TESORO SAVAGE VANCOUVER ENERGY DISTRIBUTION TERMINAL DEIS INDEPENDENT REVIEW

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We have completed an independent review of the Draft Environmental Impact Statement (DEIS), dated November 2015. Our review focused on socioeconomic findings contained in sections 3, 4, and 5, as well as *Appendix O: Assessment of Vancouver Energy Socioeconomic Impacts: Primary Economic Impacts* prepared by the Analysis Group (July 28, 2014). This report includes a summary of general comments on the DEIS, as well as more detailed commentary on the reviewed sections.

I. Purpose of Independent Review

The purpose of this independent peer review of portions of the DEIS is to assess the quality and credibility of the documents prepared. Specifically, this review addresses the DEIS' accuracy, completeness, consistency, and technical soundness of methods and analysis used to assess socioeconomic impacts.

In conducting this review, the following questions are considered:

- *Are the appropriate methods employed to fully evaluate the extent of economic and social impacts of the proposed projects?*
- *Are the reviewed chapters of the DEIS internally logical, complete, and consistent?*

II. Organization of Comments

As outlined in our analysis, the DEIS in its current form significantly mischaracterizes the socioeconomic impacts of the proposed facility and its ongoing operation. In general, the report systemically overstates benefits while ignoring offsetting negative impacts. Table 1 provides a summary outline of comments from our independent review of the DEIS. Each of these issues is discussed in greater detail within the body of this review.

Table 1: Summary of Independent Review Findings

Issue #	Summary of Review Comments
1	The cumulative economic impact analysis fails to evaluate the full range of impacts, and does not represent a "net" impact analysis.
OVERSTATEMENT OF SOCIOECONOMIC BENEFITS	
2	The DEIS fails to incorporate findings with economic implications in other portions of the document into the socioeconomic analysis.
3	The Primary Economic Impacts Analysis included in Appendix O overstates positive impacts. This includes categorizing indirect impacts as primary impacts, as well as overstating the likely capture of employment in Washington State.
4	The economic impact analysis fails to consider alternative uses of the site.
5	There is no recognition of the risk inherent in assuming ongoing operation of a facility of this sort in light of significant shifts in international prices. The assumed 16-year lifespan of the operation is not consistent with the terms of the facility lease.
UNDERSTATEMENT OF NEGATIVE IMPACTS	
6	Economic impact analysis does not consider the impact of likely reduced property values along the corridor associated with increased traffic as well as hazardous cargo.
7	The potential negative economic impact on tourism is not addressed.
8	The economic and fiscal losses associated with potential environmental damages are not considered in assessment of economic impacts.
9	There is no recognition of the risk inherent in assuming ongoing operation of a facility of this sort in light of significant shifts in international prices.
10	No consideration is given to the impact on other shippers due to rail system congestion.
11	The likely negative impact on property values associated with traffic from the corridor has significant economic and fiscal implications which are not considered.

III. Review of the DEIS, Socioeconomic Findings

a. Overview of Deficiencies in DEIS To-Date

The DEIS evaluates a broad range of issues and areas of impact, but we find that individual components of the report do not appear to consider the full range of findings. As an example, while the economic and fiscal impacts of the proposed facility are addressed in a limited way in section 3.16, the analysis does not incorporate the findings of other sections that indicate significant related socioeconomic impacts not considered in this section. The resulting summary of conclusions reflects only the reiteration of a limited scope analysis produced by the applicant, and not a true ***net*** impact analysis.

Impacts that at a ***minimum*** should be considered as part of producing a net impact analysis include:

- *Impact of the loss of capacity and/or increased delays on key segments of the rail system, which will impact other potential shippers (3.14.6, Significant Unavoidable Adverse Impacts)*
- *The economic and fiscal impact of alternative uses for the site*
- *The economic and fiscal impact of a reduction of property values and achievable pricing along the rail corridor, as well as in downtown Vancouver*
- *Impacts to tourism, associated with increased traffic and potential environmental degradation, which would be both economic as well as fiscal*
- *The potential for economic and fiscal losses associated with environmental damages, including impact to fisheries, tourism and recreation*
- *Potential life safety risks*

The analysis incorporated into the draft EIS represents **only positive** impacts claimed by the proponents, and makes no attempt to quantify and balance the range of negative socio-economic impacts of the proposed facility and operations. This unbalanced presentation is both misleading and inconsistent with the remainder of the DEIS, which does document these issues.

The findings of cumulative impact summarized in section 5.17 reflect an incomplete assessment of socioeconomic impacts. The findings merely repeat those contained in Appendix O, a report which does not even purport to represent a cumulative impact, only a claimed primary economic impact. It does not include ***any*** consideration of the aforementioned issues that would be expected to have substantive impacts, despite discussion of these potential impacts in other portions of the DEIS.

The DEIS cites literature review with respect to property value impacts (3.16.1.4), which it states is included in Appendix O. We did not find this review in Appendix O, nor did we find any incorporation of impacts on property values included in the analysis. It is our assumption that the DEIS is referring to a supplemental report prepared by The Analysis Group, which does not appear to have been included in the DEIS. In any case, while the literature review cites significant negative impacts on value associated with

the increased levels of traffic as well as at-grade crossings, the DEIS at this point completely ignores any negative impacts.

b. Overstatement of Benefits

IMPlan Analysis

Appendix O of the DEIS is a report prepared by The Analysis Group for Tesoro's submission. The report utilizes the IMPlan model to calculate economic impacts from the Tesoro project. This model is an input-output model which calculates indirect and induced impacts associated with a defined event, which is referred to as "direct" effects. In this case, the defined event was the construction and operation of the proposed terminal.

It is clear that the analysis takes Tesoro's application at face value for its assumptions, any of which can be questioned. For example, the analysis assumes a 16-year lifespan for the Tesoro facility. This appears to be inconsistent with the terms of Tesoro's lease with the Port of Vancouver, which sets a ten-year initial lease period with two five year optional renewals. The analysis also appears to adopt the application's use of off-site related employment as direct employment, which overstates the impacts of the facility. This overstates impacts, as it incorrectly categorizes indirect impacts as direct impacts. When using an input-output approach, overstating direct impacts will lead to a commensurate overstatement of indirect and induced impacts.

The accuracy of the model depends upon the particular assumptions and inputs to the model, which are not ascertainable from the summary report provided. An example is the report's calculation of economic benefits associated with lease revenues to the Port of Vancouver and local taxes. This is a somewhat unusual approach which can be verified only with review of the detailed output from the IMPlan model.

More importantly, as discussed throughout this review, the report does not represent a "net" analysis of impacts from the proposed facility. It does not account for any negative impacts on impacted properties, potential alternative use of the leased property, the impact associated with dedication of rail capacity to this use at the potential expense of alternative uses, and the likelihood that an alternative location for an oil export terminal is one likely result if the Vancouver proposal does not go forward. The analysis acknowledges some but not all of these issues, and makes no effort to substantively address these significant omissions.

No Evaluation of Alternative Uses of Site

Appendix J contains a significant caveat on Page 5, which outlines and acknowledges a significant shortcoming in the analysis:

> *We do not explicitly model scenarios in which another industrial activity is undertaken in place of the Project. In principle, an alternative Port use could result in impacts that are larger or smaller than those from the Project depending on a range of factors. While we do not consider alternative*

uses, one factor suggesting that the Project could have greater impacts than an alternative use is the Port's conclusion that a crude-by-rail facility would provide the Port with greater revenue streams than other uses. Revenues to the Port affect overall economic impacts to the regional economy because these revenues would be used to either increase operations at the Port or increase investment in additional construction by the Port, both of which would increase primary positive economic impacts.

This is an important gap in the analysis. While the report cites a "net effect", determination of a net effect would at a minimum require an assessment of the impact of alternative use of the property, as this development will preclude alternative uses of the property. As an example, if the purported impact of the facility is 1,000 direct and indirect jobs, but that development precluded an alternative use that would have supported 600 direct and indirect jobs, the "net" impact would be 400 jobs. While the caveat proposes that the crude-by-rail facility provides greater expected revenue streams which indicates a greater economic impact of this use, this is neither necessarily true nor does it address the fundamental requirement of assessing alternatives uses in order to generate a "net" impact.

The City of Portland commissioned a study by ECONorthwest and Maul Foster & Alongi in 2012, which concludes that the Port of Portland's existing marine terminals have insufficient capacity to meet mid- to long-term needs. The report notes that these needs could be met through a new marine terminal at the Port of Vancouver. While the forecasts included a wide range of potential terminal needs, under the high growth scenario the current regional inventory appropriate for these facilities is seen as insufficient to accommodate demand.[1]

For ongoing impacts, the report includes the impact of revenue streams from property taxes and Port of Vancouver lease payments, which combine to total over $47 million annually. While we may question if the revenue streams to a public agency will have the same proportional impact as private sector income, the more relevant issue is again the "net" impact, as no alternative use of the property and the associated revenue streams is evaluated. In addition, the report doesn't address negative impacts on property tax revenues associated with likely reductions in value of properties impacted by the increased rail traffic. In addition, this is a double count, as the payments are part of the operations of the facility, and are already reflected in the IMPLan calculations under operating costs.

Overstatement of Construction Capture in Washington State

The summary of construction impacts (Table ES-1) shows direct impacts with labor income and economic value added being identical at $31.4 million. Apparently the assumption here is that all construction labor is completed by local firms, a highly questionable assumption in a county that serves as part of a much larger metropolitan area. Based on second quarter 2015 data from the Bureau of Labor Statistics, Clark County accounts for only 22.3% of construction employment in the Portland-Vancouver-Hillsboro MSA, and only 16.3% of industrial building construction. While we expect that Clark County

[1] ECONorthwest, Portland Harbor: Industrial Land Supply Analysis, June 2012

firms will have a competitive advantage due to proximity, the likelihood of all construction work being captured locally is quite low.

QCEW, 2Q-2015		Portland-Vancouver Hillsboro MSA	Clark County, WA	% of MSA Total
Construction Employment		43,763	9,754	22.3%
23621	Industrial Building Construction	689	112	16.3%
237	Heavy and Civil Engineering Construction	3,331	1,406	42.2%
238	Specialty Trade Contractors	29,044	6,524	22.5%

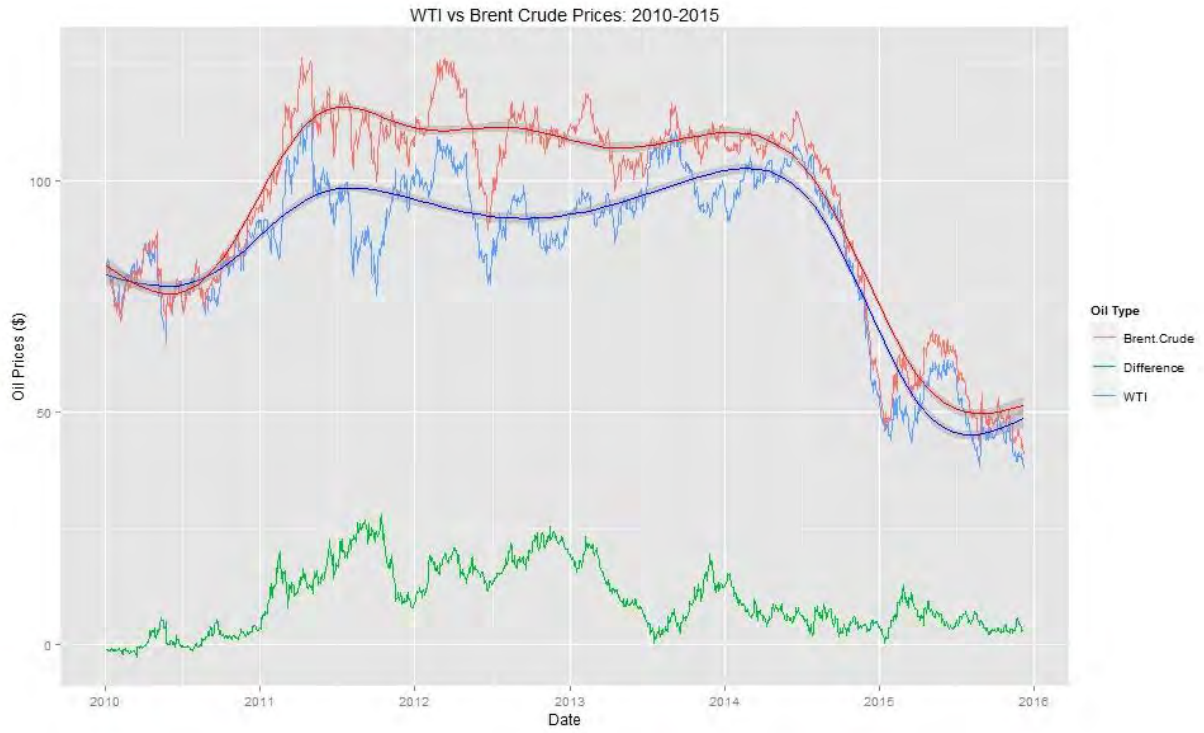
In addition, construction apparently provides no profit, as the labor income and economic value added are identical (Table 4, Page 12). This appears to be either an error or a highly unusual assumption.

No Assessment of Risk in Operational Patterns

The analysis also completely omits a discussion of the long term prospects for the facility. Transportation by rail of crude oil is both more hazardous as well as less cost effective, and this mode of transport is likely only a temporary solution that could eventually be replaced by pipeline infrastructure.[2] There is considerable risk that future pipeline improvements will substantially reduce the need for rail transportation of crude oil, reducing the use of the facility. Rail has benefited vis-a-vis pipelines in the short term due to greater political expedience, but this is likely only a short-term advantage. The analysis should at least address the significant risk that the assumed level and duration of activity will not be as great or as sustained.

In addition, the economics of crude production have been shifting rapidly. At the time that this process was conceived and the operational projections were produced, crude prices traded in the range of $100 to $120 per barrel. Since that time, the market has largely collapsed, with crude prices now trading below $40 per barrel and many analysts expecting pricing to decline further in 2016.

[2] Furchtgott-Roth, Pipelines are Safest for Transportation of Oil and Gas, Manhattan Institute, June 2013



Bernstein Research finds that roughly a third of U.S. shale production would be uneconomical if oil prices were to fall to $80 per barrel. The following is a summary of analysts' estimates of break-even oil prices for various shale fields in North America.

- "The U.S. E&P industry needs (more than) $90 NYMEX, about $100 Brent, oil prices to maintain the current oil rig count of 1,500 to 1,600 rigs, with is intrinsic to our U.S. oil production outlook"[3]
- "Our analysis suggests that the average breakeven for our E&P coverage is $70 per barrel, well below our $90 per barrel marginal cost" "Our estimate for the marginal cost of oil remains $90 per barrel WTI and $100 per barrel Brent"[4]
- "We estimate that about a third of U.S. shale oil production is uneconomic at $80 per barrel WTI"[5]
- "We estimate $73 as the weighted average breakeven point for U.S. supply"[6]
- "If the crude oil market believes a price-driven market share war is underway and 2015 demand growth will be meaningfully lower than prior expectations, then our updated view is that U.S.

[3] KLR Group, October 22, 2014

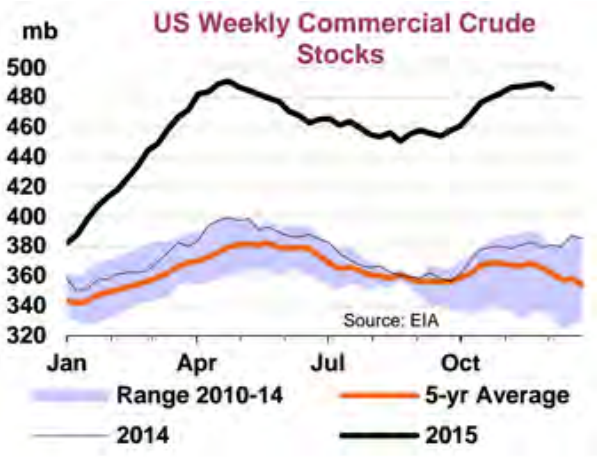
[4] Morningstar Inc., October 21, 2014

[5] Bernstein Research, October 20, 2014

[6] Robert W. Baird Equity Research, October 14, 2014

onshore 2015 E&P budgets would need to be trimmed so as to moderate production growth relative to lower demand expectations."[7]

The commercial crude stock in the US is at all-time highs, and OPEC appears to have lost its ability to control production. In addition, Iranian crude is expected to start entering the market in the next year, as sanctions are removed. As a result, there is little structural indication that crude pricing will rise again to the levels seen in the previous decade. Russia has recently stated an expectation of pricing in the $40 to $60 per barrel range through 2022.



We note the preceding to recognize that the global market is highly dynamic, and assumptions based on anticipated production levels should also recognize the highly volatile nature of this market and the significant risk that forecasts of local economic activity predicted on activity in this market will not be met. While there is much debate regarding the impact of oil pricing on production, this risk should be addressed in any analysis.

c. Understatement of Negative Impacts

Impacts of Rail Volume and Increased Hazard on Property Values

The DEIS primarily relies on two hedonic studies to conclude that:

> *Based on existing empirical research analyzing the impact of changes in the volume of rail traffic on property values, we find that the additional rail traffic from the development of the Project, to the extent any exists, would be expected to reduce residential property values near the existing rail lines by 0 percent to 1.5 percent, with impacts diminishing as distance from the rail line increases. While there are differences between the circumstances of the Project on Vancouver and Washington State and the circumstances considered in these studies, the best available research indicates that the Project is unlikely to have significant impacts, if any, on property values due to increased volume of rail traffic.*

The studies chosen to support this finding are limited in their applicability to the proposed use, as they addressed changes in the volume of rail traffic but not the nature of the cargo. As noted in the Supplemental Report on page 6, footnote 15:

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[7] Wells Fargo Securities, October 13, 2014

These estimated effects reflect the specific types of freight that were transported along the rail lines studied, which likely reflects a diversity of cargo. To the extent that impacts for particular types of cargo would impose greater or lesser impacts, these results would not reflect such differences. We identify no previous empirical research that attempted to evaluate the effects on property values of changes in the volume of crude oil traffic specifically.

The proposed new terminal would result in a profound change in the nature of existing cargo along rail lines in the Vancouver area, with the incremental increase in traffic almost exclusively volatile crude oil shipments. In addition, the function of the rail traffic would also change, with the incremental increase in traffic no longer elevated at the site but routed to an at-grade spur line immediately adjacent to the planned Vancouver Waterfront development.

In order to accurately address the impacts from the proposal, these impacts must be evaluated and not dismissed summarily. In light of the length of the rail corridor, even a minor impact of 1.5% has a very large economic and fiscal impact. For a homeowner with a property valued at $400,000, this would translate into a reduction in value of $6,000, which is likely to be considered by the owner to represent a "significant impact". Properties in the rail corridor impact area has an estimated aggregate real market value of $5.7 billion in Clark County alone.

As part of our evaluation of the projected impacts of the proposed changes in rail configuration and traffic associated with Tesoro's proposed crude oil depot, Johnson Economics prepared a literature review of available studies which attempted to quantify similar impacts. While the available analysis is limited, it is largely consistent in finding negative impacts on pricing associated with rail lines and/or increased rail traffic. The following is a summary of some relevant available studies.

The Effect of Freight Railroad Tracks and Train Activity on Residential Property Values (2004)

Robert A. Simons and Abdellaziz El Jaouhari

A survey of potential homebuyers of inner-city homes in Cleveland inspired this study. In the survey, people were asked to rate (on a scale of -3 to 3) the desirability of a number of different factors, such as views of Lake Erie, affordability of housing, and proximity to a parks, train tracks and factories. Of the 19 factors studied, being next to a train track (with roughly 15 trains per day) rated the 4th worst with an average survey score of -2.067.

Not surprisingly, in studies the authors cited, the most negative aspect about living next to train tracks is the noise from train horns; it was negative enough for 14% of people living within 1,000 feet of tracks would consider moving. Though frustrating to residents, the USDoT found that horns could reduce accidents by 69%.

A study in rural Ohio found property values decreased 2.1% and 2.8% in two different towns studies, respectively, for each additional rail line within 0.25 miles, a number that is exacerbated if

houses are near crossings. A referenced study done in Norway found that properties within 100 meters saw their values decrease by 7 to 10%.

Simons and El Jaouhari found that houses below 1,250 square feet were significantly less valuable when next to a train track. These houses saw property values diminish in the 5 to 7% range. Larger houses showed decreases in the regressions, but the results were not significant.

In 1997, two train companies in the area acquired a third company and planned on reconfiguring the lines. The authors studied how freight trips affected housing prices before and after the consolidation/ expansion. Before the reconfiguration occurred, the train trips had no significant impact on home sales. However, after it happened there was a significant negative impact on prices. Small homes (under 1,250 square feet) saw their prices drop $194, $85 and $94 per trip depending on whether they were within 250, 251-500, or 501-750 feet from a track, respectively. Medium sized units (1,251 – 1,700 square feet) within 250 feet of a track saw home prices decrease $262 for each freight trip.

These negative impacts were assumed going into the reconfiguration. As a results, the cities of East Cleveland, Cleveland and Lakewood received total payments from the train companies just under $30 million to go towards noise reduction and other improvements.

Planes, Trains and Automobiles; The Impact of Traffic Noise on House Prices (2002)
Dr. M.A.J. Theebe
A study undertaken by Dr. M.A.J. Theebe at the SBV School of Real Estate in Amsterdam, The Netherlands looked at how noise levels affected housing prices. The Netherlands has strict noise pollution controls in place. The so-called Noise Nuisance Act allows maximum levels of 70 decibels (recorded at properties at a certain distance) generated by road, rail and air. To reach these levels, the installation of rail dampers and European requirements for new trains to have composite brake blocks rather than cast-iron brake blocks has lowered decibel levels by roughly 10.

Dr. Theebe's study covered most of the western provinces in The Netherlands, including the major cities of Amsterdam, Utrecht, Rotterdam and Den Haag (The Hague). The study assumed baseline noise levels of 56 to 60 decibels. House prices were unaffected until a level of 66 to 70 decibels (dB) were reached. At this point, house prices declined 0.7%. This jumped to a negative 3.9% decrease at 71 to 75 dB and 5.2% decrease at noise levels greater than 76 dB. The effects were more pronounced at areas with higher average incomes; as a comparison, the decrease of prices at the highest noise level for these areas was 7%, significantly higher than the average.

Dr. Theebe estimated that if a property in an area with noise levels greater than 76 dB changed into a neighborhood with levels lower than 40 dB (the smallest category in the study), prices would increase by 9.2%.

The Impact of Rail Transport on Real Estate Prices: An Empirical Analysis of the Dutch Housing Markets (2006)

Debrezion, Pels & Rietveld

This study looked both at housing price effects due to distance to stations and distance to rails. As the study evaluated commuter light rail studies, houses closer to stations saw premiums. However, those that were close to rails and not stations showed completely opposite results. In line with some of the other results seen above, homes located within 250 meters of a railroad line were roughly 5% less expensive than those located at distances of 500 meters or more. Those between 250 and 500m were roughly 3 to 3.5% less expensive than the > 500m group.

While the authors cannot pinpoint the exact reason, they speculate that it is most likely due to noise.

Externality Effects on Residential Property Values: The Example of Noise Disamenities (2006)

David Clark

The author looked at the impacts of trains on house prices in a three county area (Butler, Trumbull and Middlesex) in Ohio. Using a hedonic pricing methodology that takes into account a number of home, neighborhood and other variables, regressions were run to see the impact of living within 1,000 feet of a Conrail rail line or within 2,320 feet of a Conrail rail crossing (the point at which train engineers must start blowing their horns in the area).

The rail variables showed significant, negative impacts on home prices. Homes in the three counties within 1,000 feet of a rail line saw price drops of 6.8%, 6.33% and 8.98%, respectively. Homes near crossings had even greater price drops. Butler and Trumbull homes in these areas saw property values 8.71% and 9.01% less than those outside of the crossing radius. Homes in Middlesex County did not see a significant decrease in the regression.

The Relationship Between Property Values and Railroad Proximity: A Study Based on Hedonic Prices and Real Estate Brokers' Appraisals

Jon Strand, Mette Vågnes

This study looked at the relationship between the price of residential property value and proximity to railroads in Oslo, by two different methods, namely a) through a hedonic price study where the statistical relationship between property prices and railroad proximity is estimated, and b) through a multi-attribute utility investigation of real estate agents' evaluation of such a relationship. We find in both cases that there are strong effects of proximity to railroad lines on property prices, at distances less than 100 meters from the lines. Their estimates indicate that a doubling of the distance from the railroad line, within a 100 meter bound, increases the property price by about 10%. With real estate agents only a linear relationship is probed. This yields an increase in the price of an average relevant housing unit by about 182,000 NOK, due to an increase in the distance to a railroad track from 20 to 100 meters. The equivalent figure from the

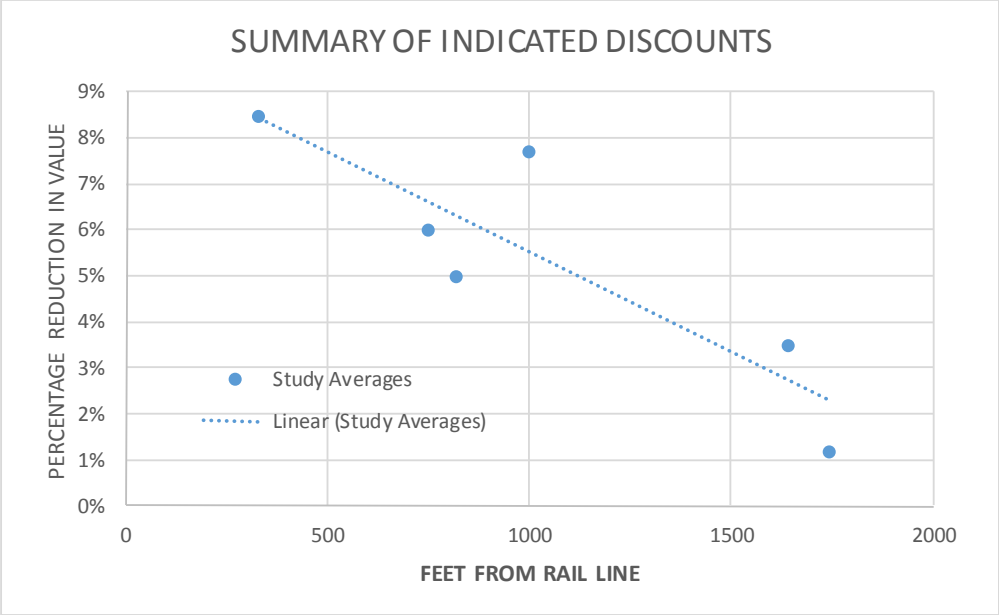
statistical study is in the range 120–150,000 NOK. The two figures are thus of the same magnitude.

The studies reviewed found statistically significant negative impacts on pricing associated with rail lines and/or increased rail traffic. These findings were also reinforced by the two studies cited yet ignored by the DEIS (Simons and El Jaouhari, and Futch). The following matrix summarizes the general findings of the outlined studies:

TABLE 2: SUMMARY OF PROPERTY VALUE IMPACTS FROM LITERATURE REVIEW

Study	Area of Impact	Level of Impact
Simons and El Jaouhari	750' from track	5% to 7% decrease
Clark	1000' from track, 2,320' from crossing	6.3% to 9.0% decrease
Strand and Vagnes	330 feet	7% to 10% decrease
Debrezion, Pels & Rietveld	250 meters and 500 meter (820 and 1,640 feet)	5% decrease within 250m, and 3.5% discount within 500m
Theebe	Noise range	0.7% to 9.2% discount, depending upon noise levels
Futch	1/3 mile 1/3-2/3	0.6% reduction per 100 million gross tons 0.6% reduction per 100 million gross tons

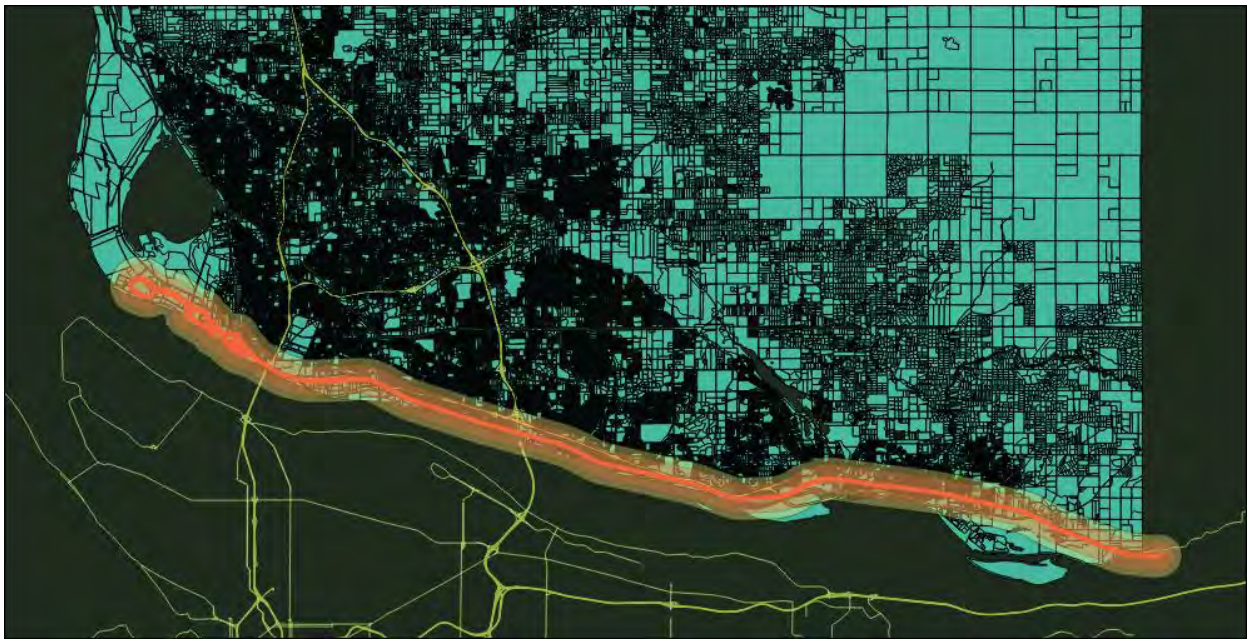
Applying the findings of the available research to the proposed Tesoro project is dependent upon a number of variables. These include issues such as at-grade crossings, train horn practices, traffic patterns on the elevated as well as at-grade spur and projected noise levels. In addition, none of these studies address the elevated risk hazard associated with crude oil transport. For potential developments sites such as the Waterfront Vancouver, the additional at-grade crossings would be expected to sharply increase the negative impact of the increased traffic.



The studies indicate a fairly consistent finding of negative impact on values, which as would be expected is greater at closer proximity to the tracks.

The implications of this expected reduction in values is highly significant. As shown in the following map, our office evaluated what the impact would look like in Clark County, which represents only a small portion of the overall corridor. The areas of defined impact in this analysis were 1/3 and 1/5 miles from the rail line (1,742.4' and 2,640').

AREA OF IMPACT, 1/3 AND 1/5 MILES FROM TRACK



Clark Couty GIS

The DEIS refers to a potential impact of up to 1.5% within a one-mile radius, which was also evaluated as a potential area of impact. A visual representation of this impact area is shown in the following map.

AREA OF IMPACT, 1-MILE FROM TRACK

While the area of impact evaluated was limited to Clark County, the impact on values associated with negative externalities from the incremental increase in train traffic would be expected to be experienced

along the entire corridor. For the purposes of this analysis, we limited the evaluation to Clark County. We would expect that the final EIS would extend a similar analysis to the entirety of the impact area.

Properties within these areas of impact were identified, including their estimated Real Market Value (RMV) and taxable value based on the most current assessor records. We modeled the expected loss of value in the impact area based on a range of assumptions regarding the percentage reduction in value and the assumed impact area. The following table summarizes the results of this analysis:

TABLE 3: SUMMARY OF IMPACTS OF REDUCED PROPERTY VALUE, CLARK COUNTY IMPACT AREA

Assumed % Impact	**-1.50%**			**-5.00%**		**-7.00%**	
Assumed Impact Area	**1 mile**	**1/3 mil**	**1/2 mile**	**1/3 mile**	**1/2 mile**	**1/3 mile**	**1/2 mile**
RVM Impact (Million $)	-$147.59	-$63.93	-$84.96	-$213.08	-$283.21	-$298.32	-$396.50
Taxable Value Impact (Million $)	-$121.36	-$47.78	-$66.36	-$159.27	-$221.19	-$222.97	-$309.67
Annual Property Tax Impact ($000s)	-$1,855.7	-$730.6	-$1,014.7	-$2,435.4	-$3,382.3	-$3,409.5	-$4,735.3
State of Washington	*-$270.0*	*-$106.3*	*-$147.6*	*-$354.3*	*-$492.0*	*-$496.0*	*-$688.8*
Clark County	*-$400.8*	*-$157.8*	*-$219.1*	*-$526.0*	*-$730.5*	*-$736.4*	*-$1,022.7*
Municipal	*-$339.8*	*-$133.8*	*-$185.8*	*-$445.9*	*-$619.3*	*-$624.2*	*-$867.0*
School District	*-$621.4*	*-$244.7*	*-$339.8*	*-$815.5*	*-$1,132.6*	*-$1,141.7*	*-$1,585.7*
Other	*-$223.8*	*-$88.1*	*-$122.4*	*-$293.7*	*-$407.9*	*-$411.2*	*-$571.1*

As outlined, the impact of even a very small reduction of 1.5% is quite high, reducing real market values in a 1-mile study area by almost $148 million. Our analysis indicates a more likely value impact of 5.0% within a 1/3 to ½-mile radius, which would represent a loss in value along this corridor of between $213 and $283 million. The fiscal implication of this loss would be a reduction of between $2.4 and $3.4 million per year for affected taxing jurisdictions. Over the 16 year operating period assumed in Appendix O, this would reflect a reduction of between $36 and $50 million in property tax revenues from this section of the impact area.

As noted earlier, our analysis addresses only the Clark County portion of the rail corridor. The impact on the entire corridor would be significantly greater if evaluated, an analysis which should be included in the final EIS. While discounted in the DEIS as "insignificant", the impacts are actually quite significant, even when the analysis is limited to only Clark County.

The preceding analysis does not adequately address the expected substantive impact on development patterns in downtown Vancouver, most notably in the Waterfront Vancouver and the Port of Vancouver's property at the former Red Lion facility. This is dealt with in much more detail in a study our office completed in December 2013.

Additional Literature Review of Hazard Impacts

Additional literature review was also conducted to evaluate impacts of increased risk on property values. This reflect the fact that the proposed cargo entails significant risk hazard, which would be expected to impact values to a greater extent than simple rail traffic. While the findings of these studies have not been included into our calculations of impacts, nor the assumptions used in the DEIS, they clearly support the proposition that perception of hazard has a negative impact on property values, which would be above and beyond that associated with the negative externalities of rail traffic alone. The final EIS should at a minimum recognize these impacts, and more appropriately make some effort to evaluate them.

The Economic Impact of a Transient Hazard on Property Values: The 1988 PEPCON Explosion (1996)

Carroll, et al.

In their literature review, the authors pointed to several studies pointing to perceptions of risk on property values. The studies vary from effects of overhead power lines to hazardous waste facilities. In all instances, there was a negative correlation with the perceived risk from these nuisances and home values. A survey in 1992 showed that appraisers believed overhead power lines caused as much as a 10% decline in property values nearby. While poor aesthetics played a major role, nearly 60% believed that perceived risk of power lines on health were to blame.

A 1982 paper by Gamble and Downing showed that property values increased $163 for every mile a property was away from the Three Mile Island nuclear facility in Pennsylvania before the meltdown. They saw no shift in this after the accident, *suggesting that the risk of such an accident was already built into the pricing structure.* Another study found that prices of homes closer to the facility (within five miles) appreciated more slowly than those farther away. This negative relationship can be seen again with property values near hazardous waste facilities. A study by Smolen in 1992 showed property values increased *$12,000* for every mile father away from a hazardous waste facility. This relationship was consistent up to nearly 6 miles away from the facility. This effect has been seen in numerous other studies.

The authors' study looked at the housing prices before and after a chemical plant explosion in Nevada. They found that prior to the accident, home prices close to the facility were depressed by roughly 6%. Prices dropped even further after the explosion, but quickly rose when it was found out that the facility would not be rebuilt in its old place, but rather in a city in Utah. The main takeaway is that buyers are cognizant of potential risks and factor them into their bids, accordingly.

Undesirable Facilities and Property Values: A Summary of Empirical Studies (1997)

Stephen Farber

The author points to a 1991 study done outside of Toledo, Ohio. In the study, house prices increased $9,000 to $14,000 for every additional mile a property was away from a hazardous waste

facility. In this study – and other similar ones – it is interesting to note that the marginal effects are greater in smaller, rural areas as opposed to larger, urban areas.

Stephen Farber illustrated the marginal effects of 25 different studies in a table in this paper. Nineteen of the studies showed negative effects of hazardous facilities and incidents on home values. Four of the studies showed some negative effects, while only two showed no effects at all. Rumors for the building of sites such as hazardous waste facilities were enough to bring home prices down between $2,057-$2,759 (in 2015 dollars).

Nuclear Waste Transport and Residential Property Values: Estimating the Effects of Perceived Risks (2000)
Gawande and Jenkins-Smith
and
The Long-Run Impact of Nuclear Waste Shipments on the Property Market (2012)
Gawande, Jenkins-Smith and Yuan

The authors looked at the transport of spent fuel rods through three different communities in South Carolina between the years 1994-1996. Effects varied based on the nature of the three different communities, showing that perceived risk from the transportation of hazardous materials varied. In Aiken County, SC, there were no significant impacts on home values. Aiken County, however, happens to be home to the Savannah River Site, a nuclear reservation. The site provides thousands of jobs. The authors note that, because of this, Aiken County residents better understand the risks associated with spent nuclear fuel rods and, thus, did not devalue property based on whether or not a home was close to the transit corridor for the material.

In Berkeley, another relatively rural county, property values did diminish during the period of time that the trains were moving through the area, but rebounded upon completion of the last shipment. This One reason for this could be that, because the area is less densely populated than an urban area, people were quick to forget about the issue: out of sight, out of mind. However, in the very urban Charleston County – where a vast majority of the authors' sample was taken – the negative effects from the perceived risk stuck. Even after the final shipments went through, house prices in Charleston remained depressed. Houses five miles away from the route had values 3% higher than those near the tracks, *ceteris paribus*. It was not just a short-term phenomenon either.

In 2012, the authors followed up their research with a study in the Journal of Environmental Economics and Management. Shipments of spent fuel rods have continued once per year. While there have been no accidents, the perceived risk of one has actually increased over time (In 2005, surveyed residents believed the likelihood of a train accident was 56.5% compared to 46.8% in 1994), likely because more and more people have become aware of what is being shipped. The findings, using more sophisticated modeling techniques than their previous study, were similar; houses close to the spent fuel rod shipping lines were valued 2.5%-5% less than those away from the lines. Not only were the effects significant in the long term, but the effects reached distances of

18 kilometers, diminishing as the distance from the lines grew. Moreover, quantile regressions showed that the effects varied across different house price brackets. Homes in the bottom quartile showed a long-run expected loss of 10.5% while those in the highest quartile showed more modest, but still significant, declines of 3.1%.

Economic Impacts of Spills/Catastrophic Accidents

The DEIS discusses a number of potentially significant or even catastrophic events, identifies these as being having a relatively low probability of happening, and then ignores the negative consequences of these occurrences in assessing socioeconomic impacts. The correct methodological approach would be to calculate an expected value, similar to the approach that would be used by an actuary for an insurance company. While the likelihood of an event may be low, when the consequences of that event are high the expected value of the outcome is often significant.

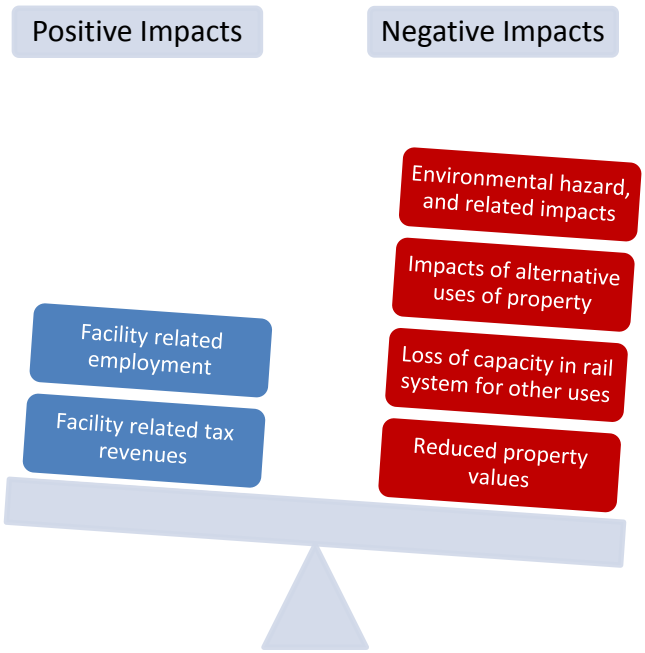
The following is a simple example of how this should be done for potential events.

Event	Significant Oil Spill	Catastrophic Explosion
Annual Likelihood of Event	5.0%	0.1%
Assumed Years of Operation	16	16
Likelihood During Operation	80.0%	1.6%
Impact of Event (Current $s)		
Estimated Cost of Event	($10,500,000,000)	($20,000,000,000)
Job Losses Associated	165,000	200,000
Expected Value (Current $s)		
Estimated Cost of Event	($8,400,000,000)	($320,000,000)
Job Losses Associated	132,000	3,200

The preceding example is for explanatory purposes only, as we have made no effort to assess the likelihood of specific events nor have we evaluated the likely socioeconomic impacts. The final EIS **should** address these issues if it is to be viewed as a credible assessment of net impacts.

IV. SUMMARY

In summary, a primary weakness of the DEIS in terms of its assessment of socioeconomic impacts is that it does not present a "net" analysis of impacts. The proposed facility and its ongoing operational characteristics generate a number of definable and significant negative impacts, which influence the economic and fiscal impacts of the facility. As outlined in the following graphic, the socioeconomic portion of the DEIS as it currently stands represents only a benefits analysis, as opposed to a net impact analysis. While it is common practice for a proponent of a development to present an unbalanced assessment, we would expect an impartial DEIS to present a comprehensive analysis that addresses net socioeconomic impacts.



In addition, the limited range of impacts that were assessed were not adjusted for market risk, a considerable omission for a commodity export facility operating in an unusually volatile environment. When the facility was initially proposed, and the primary impacts evaluated by the proponent, the market price for oil was more than double current pricing. The analysis relies upon an assumption of a 16 year operating life, while the lease terms with the Port reflect only a ten-year commitment with options to extend.

When the full range of socioeconomic impacts are evaluated in a net impact analysis, the positive primary impacts asserted by the applicant are offset by the negative impacts not considered in the DEIS. The following table presents a simplified net accounting of impacts that would appropriately be included in a net socioeconomic impact assessment. The variables in red are assumed to be negative, and as noted

previously, only impacts expected to be negative have been excluded from the DEIS analysis. A large number of these impacts have not been evaluated to date, but assessments of these impacts should be included in the final EIS.

SUMMARY OF NET SOCIOECONOMIC IMPACT ANALYSIS, TESORO/SAVAGE FACILITY

	Employment FTEs	Income ($ millions)	Value Added ($ millions)
CONSTRUCTION IMPACTS			
DEIS (Appendix O)	1,429.0	$86.8	$124.8
Less:			
Adjustment for Overstatement 1/	(714.5)	($43.40)	
Impact on Corridor-Clark County 2/			($248.1)
Impact on Waterfront Vancouver 3/	(2,154.0)	($105.9)	($151.6)
Impact of Alternative Uses of Property	Not Evaluated	Not Evaluated	Not Evaluated
Impact on Remainder of Corridor	Not Evaluated	Not Evaluated	Not Evaluated
Impact on Tourism	Not Evaluated	Not Evaluated	Not Evaluated
Environmental Risk Hazard	Not Evaluated	Not Evaluated	Not Evaluated
Loss of Rail Capacity for Alternative Uses	Not Evaluated	Not Evaluated	Not Evaluated
Net Impacts/Limited to Available Analysis	(1,439.5)	(62.5)	(274.9)
OPERATIONS/ANNUALLY			
DEIS (Appendix O)	1,081.0	$104.0	$133.5
Less:			
Impact on Corridor-Clark County 2/		($7.9)	
Impact on Waterfront Vancouver 3/	(613.0)	($27.2)	($31.6)
Impact of Alternative Uses of Property	Not Evaluated	Not Evaluated	Not Evaluated
Impact on Remainder of Corridor	Not Evaluated	Not Evaluated	Not Evaluated
Impact on Tourism	Not Evaluated	Not Evaluated	Not Evaluated
Environmental Risk Hazard	Not Evaluated	Not Evaluated	Not Evaluated
Loss of Rail Capacity for Alternative Uses	Not Evaluated	Not Evaluated	Not Evaluated
Net Impacts/Limited to Available Analysis	468.0	68.9	101.9

1/ Reduces construction impact by 50% to reflect likelihood that impact is captured by firms and labor residing outside of Clark County.

2/ Construction impacts reflect an assumed reduction of value of 5%, with an impact area ranging from 1/3 to 1/2 mile. Operational impacts reflect a 3% annual return on asset value over a 16 year lifespan

3/ Based on Estimated Economic and Fiscal Impacts of the Tesoro Savage Facility on the Waterfront Vancouver Development and Downtown Vancouver, January 6, 2013

The net result is that the DEIS presents a significant overstatement of the socioeconomic benefits of the project by not accounting for the full range of impacts. When the full range of impacts are evaluated, it is far from certain that the proposed operation would even provide a net positive socioeconomic impact. As purported economic benefits appear to be the primary argument for approval of the proposed facility, the final EIS should provide a more comprehensive assessment.

Attachment B

Exhibit 4003-000022-CWF

Columbia Waterfront LLC