot be assumed that just because there are some 'escort tugs' in BC waters that those specific tugs have all the capabilities required to be fully effective when needed"; and
- at PDF page 43, it also states that there are only five tugs in BC which satisfy the criteria noted by DNV in its marine shipping risk assessment for controlling a laden tanker under prevailing wind and wave conditions. All of these tugs are coastal towing tugs and not part of the current escort tug fleet.

Reference iv), at PDF page 47, states that the assessment of the present tug fleet against precise force-generating requirements for controlling a laden tanker is a critical missing link in defining safe procedures for tanker escort in British Columbia waters.

Reference iv), at PDF page 5, states that there is no permanently stationed rescue tug for use in Canadian waters and that the rescue tug permanently stationed at Neah Bay in Washington

State would not likely respond to an incident in Canadian waters, unless there was a direct threat to the United States coastline.

Request:

a) Please confirm that:
   a.1) Trans Mountain would ensure that all laden tankers would have tug escort between the Westridge docks and Buoy J at the limit of Canada's territorial sea; and
   a.2) such escort tugs would be capable of controlling a disabled, laden tanker under all foreseeable weather conditions.

b) Please discuss:
   b.1) how Trans Mountain would ensure that a sufficient number of tugs of sufficient capability would be available in the event that the current tug fleet in the Project area is not sufficient to meet the required demand;
   b.2) whether Trans Mountain has considered construction and operation of purpose-built escort and rescue tugs for the Project; and
   b.3) how Trans Mountain would ensure that a rescue tug capable of operating in all weather conditions would be available to respond to a disabled tanker associated with the Project. Please address responses within Canada's territorial sea, as well as beyond the territorial sea in circumstances where a disabled tanker could run aground on Canada's coastline.

Response:

a.1) Should the TERMPOL Review committee endorse the enhancements proposed for the tug escort between Westridge and Buoy J, it would be Trans Mountain's preference to see this requirement mandated under Federal regulations. However, if that is not possible Trans Mountain will make it a requirement of acceptance for tankers nominated to load at Westridge to have a suitable arrangement for the proposed enhanced tug escort. A copy of the current Tanker Acceptance Standard is attached for reference (see NEB IR No. 1.59a - Attachment1).

a.2) If the requirements for enhanced tug escorts are not mandated under Federal regulation Trans Mountain will develop a tug matrix for inclusion as part of its Tanker Acceptance Standard (Westridge Marine Terminal Operations Manual) to prescribe minimum tug capabilities required upon departure of the tanker. The tug matrix will define the capabilities and number of tugs required for foreseeable meteorological and ocean conditions (e.g., winds, waves and currents, also referred to as "Met-Ocean" conditions) and based on tanker and cargo size. The tug matrix will build on the requirements provided in Reference iv), and will be developed by Robert Allan Ltd., or a similarly qualified third-party consultant, in conjunction with the tug operators and, where required, regulatory authorities.

Reference iv) defines "escort capable" as having sufficient certified performance, including bollard pull and indirect force-generating capabilities, as well as appropriate towing equipment to provide effective escort for a fully laden Aframax tanker in 100% of

summer Met-Ocean conditions and 93% of winter Met-Ocean conditions, whereas the Project-related Aframax tankers are expected to be only partly laden. The study identified in Reference iv) also mentions that more than a one tug may be used to escort a tanker under more severe conditions. Should conditions be forecast to exceed the criteria established in the tug matrix or the capabilities of available tugs, a tanker will be required to delay its departure until the weather subsides or a sufficient escort is available. Such delays are expected to be for brief and infrequent.

Reference:

Westridge Terminal Marine Operations Manual. 3.0 Marine Operations Standards, 3.1 Tanker Acceptance Standard.

b.1) A well functioning and competitive market exists for the provision of tug services including tanker escorts in the Salish Sea. Vancouver Harbour is a base for two companies, Seaspan ULC (Seaspan), and SMIT Marine Canada (SMIT) whose tugs provide the existing escort service for tankers departing Westridge and whose vessels comprise the six identified in Reference iv) as being capable of providing the enhanced service proposed.

The configuration and capability of the existing fleet has and continues to evolve to meet the requirements of the local market. In recent years these two companies have both invested in new equipment to meet changing demands of the local market. Both companies are aware of the requirements defined in Reference iv) and proposed as the basis of the tug matrix described in response to a.2) above and have provided letters expressing their ability and interest in providing tug escort services for Project-related tankers. Copies of these letters are attached as NEB IR No. 1.59b - Attachment1 and NEB IR No. 1.59b - Attachment2.

b.2) Procurement of suitable tug escorts is currently the responsibility of the tanker on behalf of the charterer. Given that there is an existing market with capacity to provide the proposed service Trans Mountain does not believe it is necessary for it to construct or operate purpose-built escort and rescue tugs for the Project.

b.3) Trans Mountain's Tanker Acceptance Standard requires that vessels planning to depart Canada via the Juan de Fuca Strait take the most direct route out of the Canadian Exclusive Economic Zone (EEZ) (200 NM from coast of Canada) and doing so reduces the exposure to circumstances where a disabled tanker could run aground on Canada's coastline.

Once the tanker passes the Buoy J and its escort tug is released the separation between tanker and escort increases. Similarly, the tanker's risk for drift grounding steadily declines as its distance from shore increases. Within 61 kilometers (33 nautical miles) of leaving Buoy J, i.e. within about three hours, the tanker is beyond the limits of the Voluntary Tanker Exclusion Zone, considered by Transport Canada as the point where there is sufficient time and distance to secure external marine resources in an emergency to prevent grounding. Prior to this, the escort tug would be available to return to the assist

the tanker. If indeed such a low probability event should take place even under very poor weather conditions, the escort tug could stabilize a tanker at a safe distance from shore until additional tug resources arrive on scene.

In relation to this discussion, the Tanker Acceptance Standard (acceptance standards; see NEB IR No. 1.59a - Attachment1) currently requires every tanker to do the following, which ensures early notification and response to a tanker incident anywhere within the Canadian EEZ to allow for early intervention to prevent a situation from developing into an incident:

- 4.7.5 Once within Canadian EEZ, the Master shall be under instructions from Owners to immediately notify Authorities and the Terminal in case of any incident affecting safety or the environment as well as loss of propulsion.
- 4.7.5.1 Western Canada Marine Response Corporation (WCMRC) shall be immediately notified by the Master in case of any oil spill, however minor.
- 4.7.6 The Master shall be familiar with means to promptly obtain (in case of need) computerized, shore-based damage stability and residual structural strength information and will confirm that she/he has the authority to do so directly without awaiting additional approval from the Owner.
- 4.7.7 In case of an emergency that may require salvage, the Master shall have the authority to enter into a Lloyd's Open Form Agreement with SCOPIC [Special Compensation P&I Club] clause promptly with a salvor of his choice without having to seek additional approval from the Owner.

Given Trans Mountain's due diligence during the tanker acceptance process and only accepting modern tankers that meet all international and national rules and regulations, are well maintained, and are operated to best industry operating practices, the possibility of a tanker associated with the Project becoming disabled at sea is very low. Furthermore, because the number of Project tankers in only expected to be about 3% of the total traffic in Juan de Fuca Straits, the probability of any disabled vessel being a Project tanker is extremely low.

Summary of New Commitments:

- Trans Mountain will develop a tug matrix for inclusion as part of its Tanker Acceptance Standard to prescribe minimum tug capabilities required upon departure of the tanker.

Emergency management (oil fate and behaviour)

1.60 Temperature effects on weathering of diluted bitumen

Reference:

i) A3S4Y5, Application Volume 8A, Marine Transportation, PDF pages 12 to 15 of 43
ii) A3S5G2, Application Volume 8C, TERMPOL Reports, TR 8C-12, S7 – A Study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters, PDF page 13 of 55

Preamble:

Reference i) states that all experiments regarding weathering of the diluted bitumen products studied were undertaken at average water temperatures of 15 degrees Celsius.

Reference ii) states that water temperatures in Burrard Inlet average near 7 degrees Celsius in February.

Request:

a) Please explain why the tests were conducted at average water temperatures of 15 degrees Celsius and why tests were not conducted at colder water temperatures.

b) Please provide a detailed discussion on the potential effects of water temperature on weathering of diluted bitumen and whether colder water temperatures could cause diluted bitumen to sink or submerge in freshwater, brackish water, and full-salinity seawater.

Response:

a) The original study plan called for temperatures of approximately 10°C in tanks that could be thermally controlled. However, due to limitations at the initially planned-upon experimental facilities, the test were done at the Gainford site using multiple steel tanks that did not have temperature controls but instead were subject to local ambient temperatures.

   As stated in the study identified in Reference ii), "Most of Burrard Inlet is characterized by an upper surface layer of brackish water subject to runoff and river inputs, predominantly the Fraser River for the outer harbor and the Indian, Seymour and Capilano rivers for the inner harbor. The surface water layer temperatures are dependent on local weather conditions and precipitation. In general terms, the temperature of the surface water layer in the inlet ranges from a mean near 7°C in February to approximately 17°C in July." The ambient temperature conditions at Gainford during the tests were not typical of Burrard Inlet in February, but do fall within the documented temperature range for the inlet.

   15°C is a standard reference temperature used in both labs and the industry at large to report information on oil physical properties. This also allows assessments to be calculated for other temperatures.

b) There are numerous environmental factors that will affect oil-on-water weathering and behaviour. Water temperature, within the range of 0°C to 20°C for marine waters, can be

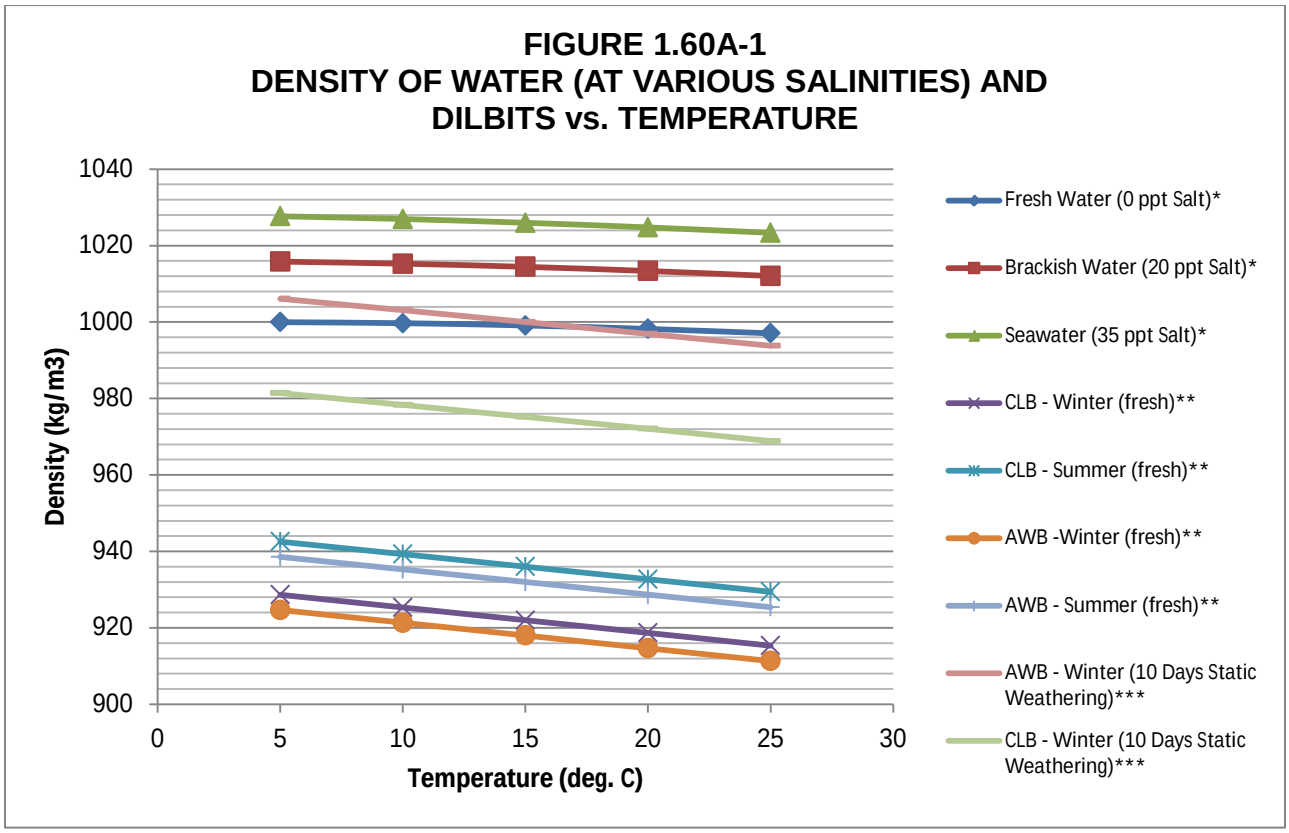
expected to have an effect on the weathering of diluted bitumen through several mechanisms. Oil viscosity, spreading, density, and evaporation are all affected by oil (or receiving water) temperatures; colder temperatures increase both oil viscosities and oil densities, which result in slower spreading. Colder temperatures also reduce the rate of evaporation.

The degree to which temperature affects these properties is, in turn, dependent on the properties of the oil. For instance, the Government of Canada (2013) notes a dynamic viscosity for fresh CLB of 285 mPa*s at 15°C and 803 mPa*s at 0°C (Table 3-2). Once CLB evaporated to 16.9% mass loss, viscosities at these same two temperatures were $1.83*10^4$ and $1.29*10^5$ mPa*s, respectively, or several orders of magnitude higher. Increasingly weathered CLB shows more pronounced temperature effects on viscosity. Similar results are demonstrated in Appendix B of the Gainford report (TR 8C-12, S7 – A Study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters is also referred to as the Gainford report).

Densities, as measured under laboratory conditions, are reported for a specific reference temperature. The Gainford report test results were reported at 15°C, as that is a standard temperature for reporting densities, and is also representative of the average temperature of the water in test tanks; for comparison, the Government of Canada (2013) provides densities for CLB and AWB at both 0°C and 15°C (see Government of Canada, 2013, Section 3.4.1, p.30-31).

At colder temperatures, all oil densities increase at a rate greater than that of water. The Government of Canada report specifies that "Temperature decreased oil density by approximately 2% from 0°C to 15°C" (p.31). In the Government of Canada (2013) report, the most evaporated dilbits (>25% mass loss through heating to 80°C) exceeded 1,000 kg/m^3, or freshwater, and would be expected to submerge or sink in freshwater.

The Gainford report test results showed that natural weathering of Cold Lake Blend (CLB) and Access Western Blend (AWB), without any agitation and water uptake (static), resulted in one density record of 1,000 kg/m^3 (AWB at 15°C) after 10 days on water. After weathering under mild to moderate agitation conditions for 8 days, AWB dilbit emulsion densities reported from the Gainford report tests exceeded 1,000 kg/m^3 (at 15°C). Weathered CLB, inclusive of incorporated water, exceeded 1,000 kg/m^3 in two cases: moderate agitation interior tank after 8 days (Table 4-4) and mild agitation exterior tank S4 after 9 days (Table 4-7). These weathered oils would have slightly greater densities at colder temperatures than the 15°C reference temperatures used at Gainford (see Figure 1.60A-1 below); however, colder temperatures also can be expected to slow evaporation so the time required to reach an equivalent weathered state would be longer.



* from www.csgnetwork.com/h2odenscalc.html

** from www.crudemonitor.ca extrapolated using ASTM D1250 - 04

*** from Gainford Study extrapolated using ASTM D1250 - 04

Flume tests conducted by SL Ross (2011), also with *naturally* evaporated CLB, showed temporary submergence in freshwater only at a cascading point in the flume, and dilbit remained floating on the water surface at 15°C throughout the 13 day weathering experiment (reported maximum densities were 998 kg/m^3 at a reference temperature of 20°C).

Weathering through evaporative loss alone is not expected to cause AWB or CLB submergence or sinking in marine conditions even at 0°C, as acknowledged in the Government of Canada report (2013) (Section 4.3.3, p. 47, and 6.0 Conclusions, pg. 73).

References:

Government of Canada. 2013. Federal Government Technical Report. Properties, Composition and Marine Spill Behaviour. Transport of Two Diluted Bitumen Products from the Canadian Oil Sands. November 30, 2013. Environment Canada, Fisheries and Oceans Canada, and Natural Resources Canada.

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway.

1.61 Behaviour of diluted bitumen in water

Reference:

i) A3S4V5, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF pages 75 to 84 of 84
ii) A3S4Y5, Application Volume 8A, Marine Transportation, PDF pages 2 to 43 of 43
iii) A3S4V6, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF pages 1 to 15 of 137
iv) A3S4Y6, Application Volume 8A, Marine Transportation, PDF pages 1-26 of 34
v) A3S5G2, A3S5G4, and A3S5G5, Application Volume 8C, TERMPOL Reports, TR 8C-12 S7 – A Study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters
vi) A3S5G7, Application Volume 8C, TERMPOL Reports, TR 8C-12 S8 – A Comparison of the Properties of Diluted Bitumen Crudes with other Oils
vii) Federal Government Technical Report – Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands (30 November 2013) – Environment Canada website: www.ec.gc.ca/Publications

Preamble:

References i) to vi) discuss the potential fate and behavior of diluted bitumen products if spilled in water and how Trans Mountain has considered this information regarding potential environmental effects and emergency preparedness and response planning.

Reference vii) is a report prepared by the Government of Canada on research that federal government departments have conducted regarding the potential fate and behavior of diluted bitumen spilled in water. The Board notes that this report was released after Trans Mountain filed its Project application.

Request:

Please provide a detailed discussion and analysis of the Government of Canada report and how its results and conclusions may relate to any information on the fate and behavior of diluted bitumen and potential environmental effects contained in Trans Mountain's Project application. The response must address:

a) whether the report supports or contradicts any findings or conclusions in Trans Mountain's application; and

b) whether the report necessitates any changes to conclusions in the Project application regarding oil fate and behavior, potential environmental effects, and emergency preparedness and response planning.

Response:

a) Although the two studies differed in the approach used for weathering (the Government of Canada report is based on artificially weathering Access Western Blend (AWB) and Cold Lake Blend (CLB) diluted bitumens instead of a more natural evaporation) and simulated conditions of receiving waters, the Government of Canada results are generally supportive

of the Trans Mountain's results presented in the Gainford report (TR 8C-12 S7 – A Study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters).

The AWB and CLB diluted bitumens (dilbits) used in both of those studies were, for each type, from the same batch and provided by Kinder Morgan Canada Inc. (KMC).

The following two sections ("Supports" and "Differences") address the question about which findings support and which contradict the conclusions Trans Mountain presents in its Application related to the fate and behaviour of diluted bitumen.

Supports

Physical properties and behaviour

- Both studies show rapid evaporative loss with commensurate rapid increases in density and viscosity of the weathered dilbits.
- The synthetically weathered dilbits exhibited water uptake with agitation, but all remained buoyant (floating) on saltwater (20 to 35 ppt).
- The differences in weathering rates between CLB and AWB (and resulting compositions) are identified and are consistent with what was observed in the Gainford report.

Chemistry

- Both reports show comparable chemical compositions for CLB and AWB originating oils and weathered oils.

Countermeasures

- Both studies document CLB and AWB physical properties and behaviours that are amenable to on-water mechanical response countermeasures (booming and skimmers) for at least the first ten days of oil on water.
- As a possible spill countermeasure for the two oils tested, dispersant effectiveness has limited potential efficiency and would be limited to the earliest hours of a release.

Differences

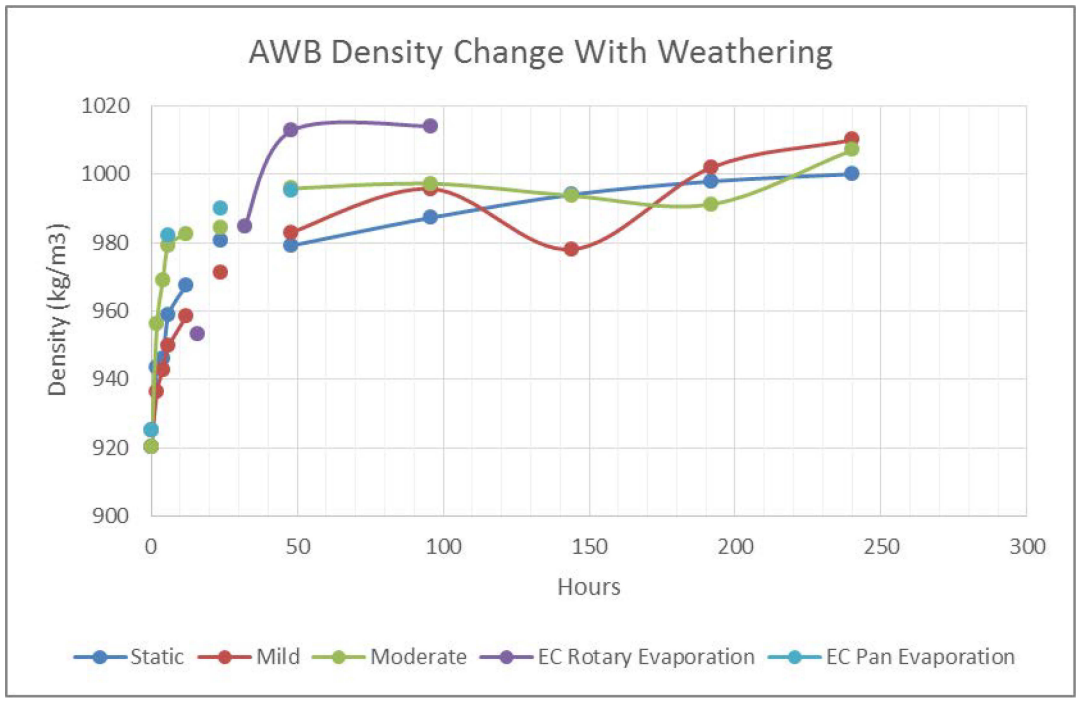
The following are not necessarily representative of contradictory statements with the application, but are points in which some of the results in the Government of Canada report must be considered within context of the methods of their study.

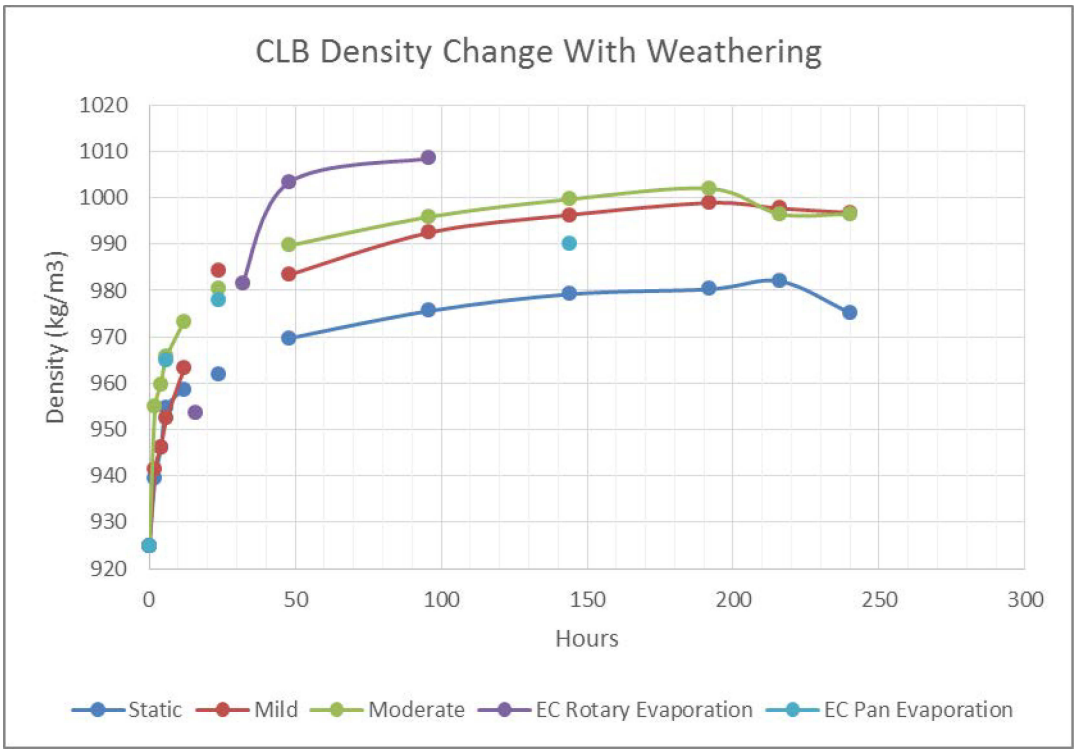
Oil Weathering

- Evaporative weathering for tests followed standardized and internationally recognized methods as a valid source for modeling oil; however, as the authors point out, applicability of evaporative models to real conditions (tank, meso-scale, and real) can use further validation.
- The use of rotary evaporation (at 80°C) to weather the oils is convenient, but does not aid in understanding the evaporative rate at ambient temperatures. In section 3.2.1 of the Government of Canada report, sample W3 represents 48 hour loss by weight

(through rotary evaporation), which is shown as 25.3% loss in Tables 3.1 and 3.2 with resulting densities at 15°C of 1012.7 kg/m^3 for AWB and 1003.4 kg/m^3 for CLB. In the Gainford study and in the Pan Evaporation conducted for the Government of Canada study, these densities were never reached even after ten days. There is fairly close agreement between Pan Weathering and the Moderate Weathering at Gainford for AWB and to the Mild/Moderate Weathering for CLB.

The following graphs, in which static, mild and moderate refer to the agitation imposed from the Gainford tests, illustrate these differences:





- The rotary evaporation density data in Section 3 of the Government of Canada report implies that both CLB and AWB would not remain buoyant in freshwater. The densities measured for these two oils in the Gainford study showed that water uptake affects the mass oil, and near neutral buoyancy in freshwater may occur after six or more days of agitation and weathering. As noted in flume tests conducted by SL Ross (2011), naturally evaporated CLB showed temporary submergence in freshwater only at a cascading point in the flume, and dilbit remained floating on the water surface at 15°C throughout the 13 day weathering experiment (reported maximum densities were 998 kg/m^3 at a reference temperature of 20°C).

Sediment interaction

- While conducting the spill modelling described in the Application (Volume 8C – Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Project) it was found that the range of sediment concentrations and energy dissipation levels characterizing the spill environment were generally considerably lower than the conditions used in the laboratory studies available at the time. This situation persists, and is noted as such, in the Government of Canada study. Observed and modelled sediment concentrations in the surface waters of the Fraser River and the Strait of Georgia are summarized in NEB IR No. 1.62a and NEB IR No. 1.62b (HyDat 2013), and repeated below.

TABLE 1.62A-1

SURFACE SEDIMENT CONCENTRATION (mg/L)

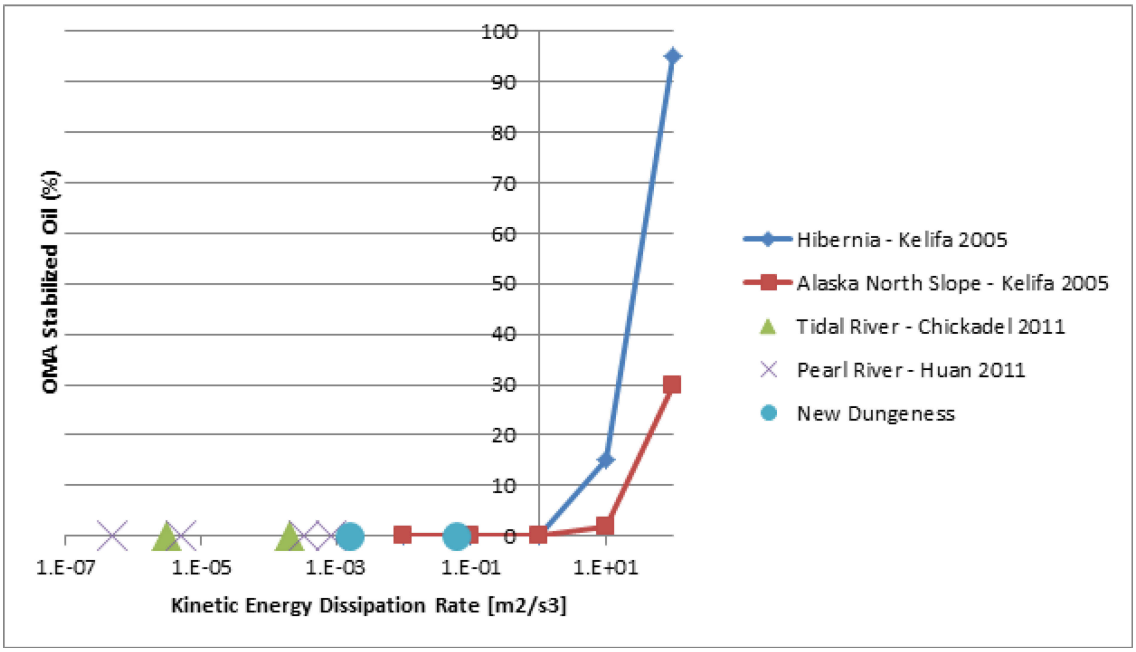
	Winter			Spring			Summer			Fall		
	min	median	max	min	median	max	min	median	max	min	median	max
Westridge	0.1	0.3	2.6	0.8	1.6	11.9	0.5	1.0	4.4	0.3	0.7	5.1
Fraser River	26.5	31.0	54.2	48.6	50.1	79.6	25.5	28.7	41.3	30.2	34.3	44.3
Strait of Georgia	0.1	1.4	20.8	0.6	7.2	51.5	0.7	5.7	25.6	0.5	2.9	24.1
Arachne Reef	0.1	0.1	1.5	0.3	1.1	11.5	1.0	1.6	7.7	0.5	0.7	2.8
Race Rocks	0.0	0.0	0.1	0.0	0.3	2.2	0.4	0.7	2.0	0.1	0.2	0.6
Buoy J	0.0	0.0	0.0	0.0	0.1	0.6	0.1	0.3	0.8	0.0	0.0	0.3

TABLE 1.62B-1

BACKGROUND SUSPENDED SEDIMENT CONCENTRATION AT SURFACE (mg/L)

	minimum	maximum
Westridge	<4	22
Fraser River	10	400
Strait of Georgia	1.0	9.0
Arachne Reef	1.0 *(assumed)*	9.0 *(assumed)*
Race Rocks	1.0 *(assumed)*	9.0 *(assumed)*
Buoy J	1.0 *(assumed)*	9.0 *(assumed)*

- These concentrations are in mg/L. Values in the Salish Sea reach as high as 51.5 mg/L, in the Fraser River Plume, in the immediate vicinity of the mouth of the Fraser River. In the Fraser River, surface concentrations can get as high as 400 mg/L, for a brief period during the annual freshet. These numbers should be contrasted with the 10 g/L (10,000 mg/L) value used corrected in the Government of Canada report (March 2014). The Government of Canada value is 200 to 1000 times larger than naturally-occurring sediment concentrations, except for the Fraser River, where it is still 25 times higher than the peak annual concentration.
- Khelifa et al. (2005) presented results from a comprehensive model of oil-mineral aggregate (OMA) formation. The simulations were done for a range of energy levels from 10^{-2} m^2/s^3 to 10^2 m^2/s^3, and a sediment concentration of 250 mg/L are reproduced in the figure below. Energy dissipation rates for the Dungeness buoy and two large rivers, the Pearl and the Snohomish (the latter indicated as Tidal River), have been added to this figure.



- The energy dissipation rate for the Dungeness Buoy area and the two rivers are well below the threshold value required for OMA formation. No information on energy dissipation rate is provided in the Government of Canada report, but it is stated that the oil-sediment-water mixture was mixed in an end-over-end mixer for 12 hours.
- Two aspects of the Government of Canada report would have been more illustrative of potential OMA formation if more representative conditions had been used in tests. For example, water samples from the Fraser River and the Strait of Georgia, collected during the freshet could have been used. Sediment concentrations and chemical characteristics would then match those that will be found along the oil pipeline and shipping route. Second, the energy dissipation levels could have been selected to match conditions in the Fraser River and in the open Strait of Georgia.
- In the modelling done for the Application, it was assumed that sediment concentrations were dominated by Fraser River sediment. While this is generally true, there may be localized regions, such at the mouths of small rivers flowing into Juan de Fuca Strait, where sediment concentrations are locally relatively high during the freshets of these rivers and energy dissipation levels may also be high, in which case there is potential for OMA formation.

See the response to NEB IR No. 1.62 for additional information on sediment interaction.

These differences between the results of the Gainford report in the Application and the Government of Canada report do not affect the conclusions presented in the Application.

References:

HyDat CD-ROM. Available at: http://www.ec.gc.ca/rhc-wsc/default.asp?lang=En&n=9018B5EC-1. Acquired: 1 May 2013

Khelifa, A., M. Fingas and C. Brown, 2008. "Effects of Dispersants on Oil-SPM Aggregation and Fate in US Coastal Waters". Final Report to the Coastal Research Response Center, University of New Hampshire, July 2008.

SL Ross, 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway.

b) Oil Fate and Behaviour

Trans Mountain does not believe that any changes are required to conclusions in the Application associated with oil fate and behaviour characteristics.

Both studies:

- showed that weathered CLB and AWB oils are expected to remain floating on saltwater,
- reported fresh and weathered oil densities that indicate both CLB and AWB would float on freshwater for a period of days (see responses to NEB IR No. 1.60b and 1.61a),
- acknowledged that other contributing factors may lead to some portion of oil becoming neutrally or negatively buoyant,
- concluded that diluted bitumen oils display high viscosity and increased density relatively quickly during weathering, and otherwise behave similar to how heavy conventional crude oils and heavy refined products would if spilled on water,
- noted water uptake within the oil matrix, mostly through entrainment, affects the density and viscosity, and
- documented CLB and AWB physical properties and behaviours that are amenable to on-water mechanical response countermeasures (booming and skimmers).

Potential environmental effects

Trans Mountain does not believe that any changes are required to our conclusions in the Application associated with potential environmental effects of diluted bitumen oils.

Emergency preparedness and response planning

Trans Mountain does not believe that any changes are required to conclusions in the Application associated with emergency preparedness and response planning.

- Systematic and application of spill prevention measures is considered the best countermeasure as it helps avoid the consequences of oil spills.
- The critical path to addressing spilled oil is to respond quickly and remove product from the surface of the water as rapidly as possible.
- Given the appropriate conditions, all heavy oils can sink (see the response to NEB IR No. 1.61a).
- Oil recovery tactics involving mechanical means are effective in dealing with spilled diluted bitumen oils.
- Any sunken oil should be treated as a post emergency response function with initial data acquisition efforts assigned to SCAT, and further remedial actions, including any actions required to recover it, should be guided by a net environmental benefit analysis. In this

respect, the approach to sunken oil remediation would be similar to cleanup of industrially contaminated sediments in waterways.

1.62 Incorporation of oil/sediment interactions in modelling

Reference:

i) A3S5G9, Application Volume 8C, TERMPOL Reports, S9 – TR 8C-12 – Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Project, PDF pages 35, and 55 to 56 of 72
ii) A3S4W9, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, TR 7-1 – Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report, PDF pages 66 and 67 of 210
iii) A3S4K7, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-7 – Ecological Risk Assessment of Marine Transportation Spills, PDF page 18 of 116

Preamble:

Reference i), at page PDF page 35, discusses how oil/sediment interactions were considered in the fate and behavior modelling.

Reference i), at PDF pages 55 and 56, states that the simulation of a spill at the Fraser River at Port Mann Bridge site found that the amount of oil bound up in oil-mineral aggregations was negligible, and that the potential to form oil-mineral aggregates (OMA) was greater in the Fraser River than in any other sites of study. However, the required energy level to mix the oil and form the OMA was not present in the river.

Reference ii) discusses potential oil fate and behavior when spilled in terms of potential OMA formation.

Reference iii) states that a detailed quantitative risk assessment will be filed in early 2014.

Request:

a) Please specify the maximum and mean suspended sediment or suspended particulate matter concentrations considered in the marine fate and behavior modelling for each of the scenarios described in Section 8.0 of Reference i).

b) Please specify the background suspended sediment and suspended particulate matter concentrations within the spatial boundaries used for the fate and behavior modelling for each of the scenarios described in Section 8.0 of Reference i). Please provide references for these concentrations.

c) Please discuss in detail how the marine transportation ecological risk assessment (noted in Reference iii)) considered potential interactions between oil and suspended sediment or suspended particulate matter.

d) Please discuss in detail whether the detailed quantitative ecological risk assessment (referred to in Reference iii)) will consider potential interactions between oil and suspended sediment or suspended particulate matter.

Response:

a) A summary of the modelled surface sediment concentrations used in the marine fate and behaviour modelling is presented in Table 1.62A-1. The values are summarized from an area around each spill site corresponding with the average areal extent of the spills. The sediment concentrations are summarized first spatially, and then in seasonally. So, for the median column in the table, first the median of all model cells at a particular time is determined, and then the median of the medians for each time in that season is determined to produce a single number. For the maximum column, the maximum of the maximums is presented. For the minimum, the number presented is the seasonal minimum of the spatial median values, as the minimum of minimums is often zero.

The sediment used in the hydrodynamic and spill modelling is fine silt with grain size less than 8 microns. This grain size range was chosen based on model calibration using satellite imagery of the Fraser River plume. Coarser grain sizes sink from the surface layer once the Fraser River reaches the Strait of Georgia, and are not available for interaction with oil on the surface. The model input sediment concentrations were extracted from the HYDAT database.

TABLE 1.62A-1

SURFACE SEDIMENT CONCENTRATION (mg/L)

	Winter			Spring			Summer			Fall		
	min	**median**	**max**	**min**	**median**	**max**	**min**	**median**	**max**	**min**	**median**	**max**
Westridge	0.1	0.3	2.6	0.8	1.6	11.9	0.5	1.0	4.4	0.3	0.7	5.1
Fraser River	26.5	31.0	54.2	48.6	50.1	79.6	25.5	28.7	41.3	30.2	34.3	44.3
Strait of Georgia	0.1	1.4	20.8	0.6	7.2	51.5	0.7	5.7	25.6	0.5	2.9	24.1
Arachne Reef	0.1	0.1	1.5	0.3	1.1	11.5	1.0	1.6	7.7	0.5	0.7	2.8
Race Rocks	0.0	0.0	0.1	0.0	0.3	2.2	0.4	0.7	2.0	0.1	0.2	0.6
Buoy J	0.0	0.0	0.0	0.0	0.1	0.6	0.1	0.3	0.8	0.0	0.0	0.3

Note: All values are summarized from an area around the spill location corresponding to the median oil coverage after 24 hours. Minimum and Median values are computed as the median (during each season, in time) of modelled surface sediment concentration minimums or medians from the spatial extent. Maximum values are the highest in both space and time.

Reference:

HyDat CD-ROM. Available at: http://www.ec.gc.ca/rhc-wsc/default.asp?lang=En&n=9018B5EC-1. Acquired: 1 May 2013.

b) Background suspended sediment concentrations are presented from various references to cover the environments represented in the oil fate and behaviour modelling scenarios. The spatial detail required to differentiate between some of the locations is not necessarily available in published literature.

Church and Krishnappan (1998) present a Fraser River at Mission mean concentration of 165 mg/L, with a range from 5 to 1000 mg/L though this includes all size fractions, some of which would not be present at the surface and includes some measurements farther

upstream. Concentrations are highest in spring and summer, lowest in winter, intermediate in fall.

Milliman (1980) presents further detail regarding fine sediment, whose concentration peaks on the rising limb of the freshet (earlier than the flow peak) at 300 to 400 mg/L, and quickly drops to a relatively stable 50-100 mg/L for the remainder of the freshet, and lower at other times of the year. Milliman's fine sediment is defined as grain sizes smaller than 16 microns.

Feely and Lamb (1979) discuss the detection of surface sediment in the Strait of Georgia / Juan de Fuca region using satellite imagery sea-truthed with observations of surface sediment concentrations inside and outside of the Fraser River plume. Sampling occurred in June, July and September, covering time periods during and after the Fraser freshet. Background values in the southern Strait of Georgia are 1.0 mg/L outside of the Fraser River plume, and 2.5 to 9.0 mg/L inside the plume.

Water quality sampling is conducted in Burrard Inlet as part of Metro Vancouver's goal of meeting water quality objectives (Bull & Freyman 2013). Monitoring is conducted every year, though temporal coverage is limited to the fall and winter months. Suspended solids, a similar quantity to suspended sediment, range from <4 to 22 mg/L in the cited report, with similar ranges in other years.

The Arachne Reef, Race Rocks, and Buoy J sites are assumed to follow similar patterns to the Strait of Georgia, though more likely these sites have lower values as they are farther from the region's principal sediment source, the Fraser River.

The background suspended sediment concentrations from the above references are summarized in Table 1.62B-1.

TABLE 1.62B-1

BACKGROUND SUSPENDED SEDIMENT CONCENTRATION AT SURFACE (mg/L)

	minimum	maximum
Westridge	<4	22
Fraser River	10	400
Strait of Georgia	1.0	9.0
Arachne Reef	1.0 *(assumed)*	9.0 *(assumed)*
Race Rocks	1.0 *(assumed)*	9.0 *(assumed)*
Buoy J	1.0 *(assumed)*	9.0 *(assumed)*

References:

Bull, J. & Freyman, L. (2013). Status of Water Quality Objectives Attainment in Burrard Inlet and Tributaries 1990 to 2010. BC Ministry of Environment, July 2013.

Church, M., & Krishnappan, B. G. (1998). Sediment sources, transport processes, and modeling approaches for the Fraser River in C. Health of the Fraser River Aquatic Ecosystem: Environment Canada, DOE FRAP, 11, 18.

Feely, R. A., & Lamb, M. F. (1979). A study of the dispersal of suspended sediment from the Fraser and Skagit River into Northern Puget Sound using Landsat imagery (Vol. 1). Office of Energy, Minerals and Industry, Office of Research and Development, US Environmental Protection Agency.

Milliman, J. D. (1980). Sedimentation in the Fraser River and its estuary, southwestern British Columbia (Canada). Estuarine and Coastal Marine Science, 10(6), 609-633.

c) The potential for oil-mineral aggregate formation is considered in the preliminary quantitative ecological risk assessment (PQERA) identified above as Reference iii, through the modeling of crude oil behaviour and fate that was carried out by EBA Engineering Consultants Ltd. (2013) (Volume 8C, Technical Report 8C-12, Modelling the Fate and Behaviour of Marine Oil Spills).

Under certain circumstances crude oil and suspended sediment can interact in the environment to form oil-mineral aggregate. This can affect the fate of oil, and can determine potential exposure of ecological receptors to hydrocarbons after a spill (Volume 8C, TERMPOL Reports). In order for oil-mineral aggregate to form, several conditions are generally required to be met. These include that the oil must have sufficiently low viscosity, and the marine environment must be sufficiently turbulent, to entrain small oil droplets into the water column. At the same time, there must be sufficient suspended sediment in the water column to interact with the entrained oil droplets leading to the formation of the oil-mineral aggregate. In general, the presence of salinity facilitates the interaction, so that formation of oil-mineral aggregate is less likely to occur in fresh water than in brackish or salt water.

The formation of oil-mineral aggregate has been identified as a process that can enhance the natural processes of oil weathering, as it helps to disperse crude oil and facilitates microbial activity leading to the breakdown of the oil.

Seasonal stochastic oil spill modelling completed by EBA, considered the interaction of oil and suspended sediment in their predictions of the probability and spatial extent of surface and shoreline oiling for a large number of hypothetical release scenarios as described in the Application (Volume 8A, Section 5.4.4).

The PQERA for marine transportation spills discusses the range of potential effects to ecological resources by considering these oiling probabilities, against the characteristics and sensitivity of potentially affected aquatic and shoreline habitats within the study area. Potential environmental effects were visualized and quantified using GIS overlays of data layers containing information on biological resources, sensitive habitats and other areas of ecological importance (Volume 8A, Section 5.6.2.1).

Refer to the response to NEB IR No. 1.62 a and b for specific details on the concentrations of suspended solids used by EBA in the fate modelling for stochastic simulations at each location.

d) Please find attached (NEB IR No. 1.62d – Attachment 1 Detailed Quantitative Ecological Risk Assessment for Loading Accidents and Marine Spills) the detailed quantitative

ecological risk assessment (DQERA, Stantec 2014). The DQERA has considered the potential interactions between oil and suspended sediment or suspended particulate matter, in the same way the PQERA did. Please refer to the response to NEB IR 1.62c for further information on the PQERA.

Reference:

Stantec Consulting Ltd. 2014. Detailed Quantitative Ecological Risk Assessment, Loading Accidents and Marine Spills, Technical Report for the Trans Mountain Pipeline ULC, Supplementary Report. May 2014.

1.63 Oil fate and behaviour research

Reference:

A3S5G4, Application Volume 8C, TERMPOL Reports, TR 8C-12, S7 A – Study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters, PDF page 11 of 34

Preamble:
The reference recommends areas for future research regarding oil fate and behavior.

Request:

a) Please discuss whether Trans Mountain is aware of ongoing or proposed research in the recommended areas. If so, please summarize this research and note the party undertaking the research.

b) Please discuss whether Trans Mountain is considering leading, funding, or in way contributing to additional research in these areas. If so, please describe the research plan, the timing of the research, funding commitment, contributing parties, and potential deliverables.

Response:

a) Areas for proposed research are listed in both the referenced report (also referred to as the Gainford Studies) and the Government of Canada report (2013a). Trans Mountain understands that the American Petroleum Institute (API) is also assessing in this area. Condition 169 of the Joint Review Panel Report for the Enbridge Northern Gateway Project (Volume 2, Appendix 1) (Government of Canada 2013) calls for further modelling of oil behaviour and weathering that may require similar research and calls for the work to be completed by a Scientific Advisory Committee.

   Trans Mountain believes that a joint industry approach working in cooperation with Federal and Provincial agencies will be the most efficient and effective means to conduct further research in this area. Trans Mountain has agreed to participate and support the Scientific Advisory Committee process and is working with the Canadian Energy Pipeline Association (CEPA) and the Canadian Association of Petroleum Producers (CAPP) to create broad industry support in this effort.

   A framework for development the Scientific Advisory Committee and its objectives has been established and formation of a management team is underway and expected to be completed in the third quarter of 2014. This team will consist of representatives from Trans Mountain, industry, and government agencies. The management team will lead the prioritization and refinement of research elements to be conducted in 2015.

   Research topics for the Scientific Advisory Committee may include, but are not limited to those described in the Gainford Studies, Government of Canada report (2013b), and Condition 169 of the Joint Review Panel Report for the Enbridge Northern Gateway Project (Volume 2, Appendix 1).

While specific research plans have not yet been defined, as part of such a joint effort Trans Mountain is willing to provide funding and contributions in-kind, or both, for research to advance oil fate and behaviour knowledge applicable to detailed emergency preparedness and response planning.

References:

Enbridge Northern Gateway, Attachment 1 JRP IR 14.4 Northern Gateway's Response to Government of Canada – Environment Canada Written Evidence: Technical Review of Enbridge Northern Gateway's Marine Spill Modelling Studies and Related Environmental Consequence Analysis (Exhibit E9-39)

Government of Canada. 2013a. Considerations. Report of the Joint Review Panel for the Northern Gateway Project. Volume 2. December 2013.

Government of Canada. 2013b. Federal Government Technical Report. Properties, Composition and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands. Environment Canada, Fisheries and Oceans Canada, and Natural Resources Canada. November 30, 2013.

b) Please see response to NEB IR No. 1.63a.

Emergency management (marine)

1.64 Proposed marine oil spill response improvements

Reference:

i) A3S4Y6, Application Volume 8A, Marine Transportation, PDF pages 32 to 34 of 34
ii) A3S5Q3, Application Volume 8A, Marine Transportation, PDF pages 1 and 2 of 29
iii) A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment

Preamble:

References i) and ii) outline the results of the study (Reference iii) undertaken by Western Canada Marine Response Corporation regarding potential improvements to current oil spill response capability within the Project area.

Reference ii) states that "the [Western Canada Marine Response Corporation] report describes an enhanced response regime that would be capable of delivering 20,000 tonnes of capacity within 36 hours with dedicated resources staged within the study area. This represents a response capacity that is double and a delivery time that is half the existing planning standards."

The Board notes that there is no clear language in References i), ii), or iii) confirming whether Trans Mountain is committed to having in place the response capacity and delivery time noted in Western Canada Marine Response Corporation's report prior to commencing Project operations.

Request:

a) Please confirm whether Trans Mountain is committed to having the oil spill response improvements outlined in the Western Canada Marine Response Corporation report in place prior to commencing Project operations.
   a.1) If confirmed, please discuss how Trans Mountain would ensure that the proposed improvements are in place prior to commencing Project operations, and how would it ensure the continued availability of the proposed resources for the life of the Project.
   a.2) If not confirmed, please discuss why Trans Mountain is not prepared to commit to having the proposed improvements in place prior to commencing Project operations and maintain them for the life of the Project.

b) Please describe any discussions between Trans Mountain and Western Canada Marine Response Corporation regarding potential funding of the proposed improvements.

c) Please explain what alternatives are available to Trans Mountain to ensure the oil spill response system outlined would be in place, in the event that Western Canada Marine

Response Corporation is not able to or willing to undertake the proposed improvements.

Response:

a.1) Trans Mountain is a member and founding shareholder of Western Canada Marine Response Corporation (WCMRC) and in this capacity is working to secure a commitment from WCMRC, in the form of a resolution from its Board of Directors or similar instrument, to implement the enhanced planning standards described in Table 5.5.3 of Reference i). Doing so requires that an appropriate funding mechanism be in place to protect other WCMRC members from costs associated with investments by WCMRC in enhanced marine spill response procedures, equipment, and resources while ensuring that all members benefit from the reduction in Bulk Oil Cargo Fees expected to result from the commencement of the Project-related volumes.

Resolution of these issues and a commitment from WCMRC to implement the enhanced planning standards is expected by Q3 2014.

b) Please see response NEB IR No. 1.64a.

There is an established regulatory and commercial structure for the provision of marine spill response services on the west coast and as part of this structure Western Canada Marine Response Corporation (WCMRC) recovers the cost of its services through fees charged to vessels and oil handling facilities. The primary source of revenue for the organization is the Bulk Oil Cargo Fee (BOCF) levied on oil handled at facilities like the Westridge Marine Terminal. Trans Mountain collects the BOCF under its Tariff 93 from pipeline shippers that deliver to the Westridge Marine Terminal and remits these fees to WCMRC.

Trans Mountain believes that where the need exists for additional response capacity it should be met through an expansion of WCMRC's resources. Likewise, Trans Mountain believes that WCMRC's existing funding framework can be used to recover the cost of proposed improvements.

c) Early in project planning Trans Mountain Pipeline tested the basic premise of implementing a separate Response Organization (RO) to provide requisite marine oil spill response enhancements. Trans Mountain ultimately concluded that implementing a standalone RO was significantly less desirable than an expansion of Western Canada Marine Response Corporation's (WCMRC's) resources. Accordingly, Trans Mountain did not continue with a further assessment of this alternative. Expansion within the existing framework for marine spill response:

- Ensures enhanced response resources are available to all members served by WCMRC not just the Westridge Marine Terminal and associated tankers.
- Avoids inefficiency in the form of duplication and competition for resources that would result in higher costs overall.

1.65 Environmental conditions for marine oil spill response

Reference:

i) A3S4Z0, Application Volume 8A, Marine Transportation, PDF page 11 of 60

A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment:

ii) PDF page 17 of 81
iii) PDF page 34 of 81

Preamble:

Reference i) states that the Oil Spill Response Simulation Study was undertaken during amenable (*sic*. amendable) weather conditions.

Reference ii) states that the key to meeting proposed response thresholds is "reaching the site quickly and responding to the spill in an effective manner."

Reference iii) discusses operational limits, such as wind and wave conditions between the Westridge Marine Terminal and Buoy J.

The Board notes that, although some data are provided regarding tides and waves, there are no data indicating the potential timeframes over which oil spill response may be halted, or limited, due to equipment limitations or safety concerns. Such an analysis is sometimes referred to as a "response gap analysis."

Request:

Please provide a study on the percentage of time for which oil spill response in the marine environment may be halted, or limited in effectiveness, due to environmental conditions such as wind, waves, and tides. The study must be applicable from the Westridge Marine Terminal to Buoy J and must also address:

a) environmental conditions that may be encountered on a year-round basis;

b) equipment limitations and safety concerns; and

c) the types of response, such as on-water recovery operations, that may be limited by prevailing environmental conditions and the environmental limits for each type of response.

Response:

a) Wind and wave conditions at long-term stations along the route of the Project-related tanker were analyzed and the data was binned into speed or wave height bins using the speed or wave height boundaries as described in NEB IR No. 1.65 (b and c).

The results of the environmental analysis are shown in the tables below and the locations of the wind and wave stations may be found on Figure 3.1 of the MetOcean Report. The frequency bins were developed using all data supplied in the MetOcean Report but not seasonally binned.

Stations listed in order: along route to Buoy J from closest to terminal:

WINDS

TABLE 1.65A-1

WIND SPEED FREQUENCY RECORDED AT VARIOUS LOCATIONS

Station	Wind Speed - Frequency of Occurrence			
	<16 knots (B0-B4)	**17 – 21 knots (B5)**	**> 21 knots (B6+)**	**>27 knots (B7+)**
Sea Appearance	Smooth – Small Waves	Moderate Waves with Whitecaps	Large Waves with White Foam Crests	Breaking Waves
Point Atkinson	89.6%	6.6%	3.8%	1.0%
Halibut Bank Buoy	85.2%	11.6%	3.2%	0.4%
Sand Heads	81.2%	12.2%	6.6%	1.2%
Saturna Is. – East Pt.	87.3%	6.8%	5.9%	2.5%
Kelp Reefs	87.0%	7.9%	5.1%	1.9%
Smith Island	77.2%	10.9%	11.9%	4.6%
Discovery Island	90.9%	4.8%	4.4%	2.1%
New Dungeness Buoy	82.3%	11.8%	5.9%	1.5%
Race Rocks	62.9%	16.1%	21.0%	6.4%
Sheringham Point	82.1%	11.0%	6.9%	1.4%
Neah Bay Buoy	83.2%	11.7%	5.1%	1.0%

WAVES

The offshore waters, such as those at Buoy J and the entrance to Juan de Fuca Strait, are characterized by two types of waves: sea and swell. *Sea* are waves that are generated by local winds. Their periods are generally between 2 and 10 seconds. *Swell* are waves that are generated at remote locations, say the middle of the Pacific Ocean, that then propagate toward shore. During this propagation, the wave field simplifies so that only long period waves (10 – 24 second periods) remain. While waves at the entrance to Juan de Fuca consist of both sea and swell, swell attenuates as it travels down (into) the Strait of Juan de Fuca, resulting in significantly reduced swell farther into the Strait, for instance at Dungeness. Waves in the Strait of Georgia are exclusively wind waves, and are highly correlated with local winds. The wavelength of swell is much longer than the wavelength of sea, and hence the wave slope (wave height divided by wave length) is flatter for swell waves. Although swell waves may contain considerable energy, as measured by the significant wave height, for the same sea or swell wave height, there could be far less disturbance on the surface of the water of a large swell than expected from wind driven waves, especially in deeper offshore waters.

TABLE 1.65A–2

WAVE HEIGHTS RECORDED AT VARIOUS LOCATIONS

Station	Significant Wave Height – Frequency of Occurrence		
	<1.5 m	**1.5 – 2.5 m**	**>2.5 m**
Halibut Bank	99.5%	0.5%	0.03%
New Dungeness	98.1%	1.8%	0.08%
Neah Bay	40.1%	37.9%	22.0%
	Primarily Swell with Influence by Prevailing Local Winds		

Reference:

TR 8C-10 S2 Meteorological And Oceanographic Data Relevant To The Proposed Westridge Terminal Shipping Expansion

b) Please see response to NEB IR No.1.65c.

c) **Response Gap Analysis of Oil Spill Response within the TMEP Marine Study Area**

Discussion and Background

To be effective, on-water oil spill response must take a systems approach. Selected countermeasures must be appropriate for the physical properties of the oil, its fate and behaviour, and the environmental conditions where the release occurred. This requires the deployment of adequate and well-maintained equipment by a knowledgeable crew managed under a formal incident management system comprised of key stakeholders from industry, government and communities. The safety of first responders and other response personnel is a key concern and every effort is made to ensure that these persons are not put at risk. The spill location and the environmental conditions during the response influence operational effectiveness. Winds, waves and currents (tidal or wind-driven) will affect the following mitigation efforts:

1) Ability to quickly reach the spill site;
2) Deployment of booms to contain, concentrate and reduce the spreading of spilled oil;
3) Mechanical skimming to recover oil from the surface of the water; and
4) Transfer recovered oil from smaller skimming vessels into sufficient larger units for temporary storage.

Operational safety depends on the human element to exercise prudent seamanship and safe management of personnel and equipment. Under the circumstances, field supervisory personnel and vessel captains are given wide discretion in determining safe working conditions for deploying equipment and conducting operations. Vessel Masters are ultimately responsible for the safety of the craft, the crew, and to prevent further harm to the environment.

When environmental conditions temporarily limit on-water response operations, the incident command will engage resources from other key areas to maintain positive momentum on the spill cleanup, for example:

- Trajectory analysis and spill modeling can be used to anticipate the spreading of the oil;
- Overflight information, generated by oil slick sensors aboard the regionally dedicated aircraft operated by Transport Canada's National Aerial Surveillance Program (NASP), can be used to identify the locations of significant oiling and to aid in the selection of appropriate response strategies;
- Protective booms can be deployed at other accessible locations to reduce or mitigate the impact of oil forecast to reach those locations;
- Shoreline response personnel can be dispatched along with supplies and resources from other locations; and
- Optional response tactics such as the use of dispersants and in-situ burning opportunities can be explored with regulators.

The key criteria to meeting realistic maximum operating limits for on-water recovery is to pre-assign appropriately sized resources at selected locations along the entire tanker shipping route from Westridge Marine Terminal to Buoy J. Such resources must take into account the differing water and weather conditions under which they may be deployed. Transport Canada (TC) in consultation with the Canadian Coast Guard (CCG), Environment Canada and other stakeholders codified response equipment capability according to the environment in which it will operate[1]. These Transport Canada equipment designations of shoreline, sheltered and unsheltered water capability will drive resource selection and its appropriate placement at the various bases to be sited along the route.

Equipment Criteria

There have been continual improvements in the design of spill response equipment that have made them, as well as the entire response system, more effective in different weather conditions, as noted in the Application, Volume 8C, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendation on Bases and Equipment (PDF page 34 of 81). Nevertheless, the effectiveness of booming and skimming operations will be reduced under the influence of increasing winds, waves and currents. Winds up to 16 knots (Beaufort Scale 4[2]) and wave heights up to 1-meter are accepted by Transport Canada and others as the limits to which response is fully effective and it becomes less so as those parameters are exceeded and subsequently ceases to be effective. Table 1.65C–1 below shows the optimal working range of different mechanical on-water response equipment used as part of response planning guidelines; actual conditions may allow equipment – particularly larger equipment – to operate beyond these guidelines.

[1] Transport Canada. (1995). Response Organizations Standards (1995) – TP 12401E. Retrieved from: http://www.tc.gc.ca/publications/en/tp12401/pdf/hr/tp12401e.pdf

[2] The **Beaufort scale** https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=80C039A3-1 provides a means to relate wind speed to observed conditions at sea or on land.

TABLE 1.65C-1

PLANNING GUIDELINES – OPTIMAL WORKING PARAMETERS

	Wind Speed (Knots)	Wave[3] Height (Meters)	Current Velocity (Knots)
Personnel Safety	**Field Discretion**		
Boom	16	1	0.75[4]
Small Skimmers & Vessels (Up to 12m)	16	1 ≤ 1.5	N/A
Large Skimmers & Vessels (Up to 27m)	16	1.5	N/A
Transfer to Storage	27	2.5	N/A

Operational thresholds may be increased through the deployment of more recently developed dual purpose containment and recovery devices such as Current Busters™ that offer more effective countermeasures under stronger wind, wave and current conditions. Additionally, experiences in other locations have shown that during deteriorating weather conditions, large storage vessels can be used as extended deployment platforms to shelter smaller on-water assets so that those units may continue to remain close to the response site awaiting improved conditions to resume operations.

Conventional general purpose booms – the most commonly used floating barriers designed to contain, concentrate and reduce the spreading of spilled oil – become less effective when moored in areas with higher tidal currents. To restore some of the performance lost to fast moving water, tactics can be adjusted from containment to the angled diversion of oil to a collection point. Likewise, additional deployments of boom (for example, double booming techniques) and use of purpose-designed booms have been shown to increase effectiveness. Evidence from other responses have indicated that Current Busters™[5], with their high rates of encounter, have demonstrated enhanced performance over conventional booms in containing and recovering oil in higher current speeds. Such techniques have been used as part of a systems based spill response outlined in Volume 8C, TR8C- 12 S13 Transmountain Expansion Project Oil Spill Response Simulation Study, Arachne Reef and Westridge Marine Terminal.

[3] See response to NEB IR No. 1.65a. It is rather the actual state of disturbance to the surface of the water than the measured wave height that would most influence the deploying of equipment. There is a greater probability of deploying equipment offshore, especially from larger platforms, during relatively higher swell conditions than during elevated sea conditions.

[4] Conventional general purpose floating boom works best when deployed in areas with currents up to 0.75-knots. Performance may be improved with alternate deployment tactics.

[5] Tests of the NOFI Current Buster® 4 (carried out by the US Coast Guard) indicate that the system collects and retains oil at towing speeds of up to 4 knots, with an acceptable loss of oil, also in short period waves. http://www.nofi.no/nofi-current-busterareg-4.4663348-139608.html

Westridge Terminal

Westridge Terminal facility already incorporates many features that allow rapid oil spill response under an existing emergency response plan. This includes the pre-deployment of a dedicated boom around all tankers while these are being loaded. Additional booms are stored at Westridge and can be deployed quickly. A Western Canada Marine Response Corporation (WCMRC) skimmer is also moored at Westridge for rapid response. The Westridge facility response plan, including spill response capacity, will be enhanced as part of the Project.

Response Limitations – Reduced Visibility

Response operations during darkness and periods of reduced visibility can continue using enhanced illumination and special tools such as forward-looking infrared cameras (FLIR), s-band radar, x-band radar, etc. However, the overall effectiveness of response during such periods will be less than response during the daytime without impaired visibility.

Response Limitations – Wind and Wave

As a conservative approach, parameters detailed in Table 1.65C–1 was compared with sea and swell wave data in the response to NEB IR 1.65a to assess the annual percentage of time that effective oil spill response may be possible in the marine study area. This assessment appears below in Table 1.65c-2.

TABLE 1.65C–2

WIND LIMITATIONS ON TYPES OF RESPONSE

Station	Booming / Recovery Operations*			
	Effective	Less Effective		Not Effective
	Wind Speed - Frequency of Occurrence			
	<16 knots (B0-B4)	17 – 21 knots (B5)	> 21 knots (B6+)	>27 knots (B7+)
Sea Appearance	Smooth – Small Waves	Moderate Waves with Whitecaps	Large Waves with White Foam Crests	Breaking Waves
Point Atkinson	89.6%	6.6%	3.8%	1.0%
Halibut Bank Buoy	85.2%	11.6%	3.2%	0.4%
Sand Heads	81.2%	12.2%	6.6%	1.2%
Saturna Is. – East Pt.	87.3%	6.8%	5.9%	2.5%
Kelp Reefs	87.0%	7.9%	5.1%	1.9%
Smith Island (WA)	77.2%	10.9%	11.9%	4.6%
Discovery Island	90.9%	4.8%	4.4%	2.1%
New Dungeness Buoy (WA)	82.3%	11.8%	5.9%	1.5%
Race Rocks	62.9%	16.1%	21.0%	6.4%
Sheringham Point	82.1%	11.0%	6.9%	1.4%
Neah Bay Buoy	83.2%	11.7%	5.1%	1.0%

* Note: Transfer and storage may continue unhindered at less than 27-knot winds

Summary and Conclusion

In Table 1.65C-2, data was analyzed for 11 wind stations and 3 wave stations (Refer to response to NEB IR 1.65a) along the shipping route and used to compute the percentage of time that response effectiveness might be impaired by environmental conditions. The analysis found that the annual percentage of time that oil spill response in the marine environment may be halted, or limited in effectiveness due to environmental conditions such as wind, waves and tides/currents varies based upon the location along the shipping route. This information is further summarized by consolidating multiple sample stations into shipping route segments with simple averages displayed at-a-glance in Table 1.65C–3.

TABLE 1.65C–3

AVERAGE EFFECT OF WEATHER ON OIL SPILL RESPONSE (ANNUAL PERCENTAGE OF TIME)

SHIPPING ROUTE SECTION	Effect of Wind		
	Response Is Effective	**Response Is Less Effective**	**Response Is Not Effective**
Westridge thru Strait of Georgia (Data from Point Atkinson, Halibut Bank, and Sand Heads)	85.3%	14.6%	0.9%
Boundary Pass thru Haro Straits (Data from Saturna Island and Kelp Reefs)	87.2%	12.9%	2.2%
Juan de Fuca Strait – East (Data from Smith Island, Discovery Island, New Dungeness, and Race Rocks)	78.3%	21.7%	3.7%
Juan de Fuca Strait – West (Data from Sheringham Point and Neah Bay)	82.7%	17.4%	1.2%
SHIPPING ROUTE SECTION	**Effect of Waves**		
	Response is Effective	**Response is Less Effective**	**Response is Not Effective**
Westridge thru Haro Strait (Based on Halibut Bank buoy)	99.5%	0.5%	0.03%
Juan de Fuca Strait – East (Based on New Dungeness buoy)	98.1%	1.8%	0.08%
Juan de Fuca Strait – West (Based on Neah Bay buoy)	40.1 %	≤ 37.9 %	≤22.0 %
		Subject to combined Sea and Swell Conditions and Distance Offshore	

Annually there are generally a higher percentage of not effective response periods in the western portion of the shipping route. The location near Race Rocks is identified as an area of higher periods of stronger winds and the western entrance to the Juan de Fuca Strait is more prone to wave action, which could potentially hinder effective response. Based upon the low annual percentage incidence of strong winds compared with the high annual

percentage incidence of high waves at Neah Bay (see response to NEB 1.65 a) it can be assumed that the majority of waves found offshore at the western entrance to the Juan de Fuca Strait are caused by swell and, unless there is accompanying strong winds, effective response may be possible, especially by deploying equipment from larger platforms, as proposed in Reference (i), which forms part of the Application.

References:

ASTM Standard F625/F625M-94 (Reapproved 2011), "Standard Practice for Classifying Water Bodies for Spill Control Systems." ASTM International, West Conshohocken, PA 19428-2959.

International Tanker Owners Pollution Federation (ITOPF). "Use of Booms in Oil Pollution Response." London, UK. www.itopf.com. Acquired: 19-September 2013.

Transport Canada. (1995). "Response Organizations Standards." TP 12401E.

1.66 Marine oil spill modelling

Reference:

i) A3S4Z0, Application Volume 8A, Marine Transportation, PDF page 11 of 60
ii) A3S5J0, Application Volume 8C, TERMPOL Reports, TR 8C-12 S9 – Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Project, PDF page 25 of 42

Preamble:

References i) and ii) outline the development and use of an oil spill model by EBA Consulting and Western Canada Marine Response Corporation. The Board notes that this model appears to have been developed in support of Trans Mountain's Project application.

The Board also notes that the references indicate the importance of good oil spill modelling for forecasting, planning, and resource deployment. Reference ii) discusses the use of the model in an "operational" mode.

Request:

a) Please confirm whether or not the oil spill model developed in support of Trans Mountain's Project application will be made available to Western Canada Marine Response Corporation for oil spill response planning and actual use in the event of a spill.

b) If a) is confirmed, please describe who would be responsible for ongoing maintenance and updating of the model, as required, and the associated funding for such tasks.

c) If a) is not confirmed, please discuss why the model would not be made available to Western Canada Marine Response Corporation.

Response:

a) Confirmed.

Trans Mountain has already made available to Western Canada Marine Response Corporation (WCMRC) the modelling inputs and results developed in support of the Project. The model itself was not developed specifically for Trans Mountain's Project Application but is the result of many years of development and refinement prior to the Application and remains the property of Tetra Tech EBA.

In its current form the model consists of three separate components and although the scientific and mathematical aspects are well-developed, they require expert review to implement and operate. Tetra Tech EBA has indicated that they are willing to work collaboratively with WCMRC to make the model available under license, to provide consultancy services related to the model, and if desired to improve the model's ease of use for active spill response.

b) As the certified Response Organization for vessels and oil handling facility spills on the west coast of Canada, Western Canada Marine Response Corporation (WCMRC) maintains resources for spill response including models for planning and response. WCMRC would be responsible for ongoing maintenance and updating of the model and the associated funding should they deem it to be a useful addition to their response resources. Trans Mountain understands that WCMRC is currently in discussion with Tetra Tech EBA in this regard.

c) Please see the response to NEB IR 1.66a.

1.67 Spatial boundaries of the marine ecological risk assessment

Reference:

A3S4K7, Application Volume 8B, Marine Environmental and Socio-Economic Technical Reports, TR 8B-7 – Ecological Risk Assessment of Marine Transportation Spills:

i) PDF pages 26 and 27 of 116
ii) PDF page 30 of 116
iii) PDF page 62 of 116

Preamble:

Reference i) states that the "spatial boundaries for evaluating the environmental effects of spills originating from marine transportation accidents include the geographic domain where potential environmental effects of spilled crude oil are expected to be measurable i.e., the modelling domain for the stochastic oil spill model."

Reference ii) states that stochastic modelling completed at Buoy J predicted surface oiling beyond the boundary of the Regional Study Area, but the results were not considered in the ecological risk assessment.

Reference iii) states that stochastic modelling indicates that the probability of surface oiling extends beyond the northern boundary of the Regional Study Area for the ecological risk assessment described in Reference i).

Request:

Please provide additional rationale for establishing the spatial extent of the Regional Study Area, including clear justification for not matching the boundaries of the Regional Study Area with results of the stochastic modelling as implied by Reference i).

Response:

Section 4.2.1 of the Ecological Risk Assessment (ERA) of Marine Transportation Spills (Technical Report 8B-7 of Volume 8B) utilized the Regional Study Area (RSA) as defined for the effects assessment for marine resources and marine birds.

The Marine RSA was established by the Environmental and Socio-economic Assessment (ESA) team to be the area of ecological relevance where environmental effects could result from the Project, and extends from the Westridge Marine Terminal through Burrard Inlet, out to the 12 nautical mile limit of Canada's territorial sea in accordance with direction from the NEB.

Based on the established RSA limits, information related to biological resources was collected and used for the assessment of effects to marine resources and marine birds, as well as for the evaluation of effects from spills in the ERA.

Seasonal stochastic oil spill modelling (Technical Report 8C-12 of Volume 8C, General Risk Analysis and Intended Methods of Reducing Risk [EBA December 2013]) was subsequently

completed at a number of release locations (including Buoy J) with the results summarized in the Application (see Sections and 5.4.4.8 of Volume 8A).

The ERA (Technical Report 8B-7) subsequently focused on potential environmental effects arising from hypothetical oil spills at several locations moving outward along the shipping route towards international waters. The ERA carried out assessments at most of the locations where oil spill fate and transport modeling had been completed by EBA (Technical Report 8C-12). At most locations, little of the spilled oil considered in the modelling was expected to be transported beyond the boundaries of the RSA. If an incident were to occur close to the boundary of the RSA (*e.g.*, Buoy J), a substantial fraction of the spilled oil could extend beyond that boundary. However, because the probability of an oil spill occurring due to a vessel collision is extremely low at Buoy J (Volume 8C, TERMOL Risk Analysis), the ERA studies appropriately focus on hypothetical credible worst case spill locations where the probability of an incident is somewhat greater (although still low).

1.68 Locations for marine oil spill fate and behaviour modelling

Reference:

A3S5G9, Application Volume 8C, TERMPOL Reports, S9 – TR 8C-12 – Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Project, PDF page 16 of 72

Preamble:

The reference states that four locations were chosen for fate and behavior modelling from the eight locations identified in the marine shipping quantitative risk assessment.

Request:

Please explain how the four locations were chosen for fate and behavior modelling, and include criteria and justification for selecting these locations and for not including other locations.

Response:

Locations were identified by the navigational risk assessment team as possible accident locations, of which representative oil spill accident locations were selected for subsequently modeling. The selection process is explained in Volume 8C, Section 10.1 of TR8C-12 TERMPOL 3.15 General Risk Analysis and Intended Methods for Reducing Risks, prepared by Det Norske Veritas.

Emergency management (pipeline and marine terminal)

1.69 Trans Mountain emergency management exercises

Reference:

i) A3S4V5, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF pages 62 and 63 of 84
ii) National Energy Board Letter - Pipeline Performance Measures Reporting, Section III - Emergency Management Performance Measures, PDF page 16 of 44

Preamble:

Reference i) states that Kinder Morgan Canada has a rigorous training and response exercise program that ranges from detailed equipment deployment drills to full Incident Command System management and organization training and deployment. Training is provided to operations and head office staff, and at locations along the pipeline.

Reference ii) states that companies may report a real incident as an exercise if it meets the same objectives as the planned exercise, if the incident occurs in the region that a planned exercise was to occur, and if appropriate methodology is used.

Request:

a) Please provide a list of all emergency management tabletop and full-scale exercises that Trans Mountain has completed, in Canada, on land and on water, in the past 5 years. The list content must include, but not be limited to, the following information:
   a.1) the scope and objectives of each exercise;
   a.2) the scenario for each exercise; and
   a.3) the internal company departments such as executive, engineering, environment, Trans Mountain facilities and pipeline operations personnel, and external participants (e.g., mutual aid partners, Western Canada Marine Response Corporation, Environment Canada) that attended each exercise.

b) Please discuss the learnings from the exercises and provide evidence of how these learnings were incorporated into Trans Mountain's emergency management program, and communicated to Trans Mountain office and field personnel.

c) Please discuss any exercises that were cancelled as a result of Trans Mountain's emergency response plan being activated for a real incident, as noted in Reference ii).

Response:

a) The following is a list of all exercises that Kinder Morgan Canada Inc. (KMC) completed from 2009 to March of 2014 related to the Trans Mountain Pipeline ULC System. The list encompasses only those exercises that are organized and executed by KMC.

Definitions:

TT – Table Top Exercise which involves a scenario and varying levels of Incident Command System forms and staffing depending on the objectives of the exercise. The exercise can range from a roundtable discussion with a few individuals to work out early actions, to assigned roles and responsibilities with the expectation of completing the Incident Command System forms.

WC – Worst Case/Level 3 Exercise which involves all incident management team members, contractors, and responding agencies.

WC* - Worst Case/Level 3 Exercise with a full deployment of field response equipment the same day and time, responding with real environmental factors.

D – Deployment Exercise which involves the deployment of equipment to an actual response location, but does not involve the use of an off Site Command Post.

BC – British Columbia

AB - Alberta

Trans Mountain Departments:

- Environmental Health and Safety – includes personnel from Environment, Health and Safety, Security, Emergency Response and Fire Protection.
- Operations – includes personnel from terminals, tank farms, districts, pipeline protection, technical services, stores, and control centre.
- Executive - includes personnel whose job title is one of the following; Director, Senior. Director, VP and/or President.
- External Relations – includes personnel from Lands and Right of Way, External Relations, and Media Relations.
- Engineering – includes any Professional Engineers, or Engineers in Training who also work in the Engineering, and Integrity Programs/Risk Assessment. Also includes Drafting/GIS services.
- Procurement – includes personnel from accounting, procurement, human resources, budge analysts and administrative assistance.

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
March 5, 2009	Kamloops	WC	• Conduct Internal notifications using KMC Emergency Reponse Line (ERL)- Complete 1st conf. call with all participants • Unified Command with appropriate agencies • Communications plan developed • Completion of Tactics Meeting • Planning meeting schedule approved by Unified Command (UC) • Updates to internal contacts in the Emergency Response Plan (ERP) to identify appropriate personnel for the Incident Command System (ICS) role	At 09:30 a contractor for the elementary school started work installing lamp standards as part of a parking lot expansion. They didn't wait for a pipeline inspector and hit the line causing a spill of approx. 400 m^3 of gasoline. The school and immediate area needed to be evacuated. A fire started due to unknown ignition source.	KMC – Environmental Health and Safety, Engineering, Operations, External Relations, Procurement Others – Pembina Pipelines, Ministry of Environment (BC), Upper Nicola Band, First Nation Emergency Services Society, City of Kamloops Fire and Rescue, Provincial Emergency Program (BC)
March 25, 2009	Edmonton	D	• Simulate oil under ice recovery.	Spill to water with ice coverage.	KMC – Environmental Health and Safety, Operations, Engineering. Others – Onsite Contractors, Response contractors.
April 16, 2009	Jasper	WC	• Educate participants on how to function within the ICS • Establish a UC which includes company, federal, provincial & local representation • Identify external resources • Identify jurisdictional issues in response to an incident • Conduct an initial briefing and transfer of command • Develop a communication plan • Develop a wildlife plan • Update the ICS 201.	Vandalized Mainline Block Valve causing a 150 m^3 spill and highway shut down.	KMC – Environmental Health and Safety, Operations, Engineering, External Relations, Procurement. Others – Municipality of Jasper, Jasper Fire Dept., Parks Canada, Mt. Robson Area Supervisor – BC Parks, Jacques Whitford Environment Ltd., National Energy Board
September 10, 2009	Fraser River	D	• To simulate oil recovery in a river environment and deploy boom vane in Fraser River.	Spill to large river, recovery options.	KMC – Environmental Health and Safety, Operations Others – Response Ready, Surrey Fire Services, Sunrise Flagging, Quantum Murray, First Nations' Emergency Services Society, Tsleil Waututh First Nation, City of New Westminster

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
October 14, 2009	Edmonton	TT	• Establish Unified Command with appropriate agencies • Utilise ICS to manage a security incident • Internal notification conducted - ERL+ issued • Completion of a tactics meeting • Initiate Red threat level security measures for the Edmonton Terminal	At 06:00 on Oct 16, the control center received a call from an unidentified individual who reported a bomb is going to explode on the pipe rack over the creek and that another one is attached to a tank. An explosion took place at 06:02 hrs and a fire ball was observed. The pipe rack has many pipelines that ship multiple products including crude oil, butane and gasoline (simulated). Keyera, Alberta Enviro Fuels, Petro Can Refinery, Enbridge all affected. Using real weather. Spill of up to 1000 m^3 oil into creek and pond, all of which may be on fire. An unidentified object was observed attached to the inlet valve of tank 250-8 in the N40 Terminal.	KMC – Environmental Health and Safety, Engineering, Executive, Operations Others – National Energy Board, Alberta Justice, Royal Canadian Mounted Police, Quantum Murray
November 17, 2009	Westridge	D	• Spill and Security Notifications (internal and external - simulated) • Deploy KMC secondary boom around primary Bennett boom • Assess shoreside boom anchors and requirements for water anchors • Transfer of command from initial incident commander to incoming incident commander Deploy deflection boom and shore seal boom • Conduct Tailgate Hazard Assessment including air monitoring • Deploy skimmer from Westridge Trailer	At 09:15 on Nov. 17th, Westridge Terminal was loading a vessel with AHS. A leak was observed at the loading arm by terminal personnel and shut down procedures were initiated. Approximately 300m^3 of oil leaked directly into the Burrard Inlet within the primary boomed area – the vessel was ponded during loading. Additionally, a fitting on the propane line to the thermal oxidizer released propane. A plume was observed and the emergency shut off valve was activated. The plume was allowed to dissipate with no ignition.	KMC – Environmental Health and Safety, Operations. Other - Western Canadian Marine Spill Response Corporation, Transport Canada, City of Burnaby Fire Department.

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
January 27, 2010	Richmond	WC	• Establish Unified Command with appropriate agencies • Utilise ICS to manage a security and spill incident • Internal notification conducted - ERL+ issued • Safe approach • Initiate Red threat level security measures for the Airport and Westridge Terminals	A neighboring resident to the Jet Fuel pipeline (40 m away) called in an odour complaint at 7am to our CCO. CCO shut down line with the exception of Gilley Valve at KP19.7 which could not be closed and sent out KMC personnel to investigate. Leak was too small to be detected by leak detection system. KMC personnel observed an unknown object sitting on top of the vault and fuel spilling out of the vault. Fuel is flowing down hill and through the back alley. Spill is approximately 1500m from the Fraser River but a ravine is in close proximity to the spill source and may transport fuel to other areas. It is also unknown if there are sanitary sewers/storm drains that are in the area that would drain fuel into the Fraser. Multiple residents in the immediate area will need to be evacuated. The spark plug caused a pressure transmitter fitting to fail thus causing a leak. Personnel reporting to both Westridge and the Airport Terminals for their day shift found a fence line cut and obvious signs of illegal entry	KMC – Environmental Health and Safety, Operations, Engineering, Executive, Procurement. Other – City of Richmond, Richmond Fire Department, Vancouver International Airport, BC Oil and Gas Commission, Transport Canada, Quantum Murray, Provincial Emergency Program, Richmond RCMP.
September 21, 2010	Westridge	D	• Initiate Emergency Response Line Notification. Deploy containment equipment within one hour • Complete ICS 201 Form	Leaking flange on the transfer line, while loading a ship. Oil is escaping the west side of the boom. The tide is running west.	KMC – Environmental Health and Safety, Operations, Executive, Engineering Others – Transport Canada

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
June 23, 2010	Edmonton	TT	• Continue with scenario from October 2009 and work through to Planning meeting and Incident Action Plan.	At 06:00 on Oct 16, the control center received a call from an unidentified individual who reported a bomb is going to explode on the pipe rack over the creek and that another one is attached to a tank. An explosion took place at 06:02 hrs and a fire ball was observed. The pipe rack has many pipelines that ship multiple products including crude oil, butane and gasoline (simulated). Keyera, Alberta Enviro Fuels, Petro Can Refinery, Enbridge all affected. Using real weather. Spill of up to 1000 cubic meters oil into creek and pond, all of which may be on fire. An unidentified object was observed attached to the inlet valve of tank 250-8 in the N40Terminal	KMC – Environmental Health and Safety, Operations, Engineering, External Relations, Executive, Procurement Others – Alberta Justice
September 15, 2010	Valemount	TT	• Establish Unified Command with appropriate agencies • Utilise ICS to manage a spill incident • Fill in appropriate ICS forms related to Unified Command Objectives.	At 18:00, local landowner reported heavy petroleum odor to Control Centre Operator (CCO). At 18:05 two local KMC employees deployed to investigate report. Eleven minutes later oil was confirmed on the ground around Canoe River valve. On discovery, the line was quickly shut down and the valve closed. The access road immediately closed and site was secured. The homeowner is not affected. Initial estimates of the release are unknown at this time. There are no known injuries.	KMC – Environmental Health and Safety, Operations, Engineering, External Relations. Others – Environment Canada, Simpcw First Nation, McBride Volunteer Fire Department, BC Ministry of Environment.

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
February 23, 2011	Edmonton	TT	• Work with first responders to better understand roles in the first hour of an incident.	Time of report: 04:30 There has been a spill reported at km 0 of the Trans Mountain pipeline, at the Edmonton Terminal. The spill was reported to the Control Center at 04:05 on February 23. The pipeline was carrying Gasoline at the time of the spill. The pipeline was shut down at 04:05 resulting in an estimated spill size of 50 cubic metres.	KMC – Environmental Health and Safety, Operations, Engineering, Executive. Other – Strathcona Fire Department, Alberta Justice
February 10, 2011	Westridge	D	• Deploy back-up boom within 1 hour of spill discovery.	Kinder Morgan is loading a ship at the Westridge Marine Terminal dock 61 on February 10, 2011 when a Kinder Morgan operator discovers a leaking flange on the transfer line. The operator quickly shuts down the delivery and assesses the spilled Albian Heavy Synthetic crude oil. The gas detector indicates a hydrogen sulfide (H2S) level of 2 ppm and Lower Explosive Limit (LEL) of 1%. The spilled product is in a contained area with the tide running towards the West. The Chief Officer radios to shore and indicates some oil appears to escaping on the West side. The Kinder Morgan operator calls for help from the surrounding group to assist with deploying the back up boom.	KMC – Environmental Health and Safety, Operations Others – Transport Canada
April 21, 2011	Jasper	TT	• Identify roles and responsibilities with responding agencies. • Develop appropriate ICS plans and forms as needed to fulfill ICS Objectives.	There was a small Earth Quake over night that dislodged a large section of rock face from above KP 362. This rock has crushed the line causing oil to be released from the pipeline, and into 6 mile Lake.	KMC – Environmental Health and Safety, Operations, Engineering, External Relations. Other – National Energy Board, Golder & Associates, Jasper Fire Dept., Municipality of Jasper, Parks Canada

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
November 23, 2011	Abbotsford	WC	• Work with government agencies and stakeholders to ensure a coordinated response. • Work through the activities of the ICS Planning Cycle up to the completion of a Tactics meeting • Practice timely and effective communications. • Test the applicable duties against KMC's ICS Manual. • Record for review all recommendations, and implement any that improve or enhance KMC's ability to respond to an incident.	While re-painting tank 122, a contractor in a manlift falls over resulting in a fitting on the side of the tank breaking. Product is spraying from the tank into the tank bay. At 12:50 the spill ignites	KMC – Environmental Health and Safety, Engineering, Operations, Executive, External Relations, Procurement Others – National Energy Board, BC Wildlife Management, Fraser Valley Regional District, Abbotsford Fire Department, Golder and Associates, Quantum Murray, Abbotsford Police Department, Sumas First Nation
April 10, 2012	Hope	D	• Determine response strategies for the confluence of the Coquihalla River and the Fraser River Control Point 59-04.	Spill into the Coquihalla River upstream of the confluence to the Fraser River.	KMC– Environmental Health and Safety, Operations Others – Hope Fire Department
June 27, 2012	Clearwater	D	• Dry land deployment of equipment for scenario of land spill threatening water.	Blackpool Mainline 24" Valve (KM710) bonnett gasket has failed. Valve containment vault has filled with crude oil and escaped containment. Oil has enetered the standing water immediately upstream of the valve, is threatening to leave site via overland water flow due to site flooding and enter the North Thompson River	KMC – Environmental Health and Safety, Operations Others – Cobra Contracting, First Response.
September 6, 2012	Jasper	D	• To have techs trained in the pulling of boom using two boats. • Set up and test oil recovery equipment • Review our safety protocol for being in a work boat • Deploy and set deflection boom	To capture free oil on a lake using two boats to pull boom, and capture recovered oil next to shore using recovery equipment.	KMC – Environmental Health and Safety, Operations Others – Parks Canada

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
October 26, 2012	Edmonton	TT	• Understand response actions within the first 6 hours of an emergency prior to a full IMT response. • Work with local agencies during the first response procedures and understand the interaction of the KMC emergency procedures with those of law enforcement and fire suppression. • Implementation of IMT for cleanup and remediation activities.	The control centre receives an unspecified bomb threat at 0610. The Control Centre calls field technician and notifies of the situation and starts and evacuation of the facility (sounds the alarm). At 0800 an explosion is reported near Tank 9 resulting in a fire.	KMC – Environmental Health and Safety, Operations, Engineering Other – National Energy Board, First Response, Royal Canadian Mounted Police
November 28, 2012	Richmond	WC*	• Equipment Deployment at Westridge Dock within 1 hour of a release. • Containment and recovery methods of on-water simulated spilled product. • Interact with Western Canada Marine Response Corp (WCMRC) to back up Kinder Morgan on water response efforts. • Demonstrate Kinder Morgan's response capabilities, and interact with the National Energy Board, BC Oil and Gas Commission, Canadian Coast Guard, Environment Canada, Transport Canada, BC Ministry of Environment, BC Provincial Emergency Program, First Nation Groups, City of Burnaby, Fire Department, and Royal Canadian Mounted Police, and other interested government agencies. • Command System: o Establish a functioning Incident Command Post with full Command Staffing (ICS Structure) o Establish Unified Command o Implement ICS Planning Cycle through the successful completion of a Tactics Meeting and work towards a planning Meeting. o Safety - ongoing field and facility safety assessments	At 07:30 on the morning of November 29, 2012 an operator was checking the area around a loading ship at the dock. The operator immediately notices a spray of oil hitting the shoreline area and running off into Burrard Inlet. The Spray is coming from a flange on the delivery line. The operator immediately requested shut down and isolation of the loading line. An ERL+ is issued at 07:31. On-Site KMC personnel begin deployment of secondary containment around the ship at 0740. KMC personnel are dispatched to Westin Wall Centre to set up Incident Command Post at 07:45. Estimated volume released is 100 bbl of Alberta Heavy Synthetic crude oil.	KMC – Environmental Health and Safety, Operations, Engineering, Procurement, External Relations, Executive Others – First Response, National Energy Board, Transport Canada, City of Burnaby Fire Department, 3SI Security, Crockett Contracting, Western Canada Marine Response Corporation, BC Chamber of Shipping, BC Ministry of Environment, BC Emergency Management, Canadian Coast Guard, Environment Canada, Port Metro Vancouver, Valley Helicopters, Polaris Applied Sciences, Golder and Associates, Focus Wildlife, AMEC Environmental, Center for Toxicology and Environmental Health

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
See above	See above	See above	o Protection – develop a plan for protection of sensitive areas o Resource Tracking - monitoring the check-in, status and location of personnel and tactical resources (real and simulated) throughout the exercise o Disposal - develop a waste disposal plan o Air Transportation - develop an air transportation plan o Personnel Support - develop a plan to support food, housing, transportation and other needs of response personnel o Documentation -complete a file of all relevant exercise documentation o Wildlife – prepare a response to impacts to wildlife • Information Centre – conduct a press briefing, establish an emergency information website and other public information tools, prepare for a local officials briefing.	See above	See above
February 13, 2013	Blue River	D	• To demonstrate the capture and recovery methods of oil under ice. • To review recovery and containment options for an oil spill on land covered in ice and snow.	Simulated oil spill on a lake surface under ice, and on land.	KMC – Environmental Health and Safety, Operations
June 25, 2013	Kamloops	D	• To deploy a shore boom to protect the shoreline from spilled hydrocarbon. • To deploy a sweep boom to catch and trap hydrocarbons in a “V” for a skimmer to remove. • To deploy a skimmer into the boom for caught hydrocarbons. • To give boat operators more experience with their boats. • To deploy a “U” shaped boom to be towed up lake to catch any hydrocarbons on the lake surface and move them into the reach of the “V” boom for recovery.	A spill of unknown quantity into an unnamed creek which migrates to Nicola Lake.	KMC – Environmental Health and Safety, Operations, External Relations, Executive Other – AWS Ventures, Merritt Fire Department, BC Ministry of Environment, BC Emergency Program, Lower Nicola Indian Band, Upper Nicola Band, Kamloops Daily News, CFJC Kamloops, Nicola Valley Search and Rescue, STUWIX Contracting

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
May 23, 2013	Westridge	D	• To ensure a secondary boom can be deployed within 1 hour using KMC owned equipment as a back-up to the primary boom.	Leaking flange on the loading arm while loading a tanker at the dock. Crew member on the boat notices sheen in the water, and calls for shut down of loading.	KMC – Environmental Health and Safety, Operations
May 30, 2013	Edmonton	TT	• Determine level of ICS required to be filled. • Participate in live ERL call about the event. • Prepare a media statement about the event. • Discuss with local authorities, what information would be required from KMC. • Use an ICS 201 as an incident action plan for the event.	At about 09:30 an operator notices two people on the wind girder of Tank 15, they have barricaded the ladder and will not respond to requests to descend from the tank. At about 10am a contractor notices two additional people on Tank 16, who also will not respond to requests to descend. There is a scheduled protest at the main gate at 11 am. The decision was made to evacuate the south half of the east tank farm, for safety reasons. It is currently believed the people are on the tank related to the protest.	KMC– Environmental Health and Safety, Operations, Executive, External Relations, Engineering Other – TERA Environmental, First Response, Strathcona County Emergency Services, Royal Canadian Mounted Police.
September 12, 2013	Edmonton	D	To successfully deploy boom in a river environment in a V formation to facilitate the collection of free oil in a skimmer.	A release of oil at the Edmonton Terminal Site entering unnamed creek and the North Saskatchewan River.	KMC – Environmental Health and Safety, Operations
November 7, 2013	Westridge	TT	• Conduct ERL notification. • Identify Initial Incident Commander, Safety Officer • Identify Initial 4 Objectives • Discuss ERL Call content where additional ICS positions are filled and notifications are made. • Discuss field responses to scenario, documenting on 201. • Understand the risks associated with a propane bullet and fire/explosion. • Review response tactics and hydrant operation. • To understand the risks associated with a propane bullet and response strategies	A farmer has called CCO to identify that he thinks he has hit the pipeline with a tool used for installing drainage tile near KP 26 (Number 7, and Cambie Roads). There is no product, coming out at the surface at this time. He did not smell product or see any liquid release.	KMC – Environmental Health and Safety, Operations Others – First Response, BC Oil and Gas Commission

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
December 11, 2013	Edmonton	WC	• Demonstrate Kinder Morgan's response capabilities, and interact with the participating invited guests. • Command System: o Establish a functioning Incident Command Post with full Command Staffing (ICS Structure) o Establish Unified Command o Implement ICS Planning Cycle through the successful completion of a Tactics Meeting. o Safety – prepare a health and safety plan o Protection – develop a plan for protection of sensitive areas/the public o Resource Tracking - monitoring the check-in, status and location of personnel and tactical resources (real and simulated) throughout the exercise o Air Transportation - develop an air transportation plan o Personnel Support - develop a plan to support food, housing, transportation and other needs of response personnel o Documentation -complete a file of all relevant exercise documentation o Wildlife – prepare a response to impacts to wildlife o Information Centre – prepare an initial media statement, conduct a press briefing, prepare for a local officials briefing.	Sunken tank roof, on a full crude tank, creating high onsite petroleum vapour concentrations and measurable concentrations offsite. Simulated local conditions and scripted weather included an usual snow event followed by record high temperatures and rain, resulting in a water load to the roof of Tank 16 allowing it to sink.	KMC – Environmental Health and Safety, Operations, Executive, External Relations, Engineering, Procurement. Other – First Response, Alberta Emergency Management Agency, Royal Canadian Mounted Police, Alberta Energy Regulator, National Energy Board, Strathcona County Emergency Services, Alberta Health Services, Alberta Environment Support and Emergency Response Team, Environment Canada, Alberta Justice, City of Edmonton

Exercise Date	Location	Type	Scope/Objectives	Scenario	Attendance
April 10, 2014	Chilliwack	D	To deploy an effective booming strategy for the recovery of oil from the Fraser River.	Spill into an unnamed creek which enters the Fraser River.	KMC – Environmental Health and Safety, Operations, External Relations, Aboriginal Relations, Executive Others – Western Canadian Spill Services, Abbotsford Police Department, Royal Canadian Mounted Police, Cheam First Nation, Chawathil First Nation, Yale First Nation, Katzie First Nation, Shxwowhamel First Nation, Canadian Pacific Railway, Oiled Wildlife Society, SPCA Wildlife Rehabilitation, Wildife Rescue Association, Justice Institute of BC, Fraser Health

b) Kinder Morgan Canada Inc. (KMC) held 28 exercises between March of 2009 and March of 2014.

The following pages list the exercises from Information Request No.1.69a and include emergency management program related learnings, how they were incorporated to the emergency management program, and how they were communicated. Some of the earlier exercises have missing data and the learnings are unavailable, though information gained would have been used in continuous improvement of the program. During the Emergency Management Program Management System review in 2012 a deficiency was identified with regard to the procedure for retention of records related to emergency response exercises. KMC is committed to continual improvement, and as such has corrected the procedure for the capture of learnings within the management program. Exercises with incomplete documentation have been identified in the following list of exercises.

Exercise Date	Location	Learnings
March 5, 2009	Kamloops	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
March 25, 2009	Edmonton	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
April 16, 2009	Jasper	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
September 10, 2009	Fraser River	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
October 14, 2009	Edmonton	Incomplete documentation.
November 17, 2009	Westridge	Incomplete documentation.
January 27, 2010	Richmond	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
September 21, 2010	Westridge	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
June 23, 2010	Edmonton	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
September 15, 2010	Valemount	The radio communications were difficult due to building limitations; a radio relay was established to fix the issue of communicating with the field operations. Other learnings were related to the need to have local knowledge in the Logistics section, and more people were required for the size of the exercise and local conditions.
February 23, 2011	Edmonton	Incomplete documentation.
February 10, 2011	Westridge	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
April 21, 2011	Jasper	The emergency response plans require updates to the contact sections; this update was completed by June of 2011 and distributed to all plan holders.
November 23, 2011	Abbotsford	Incomplete documentation.
April 10, 2012	Hope	Incomplete documentation.
June 27, 2012	Clearwater	Incomplete documentation.
September 6, 2012	Jasper	It was recognized at the exercise that the response trailers may be stocked and have inconsistent set up, which may complicate response efforts if personnel were to respond from an adjacent district, therefore the outcome was to conduct a system wide readiness and feasibility study of equipment types, locations and suitability in 2014. This is on-going and involves the participation of various levels of the company.
October 26, 2012	Edmonton	To liaise with companies in pipeline alley and exercise response plans together. This is scheduled for September of 2014. To continue with efforts to exercise with Strathcona County Emergency Services, this was completed in May of 2013, and efforts are on-going to ensure Trans Mountain participates with local response agencies across the pipeline.

Exercise Date	Location	Learnings
November 28, 2012	Richmond	Ordering and resource request process needs clarification. A study was undertaken to determine what had worked in the past for the ordering process and forms that work with the Kinder Morgan Canada procurement process. A form was developed and distributed to all field offices in September of 2013. ICS Manual required updates and amalgamation into a guide that is specific to Kinder Morgan Canada operations. A project was undertaken to update the ICS guide and make it a handbook for all employees. The guide was finalized and distributed in July of 2013, after field testing and review. All members of the incident management team received a copy of the guidebook and is used as part of ICS training. The training priorities were reviewed and updated to ensure groups of responders were receiving the material that was most appropriate to them. The exercise program was revamped for 2013 and communicated to all employees.
February 13, 2013	Blue River	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
June 25, 2013	Kamloops	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
May 23, 2013	Westridge	The exercise confirmed the adequacy of existing emergency response program.
May 30, 2013	Edmonton	Response to the Edmonton Terminal site is confusing for Emergency Services due to multiple buildings and entrances with the same address. Signage was added to the main gate and procedures for calling emergency services were updated and communicated to all terminal and office employees working at Edmonton Terminal for calling 911. Changes were made to the alarm system automatic call out to reflect the new entrance labelling system. This was completed in November 2013.
September 12, 2013	Edmonton	Learnings specific to logistics and support services to improve effectiveness of exercise and not to the Emergency Management Program.
November 7, 2013	Westridge	The exercise confirmed the adequacy of existing emergency response program.
December 11, 2013	Edmonton	The exercise confirmed the adequacy of existing emergency response program. Learnings were related to the logistics of an exercise to make things more visible for observers and evaluators. Examples include ability to print larger maps, a tracking mechanism for injection of recovered oil, communication of exercise inputs and responses to observers, and ICS vests for all in the command post to easily identify operational groups.
April 10, 2014	Chilliwack	To further develop response plan information for wildlife recovery, and local knowledge of culturally and environmentally significant areas surrounding the pipeline. To further develop control point information to contain more response tactics. These learnings are being researched for ongoing operational updates to the ERP as well as planned enhancements for the proposed expansion.

c) Kinder Morgan Canada Inc. (KMC) makes every attempt to ensure that scheduled exercises take place, regardless of an incident, by first rescheduling the exercise once all equipment and crews have been returned to a state of readiness. Only under exceptional circumstances will an exercise be cancelled due to the emergency response plan being activated.

The response to information request NEB IR No. 1.70a describes two hydrocarbon releases that occurred in June of 2013 which required activation of the Emergency Response Plan (ERP). KMC cancelled a deployment exercise planned for Sumas District during this time as similar experience was gained during the response to the 2 incidents. KMC has not reported these two spills as exercises in NEB IR No. 1.69a, but does capture learnings through investigation of the incident.

1.70 Trans Mountain's response to previous incidents

Reference:

A3S4V5, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF pages 55 to 59 of 84

Preamble:

The reference discusses Kinder Morgan Canada's Emergency Management Program and response to potential incidents.

Request:

a) Please provide a list of hydrocarbon releases that Trans Mountain has experienced on its facilities, in Canada, on land and on water, in the past 10 years that required activation of the company's emergency response plan. The list content must include, but not be limited to, the following information:
   - a.1) a description of each incident (level of incident, location, description of access to site, volume of hydrocarbon release, etc.);
   - a.2) the cause of the release;
   - a.3) the time it took for Trans Mountain personnel to get to the site and complete an initial assessment;
   - a.4) the time it took Trans Mountain to notify the Transportation Safety Board of Canada and the NEB (through the one-window reporting);
   - a.5) the time it took Trans Mountain to mobilize equipment to the site, set up an incident command post, and commence emergency phase activities (i.e., set up mitigation/equipment to prevent hydrocarbon migration, and allow containment and repair); and
   - a.6) a summary of challenging environmental conditions such as heavy snowfall or snow pack, ice cover, or heavy rainfall conditions that affected access to the response sites and a discussion of how such conditions affected the mitigation and recovery strategies employed.

b) Please discuss the learnings from the incidents and provide evidence of how these learnings were and will be incorporated into future development of Trans Mountain's emergency management program, and communicated to Trans Mountain office and field personnel.

Response:

a) Kinder Morgan Canada Inc.'s (KMC) Emergency Management Program is based on a 3 tiered response structure. Incidents are identified and categorized into one of the 3 tiers, depending on the nature and severity of the incident. Each level is managed by an escalating degree of management seniority and authority, and assistance from outside the initial response organization. The Incident Command System (ICS) Structure provides the flexibility to tailor the size of the response organization to the specifics of the incident and allows for rapid adjustments as an incident evolves.

The 3 levels of emergency are defined as:

- Level 1 - An incident in which the potential public and environmental exposure is moderate and the problem can primarily be corrected with local resources and some 3rd party resources. Government involvement and media interest is low and local.
- Level 2 - An incident that is beyond the control of local management. An incident with regional implications, and potentially significant public and environmental exposure. Management of the incident is by a Regional Incident Commander with the support of local management and response organizations and with access to all Kinder Morgan corporate resources as needed.
- Level 3 - An incident in which there are national or global implications, where potential public or environmental exposure is significant, and media interest is intense. Maximum Kinder Morgan and 3rd party resources would be activated to respond to a level 3 incident.

KMC activates the Emergency Response Plan and full Incident Management team at a level 2 incident. Level 1 incidents are generally handled within one operating shift and are entirely handled by the local response team. The below list includes only those incidents experienced by Trans Mountain that are a level 2 or 3 incident.

The description of incidents is as follows:

Name of Incident

Date – the date on which the incident occurred.

Time – time of first report of an indicator of a potential incident, may include 3rd party report of odour or product, contractor or employee report and/or a report from control centre operators.

Level of Incident – as defined above.

Volume – the amount in barrels (bbl) released.

Product – where possible the specific product is identified, where the product is not identifiable as a single source it is referred to as Crude Oil.

Location – the location of the incident site.

Site Access – description of how the site was accessed.

Cause of Release – as identified.

Time of Initial Assessment – time of arrival on site by KMC personnel, also considered to be the time the incident is confirmed as part of the Trans Mountain System.

Notification to Transportation Safety Board/NEB – the time the notification was made.

Time of equipment arrival on site – time of arrival of the first piece of equipment on site, this is often the same time as the time of initial assessment. KMC employees bring basic spill response equipment with them when responding to incidents.

Time of Incident Command Post activation – the time the incident command post was identified as needed and operations began setting it up.

Summary of environmental conditions – a summary of any challenging environmental conditions that affected site access and/or mitigation and recovery strategies.

NOTE: All times have been reported in Mountain Time regardless of the location of incident or reporting body.

Ward Road Release

Date: July 15, 2005.

Time: 7:30 am – Odour Complaint.

Level of Incident: Level 3.

Volume: 1320 bbl.

Product: Crude Oil.

Location: Kilometre Post 3.1 – Sumas Transfer Line at Ward Road (Abbotsford, BC).

Site Access: Access to the spill site was Ward Road, and adjacent private property.

Cause of Release: Equipment failure.

Time of Initial Assessment: 7:30am Sumas Operations notified, discovered oil at Ward Road at 9:30am and completed assessment of area of impact at approximately 1:40pm. Response activities began at 9:30am while assessment continued to determine extent of impacts.

Notification to Transportation Safety Board/NEB: 1:00pm (3 hours, 30 minutes from confirmation of incident).

Time of equipment arrival on site: 10:40am – Vacuum Trucks Arrive.

Time of Incident Command Post activation: 11:10am (1 hour, 30 minutes from confirmation of incident).

Summary of environmental conditions: Site access off of main roads was characterized as good, but access to spill location involved a great deal of brushing and removal of vegetation including trees, shrubs and peat. Spill into wetland environment slowed the identification of the oil spill due to the absorption of released oil into the peat.

Westridge Delivery Line Release

Date: July 24, 2007.

Time: 11:31am (3rd party notification of oil on road).

Level of Incident: Level 3.

Volume: 1400 bbl.

Product: Albian Heavy Synthetic Crude Oil.

Location: Inlet Drive (Burnaby, BC) at Trans Mountain Kilometre post 3.10.

Site Access: Site was accessed via Inlet Drive.

Cause of Release: Third Party line strike.

Time of Initial Assessment: 11:49am (18 minutes from incident time).

Notification to Transportation Safety Board/NEB: 12:45pm (56 minutes from confirmation of incident).

Time of equipment arrival on site: 11:49am (18 minutes from incident time).

Time of Incident Command Post activation: 12:08pm (19 minutes from confirmation of incident.

Summary of environmental conditions: No significant environmental conditions impacting the ability to respond and recover products.

Tank 82 Release

Date: May 6, 2009.

Time: 8:30pm (KMC Contractor).

Level of Incident: Level 2.

Volume: 1918 bbl.

Product: Crude Oil.

Location: Burnaby Terminal Tank 82 Containment Bay (Burnaby, BC).

Site Access: Terminal access roads.

Cause of Release: Equipment Failure.

Time of Initial Assessment: 8:30pm (at time of incident confirmation).

Notification to Transportation Safety Board/NEB: 11:15pm (2 hours, 45 minutes from confirmation of incident).

Time of equipment arrival on site: 8:30pm (at time of incident confirmation).

Time of Incident Command Post activation: 10:30pm (2 hours from incident time).

Summary of environmental conditions: No significant environmental conditions impacting the ability to respond and recover products.

KP 150 Release

Date: April 22, 2011.

Time: 2:13 pm (3rd party notification of oil on the ground).

Level of Incident: Level 2.

Volume: 15 bbl.

Product: Crude Oil.

Location: Kilometre Post 150 at unnamed creek (Yellowhead County, AB).

Site Access: Range Road 111 and across private property.

Cause of Release: Equipment Failure (Corrosion).

Time of Initial Assessment: 3:30pm (1 hour, 12 minutes from incident time).

Notification to Transportation Safety Board/NEB: 4:00pm (30 minutes from time of incident confirmation).

Time of equipment arrival on site: 3:30pm (at time of confirmation of incident).

Time of Incident Command Post activation: 3:45pm (1 hour, 27 minutes from incident time).

Summary of environmental conditions: The event occurred during spring thaw, the Site was initially characterized as relatively dry. Within 24 hours, upstream snow melt and spring run-off cause flooding along the unnamed creek and required diversion and sandbags to control site water. The site access ground conditions softened and required the use of rig matting to allow for stable access for heavy equipment and to minimize the environmental impact of response equipment.

Tank 121 Release

Date: January 24, 2012.

Time: 6:37am.

Level of Incident: Level 2.

Volume: 566 bbl.

Product: Crude Oil.

Location: Tank 121 Sumas Tank Farm (Abbottsford, BC).

Site Access: Terminal Access Roads.

Cause of Release: Equipment Failure.

Time of Initial Assessment: 7:00am.

Notification to Transportation Safety Board/NEB: 8:10am (1 hour, 10 minutes after confirmation of incident).

Time of equipment arrival on site: 7:00am (at time of incident confirmation).

Time of Incident Command Post activation: 7:15am (15 minutes after confirmation of incident).

Summary of environmental conditions: No significant environmental conditions impacting the ability to respond and recover products.

Kingsvale North Release

Date: June 12, 2013.

Time: 11:05am.

Level of Incident: Level 3.

Volume: 5 bbl.

Product: Crude Oil.

Location: Kilometre Post 923.57 (Thompson-Nicola Regional District, BC).

Site Access: Right-of-way access roads.

Cause of Release: Equipment Failure (Crack).

Time of Initial Assessment: 11:05am (at time of incident report).

Notification to Transportation Safety Board/NEB: 11:35 am (30 minutes after confirmation of incident).

Time of equipment arrival on site: 11:35am (30 minutes after confirmation of incident).

Time of Incident Command Post activation: 11:45am (40 minutes after the confirmation of incident).

Summary of environmental conditions: Site was dry with natural surface drainage and runoff through the incident location. Diversion and containment was set up to limit the amount of surface water runoff and to prevent product migration.

KP 966 Release

Date: June 26, 2013.

Time: 12:09pm.

Level of Incident: Level 2.

Volume: 112 bbl[1].

Product: Crude Oil.

Location: Kilometre Post 966.89 (Fraser Valley Regional District, BC).

Site Access: Pipeline right-of-way road through Coquihalla Canyon.

Cause of Release: Equipment Failure (Crack).

Time of Initial Assessment: 12:09pm (at time of incident report).

Notification to Transportation Safety Board/NEB: 1:56pm (1 hour, 47 minutes from time of confirmation of incident).

Time of equipment arrival on site: 12:09pm (at time of incident report).

Time of Incident Command Post activation: 1:00pm (51 minutes from time of confirmation of incident).

Summary of environmental conditions: The Coquihalla Canyon was dry and free of snow at the time of the incident. Access roads were upgraded with gravel and grading in anticipation of the added road traffic for the response including the addition of rig mats in some washout areas. A potential slide assessment was completed for the access routes to ensure the added heavy equipment would be able to travel safely. The location of the release site is relatively flat and assessed to ensure surface water runoff would be intercepted from migrating towards the Coquihalla River.

b) Kinder Morgan Canada Inc. (KMC) investigates all petroleum release incidents on the Trans Mountain Pipeline system. The investigation reports include recommendations to prevent future incidents or improve the Company's incident response. The investigations completed for the seven incidents outlined in the response to question NEB IR No. 1.70a did not include recommendations specific to the KMC Emergency Response Program. Also, post incident emergency response evaluations completed after some of these incidents included learnings generally related to operational activities that could have prevented the release,

[1] Based on initial observations and an estimate at the time of the release, KMC initially reported 25 bbls of petroleum being released. A revised interim volume of 112 bbls has been calculated and reported based on clean up in 2013 and oil recovery to date. As clean up efforts at this location will continue in 2014, KMC will continue to do what is necessary to ensure that regulatory criteria for clean up and remediation are being met. Once clean up efforts have been completed, (late fall 2014) the release volume may be further revised, if site data warrants change.

and not the response activities that took place. After all events it was noted that KMC had an appropriate response to each event and was able to procure the staff and resources required to respond to the incident.

A learning that resulted from the Sumas Tank Farm release in 2012 was the need to develop a community air monitoring program to address public health concerns related to emissions from a petroleum release and to identify when evacuation of local residents would be necessary. The Kinder Morgan Air Monitoring Plan for Unplanned Petroleum Release Acute Public Health Risk Related to the Inhalation Pathway was completed in February 2013 and implemented in an exercise the same year. This plan is being incorporated into all emergency response plans in 2014.

The method used to communicate learnings to company or contractor personnel depend on the target audience and include modifications to the training program, safety flashes or other bulletins, or discussion at tailgate or other safety meetings. Examples of changes to company procedures as the result of learnings from the incidents mentioned in NEB IR No. 1.70a include:

- Issuing Company ID cards issued to all employees and contractors, and procedures for identifying who requires an ID card,
- Modifications to the odour complaint process for investigation and reporting of odours,
- Modification to leak detection systems,
- Enhancement of crossing permits, line marking, line locating and crossing inspection work processes and documentation,
- Enhancing the public awareness management program to cover all aspects of pipeline protection, including the periodic evaluation of the effectiveness of pipeline surveillance practices,
- Updated training for tank inspectors to include procedures for ensuring contractor preparedness for emergencies and assessing hazards on active tanks,
- Studying site drainage paths and ensuring any points of intersection with groundwater drainage systems are isolated,
- Assessing the capacity and permeability of tank bays,
- Updating the winterization procedure for external floating roof drain systems to address system freezing hazard at locations where hazard may only be present on a short term and/or infrequent basis, and
- Development and implementation of a Tank Level Deviation Alarm Standard.

1.71 Access for emergency response purposes

Reference:

A3S4W9, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF page 19 of 210

Preamble:

The reference states that the description of response and mitigation for agricultural lands would also generally be applicable to forested areas, although the terrain could be more challenging, and site access could be more difficult.

The Board requires additional information on areas along the existing and proposed pipeline rights-of-way where Trans Mountain is of the view that terrain could be more challenging, and where site access could be more difficult for emergency response purposes.

Request:

Please provide an assessment of areas along the existing and proposed pipeline rights-of-way where terrain could be more challenging and site access could be more difficult for emergency response purposes. This assessment must address how the right-of-way, control points on watercourses, as well as staging and mobilization areas, would be accessed in the identified areas under all seasons.

Response:

Kinder Morgan Canada Inc. (KMC) continually reviews and evaluates the existing Trans Mountain Pipeline system (TMPL) right-of-way access for both regular maintenance activities and emergency response purposes. This review is done during response planning activities, ongoing maintenance, and during regularly scheduled aerial patrols of the pipeline right-of-way.

Access to the TMPL and proposed Trans Mountain Expansion Project (TMEP) rights-of-way is generally enabled by proximity to the major transportation corridors, with the pipeline in close proximity to Highway 16 in Alberta, Highway 5 through the North Thompson to Coquihalla regions, and Highway 1 from Hope to Greater Vancouver. While there may be seasonal variation in site specific conditions, the major transportation corridors and established accesses to the pipeline rights-of-way enable emergency response under variable conditions.

The most difficult section of the rights-of-way to access under all seasons is the Coquihalla Canyon. The pipeline enters the Coquihalla Canyon at about kilometer 963 and exits the difficult to access areas and rejoins Highway 5 at about kilometre 984.

The Coquihalla Canyon is characterized by high mountain passes, steep cliffs, low valleys, narrow roadways, and the potential for rapidly changing meteorological conditions. During the winter months the region is characterized by heavy snowfall, and is subject to frequent avalanche activity. During the spring the area is characterized by heavy rainfall, melting snow, fast river run off and the potential for land and rock slides. At any time of the year the weather conditions may change rapidly, particularly during spring and fall. Workers may be exposed to

extreme cold, heat, rain, wind, and snow. Any point along the 21 km stretch of right-of-way has the potential for an emergency condition; therefore KMC has a number of strategies developed for dealing with the varying conditions in the area, including year round access to two staging areas, one at either end of this stretch of pipeline.

During the winter months a response in the Coquihalla Canyon may be slowed by high snowfall conditions. KMC is committed to the safety of employees and contractors; as such the area in the Coquihalla Canyon would first require an aerial evaluation for avalanche risk. If there is a potential for avalanche in the vicinity of the response, or along the access routes, avalanche control may be required. Upon the completion of avalanche control the plowing of access/egress could begin. When avalanche safety is assured, the response equipment could be transported with responders by helicopter into the canyon, before plowing crews establish access/egress in the canyon. KMC has an established network of control points in the area, many of which are accessible year round. KMC would deploy spill containment equipment in the easily accessed areas downstream of the incident location, to intercept and minimize downstream impacts. The first of the fully accessible control points is located at approximately kilometre 988, with several additional control points and opportunities for downstream deployment on the Coquihalla River. KMC maintains a list of contractors that are available with the heavy equipment that is required to access the Coquihalla Canyon during winter months.

Spring, summer and fall response is easier by comparison to winter response in the Coquihalla Canyon, but also has the potential risk of slides, and rapidly changing meteorological conditions. Slide control measures, including shoring and scaling, may be required prior to a response to ensure the safety of the responders. Again this type of work may slow the response to the primary site; however as in the winter KMC would immediately deploy containment measures downstream. During periods of high water and heavy rainfall KMC uses water control methods to direct surface run-off around an incident site, and will use stream diversion techniques to minimize the impacts of a spill on surrounding water bodies.

KMC has a robust Health and Safety Program that has controls in place for Safe Work Practices including excavation, trenching, shoring, fall protection, all-terrain vehicles, snowmobiles, boat operations, confined space, respiratory protection, Avalanche Safety Program and other policies and practices that make difficult to access areas safe for employees and contractors that could be responding to an emergency.

This response specifically addresses the Coquihalla Canyon as potentially difficult to access during any time of the year. Much of the proposed pipeline corridor between Edmonton and Hope is readily accessible but may require some plowing activities during winter months, and may require some of the same site access considerations as would be used in the Coquihalla Canyon.

1.72 Emergency preparedness and response under challenging conditions

Reference:

A3S4V5, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF pages 73 and 74 of 84

Preamble:

The reference discusses potential response strategies in the event of an incident.

The Board requires additional information on how factors such as access, as described in Trans Mountain's response to Information Request No. 1.71, or challenging environmental conditions, such as heavy snowfall or snow pack, ice cover, and heavy rainfall, could inhibit emergency response during an incident.

Request:

Please discuss:

a) how emergency management exercise(s) that Trans Mountain has conducted in the past 5 years (described in its response to Information Request No. 1.69) consider emergency response in challenging terrain, difficult to access areas, and in challenging environmental conditions such as heavy snowfall or snow pack, ice cover, and heavy rainfall; and

b) the various options and mitigation available to Trans Mountain for it to effectively respond should a release occur in areas with heavy snowfall or snow pack, under ice cover, or heavy rainfall conditions and in difficult-to-access areas along the entire existing and proposed Trans Mountain rights-of-way.

Response:

a) Kinder Morgan Canada Inc. (KMC) conducts regular emergency response exercises of various types and scenarios as outlined in the response to NEB IR No. 1.69 These exercises can be categorized as either table top or deployment exercises and are completed under various real (deployment) or hypothetical (table top) environmental conditions.

   Table top exercises may involve a few individuals determining early response actions or may be a more involved worst case scenario or level 3 exercise. Table top exercises use scripted weather conditions designed to force responders to think about challenging terrain, access and environmental issues including heavy snowfall, rainfall and snow or ice. For example, the possibility of avalanches during the winter months in the Coquihalla Canyon is well recognized and an exercise for a spill under this or similar conditions would consider avalanche control as part of access planning and the deployment of personnel and equipment. Accident scenarios have also included earthquakes, third party damage, integrity leaks, and valve failures. Exercise controllers will include hypothetical adverse weather events as inputs to the exercise to increase the difficulty for responders. KMC includes table top exercises as part of the management system to test response plans, further refine local response tactics, and work with local and regional response

organizations and Aboriginal communities where possible. Local personnel are often involved in designing the exercises to obtain input with regard to identifying locations that would pose increased challenges for a response and provide the benefit of local knowledge key to mounting effective operations.

The exercises are managed using the Incident Command System (ICS) and enables a response team to consider, plan for, and implement a response with consideration for the severity of the incident and the challenges presented by difficult terrain, weather and environmental conditions. ICS calls for the development, review, and approval of a Health and Safety Plan which further ensures the safety of both responders and the public, whatever the situation.

A deployment exercise involves the deployment of equipment to an actual response location, but does not involve the use of an off Site Command Post. KMC does not cancel deployment exercises due to inclement weather unless the exercise cannot proceed in a safe manner. For example river exercises are scheduled early in the freshet season for exposure and training at high water levels, mid season to deal with average water levels, and late in the season to deal with low water levels, and would only be cancelled if the area is closed to boating for safety reasons. Deployment exercises are scheduled in difficult environments at varying times of the year, and regularly include winter response tactics which include actual ice and snow conditions. Exercises are also scheduled during the winter months in the lower mainland of British Columbia to ensure responders are exposed to rainfall and fog events.

b) Site access under adverse conditions, including extreme terrain, heavy snowfall or snow pack, and difficult to access areas is addressed in NEB IR No. 1.71, specific to a winter spill in the Coquihalla Canyon, though the assessment and considerations would apply equally to other locations along the pipeline. Access to a spill site will consider transportation options suitable for the weather conditions and terrain encountered. Vehicles with four-wheel drive and snowplows, ATVs, helicopters, and tracked vehicles (e.g. caterpillars or bobcats) are available options for spill response.

The KMC response trailers include ice augers, cold weather personal protective equipment, and other gear specifically selected to deal with winter conditions including heavy snowfall or snow pack, ice cover, and rainfall conditions. Response equipment is located in portable trailers along the pipeline corridor and can be deployed by helicopter if necessary. Western Canadian Spill Services (WCSS), the spill response cooperative operating in Alberta and NE BC, also maintains specially-equipped depots available to its members, that solely contain oil/ice and cold weather equipment

Heavy snow fall, snow pack, and ice are factors that will be considered in a spill response. Although in some cases snow and ice can reduce or prevent oil migration to water, it can also hinder the recovery if oil reaches water. When this happens responders have to use equipment included in the response trailers to drill holes in the ice, assess water depth and flow conditions to determine the best locations to recover the oil. Specially equipped chain saws are then used to cut slots in the ice for oil collection and skimmer installation. KMC

regularly holds emergency response exercises under frozen conditions to practice recovery from ice covered rivers.

KMC also works with contractors who have northern/cold weather spill response experience who contribute their knowledge and experience to response planning and training. The Shoreline Cleanup Assessment Technique (SCAT) will continue to be an important element of spill response to aid in determining possible impacts, the potential mitigation provided by snow and ice cover, and the optimum recovery methods which will result in a reduction of environmental impact.

Heavy rainfall is considered in KMC's planning initiatives. Access routes would consider drainage to provide access through the full response. In areas susceptible to flooding, alternative routes have been identified that include accessible sites for boat launch and equipment deployment to control points. The possibility of secondary contamination is included in response planning. Portable storage tanks are equipped with covers to prevent water intrusion. Storage areas for collected oily liquids would be located on flat ground with drainage. Shelters are also available to work crews and included in the OSCAR trailers.

1.73 Site-specific mitigation for emergency preparedness and response

Reference:

A3S4V5, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills:

i) PDF page 71 of 84
ii) PDF pages 42 and 43 of 84

Preamble:

Reference i) states that the existing plans and guides will be used as the foundation for the development of enhanced plans and guides for the Project. These updated plans for the pipeline and facilities will reflect the added scope of the Project, increased volumes, new or updated control points due to routing, and updates to new response equipment and bases if required.

Reference ii) defines high consequence areas along the pipeline route.

The Board requires additional information on how Trans Mountain has considered, or will consider, site-specific mitigation that the company could implement in areas with challenging terrain, in areas that would be difficult to access for emergency response purposes, or in high consequence areas, to lessen potential consequences associated with a spill.

Request:

a) Please discuss whether Trans Mountain has considered site-specific mitigation, such as in-stream hydrocarbon sensors, diversion structures, or off-channel product capturing structures within or adjacent to watercourses or high consequence areas, along the existing and proposed Trans Mountain rights-of-way.

b) If Trans Mountain has considered site-specific mitigation, please provide an assessment of the locations that mitigation options, such as those mentioned in a), will be used.

c) If Trans Mountain has not considered site-specific mitigation, please provide a rationale for not doing so, or, if any specific options mentioned in a) were excluded from consideration, a rationale in each case.

Response:

a) Trans Mountain has selected more than 160 control points strategic to the pipeline corridor (including High Consequence Areas) that allow both access and effective spill response. The selection criteria include natural diversion and spill accumulation, sites with reduced flow velocity, enhanced environmental protection, and maximum potential oil recovery effectiveness. This approach to site-specific mitigation has evolved over the lifetime of the existing pipeline. Trans Mountain is committed to ongoing review and enhancement of the control points.

Current plans call for more detailed control point information in an expanded 4-page (approximate) format that details the environmental sensitivities, shoreline types, specific equipment that will be deployed, countermeasure strategies at the site, seasonal concerns relating to flow, water level, snow, and ice, access alternatives, and other variables that will enhance containment spill recovery effectiveness.

At many of its facilities such as pump stations and tank terminals Trans Mountain uses site-specific mitigation that includes diversion structures, containment, and hydrocarbon sensors for early detection where the potential for the accidental release of oil into drainage systems or adjacent water bodies is possible.

Hydrocarbon sensors are a proven and reliable method of providing early detection of a hydrocarbons release. Experience has also shown that these devices, given the range of sensitivity, can be subject to false alarm, and require frequent monitoring, maintenance, and calibration. Their application at facilities provides a controlled environment, including power and communications, for reliable operation and maintenance. Application of hydrocarbon sensors as site specific mitigation has not been considered for application outside of facilities. The variability of in-stream conditions including flow rate, channel variation, and frequency of monitoring, maintenance, and calibration would greatly limit their effectiveness.

The construction of diversion or off-channel product capturing structures adjacent to watercourses or High Consequence Areas is an invasive practice that affects the natural environment. These effects are typically increased to the degree the structures must reliably address flow rate and channel variations. Given the low site-specific likelihood of a release and the length of the pipeline corridor, the preconstruction of diversion structures or off-channel product capturing structures is not considered as an efficient means to reduce environmental impact. Instead Trans Mountain's response plans rely on a combination of predetermined control points and techniques for diverting and collecting oil in response to an incident.

As part of prescribed mitigation at a control point, diversion structures would be constructed during an actual spill to enhance oil collection. Natural embayments with back eddies can sometimes be modified using simple mechanical means to result in slicks being diverted by a boom into the modified holding area for capture and recovery. Approval from regulatory authorities would be required. For land based spills, "bell holes" and other diversion structure countermeasures techniques are a component of existing tactics and training programs for the Trans Mountain Pipeline System.

b) Kinder Morgan Canada Inc. (KMC), as the operator of the Trans Mountain Pipeline System (TMPL), has selected more than 160 control points strategic to the existing pipeline that allow both access and spill response. The selection criteria include natural spill accumulation, enhanced environmental protection, and maximum potential oil recovery effectiveness. The locations of the control points provide the opportunity to implement countermeasures with consideration for the nature of the nearby terrain, flow conditions in the case of water courses, and weather conditions. This approach to site-specific mitigation has evolved over the lifetime of the existing pipeline and will be applied in the context of emergency response planning for the proposed pipeline. KMC is committed to ongoing

review of the control points for the new and proposed pipeline and the availability of updated information that further enhances spill response effectiveness.

As indicated in NEB IR No. 1.73a, the construction of diversion or off-channel product capturing structures adjacent to or in watercourses or High Consequence Areas is an invasive practice that affects the natural environment. These effects are typically increased to the degree the structures must reliably address flow rate and channel variations. Given the low site-specific likelihood of a release and the length of the pipeline corridor, the preconstruction of diversion structures or off-channel product capturing structures is not considered as an efficient means to reduce environmental impact. Similarly, the application of in-stream hydrocarbon sensors along the pipeline would not be effective.

Trans Mountain's response plans include a combination of predetermined control points, countermeasures, and deployment training for effective diversion and recovery of oil in response to an incident.

c) The discussion and rationale for not considering the indicated site-specific mitigation options is included in the response to NEB IR No. 1.73a.

1.74 Emergency response plans and improvements

Reference:

A3S4V6, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF pages 71 to 73 of 84

Preamble:

The reference sets out that updated plans for the pipeline and facilities will reflect the added scope of the Project, increased volumes, new or updated control points due to routing, and updates to new response equipment and bases if required.

Request:

In relation to Trans Mountain's overall emergency management review, please indicate how Trans Mountain has evaluated or will be evaluating the topics listed below for the existing and proposed rights-of-way. If Trans Mountain has not evaluated or will not be evaluating any of the topics listed below, please provide a rationale for excluding the topics:

a) Site-specific tactic plans (i.e., boom configuration, access to right-of-way, flow rates, mitigation available in difficult environmental conditions such as heavy snowfall or snow pack, ice cover, and heavy rainfall, etc.) for each watercourse crossing and/or high consequence area.

b) Pre-SCAT (Shoreline Cleanup Assessment Technique) and River Substrate Surveys.

c) Response tactics for floating oil and for submerged and sunken oil.

d) Access plans.

Response:

a) As part of the overall emergency management review, Trans Mountain will evaluate site-specific tactical plans for the existing and proposed rights-of-way. As a baseline for the evaluation, the assessment will build on the knowledge gained through operation of the existing Trans Mountain Pipeline system (TMPL) for more than 60 years, and expand on the information that is currently detailed in the TMPL Control Point Manual and referenced in the Emergency Response Plans.

   For the existing system, more than 160 control points are included in the TMPL Control Point Manual. Plans detail access, spill response measures, and the protection of sensitive environmental resources through implementation of proven spill response and recovery techniques. Oil deflection, exclusion, collection, and control have all been considered for the identified control points. The control point selection criteria include natural spill accumulation, enhanced environmental protection, and oil recovery effectiveness where available. Seasonality has also been considered knowing that flows and water levels can dramatically change along the pipeline route and influence the control points to be utilized should a spill occur.

The tactics used for site-specific mitigation has continued to evolve over the lifetime of the existing pipeline and continues to be reviewed with the advent of new information and technologies. Kinder Morgan Canada Inc. (KMC), as the operator of TMPL and future operator of the Project, has focussed response planning on sites where there is a greater likelihood of success.

Analysis and development of the tactical plans will include consideration of the High Consequence Area (HCA) and Overland and Stream Flow Modelling of Potential Full-Bore Rupture (Volume 7, Appendix C). The analysis provides overland and downstream pathways and will be used to inform selection and optimization of control points with a focus on protection of HCAs (Volume 7, Section 3.1.5) including watercourses intersected by the pipeline.

Current plans call for more detailed control point information in an expanded format that details the specific equipment that may be deployed, countermeasure strategies for a site, seasonal concerns relating to flow, water level, snow, and ice, access alternatives, and other relevant information sources. Format for the documentation of tactical plans and control point information is under review and will be included in the enhancement of the current TMPL Control Point and Emergency Response plans.

b) Trans Mountain has evaluated and completed pre-spill SCAT applicable to a potential spill at the Westridge Marine Terminal and will be evaluating the conduct of basic pre-spill SCAT surveys and actitivities as part of the emergency management review. The evaluation will support development of selected site-specific tactic plans for watercourse crossing and/or high consequence area and expedite the application of a full SCAT program should a spill actually occur.

Facility: A detailed pre-spill SCAT dataset was successfully compiled for Central Burrard Inlet, British Columbia and used to populate a Pre-Spill SCAT database system. The project was completed March 2014. The dataset supports both the Trans Mountain Pipeline Expansion Project and the emergency response plans for existing operations at the Westridge Marine Terminal. Pre-spill SCAT datasets can be developed to different levels of detail. For the Central Burrard Inlet project, a relatively high level of detail was completed using current standards, terminology and procedures and included SCAT related standards of Environment Canada.

Pipeline: Unlike the Westridge Marine Terminal, the location of any potential spill along the right of way is unknown. Should a spill occur a full SCAT program would be launched downstream of the spill site. Basic pre-spill SCAT will be conducted with a view to support development of proposed watercourse mitigation planning. The update and enhancement of the existing Emergency Response Plans will include targeted basic pre-spill SCAT surveys and related SCAT/shoreline cleanup guidance and training materials. Fundamental principles of SCAT and best practice shoreline cleanup response requires (a) a division of the shoreline into geographic units or segments; (b) standard terms and definitions for documentation; and (c) systematic assessment of the shorelines. At the basic level, the latter includes a physical characterization of the shoreline substrates, which is synonymous with "river bank substrate surveys".

The exact locations and level of detail of basic pre-spill SCAT surveys will be determined in coordination with other response preparedness activities, primarily, the development of site-specific shoreline response tactic plans and identification of appropriate techniques and options to address oiled river bank and lake shorelines (as addressed in NEB IR No. 1.74a and 1.74c). Pre-spill SCAT will focus on locations designated as high consequence or high priority areas, which are generally captured within the High Consequence Area (HCA) mapping. The pre-spill SCAT will be at a level of detail needed to support the development of these shoreline response tactics and techniques and would at a minimum always include shoreline segmentation and (river bank) substrate characterization.

Notwithstanding the above, a second goal of the pre-spill SCAT preparedness will be to expedite the insertion and application of the proper SCAT surveys during an actual spill, specifically to lay the basic foundation, procedures and terminology to be followed. Pre-spill SCAT in HCAs will essentially template or pilot such guidance and substantially increase the scientific soundness of information collection during initial response. The materials produced can also be used for exercises and training purposes.

c) Trans Mountain has researched and continues to investigate response tactics for oils that float, sink, or submerge.

Trans Mountain has conducted its own research. The Gainford Study (Volume 8C, TERMPOL Reports, TR 8C-12, S7 A – Study of Fate and Behavior of Diluted Bitumen Oils on Marine Waters) investigated the fate and behaviour of representative diluted bitumen products, as well as the effectiveness of response equipment and tactics including use of dispersants and in-situ burning.

Trans Mountain participates in industry groups to benefit from the experience of other companies and response agencies. For example and with regard to sunken and submerged oil, through these efforts Trans Mountain is aware of modified SCAT survey techniques and the development of both manual and vacuum recovery techniques resulting from the Lake Wabamun Train Derailment in 2005. More recently Trans Mountain is monitoring developments related to detection and recovery of submerged and sunken oil addressed by agencies such as National Oceanic and Atmospheric Administration (NOAA) and American Petroleum Institute (API) in response to the BP MC252 and Kalamazoo spill events.

Trans Mountain attends workshops and conferences such as The International Oil Spill Conference (IOSC) in Savannah, Georgia (May 4-8, 2014) and The Arctic Marine Oil Spill Program (AMOP) sponsored by Environment Canada (June 3-5) in Canmore, Alberta. The IOSC is of interest to Trans Mountain not only because of the research papers presented there but also because of the latest technologies, products and equipment that will be on display by manufacturers from around the world. AMOP affords the opportunity for Trans Mountain to discuss the properties and behaviour of dilbit and other oils with Canada's top researchers.

Trans Mountain has agreed to participate in and support the Scientific Advisory Committee process and is working with the Canadian Energy Pipeline Association (CEPA) and the Canadian Association of Petroleum Producers (CAPP) to create broad industry support in

this effort. Condition 169 of the Joint Review Panel Report for the Enbridge Northern Gateway Project (Volume 2, Appendix 1) (Government of Canada 2013) calls for further modelling of oil behaviour and weathering and calls for the work to be completed by a Scientific Advisory Committee. Trans Mountain believes that a joint industry approach working in cooperation with Federal and Provincial agencies will be the most efficient and effective means to conduct further research in this area. Please also refer to NEB IR No. 1.63a.

Trans Mountain uses information gained from these efforts to improve its emergency response plans. The annual update of these plans, currently in progress, will include response tactics for submerged oil that has been developed based on knowledge gained from the activities described above.

Reference:

Government of Canada. 2013a. Considerations. Report of the Joint Review Panel for the Northern Gateway Project. Volume 2. December 2013.

d) As indicated in the response to NEB IR No. 1.73a, a detailed review of the tactic plans for each watercourse crossing and High Consequence Area (HCA) will include consideration of access to the right-of-way and control points. Access planning will build on the knowledge currently included in the Trans Mountain Pipeline Line response plans, and include consideration for improvement to existing and new access for the proposed pipeline.

1.75 Emergency response planning consultation and coordination

Reference:

A3S4V5, Application Volume 7, Risk Assessment and Management of Pipeline and Facility Spills, PDF page 64 of 84

Preamble:

Reference i) states that, when conducting a major update to an Emergency Response Plan, Kinder Morgan Cochin makes contact with agencies that could reasonably be expected to participate in an incident response for input on the procedures used during a response.

Request:

a) Please describe how Trans Mountain, in its emergency response planning, consults and cooperates with:

   a.1) communities, municipalities, and Aboriginal groups in developing evacuation plans; notification procedures to residents, schools, industry, and businesses; and emergency planning zones that may be implemented during an incident; and

   a.2) municipalities, industry, and other agencies (such as police, fire departments, emergency medical services, 911 call centers, and all other appropriate organizations [e.g., mutual aid partners, contractors, spill cooperatives]) to ensure sufficient resources are available to respond effectively and efficiently to a major incident (e.g., a fire or a large volume hydrocarbon release), as determined by the company's hazard assessments.

b) Please discuss how existing regulatory requirements, including but not limited to the *National Energy Board Onshore Pipeline Regulations* (OPR), address the elements in a).

Response:

a) There is an error in the above Preamble. The word 'Cochin' should be changed to 'Canada'. NEB IR No. 1.75 a) is also subdivided into a.1) and a.2) but the response will address them commonly as the planning and consultation are strongly interrelated.

   Volume 7, Section 4.7 of the Application details Community Awareness and Emergency Preparedness programs including the Continuing Education Program and Consultation Program. The continuing education program is designed to provide information identifying the presence of pipelines in the community as well as to provide safety and damage prevention messaging to those who live or work near the pipeline, and to those who may be called upon to respond in the event of a pipeline emergency.

   The programs include engagement with communities, municipalities and Aboriginal groups when developing evacuation plans and notification procedures to residents, schools, industry, and businesses. Emergency planning zones that may be implemented during an incident are also reviewed with these stakeholders and Aboriginal groups to ensure sufficient resources are available to respond to a major incident.

Methods of engagement can range from telephone verification of notification methods, to face to face meetings with emergency managers. Meetings ensure a mutual understanding of the hazards associated with the pipeline and/or facilities, available resources, and the limitations of local resources. Kinder Morgan Canada Inc. (KMC), as the operator of the existing Trans Mountain Pipeline system, uses training opportunities to enhance the mutual understanding of available resources and methods of deploying resources. KMC invites local communities, municipalities, Aboriginal groups, and industry to participate in table top and deployment exercises, as appropriate.

There are several methods of communication and consultation employed in the continuing education program. The program targets 4 distinct stakeholder groups: Affected Public, Emergency Responders, Contractors/Excavators and Public Officials.

Public – those who work and live near pipeline and system facilities:

- Emergency program information is distributed on a 3 year rotational cycle to affected public and Aboriginal groups, living within 0.2 km of either side of the pipeline, and includes information on how to identify, stay safe and report a pipeline emergency.
- Annual Landowner Packages: distributed between November and June each year to landowners and neighbours whose property is next to the Trans Mountain Pipeline. These packages contain important safety information, and promote the Call Before You Dig program.
- Biennial Open House: Hosted at the Burnaby Terminal, members of the local community are invited to tour KMC's facilities and meet local staff.

Emergency Managers and First Responders:

- Annual emergency responder communication includes first responders, communities, municipalities, provincial emergency programs, Aboriginal groups, emergency medical responders, 911 call centres, industry partners/contractors and mutual aid partners. This notification includes information on;
  - How to participate in KMC's emergency response drills, table top or deployment exercises
  - How to notify KMC in the event of a suspected pipeline emergency
  - Where to get information on product characteristics and recommended equipment for responding to a pipeline emergency
  - Information about KMC's Emergency Response Plans for their local municipality or regional district.

- Community Awareness Emergency Response (CAER) presentations are provided to interested groups along the pipeline route, and are generally targeted to first responders and emergency managers. These presentations cover information related to product characteristics, an overview of the Incident Command System (ICS), and damage prevention information.
- Training courses are offered to first responders that may be required to respond to an incident at the Terminal. The tank fire courses are designed to provide the local fire

department a basic understanding of the operations at the Terminal, and the fire protection systems that are in place.

- Emergency response deployments are practiced for all weather conditions, which includes avalanche training as well as ice and river equipment deployment. Each scenario is based on a realistic scenario designed to test capabilities and pinpoint areas for improvement. Exercises are designed to have local response personnel input. Where appropriate emergency planning managers from the surrounding communities are invited to attend, to promote a mutual understanding of requirements to respond to a pipeline emergency.
- KMC participates in tradeshows, targeted to the emergency response community, as well as in external agency exercises, to gain a better understanding of how other organizations function during an emergency.

As part of the overall management program review, KMC has and will continue to conduct workshops with Emergency Managers and First Responders along the pipeline system. The workshops provide an opportunity to consult on the proposed Project, as well as to solicit input and identify issues, and concerns. The Emergency Management consultation will be documented and filed with the NEB in Q3 2014. Input received through the consultation will be used to inform enhancements to the existing Emergency Management program.

Contractors / Excavators:

Any ground disturbance work within 30 metres of the pipeline requires KMC's written permission. KMC uses various means to educate contractors and excavators about working safely near the pipeline, including:

- Tradeshows targeted at the ground disturbance community.
- DigSafe Seminars hosted by the BC Common Ground Alliance.
- Contractor Breakfasts.
- Damage Prevention Presentations.

Public Officials:

The KMC External Relations department builds positive working relationships with elected and government officials throughout the municipalities and regional districts where the pipeline operates. Regular communiqués, brochures, and operational updates are used to keep municipal, provincial and federal government officials informed.

b) There is an error in the above Preamble. The word 'Cochin' should be changed to 'Canada'.

Kinder Morgan Canada Inc. (KMC) adheres to all existing regulatory requirements related to the emergency response program on the Trans Mountain Pipeline system. The primary regulatory document KMC uses when preparing the emergency response documentation and associated programs is the *Onshore Pipeline Regulations* (OPR).

Section 32 of the OPR requires applicants to develop emergency management programs to anticipate, prevent, manage and mitigate conditions during an emergency that could adversely affect property, the environment or the safety of workers or the public. In order to

satisfy this requirement, the applicant must establish and maintain liaison with the agencies that may be involved in an emergency response on the pipeline and consult with them in developing and updating an emergency procedures manual.

Reasonable steps must be taken to inform persons who may be associated with emergency response activities of the practices and procedures to be followed and to provide them with relevant information. Sections 32 to 35 of the OPR cover the requirements for the procedure manuals, the Liaison Program and the Continuing Education Program which includes information to the public along the right-of-way in section 34 of the OPR. Section 6.1(c) of the OPR references the need for a management system.

The National Energy Board's (NEB) Guidance Notes for the OPR dated February 20, 2014 require that a company maintain up-to-date contact lists and a description of the consultation process including a schedule for contacts, nature of discussions, type of information to be provided and the methods to assess the effectiveness of the consultation process.

Additionally KMC refers to the NEB letter dated April 24, 2002 File 172-AA000-73 Security and Emergency Preparedness and Response Programs which outlines the elements of an emergency response program management system. To the extent possible, a company's emergency preparedness and response program should be integrated with existing local and regional emergency measures programs. The attachment also refers to the Canadian Standards Association (CSA) standard for Emergency Planning for Industry (CAN/CSA-Z731.03), which was used in the development of the management system for the emergency response programs.

The NEB expects applicants to develop a company-wide Consultation Program that establishes a comprehensive approach for the implementation of project-specific consultation activities, as stated in the NEB Filing Manual.[1] KMC considers the feedback received from its Project-specific consultation activities in the development of its emergency response programs.

KMC is committed to using industry best practices, and therefore has also considered regulations as guidance on emergency response programs issued by British Columbia Oil and Gas Commission, Alberta Energy Regulator, British Columbia Ministry of Environment, Washington State Department of Ecology, and United States Environmental Protection Agency – Pipeline and Hazardous Material Safety Administration.

Lastly, while not enshrined in regulation, KMC is aware and has participated in Working Groups for the BC Land Based Spill Preparedness and Response Initiative (Volume 7, Section 4.8.1.1) with a strong focus on provincial and community preparedness in the event of a spill.

References:

National Energy Board Onshore Pipeline Regulations, RSC 1985, c N-7.

[1] *Filing Manual*, 3-3.

National Energy Board. Security and Emergency Preparedness and Response Programs (24, April 2002).

National Energy Board. Guidance Notes for the National Energy Board Onshore Pipeline Regulations (20 February 2014).

National Energy Board. Filing Manual (Release 2014-01), 4A-37.

Summary of New Commitments:

- Trans Mountain will provide the consultation record with Emergency Planners and First Responders in Q3 2014.