Memorandum

To: Portland Planning and Sustainability Commission via Eric Engstrum

Subject: Need for New Port Facilities—Comments and Questions

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Over the last four years of participation in Community Working Groups and Advisory Committees related to West Hayden Island marine terminal development, I've seen extensive analysis of natural resource issues, community impact issues, and port facility design but I have seen little detailed analysis of the need for new terminals in the Port of Portland. This memorandum summarizes the information I have gathered and the questions this information raises for the Commission to consider.

My review included: 1. The Historical Performance of cargo handling in the Port of Portland, with a focus on the target commodities requiring new terminals: grain, autos, and bulk Minerals; 2. Need forecasts; 3. Future uncertainties and risks.

Historical Performance of the Port of Portland

Historical performance information is based on the Port of Portland's annual publication of Marine Terminal Statistics. I used the 32 years of statistics from 1981 through 2012.

Total Tonnage and Vessel Calls

Figure 1 has a plot of total tonnage passing through the port for the last 32 years. While there is some scatter in the annual tonnage, a linear-regression analysis provides a trend line showing a positive growth of about 206,000 tons per year. If growth is linear as suggested here, it means that the Port's rate of growth is slowing. A growth of 206,000 tons in 1981 represented an annual growth of 2.8% while 206,000 tons in 2012 is a growth of only 1.5% for the year. This is a significantly different scenario than typically used for forecasting where the annual percentage growth rate is held constant and the resulting growth of tonnage is computed with compound annual growth rates.

The Figure 1 data also shows the number of vessels calling at the port has declined about 50% since the early 1990's. A linear regression of all vessel calls since1985 shows a decline of about 14 vessels a year. I assume the contrast of increasing tonnage with fewer vessels is due to the use of larger vessels. Can these vessels be handled with fewer workers on an annual basis? Has employment in the Port's terminals been declining? Have total payrolls been declining? Will this trend toward larger vessels, perhaps with larger and more labor efficient equipment, continue in future years? What ship sizes and labor

efficiencies were used to compute the future employment and labor salary benefits from WHI development that won't start until 2025 or later?

Total Port Tonnage without mineral bulk tonnage

Figure 2 shows the mineral bulk tonnage as compared to total tonnage. From the tonnage data, it is clear that mineral bulk tonnage has increased dramatically since new terminal equipment was installed in 1988. But more importantly, if we subtract the bulk mineral tonnage from the total tonnage as shown in Figure 2, the total of all other commodities handled by the Port, including autos and grain, has actually **declined** at a rate of 29,000 tons per year for the last 25 years. How can the Port justify new terminals for autos and grain considering this declining performance over the last 25 years?

Grain Tonnage

Figure 3 shows grain shipments from Portland's public terminals. The data is scattered but the trend line shows a **decline** of about 31,000 tons per year over the last 32 years. Closure of the T-4 terminal, increase in T-5 shipments, and international market swings account for much of this variability. If we want financial stability, grain investments over the last 32 years would have been disappointing. Based on the trend line, grain tonnage declined at about -0.6% per year in 1981 and **declined** linearly to about -0.9% in 2012.

Auto units

Figure 4 shows auto unit shipments through Portland's public terminals. The data shows large variations in shipments due to markets, global economic conditions, and the number terminals. Note that due to the current recession current shipments are about the same as shipments in 1981. Again, if we want financial stability, auto terminal investments over the last 32 years would have been disappointing. Based on the trend line, auto imports grew at about +o.43% in 1981 and **declined** linearly to about +0.39% in 2012.

Forecast Issues

--Forecasts of international markets, global economic cycles, business strategies, marine shipping changes and many other factors contribute to estimates of local port performance and growth. Based on the trend lines in Figures1-4 for the last 32 years of slow Port of Portland growth, I assume that every forecast of port growth has been wrong and too high. One of the most dramatic forecast errors occurred in the mid 90's when after a 15 year period of dramatic growth in containers, the Port decided to add a major new container terminal to their permit applications for a West Hayden Island Port. As shown in Figure 5, at almost the same time that the Port decided to build, the container growth stopped and eventually began a 50% decline to where it is today. Fortunately, the Port realized that the market had changed and cancelled their

development plan. If the reversal had come a few years later, we might have had a large empty terminal sitting on the Columbia shore of WHI.

--BST included coal in their mineral bulk forecasts for the lower Columbia River forecasts (including Portland?). This contributed to the large tonnage forecast increases between their 2010 and 2012 reports.

--BTS forecasts for Portland include both public and private terminal facilities while the Port of Portland statistics are for public terminals only. This tends to exaggerate the need for public facilities, especially for grain.

--BTS forecasts are unconstrained meaning that they assume no terminal capacity constraints and no policy constraints (e.g. Portland will not exclude coal from bulk mineral terminals). I believe this allows BTS to allocate future growth to ports based on their historic role in the market place, meaning that future tonnage gets allocated to Portland, even if they don't have the capacity yet. Clearly, if West Hayden Island terminals won't be available until 2025, much of the growth until then will go to other ports, thus reducing the demand for new terminals in Portland. BST's unconstrained forecasting doesn't seem appropriate.

--BTS forecasts used compound annual percentage growth rates for the 32 years from 2008 to 2040 while the last 32 years of actual results from 1981 to 2012 appear to show no compounding of growth. Actual historic rates of growth are much lower than future rates assumed by BST. Using higher growth rates, compounded annually, seems unjustified and will over-estimate future needs.

--By starting with the Port's 2008 data, the BST forecasts start in the last year before the current recession when Port total tonnage, autos, and grain were above their historical trend lines. This allows the forecast to ignore the four down years (so far) of the recession (including the 27% drop in total tonnage between 2008 and 2009) and the years it will take to recover back to 2008 performance levels. Obviously, by beginning compound growth rates from 2080 levels, the forecasts may significantly over-estimate future terminal needs in 2040.

--The end result of BTS' forecasting for 2040 was such a wide range from Low to High that it is virtually useless for port planning. The Low Scenario said there would be virtually no capacity shortfall or new terminal needs while the High Scenario said that capacity shortfall would be more than the total capacity of the existing port and almost 1000 acres would be required for numerous new terminals.

--It appears that ECONorthwest, in their May 2012 Analysis of Capacity and Demand, simply averaged the two BTS extreme scenarios to develop a medium demand scenario for 2040 planning of Portland and Vancouver terminal needs. This was a convenient solution for West Hayden Port planning because it shows a need for three new terminals (autos, grain, and mineral bulk) but it appears that there in no set of future market developments that justify this forecast.

--ECONorthwest made another assumption that may over estimate future terminal needs. They assumed that the capacity of existing Portland capacities terminals will remain fixed and that all future growth beyond current capacities will be at new terminals. Adding capacity at existing terminals by modernization and by adding new facilities is frequently less expensive for the terminal operator than the high cost of developing a new green-field terminal. Columbia Grain at Terminal 5 in Portland has already started a $40 million expansion of their existing Facilities.

Future Uncertainties

--The new Panama Canal opens for operation next year. This canal is much wider and deeper than the existing canal and can accommodate larger ships carrying three times the volume of the existing canal.
These post-Panamax vessels are expected to change the economics of global shipping. A 2012 report by the Army Corps of Engineers' Institute for Water Resources suggests that the canal enlargement may make shipment of Midwest grains and other agricultural goods through Gulf ports to Asian markets more attractive than existing routes, including through the Pacific Northwest. Unfortunately, many of the post-Panamax vessels have drafts near 50ft and will not be able to use the Port of Portland via the 43ft Columbia River channel when fully loaded.

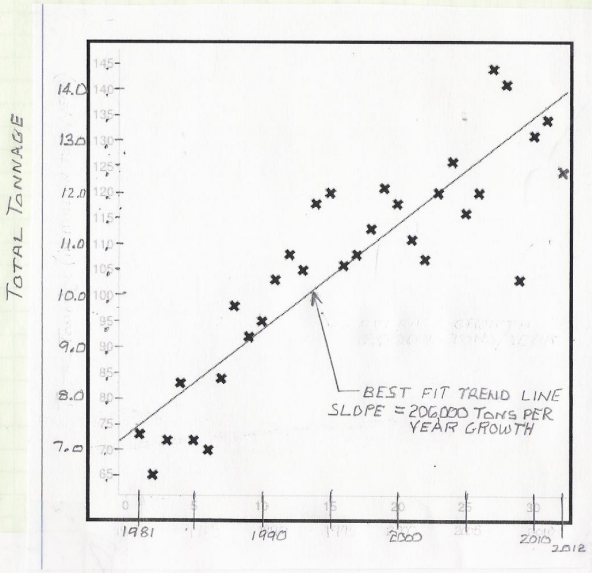
--The Port of Portland may have competition for Midwest grain and for Canadian and Western bulk minerals from a new port in Prince Rupert, British Columbia. That port now has an improved, low-gradient rail access direct to/from the Midwest. It also has an ice-free, 110ft deep harbor that is closer to Asian ports than any other West Coast U.S. ports.

--International markets for autos are changing. Come companies are shifting the assembly operations to the U.S. so West Coast auto imports may slow.

PORT OF PORTLAND

FIGURE 1: TOTAL TONNAGE **Port of Portland Marine Terminal Statistics, 1981 - 2012**

Calendar Year	Vessel Calls	Total Tonnage
1981	N/A	7,358,527
1982	N/A	6,482,768
1983	N/A	7,245,779
1984	N/A	8,268,386
1985	901	7,199,961
1986	893	7,042,011
1987	916	8,411,108
1988	1,001	9,779,216
1989	930	9,226,981
1990	896	9,498,326
1991	983	10,258,314
1992	1,017	10,768,718
1993	1,005	10,482,961
1994	1,024	11,788,821
1995	903	11,996,930
1996	818	10,552,558
1997	906	10,772,620
1998	984	11,330,619
1999	985	12,076,889
2000	913	11,804,776
2001	864	11,052,341
2002	800	10,678,519
2003	832	11,957,917
2004	773	12,581,370
2005	684	11,550,062
2006	792	11,972,031
2007	821	14,415,537
2008	766	14,109,432
2009	501	10,281,130
2010	575	13,121,666
2011	554	13,379,403
2012	544	12,351,569



The above figures apply to Port of Portland public terminals. All tonnage is in short tons. Automobiles are measured in number of units, and containers are measured in twenty-foot equivalent units (TEUs). The volumes reflect cargos loaded to or discharged from ocean-going vessels; cargos received or shipped via inland barge are not included

Port of Portland Marine Terminal Statistics, 1981 - 2011

Calendar Year	Vessel Calls	Total Tonnage	Mineral Bulk Tonnage
1981	N/A	7,358,527	317,996
1982	N/A	6,482,768	327,506
1983	N/A	7,245,779	515,420
1984	N/A	8,268,386	524,314
1985	901	7,199,961	326,769
1986	893	7,042,011	296,039
1987	916	8,411,108	318,857
1988	1,001	9,779,216	869,217
1989	930	9,226,981	1,538,542
1990	896	9,498,326	1,796,879
1991	983	10,258,314	2,103,129
1992	1,017	10,768,718	2,361,791
1993	1,005	10,482,961	2,235,615
1994	1,024	11,788,821	2,131,859
1995	903	11,996,930	2,442,017
1996	818	10,552,558	2,575,454
1997	906	10,772,620	3,201,482
1998	984	11,330,619	3,756,917
1999	985	12,076,889	3,958,237
2000	913	11,804,776	4,219,040
2001	864	11,052,341	4,140,627
2002	800	10,678,519	4,032,277
2003	832	11,957,917	4,519,256
2004	773	12,581,370	4,457,176
2005	684	11,550,062	4,552,436
2006	792	11,972,031	4,319,450
2007	821	14,415,537	5,402,217
2008	766	14,109,432	5,460,421
2009	501	10,281,130	3,130,848
2010	575	13,121,666	5,259,992
2011	554	13,379,403	5,232,883
2012	544	12,351,569	4,800,315

The above figures apply to Port of Portland public terminals. All tonnage is in short tons. Automobiles are measured in number of units, and containers are measured in twenty-foot equivalent units (TEUs). The volumes reflect cargos loaded to or discharged from ocean-going vessels; cargos received or shipped via inland barge are not included

FIGURE 2: TOTAL TONNAGE WITH AND WITHOUT MINERAL BULK

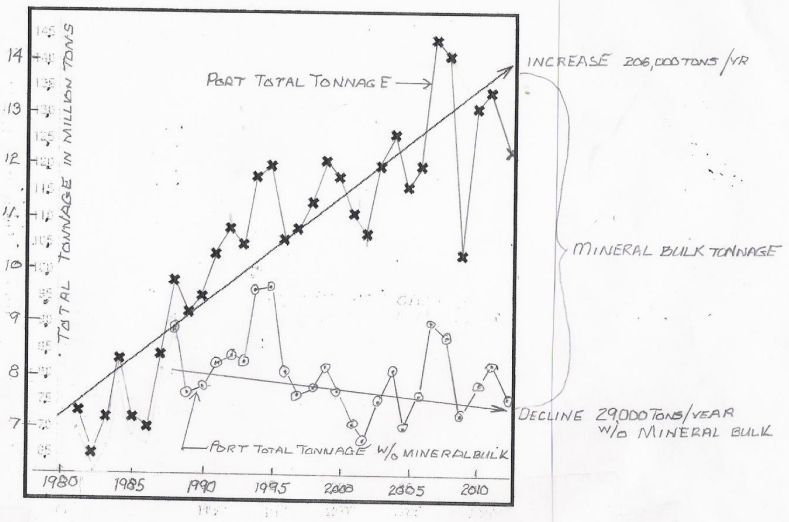
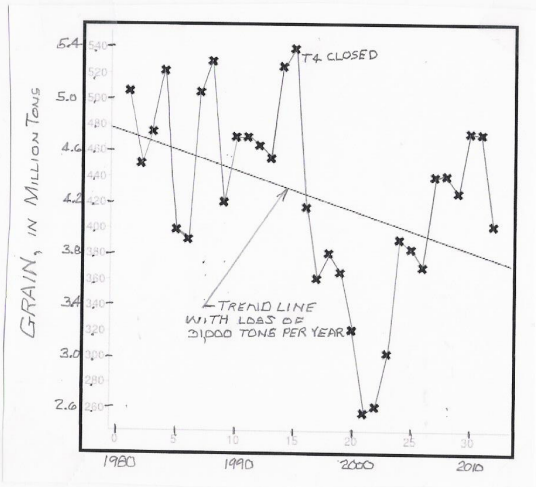


FIGURE 3: **Port of Portland Marine Terminal Statistics, 1981 - 2011** GRAIN

Calendar Year	Grain Tonnage
1981	5,069,467
1982	4,505,017
1983	4,751,707
1984	5,226,227
1985	3,995,604
1986	3,915,913
1987	5,053,527
1988	5,292,648
1989	4,209,716
1990	4,717,519
1991	4,718,840
1992	4,646,490
1993	4,544,028
1994	5,250,964
1995	5,398,942
1996	4,160,264
1997	3,611,323
1998	3,814,156
1999	3,660,089
2000	3,218,310
2001	2,574,336
2002	2,628,578
2003	3,038,142
2004	3,911,093
2005	3,849,039
2006	3,705,953
2007	4,406,529
2008	4,410,476
2009	4,282,011
2010	4,749,475
2011	4,739,669
2012	4,020,663



The above figures apply to Port of Portland public terminals. All tonnage is in short tons. Automobiles are measured in number of units, and containers are measured in twenty-foot equivalent units (TEUs). The volumes reflect cargos loaded to or discharged from ocean-going vessels; cargos received or shipped via inland barge are not included

FIGURE 4: **Port of Portland Marine Terminal Statistics, 1981 - 2011** AUTOMOBILES

Calendar Year	Automobile Units
1981	263,117
1982	260,238
1983	270,928
1984	308,884
1985	341,274
1986	411,608
1987	373,916
1988	392,212
1989	327,522
1990	302,652
1991	289,191
1992	272,958
1993	238,300
1994	294,145
1995	233,807
1996	204,542
1997	254,650
1998	245,821
1999	308,813
2000	345,772
2001	356,516
2002	394,776
2003	366,383
2004	358,682
2005	354,976
2006	463,557
2007	449,307
2008	407,803
2009	240,683
2010	264,871
2011	234,048
2012	284,138

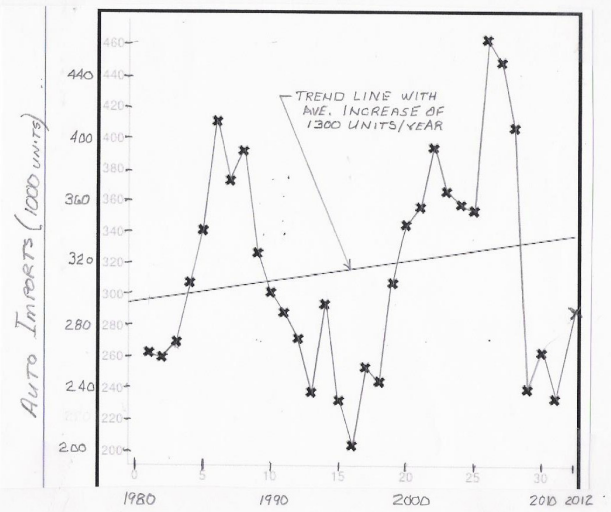


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FIGURE 5: **Port of Portland Marine Terminal Statistics, 1981 - 2011**

Calendar Year	Container TEUs Total
1981	78,799
1982	73,019
1983	101,011
1984	125,762
1985	137,884
1986	124,998
1987	139,824
1988	164,606
1989	186,027
1990	162,933
1991	175,900
1992	217,422
1993	239,439
1994	317,961
1995	329,747
1996	302,171
1997	294,930
1998	259,308
1999	293,262
2000	290,943
2001	278,491
2002	255,745
2003	339,571
2004	274,609
2005	160,479
2006	214,484
2007	260,128
2008	245,459
2009	174,203
2010	181,100
2011	197,446
2012	189,203

TOTAL CONTAINERS