

Salish Sea¹ <u>Vessel Traffic Projections:</u> New and Expanding Terminals and Refinery		Current Capacity (bbl ² , BPD ³ , MMTA ⁴ , MT ⁵ , MTPA ⁶ , TEU ⁷)	Proposed, Approved, & Recent Increase in Capacity	Current Vessel Transits ⁸	Proposed, Approved, & Recent Increase in Transits	Project Status Summary
1	Discovery LNG ⁹ liquefaction, storage and export facility, (Campbell River, BC) ¹⁰	0	20 MTPA	0	Estimate: 760 ¹¹	License to export LNG was filed July 2014 and approved in June 2015. ¹²
2	Port Metro Vancouver, Vancouver, BC, Canada (PMV): Fraser Surrey Docks (FSD) coal offloading facility with receiving/export terminal at Texada Island ¹³	0	4 MMTA ¹⁴	0	160 ¹⁵	PMV issued a Project Permit in August 2014. ¹⁶ An application to amend the permit in order to load coal directly from FSD to ocean-going vessels was submitted in July 2015. ¹⁷
3	Woodfibre LNG export terminal, (Squamish, BC) ¹⁸	0	2.1 MTPA	0	80 ¹⁹	Export license issued in December 2013. ²⁰ Application for an Environmental Assessment Certificate under review. The Squamish Nation is conducting an independent environmental review and decision-making process. ²¹
4	Richardson International Grain Terminal (Vancouver, BC) ²²	3,000,000 MT	5,000,000 MT	PMV issued project permits in 2013. ²³ No increases to vessel traffic. "Current ships range in size from 5,000 MT to 50,000 MT. Anticipate that the smaller vessels currently servicing the terminal will be replaced by larger vessels (Panamax 70,000 MT)." ²⁴		
5	PMV: Neptune Terminals - Coal and Phosphate Rock (North Vancouver, BC) ²⁵	Coal: 12.5 MMTA ²⁶ Phosphate Rock: 0	Coal: 6 MMTA ²⁷ Phosphate Rock: 1 MMTA	— ²⁸	352 ²⁹	Coal: PMV issued a Project Permit in January 2013. ³⁰ Phosphate Rock: PMV issued a Project Permit in August 2012. Construction must be completed by August 31, 2014. ³¹
6	PMV: Centerm Container Terminal (Vancouver, BC) ³²	900,000 TEU	600,000 TEU	268 ³³	Estimate: 130 ³⁴	The Centerm Expansion Project is in the preliminary design phase and establishing agreements with project partners. ³⁵
7	West Coast Reduction Ltd. via PMV: Vanterm Terminal – Canola Oil (Vancouver, BC) ³⁶	700,000 MT	1,100,000 MT	40 ³⁷	22	\$9.5 million expansion completed in April 2015.

8	PMV: Viterra Pacific Terminal – Grain (Vancouver, BC) ³⁸	2,200,000 MT	3,800,000 MT ³⁹	190 ⁴⁰	144	PMV issued the final operational upgrades project permit in July 2015. ⁴¹
9	PMV: Westridge Marine Terminal – Tar Sands Crude Oil (aka Canadian Oil Sands, diluted bitumen, dilbit) (Burnaby, BC) ⁴²	300,000 BPD	590,000 BPD ⁴³	120	696 ⁴⁴	A facilities application was submitted to Canada's National Energy Board in December, 2013. The application review process had been scheduled to conclude in January 2016. ⁴⁵ However, oral summary arguments have been postponed. ⁴⁶
10	PMV: Pacific Coast Terminals – Canola Oil (Port Moody, BC) ⁴⁷	0	575,000 MT per yr. ⁴⁸	0	46 ⁴⁹	PMV issued a Project Permit in February 2014. Expected to be operational Q3 2014.
10	PMV: Pacific Coast Terminals – Potash (Port Moody, BC) ⁵⁰	0	2,000,000 MT per yr. ⁵¹	0	88 ⁵²	PMV issued a Project Permit in March 2015. ⁵³
11	PMV: WesPac Midstream LNG export terminal (Delta, BC) ⁵⁴	0	3.5 MTPA	0	244 ⁵⁵	NEB approved the June 2014 application for a 25 year LNG export license in May 2015. ⁵⁶ Expected to be operational in Q1 2018.
12	PMV: Roberts Bank 2 Container Terminals (Roberts Bank, Delta, BC) ⁵⁷	0	2,400,000 TEUs	0	520 ⁵⁸	Roberts Bank Terminal 2 project's Environmental Impact Statement was filed in April 2015, and comments on the completeness of the EIS were accepted until June 15, 2015. ⁵⁹ The environmental assessment process is anticipated to take two to three years to complete. ⁶⁰
13	PMV: Westshore Terminals - Coal (Roberts Bank, Delta, BC) ⁶¹	2012: 26.1 MTPA ⁶²	9.9 MTPA ⁶³	540	86 ⁶⁴	Environmental Impact Assessment submitted November 2013. ⁶⁵ PMV issued a Project Permit in January 2014. ⁶⁶
14	PMV: Deltaport Terminal – Containers (Roberts Bank, Delta, BC) ⁶⁷	1,800,000 TEUs	600,000 TEUs	538	86 ⁶⁸	Construction underway: 150,000-200,000 additional TEUs as of 12/2014. ⁶⁹

15	Island Gas Connector Pipeline from Sumas, WA to Malahat LNG floating liquefaction and export facility (Malahat Nation south of Mill Bay, BC) ⁷⁰	0	Island Gas Connector Pipeline: Export = 30 MTPA LNG total. 6 MTPA for Malahat LNG ⁷¹	0	Estimate: 228 ⁷²	July '14: Steelhead LNG applied to the NEB for five LNG export licenses totaling 30 MTPA. ⁷³ Island Gas Connector pipeline project requires US (FERC) and Canadian (NEB) approvals. Applications pending. Expected operational in '20. ⁷⁴
16	Gateway Pacific Coal Terminal (Ferndale, WA) ⁷⁵	0	48 MMTA coal + 6 MMTA other dry bulk ⁷⁶	0	974 ⁷⁷	The USACE, WA Department of Ecology, and Whatcom County are conducting coordinated environmental reviews of the Pacific International and BNSF applications under NEPA and SEPA. The DEIS is due in early 2016. ⁷⁸ The USACE is reviewing the Lummi Nation's request for the denial of federal permits given the project's violation of treaty rights. ⁷⁹
17	Tesoro Refining and Marketing Company (Anacortes, WA) ⁸⁰	— ⁸¹	5,475,000 bbl/year ⁸²	0	120 ⁸³	Application submitted to Skagit County in June 2015 which includes building an Aromatics Recovery Unit capable of producing 15,000 barrels per day of mixed xylenes for export to Asia. ⁸⁴
18	Northwest Seaport Alliance (Seattle and Tacoma, WA) ⁸⁵	3,400,000 TEUs	2,600,000 TEUs ⁸⁶	— ⁸⁷	Estimate: 564 ⁸⁸	In August 2015, the ports of Seattle and Tacoma formed the Northwest Seaport Alliance to unify management of the two ports' marine cargo terminals and related functions, with plans to increase container terminals' capacity over the next 11 years. ⁸⁹
Total Recent, Approved, & Proposed Increases in Annual Vessel Transits					5,300 = 42.7% Increase in Vessel Traffic	
2013 Total Vessel Transits in the Salish Sea ⁹⁰					12,394	
2013 Vessel Transits + Proposed, Approved, and Recent New Vessel Transits					17,694	

NOTE: Only ocean-going vessel traffic is included. No local barge traffic, anchoring, cueing, and/or bunkering (ship fueling) transits are included.

¹ The Salish Sea is the unified bi-national ecosystem that includes Washington State's Puget Sound, the Strait of Juan de Fuca and the San Juan Islands as well as British Columbia's Gulf Islands and the Strait of Georgia. The name recognizes and pays tribute to the first inhabitants of the region, the Coast Salish.

² Bbl = barrels. A barrel of crude oil = 42 U.S. gallons or 158.9873 litres.

³ BPD = barrels per day.

⁴ MMTA = million metric tonnes per annum. A metric tonne is 1.10231 short tons.

⁵ MT = metric tonnes

⁶ MTPA = million tonnes per annum

⁷ TEU = Twenty-foot Equivalent Units

⁸ Transit = A vessel's passage from one location to the next. A round trip equals at least two transits. A ship or vessel call at a terminal represents two transits, the vessel's arrival and the vessel's departure.

⁹ LNG = Liquefied Natural Gas

¹⁰ Project proponent website: <http://www.discoverylng.com/> (accessed 4/29/15). See also, "Discovery LNG, Campbell River, British Columbia" Hydrocarbons Technology, August 13, 2015: <http://www.hydrocarbons-technology.com/projects/discovery-lng-campbell-river-british-columbia/> (accessed 9/3/15).

¹¹ Quicksilver Resources Canada Inc.'s application for an export license and the proponent website don't contain any information on project-related vessel traffic. The estimated annual vessel transits is based on the vessel transit number per MTPA for the Woodfibre LNG project proposal, which is approximately 38 vessel transits per 1 MTPA. 38 x 20 MTPA = 760 annual transits. This estimate could be high if the Discovery LNG facility could be accessed by larger LNG carriers than the Woodfibre LNG facility.

¹² Quicksilver Resources Canada Inc. Application for License to Export Liquefied Natural Gas: [https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/2491310/2491202/2491304/QRCI - Application for Licence to Export - A3Z6T1.pdf?nodeid=2490423&vernum=-2](https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/2491310/2491202/2491304/QRCI%20-%20Application%20for%20Licence%20to%20Export%20-%20A3Z6T1.pdf?nodeid=2490423&vernum=-2) (accessed 4/30/15) See page 1: "Annual quantity maximum: Subject to the annual tolerance, the quantity of LNG that may be exported in any 12-month period shall not exceed 20 million tonnes per annum ... Annual tolerance: The quantity of LNG that may be exported in any 12 month period may exceed the annual maximum by 15 percent." 20 MTPA + 15% = 23 MTPA
See also Canada's National Energy Board's Letter of Decision: [https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/2491310/2491202/2791657/Letter Decision - Quicksilver Resources Canada Inc. - A4R1C0.pdf?nodeid=2791658&vernum=-2](https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/2491310/2491202/2791657/Letter%20Decision%20-%20Quicksilver%20Resources%20Canada%20Inc.%20-%20A4R1C0.pdf?nodeid=2791658&vernum=-2) (accessed 7/3/15)

¹³ Proponent website: <http://www.fsd.bc.ca/> See also *Fraser Surrey Docks, Risk Assessment Study for Coal Barge Operation*, Report No./DNV Reg.No.: PP050173/1-5EZXO, Rev. 2A, 2012-09-26: http://www.fsd.bc.ca/documents/coal/marine_risk_assessment.pdf (accessed 4/30/15).

¹⁴ See Port Metro Vancouver Project Description: <http://www.portmetrovancover.com/docs/default-source/PROJECTS-FSD/backgrounder---about-this-project-and-decision-process46cdbbbe1cbf6049a5bdf00004cf7b9.pdf?sfvrsn=0> (accessed 4/30/15) "Although the project proposal was for a volume of four million metric tonnes per year, there is potential to increase volumes up to eight million metric tonnes of coal per year over the longer term."

¹⁵ Vessel transits number is for proposed Ocean Going Vessels (OGVs) only. Proposed barge traffic between Fraser Surrey Docks and Texada Island not included. Vessel transits number from July 9, 2015 Application for an Amendment to Permit No. 2012-072 Direct Transfer Coal Facility, Introduction, page 4: "The initial project design considered the use of an approximate total of 640 barges (round trip). With the implementation of the proposed amendment, the number of vessels navigating the river could be reduced to 80 OGVs (round trip), if FSD were to use only OGVs and no barges."

<http://www.portmetrovancover.com/wp-content/uploads/2015/07/July-2015-Application-for-an-Amendment-to-Permit-No-2012-072-Fraser-Surrey-Docks-DTCF-Amendment.pdf> (accessed 7/22/15) 80 OGV round trips = 160 transits.

¹⁶ See The Vancouver Sun article, "Port Metro Vancouver okays controversial coal shipping facility at Fraser Surrey docks," 8/21/14: <http://www.vancouversun.com/health/Port+Metro+Vancouver+okays+controversial+coal+shipping+facility+Fraser+Surrey+docks+updated/10137567/story.html> (accessed 4/30/15). See also, Surrey Leader, September 3, 2015, "Coal port firm drops court battle against Metro Vancouver," by Jeff Nagel: <http://www.surreyleader.com/news/324180381.html> (accessed 9/3/15).

¹⁷ July 9, 2015 Application for an Amendment to Permit No. 2012-072 Direct Transfer Coal Facility: <http://www.portmetrovancover.com/wp-content/uploads/2015/07/July-2015-Application-for-an-Amendment-to-Permit-No-2012-072-Fraser-Surrey-Docks-DTCF-Amendment.pdf> (accessed 7/22/15)

¹⁸ Project proponent website: <http://www.woodfibrelng.ca/the-project/about-the-project/> (accessed 6/5/15).

¹⁹ Project proponent project description: <http://www.woodfibrelng.ca/the-project/safety-and-transportation/> (accessed 6/5/15) "Woodfibre LNG anticipates that there would be approximately 3-4 LNG carriers per month calling at the terminal, or about 40 carriers per year for this Project." 40 annual LNG carriers = 80 transits per year

²⁰ Export License Letter of Decision, December 16, 2013: https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/977416/977417/2385283/Letter_Decision_Woodfibre_LNG_Export_Pte._Ltd._-A3S0Y4.pdf?nodeid=2385061&vernum=-2 (accessed 6/5/15).

²¹ Squamish Nation web post: <http://www.squamish.net/squamish-nation-responds-to-woodfibre-lng-agreement-to-conditions/> (accessed 9/10/15) and, "Woodfibre LNG agrees to Squamish Nation terms" by Jennifer Thuncher / The Squamish Chief, August 20, 2015: <http://www.coastreporter.net/news/local-news/woodfibre-lng-agrees-to-squamish-nation-terms-1.2036592> (accessed 9/10/15).

²² Project proponent website: <http://www.richardson.ca/news/vancouver-grain-terminal> (accessed 5/2/15).

²³ PMV approved project permits: <http://www.portmetrovancover.com/wp-content/uploads/2015/03/2013-04-15-final-richardson-international-project-permit-pdf.pdf> and <http://www.portmetrovancover.com/wp-content/uploads/2015/05/Richardson-New-Hopper-Bin-approved-project-permit-PP2013-078.pdf> (accessed 7/22/15). See also: <http://www.agcanada.com/daily/richardson-cleared-for-west-coast-terminal-expansion> (accessed 7/22/15).

²⁴ April 15, 2013 Port Metro Vancouver Richardson International Grain Storage Capacity Project background document: <http://www.portmetrovancover.com/wp-content/uploads/2015/03/n-2013-04-15-richardson-2012-099-decision-backgrounder.pdf> (Accessed 7/22/15).

²⁵ Project proponent's webpage: <http://www.neptuneterminals.com/> (accessed 5/2/15).

²⁶ Pre-expansion capacity based on PMV project description: <http://www.portmetrovancover.com/en/projects/OngoingProjects/Tenant-Led-Projects/neptune-terminals-upgrades-coal-handling-expansion> (accessed 5/2/15) "this project will take Neptune's coal handling capabilities up to 18.5 million metric tonnes per year. Approximately one additional train per day and one additional ship per week are expected to call on the terminal following the project's completion."

²⁷ Project proponent website: <http://www.neptuneterminals.com/explore-our-terminal/> (accessed 5/2/15).

²⁸ Actual vessel transit numbers for 2012 as well as comparable information for estimating purposes are unavailable.

²⁹ Neptune Terminals' estimated coal transport increase in vessel transit numbers are based on the Vessel Traffic Risk Assessment (VTRA) Steering Committee's Estimates, Notes and Decisions on Future Scenarios: http://www.psp.wa.gov/downloads/OILSPILL/VTRA_SC_Decisions4_10_13Final.pdf (accessed 5/2/15) "+176 [bulk vessels]/yr - Derivation: John Veentjer and Mike Moore were provided with this estimate from Tony Nardi of Neptune, and

corroborated by Stephen Brown, President of the Chamber of Shipping of British Columbia. This more than triples the estimate of “approximately one additional ship per week” (or 52/year) described in Port Metro Vancouver permit.”

³⁰ PMV Project Permit for Neptune Terminal coal expansion: <http://www.portmetrovancover.com/wp-content/uploads/2015/03/2013-01-23-project-permit-signed-with-plans-and-schedule-neptune-coal-capacity-pp-2012-066.pdf> (accessed 7/22/15).

³¹ PMV Project Permit: <http://www.portmetrovancover.com/wp-content/uploads/2015/03/2012-08-24-Approved-PP-No-2012-041.pdf> (accessed 7/22/15).

³² Centerm is operated by DP World Vancouver: <http://web.dpworld.com/our-business/marine-terminals/australia-americas/canada-vancouver/> (accessed 4/30/15).

³³ Current Centerm Terminal vessel transit numbers are based on the average 2012 Deltaport Terminal TEUs per vessel (see Roberts Bank Terminal 2 Project - Environmental Impact Statement, Section 4-D.1 Traffic Data Matrix, Roberts Bank Traffic Volumes: SHIP TRAFFIC, page 1: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101382E.pdf> (accessed 5/4/15)). Deltaport Terminal 2012 container ship movements (transits) = 538 current container ship transits or 269 annual vessel round trips. Deltaport Terminal 2012 TEU per vessel = 1,800,000 TEUs divided by 269 vessels = 6,691.45 average TEU per vessel. 900,000 divided by 6,691.45 = 134.49 vessels. 134 x 2 = 268 transits.

If based on 2014 average PMV containers per vessel (2014 total containers = 2,912,928 and total container vessel arrivals = 759. 2,912,928 divided by 759 = 3,838 TUE per vessel): 900,000 divided by 3,838 = 234.49 vessels. 234 x 2 = 468 transits. See Port Metro Vancouver 2014 Statistics Overview: <http://www.portmetrovancover.com/wp-content/uploads/2015/03/2014-statistics-overview.pdf> (accessed 7/22/15).

³⁴ Centerm Terminal estimated increased container vessel numbers based on proposed Roberts Bank Terminal 2 average of 9,231 containers per vessel (2,400,000 TEUs divided by 260 vessels). 600,000 TEUs divided by 9,231 = 64.99. 65 x 2 = 130 annual transits (see Roberts Bank Terminal 2 Project - Environmental Impact Statement, Section 4-D.1 Traffic Data Matrix, Roberts Bank Traffic Volumes: SHIP TRAFFIC, page 1: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101382E.pdf> (accessed 5/4/15)).

If based on Deltaport 2012 TEU per vessel (see above): 600,000 divided by 6,691.45 = 89.66 vessels. 90 x 2 = 180 annual transits.

If based on 2014 average PMV containers per vessel (see above): 600,000 divided by 3,838 = 156.33 vessels. 156 x 2 = 312 annual transits.

³⁵ See Centerm Expansion Project description: <http://www.portmetrovancover.com/en/projects/OngoingProjects/centerm-expansion-project> (accessed 4/30/15) “Centerm, operated by DP World Vancouver, is ... handling approximately one fifth of the Port's annual container cargo. The recent decision to close the aging Ballantyne Cruise Terminal, which lies just east of Centerm, and consolidate cruise operations at Canada Place in 2015 provides an opportunity to expand Centerm to meet the near-term demand for increased container handling capacity.... Concept studies suggest Centerm could be expanded from its current 900,000 TEU capacity to 1.5 million TEUs.”

³⁶ See The Vancouver Sun article, 4/7/15, “Port Metro expansion pushed by rising tide of agriculture exports”:

<http://www.vancouversun.com/business/Port+Metro+expansion+pushed+rising+tide+agriculture+exports/10953055/story.html> (accessed 4/29/15).

³⁷ Vessel transit numbers estimate based on Pacific Coast Terminals’ 25,000 MT – 45,000 MT liquid tanker capacities for carrying canola oil (see endnote #49 below). Assumption = average of 35,000 MT per vessel.

³⁸ Proponent website: <https://www.viterra.com/web/canada/terminal-operations> (accessed 7/21/15).

³⁹ Viterra Pacific Terminal Shipping System Upgrade project summary: [http://www.portmetrovancover.com/docs/default-source/PROJECTS-Viterra/2014-04-09-application-from-viterra-inc---ship-loading-system-upgrade-at-pacific-terminal-\(pp-2014-081\)---web-version.pdf?sfvrsn=0](http://www.portmetrovancover.com/docs/default-source/PROJECTS-Viterra/2014-04-09-application-from-viterra-inc---ship-loading-system-upgrade-at-pacific-terminal-(pp-2014-081)---web-version.pdf?sfvrsn=0) (accessed 6/22/15) “As part

of an expanding agricultural export market Viterra is modernizing the facility to increase its capacity for up to 6,000,000mt per annum.” See also <http://www.longshoreshippingnews.com/2014/04/viterra-increasing-capacity-at-grain-terminal-at-port-metro-vancouver/> (accessed 7/22/15).

⁴⁰ PMV project description: <http://www.portmetrovancover.com/en/projects/OngoingProjects/Tenant-Led-Projects/viterra-pacific-elevators> (accessed 6/22/15) “... average vessel movements are anticipated to increase from 95 (2014) to 167, and average vessel capacities from 23,000 to 30,000 tons.”

Updated PMV project description does not include any reference to project-related increases in vessel numbers. See

<http://www.portmetrovancover.com/working-with-us/permitting/status-of-applications/viterra-pacific-elevators-shipping-upgrade-project/> (accessed 7/22/15). Note that the average vessel capacities indicate that “average vessel movement” indicates a round trip or vessel call.

167 – 95 = 72 additional vessel movements x 2 = 144 additional annual transits.

⁴¹ Ship Loading System Upgrade permit issued by PMV: <http://www.portmetrovancover.com/working-with-us/permitting/project-and-environmental-reviews/status-of-applications/viterra-pacific-elevators-shipping-upgrade-project/> (accessed 9/10/15). Ship Loading System Upgrade application: <http://www.portmetrovancover.com/wp-content/uploads/2015/03/2014-04-09-application-from-viterra-inc-ship-loading-system-upgrade-at-pacific-terminal-pp-2014-081-web-version.pdf> (accessed 7/22/15). See also: <http://www.agcanada.com/daily/viterra-to-boost-vancouver-port-terminal-throughput> (accessed 7/22/15).

⁴² Project proponent website: <http://www.transmountain.com/proposed-expansion> (accessed 7/22/15).

⁴³ See project application: <http://www.transmountain.com/facilities-application> (accessed 6/5/15).

⁴⁴ See Trans Mountain Pipeline ULC - Trans Mountain Pipeline ULC responses to National Energy Board Information Request No. 1 - Part 1 of 2 (A60392) Page 463 of 481 (PDF page 44 of 62): https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/548311/956726/2392873/2451003/2454322/B32-3_-_Trans_Mountain_Response_to_NEB_IR_No._1_2_of_2_-_A3W9H9.pdf?nodeid=2462074&vernum=1 (accessed on 6/5/22):

“Trans Mountain has considered a theoretical future expansion scenario of 124,010 m³/d (780,000 bbl/d) average annual (sustainable) capacity on Line 2.” The full capacity the project is designed for would add another 190,000 BPD to the 590,000 BPD included in the project’s application. If the additional 590,000 barrels per day requires an additional 348 tankers/696 transits per year, the full capacity the project is designed for (780,000 barrels per day) would require another 112 additional tankers/224 transits per year, which is over 32 percent more than is included in the application, bringing the total number of tankers per year to 460 or 920 annual vessel transits.

⁴⁵ Canada’s National Energy Board’s Trans Mountain Pipeline ULC - Trans Mountain Expansion webpage: <http://www.neb-one.gc.ca/pplctnflng/mjrpp/trnsmntnpxpsn/index-eng.html> (accessed 7/22/15).

⁴⁶ See NEB news release, August 21, 2015: <http://news.gc.ca/web/article-en.do?mthd=tp&crtr.page=1&nid=1015719&crtr.tp1D=1> (accessed 9/10/15), “Trans Mountain has filed the Direct Written Evidence prepared by Mr. Steven Kelly and IHS Global Canada Limited in support of its application for NEB approval of the Project. Mr. Kelly has since been appointed to the NEB, an appointment that takes effect October 13, 2015. The hearing panel has taken appropriate action to address this matter by deciding to strike the evidence prepared by Mr. Kelly from the hearing record. ... The hearing panel has directed Trans Mountain to provide a list identifying all evidence prepared by or under the direction of Mr. Kelly, and advise whether it plans to replace this evidence. The hearing panel will not proceed with oral summary argument in Calgary or Burnaby at this time.”

⁴⁷ Project proponent website: <http://pct.ca/growing-our-business/handling-food-grade-canola-oil/> (accessed 4/29/15). Permit application: <http://www.portmetrovancover.com/docs/default-source/PROJECTS---PCT/view-the-application-.pdf?sfvrsn=0> (accessed 4/29/15).

⁴⁸ PMV's permit approval's project description states, "Expected maximum canola throughput is 575,000 tonnes/yr by 2018, with a theoretical maximum of 910,000 tonnes/yr." See Project Description, page 1 (PDF page 10 of 24): <http://www.portmetrovanancouver.com/wp-content/uploads/2015/03/approved-project-permit-2013-104.pdf> (accessed 7/22/15).

⁴⁹ Pacific Coast Terminals Co. Ltd. Environmental Review Document Canola Oil System Installation and Operation: http://pct.ca/wp-content/uploads/2014/12/J27_FINAL_PCT_Canola_Project.pdf (accessed 4/29/15). See Section 5.5 Marine Vessel Visits (page 29): "liquid tanker capacity for carrying canola will vary from 25,000 MT to 45,000 MT. Conservatively, we have chosen to use the smaller capacity vessels which result in a higher number of transits." 575,000 (MT per year) divided by 25,000 = 23 vessels x 2 = 46 transits. If theoretical maximum of 910,000 tonnes/yr and 25,000 MT per vessel, annual vessel transits would increase to 72 transits per year (910,000 divided by 25,000 = 36.4. 36 x 2 = 72).

⁵⁰ Proponent website: <http://pct.ca/growing-our-business/handling-potash/> (accessed 4/29/15). Permit application: <http://pct.ca/wp-content/uploads/2014/12/view-the-application-april-2013.pdf> (accessed 4/29/15).

⁵¹ Pacific Coast Terminals Co. Ltd. Environmental Review Document Canola Oil System Installation and Operation includes potash commodity volume forecasts. 2020 = 2,000,000 MT/yr. (see page 24, Table 5 Operations Forecasts: http://pct.ca/wp-content/uploads/2014/12/J27_FINAL_PCT_Canola_Project.pdf (accessed 4/29/15)).

⁵² Vessel transits based on PMV project description: <http://www.portmetrovanancouver.com/working-with-us/permitting/status-of-applications/pacific-coast-terminals-potash-handling-facility-project/> (accessed 7/22/15) "The proposed Potash Handling Facility would result in rail deliveries of 177 car unit trains, approximately one train every three days. At an assumed vessel size of 50,000 Metric Tonnes, the proposed project would result in 44 additional vessel calls to the terminal per year." 44 vessel calls per year x 2 = 88 vessel transits.

⁵³ PMV project permit: http://www.portmetrovanancouver.com/wp-content/uploads/2015/05/PCT-Potash-2015-03-12-approved-pp-no-2014-096_final.pdf (accessed 7/22/15).

⁵⁴ Proponent's project website: <http://wespacilbury.ca/> and project description: http://a100.gov.bc.ca/appsdata/epic/documents/p435/1430935604793_yT69VKVQq8nhp37fznBG2DfhYqyWgPkc6Sj94TFvWnrpp1KV6rvb!-9193758411430934784724.pdf (accessed 6/5/15).

⁵⁵ WesPac's FAQ: "It is estimated that up to 90 LNG barge calls and up to 122 LNG carrier calls (of various sizes) could occur at the jetty per year." <http://wespacilbury.ca/faq/#top> (accessed 7/22/15). Assuming that barge calls may remain within the Salish Sea, only the LNG carrier calls are included. 122 LNG carrier calls per year x 2 = 244 vessel transits per year.

⁵⁶ WesPac's application to Canada's NEB: <https://docs.neb-one.gc.ca/ll-eng/llisapi.dll?func=ll&objId=2483502&objAction=browse&viewType=1> (accessed 6/5/15), NEB's license decision announcement: <http://news.gc.ca/web/article-en.do?mthd=tp&crtr.page=1&nid=972719&crtr.tp1D=1> (accessed 6/4/15) and decision letter: [https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/2482343/2482959/2774368/Letter Decision to WesPac Midstream - Vancouver LLC - Application for a licence to Export Natural Gas - A4L1F1.pdf?nodeid=2773609&vernum=-2](https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90466/94153/552726/2482343/2482959/2774368/Letter%20Decision%20to%20WesPac%20Midstream%20-%20Vancouver%20LLC%20-%20Application%20for%20a%20licence%20to%20Export%20Natural%20Gas%20-%20A4L1F1.pdf?nodeid=2773609&vernum=-2) (accessed 6/5/15). WesPac's export license is for 146 Bcf which is approximately 4.14 billion cubic meters and approximately 3.5 MTPA - with a 15% annual tolerance, for a potential total of 3.55 MTPA.

⁵⁷ Project proponent website: <http://www.robertsbankterminal2.com/about-the-project/project-overview/> (accessed 6/5/15).

⁵⁸ Vessel numbers for all terminals at Roberts Bank included in Roberts Bank Terminal 2 Project - Environmental Impact Statement, Volume 1: Introduction and Project Information, Figure 4-27: Ship Traffic: Annual Ship Movements for 2012 and 2030, page 39 of 51: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101387E.pdf> (accessed 5/4/15), and Section 4-D.1 Traffic Data Matrix, Roberts Bank Traffic Volumes: SHIP TRAFFIC, page

1: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101382E.pdf> (accessed 5/4/15). Deltaport Terminal 2012 container ship movements (transits) = 538 current container ship transits. Roberts Bank 2 (proposed) container ship movements = 520, Deltaport terminal container ship movement expansion = 86. $520 + 86 = 606$ increased container ship transits.

Roberts Bank Terminal 2 Environmental Impact Statement: <https://www.ceaa-acee.gc.ca/050/document-eng.cfm?document=101482> (accessed 5/4/15). Roberts Bank Terminal 2 = 2,400,000 TEUs and 520 annual vessel transits. Deltaport (container) Terminal = 1,800,000 TEUs and 538 vessel transits in 2012 for an average of 6,691.45 TEUs per vessel (not per transit). Deltaport Terminal will increase an additional 600,000 TEUs for a total of 624 vessel transits. Total projected TEUs on Roberts Bank = 3,000,000. Total projected vessel transits = $538 + 520 + (624 - 538 = 86) = 1,144$. IF additional vessel transits for Roberts Bank (RBT2 + additional DT: 2,400,000 TEUs + 600,000 TEUs) were based on Deltaport Terminal's 2012 average, total transits would be 896 – an increase of 290 transits. IF based on PMV 2014 avg. TEU per container vessel, total transits would be 1,564 – an increase of 958 transits.

⁵⁹ See Canadian Environmental Assessment Agency news release, April 30, 2015: <http://news.gc.ca/web/article-en.do?nid=969299> (accessed 9/10/15). See also, "Delta South MLA dumbfounded at province's non-response," Delta Optimist, August 21, 2015: <http://www.delta-optimist.com/news/delta-south-mla-dumbfounded-at-province-s-non-response-1.2037369> (accessed 9/10/15).

⁶⁰ Project Proponent: <http://www.robertsbankterminal2.com/environmental-assessment/ea-process/> (accessed 9/10/15).

⁶¹ Project proponent: <http://www.westshore.com/> (accessed 5/2/15).

⁶² See Westshore Terminals Environmental Impact Assessment: <http://www.portmetrovancover.com/docs/default-source/PROJECTS-Westshore/here.pdf?sfvrsn=0> (accessed 5/2/15), page 26: "In 2012, Westshore shipped 26.1 million tonnes of coal in 270 ships."

⁶³ PMV website, Westshore Terminals Project Status: <http://www.portmetrovancover.com/en/projects/OngoingProjects/Tenant-Led-Projects/Equipment-Replacement-Upgrade> (accessed 5/2/15). Note that this webpage gives 3 MMTA as the proposed increase in capacity. This flyer assumes the 2012 actual volume of 26.1 MTPA subtracted from the total capacity of 36 MTA. $36 - 26.1 = 9.9$ MTPA.

⁶⁴ See Roberts Bank Terminal 2 Project - Environmental Impact Statement, Section 4-D.1 Traffic Data Matrix, Roberts Bank Traffic Volumes: SHIP TRAFFIC, page 1: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101382E.pdf> (accessed 5/4/15).

⁶⁵ Westshore Terminals Environmental Impact Assessment: <http://www.portmetrovancover.com/docs/default-source/PROJECTS-Westshore/here.pdf?sfvrsn=0> (accessed 5/2/15).

⁶⁶ PMV website, Westshore Terminals Project Status: <http://www.portmetrovancover.com/en/projects/OngoingProjects/Tenant-Led-Projects/Equipment-Replacement-Upgrade> (accessed 5/2/15).

⁶⁷ Project proponent: <http://www.tsi.bc.ca/content/deltaport> (accessed 5/2/15).

⁶⁸ See Roberts Bank Terminal 2 Project - Environmental Impact Statement, Section 4-D.1 Traffic Data Matrix, Roberts Bank Traffic Volumes: SHIP TRAFFIC, page 1: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101382E.pdf> (accessed 5/4/15).

⁶⁹ Deltaport Project Update, December 2014: <http://www.portmetrovancover.com/docs/default-source/projects-dtrrip/pmv-dtrrip-project-update---december-2014.pdf?sfvrsn=4> (accessed 6/5/15).

⁷⁰ The Globe and Mail, September 1, 2015, "Vancouver Island Malahat LNG project plan includes underwater pipeline," By Brent Jang: <http://www.theglobeandmail.com/news/british-columbia/vancouver-island-malahat-lng-project-plan-includes-underwater-pipeline/article26188850/> (accessed 9/3/15).

⁷¹ Project proponents: "The proposed facility, expected to have a capacity of up to 6 million tonnes per annum (mtpa), would include floating liquefaction facilities moored to the shoreline and minor supporting land-based infrastructure." See: <http://www.steelheadlng.com/proposed-malahat-lng-project/>

(accessed 9/3/15). “In addition to Malahat LNG, Steelhead LNG is also exploring the development of Sarita LNG, a proposed LNG facility with the Huu-ay-aht First Nations at Sarita Bay, BC, on the west coast of Vancouver Island 75 kilometers (47 miles) southwest of Port Alberni, BC. While the first phase of the IGC Project would be constructed to supply the Malahat LNG facility, the Project would be designed to meet the potential capacity requirements of Steelhead LNG’s two proposed LNG facilities” See: <http://co.williams.com/expansionprojects/island-gas-connector/> (accessed 9/3/15).

⁷² The estimated annual vessel transits is based on the vessel transit number per MTPA for the Woodfibre LNG project proposal, which is approximately 38 vessel transits per 1 MTPA. $38 \times 6 \text{ MTPA} = 228$ annual transits. This estimate could be high if the Malahat LNG facility could be accessed by larger LNG carriers than the Woodfibre LNG facility.

⁷³ NEB LNG Export and Import License Applications: <http://www.neb-one.gc.ca/pp/ctnflng/mjrpp/lnxprt/cnc/index-eng.html> (accessed 9/3/15).

⁷⁴ Williams’ Northwest Pipeline project proponent: <http://co.williams.com/expansionprojects/island-gas-connector/> (accessed 9/3/15).

⁷⁵ Project proponent website: <http://gatewaypacificterminal.com/the-project/> (accessed 5/2/15). Original project application materials: <http://www.whatcomcounty.us/993/Gateway-Pacific-Terminal-Proposed-Projec> (accessed 5/2/15). The Scoping Report was issued 3/29/13: <http://www.eisgatewaypacificwa.gov/resources/scoping-report>. Scoping comments and questions: <http://www.eisgatewaypacificwa.gov/get-involved/comment/all>.

⁷⁶ Pacific International Terminals, Inc. Major Project Permit and Shoreline Substantial Development Permit Supplemental Applications, Table 4-2, p. 4-63: <http://www.whatcomcounty.us/DocumentCenter/Home/View/2797> (accessed 5/2/15).

⁷⁷ Vessel transit numbers: Pacific International Terminals, Inc. Major Project Permit and Shoreline Substantial Development Permit Supplemental Applications, Table 4-2, p. 4-63: <http://www.whatcomcounty.us/DocumentCenter/Home/View/2797> (accessed 5/2/15). See also: WA State Ecology’s Gateway Pacific Terminal Environmental Review website: <http://www.ecy.wa.gov/geographic/gatewaypacific/index.html> (accessed 5/2/15).

⁷⁸ WA State Ecology’s Gateway Pacific Terminal Environmental Review website: <http://www.ecy.wa.gov/geographic/gatewaypacific/index.html> (accessed 5/2/15).

⁷⁹ Bellingham Herald, January 5, 2015, “Lummi Nation asks Army Corps to reject Cherry Point coal terminal” By Ralph Schwartz: <http://www.bellinghamherald.com/news/local/article22267380.html>

See also Indian Country Today Media Network, August 24, 2015, “Lummi Chairman: We Will Fight Coal Terminal ‘By All Means Necessary’” by Richard Walker: <http://indiancountrytodaymedianetwork.com/2015/08/24/lummi-chairman-we-will-fight-coal-terminal-all-means-necessary-161503>

⁸⁰ Project proponent: <http://tsocorp.com/refining/anacortes-wash/> (accessed 5/2/15).

⁸¹ Complete vessel transit information for the Tesoro refinery is unavailable. The 2014 Marine & Rail Oil Transportation Study includes detailed information on WA State refinery imports for 2013, including the Tesoro refinery (see Table 33: Summary of Washington State Refinery Imports on page 278 and Table 36: Washington Refinery Refined Product and Crude Receipts 2013 on page 281) but only includes gross data on refinery exports for 2008 and 2011 (see Figure 81: Oil Cargo Exports by Tanker and Tank Barge from Washington Refineries on page 282), which is before any of the refineries’ rail facilities became operational (beginning in 2012). See: <https://fortress.wa.gov/ecy/publications/SummaryPages/1508010.html> (accessed 7/20/15).

⁸² Tesoro Refining and Marketing June 2015 application documents are available here: [Tesoro Clean Product Upgrade \(Xylene Plant\) Application](#) (accessed 8/26/15). The SEPA Checklist states (on page 8): “Included in the proposed CPU Project are plans to: Build an Aromatics Recovery Unit (ARU) capable of producing 15,000 barrels per day of mixed xylenes” $15,000 \times 365 = 5,475,000$ barrels per year. The SEPA checklist also states (on page 9 and 26): “Supplemental feedstock to the ARU will be received from outside sources by marine vessel and unloaded using the existing wharf system. ... Sulfolane, a solvent commonly used in the extractive distillation process, will be used in the ARU.” For more information about xylene see the Center for Disease Control

and Prevention website's NIOSH Pocket Guide to Chemical Hazards: <http://www.cdc.gov/niosh/npg/npgd0669.html> (accessed 8-26-15); and: Kandyala R, Raghavendra SP, Rajasekharan ST. Xylene: An overview of its health hazards and preventive measures. J Oral Max Pathol. 2010;14:1–5.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2996004/> (accessed 8-26-15). For more information on sulfolane see the US National Library of Medicine Toxicology Data Network: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@DOCNO+122> (accessed 8-26-15).

⁸³ Tesoro Refining and Marketing June 2015 application documents are available here: [Tesoro Clean Product Upgrade \(Xylene Plant\) Application](#) (accessed 8/26/15). The SEPA Checklist states (on page 33): "The proposed CPU Project will increase vessel traffic in Fidalgo Bay by up to five (5) marine vessels per month for transportation of feedstock and finished products to and from the existing Tesoro Wharf. The overall vessel traffic will continue to be within the historical annual average and does not constitute a significant change." Historical vessel traffic information is not provided in the current application documents (see also endnote #81). Xylene is not currently exported from the Tesoro refinery.

⁸⁴ Press release posted by Reuters, July 21, 2014, "Tesoro Corporation Announces New Petrochemical Feedstock Project:"

The initial investment, estimated to be around \$400 million, is designed to recover up to 15,000 barrels per day of mixed xylene. The mixed xylene will mainly be exported to Asia and is used to make polyester fibers and films for clothing, food packaging and beverage containers. The global xylene market is growing about 5% to 7% annually, primarily driven by demand in Asia. Tesoro is well positioned as a supplier based on existing logistics and operating cost advantages. "This attractive diversification of Tesoro's product mix supports our goals of enhancing our gross margin and investing in high return capital projects", said Greg Goff, Tesoro's President and Chief Executive Officer. (see:

<http://www.reuters.com/article/2014/07/21/idUSnHUGW4GCqa+1ec+ONE20140721> (accessed 8-25-15))

⁸⁵ Project proponents: Port of Seattle (see <https://www.portseattle.org/About/Pages/Seaport-Alliance.aspx> (accessed 7/30/15)) and Port of Tacoma (see <http://portoftacoma.com/seaport-alliance> (accessed 7/30/15)).

⁸⁶ Northwest Seaport Alliance Strategic Business Plan presentation, see page 12:

[https://www.portseattle.org/About/Documents/Seaport Alliance%20Strategic%20Business%20Plan%20050515.pdf](https://www.portseattle.org/About/Documents/Seaport%20Alliance%20Strategic%20Business%20Plan%20050515.pdf) (accessed 7/30/15).

⁸⁷ Port of Seattle container vessel calls for 2014 = $496 \times 2 = 992$ transits (see

<https://www.portseattle.org/About/Publications/Statistics/Seaport/Pages/Vessel-Calls.aspx> (accessed 7/30/15)). Port of Tacoma container vessel calls for 2014 are not currently available, nor is a total number of 2014 container vessel calls for both ports. Note that some container vessels call at both ports.

⁸⁸ Northwest Seaport Alliance's estimated increase in container vessel transits are based on proposed Roberts Bank Terminal 2's average of 9,231 containers per vessel (2,400,000 TEUs divided by 260 vessels). Seaport Alliance's projected increase of 2,600,000 TEUs divided by 9,231 = 281.65. $282 \times 2 = 564$ annual transits (see Roberts Bank Terminal 2 Project - Environmental Impact Statement, Section 4-D.1 Traffic Data Matrix, Roberts Bank Traffic Volumes: SHIP TRAFFIC, page 1: <https://www.ceaa-acee.gc.ca/050/documents/p80054/101382E.pdf> (accessed 5/4/15)).

⁸⁹ Northwest Seaport Alliance Strategic Business Plan presentation, see page 12:

[https://www.portseattle.org/About/Documents/Seaport Alliance%20Strategic%20Business%20Plan%20050515.pdf](https://www.portseattle.org/About/Documents/Seaport%20Alliance%20Strategic%20Business%20Plan%20050515.pdf) (accessed 7/30/15). See also page 18, Non-Container Forecast: Only liquid bulk is projected to have "High Growth" with all other cargos showing "Flat" or "Modest Growth." No forecast volumes and/or vessel traffic projections provided.

⁹⁰ 2013 Vessel Entries and Transits for Washington State: <https://fortress.wa.gov/ecy/publications/SummaryPages/1408004.html> (accessed 4/30/15).