Technical Analysis of the
Interstate Bridge Project Traffic Modeling

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Executive Summary

1. Travel demand modeling underpins the rationale for the I-5 bridge, its financing, and accurately disclosing its environmental impacts. Flawed traffic models produce an invalid SDEIS.
2. Metro's Regional Travel Demand Model (RTDM) doesn't accurately predict I-5 Bridge Traffic. Metro's Kate model isn't calibrated to current traffic levels. Metro's model claims 164,000 vehicles cross the I-5 bridge daily; ODOT's traffic counts show fewer than 139,000. Metro's model over-states traffic 18 percent in current years.
3. Metro's past modeling efforts have consistently overstated **I-5 traffic growth**. The CRC EIS predicted traffic would grow 1.3% per year from 2005 through 2030; actual growth was 0.3% per year through 2019, and only 0.1 percent per year from 2005 through 2023.
4. The model overestimates **truck travel**. Metro's forecast claims 17,000 trucks per day cross the I-5 bridges; ODOT's traffic counters show fewer than 10,000 daily trucks; that's over 2 million phantom trucks annually the I-5 bridge. Metro's model says truck traffic on I-5 will increase 2 percent per year; in reality, its declined at more than 4 percent per year.
4. The Metro model ignores I-5 bridge capacity constraints that limit traffic growth. The I-5 bridges can carry no more than 4,800 vehicles in the afternoon peak hour northbound; Yet the Metro Kate model pretends than more than 6,000 vehicles cross the bridge in the PM peak now, and that number will increase. Metro is using a flawed "static assignment" model that ignores capacity constraints, in violation of federal guidance and best practice.
5. Metro's modeling uses an inflated value of time that underestimates driver response to tolls (and underestimates diversion).
6. IBR claims to rely on the Metro regional traffic model, but secretly modified the outputs of the Metro's model falsely calling alterations "post-processing." Metro's model is specific enough not to need post-processing, and IBR failed to follow state and professional standards for documenting "post-processing" alterations.
7. IBR failed to follow professional standards for traffic modeling:
    - Didn't assess accuracy of previous modeling
    - Failed to calibrate its model to match actual traffic
    - Failed to document "post processing" of model results
    - Ignored more accurate Level 2 and Level 3 models

8. IBR continues to rely on a nearly two-decade old "purpose and need" statement that overstates traffic growth by a factor of five, illegally excluding from consideration smarter, cheaper and more environmentally sound alternatives.
9. Flawed projections conceal IBR's negative environmental effects. A phony, dirty "No-Build" scenario.

10. IBR modeling violates the region's adopted climate plans. IBR plans for a25 percent increase in driving while Metro's Regional Transportation Plan calls for total driving to decline by 12 percent to meet climate requirements.

11. IBR modeling is inconsistent with Level 2 analysis; the Level 2 study shows with tolling traffic in 2045 will be fewer than 125,000 vehicles, far less than the 164,000 in the EIS
12. IBR modeling has not been transparent, important facts have been concealed from public view.
13. IBR modeling fails to incorporate post-Covid changes in travel behavior and land use patterns
14. IBR has incorrectly defined the "No Build" alternative by failing to include Regional Mobility Pricing, an adopted regional policy
15. IBR plans to reduce or eliminate tolls after construction bonds are paid and has failed to disclose the environmental effects associated with lower tolls.

Contents

Introduction

The errors in traffic modeling on the I-5 project constitute financial and environmental fraud. They misrepresent the environmental impacts of the project in a way that is calculated to understate its negative effects relative to not building the project (i.e. the No-Build Scenario).. By overstating traffic demand, IBR is fraudulently seeking more federal funds for a larger project than is needed to meet actual demand, and violating environmental laws that require accurately disclosing the project's economic, social and environmental effects.

The highway portion of the Interstate Bridge Replacement (IBR) project consists of two distinct parts, one of which stimulates and accommodates additional car travel (expanded lane capacity) and another which limits and discourages car travel (tolling). The combination of these two distinct elements will determine how many vehicles actually use the proposed IBR project when it is built.

The stimulative nature of added capacity, and the restrictive nature of tolling is confirmed by Metro's modeling. The Metro model forecasts that widening I-5 as recommended in the Locally Preferred Alternative (LPA) and not charging tolls will cause 215,398 vehicles per typical weekday to use the bridge in 2045. In contrast, that same Metro model forecasts that keeping the existing bridge (or for that matter a new I-5 bridge with just three through lanes in each direction) and imposing tolls would cause traffic to be just 153,625 vehicles per typical weekday. Regardless of the capacity of the bridge, tolling the bridge, according to the Metro model, causes 40,000 to 50,000 fewer vehicles to use the bridge on a typical weekday in 2045. In short, one cannot accurately forecast future travel on the I-5 bridge without specifying both the capacity of the roadway and the tolling regime.

Metro, IBR Modeling, February 2023, 2045 I-5 and I-205 Bridge Average Weekday Traffic

Scenario	I-5	I-205	Total
SDEIS NB	192,100	205,505	397,605
SDEIS NB tolled	153,625	227,362	380,988
Delta Tolls	-38,474	21,857	-16,617
	-20%	11%	-4%

SDEIS LPA	164,455	220,162	384,617
SDEIS LPA No Toll	215,398	192,732	408,129
Delta Tolls	50,943	-27,431	23,512
	31%	-12%	6%

Source: Metro, IBR_L2_SDEIS_I5_I205_xing_auto_truck_022723.xlsx

Consequently, tolling, and the exact level of tolls to be charged to users of the I-5 bridge is intrinsic to knowing future traffic levels, and consequently, to establishing how much capacity (the number of lanes) the bridge needs to have, and also determining what the environmental impact of the project will be.

Whether the I-5 bridge is tolled or not clearly matters to traffic levels, but so to it is the level of tolls which determines the exact level of traffic that can be expected to use the I-5 bridge. A low level of tolls will have a small effect on traffic levels a high level of tolls will tend to reduce and or divert traffic to other routes. As documented in Section 7 below, Metro's model shows the relationship between toll levels (expressed in terms of the equivalent time penalty for a dollar denominated toll amount). The Traffic Technical Report for the SDEIS is vague about the exact level of tolls that will be charged. The IBR has said it will defer actual toll setting to a later time. But not knowing the actual level of tolls to be charged means that one cannot know with any confidence the actual level of traffic that will be served by the proposed build alternative, and consequently, one cannot accurately assess the project's environmental impacts. In the case of the earlier version of the same project, the minimum level of tolls needed to be charged to finance the bridge had to be doubled from that assumed in the project's Final Environmental Impact Statement (minimum tolls were increased from $1.35 to $2.60 per crossing). This higher level of tolls, in turn, was expected to have a dramatic effect on traffic levels (reducing traffic on I-5 and shifting much of that traffic to I-205). While this reduction in traffic was calculated according to the CDM Smith "investment grade analysis" model, the computations from the Kate model illustrated above and in Section 7 below, confirm that a higher level of tolls will result in lower traffic on I-5 and more diversion of traffic to I-205.

In most Environmental Impact Statements, the "No-build" scenario can be objectively identified by reporting current data on actual conditions. In the case of major highway projects, the sponsoring agencies are defining the "No-Build" scenario not as actual observed conditions today, but rather hypothesized conditions 20 or more years from now. Because these future conditions cannot be independently or objectively verified, the burden on the agency to establish the reasonableness of its hypotheses about how the world will change is extremely great. If great deference is granted to agencies to choose hypothetical scenarios about how the world might change, without anchoring such projections in a rigorous basis, the agency can simply construct an alternative future world which, by contrast, makes whatever action the agency proposes appear to be environmentally benign.

That is exactly what has happened with IBR's construction of its hypothetical future "no-build" scenario. The agency has selected parameters, especially for future traffic growth which create an unrealistically crowded, highway system. These predictions largely mirror projections the agency made for the earlier version of this same project a decade ago—projections which have been proven, in reality, not to be true (See section 8.7).

Inasmuch as the hypothetical predictions of future traffic levels are determinative of whether a project has adverse environmental and social impacts, there should be a high degree of transparency about the data, assumptions and modeling used to generate these hypotheticals. But in reality, traffic modeling done by Metro and the DOTs, and the process of modeling itself is a closely guarded set of secrets. Metro and ODOT consultants do not publish detailed data that shows how their final figures were arrived at (contrary to professional best practices), nor have they looked to see whether their previous efforts have produced accurate predictions. They have released limited data about their work only in response to public records requests. It is not possible from the records made available by Metro and IBR modelers to replicate their calculations.

Why would sponsors of highway projects want to exaggerate the future growth in traffic levels? Predicting ever higher levels of traffic creates a perceived need for additional highway expansion projects. Highway departments and highway engineers have a personal and professional interest in building more and larger roadways.

1. Travel demand modeling for the IBR

Traffic modeling is the key to assessing the need for the project, determining its financial feasibility and gauging its environmental impact. Errors in traffic modeling lead to mis-stating the need for the project, failing to establish financial viability, and understating its negative environmental effects.

1.1 Modeling is foundational to the I-5 Bridge Replacement Project: It defines the project need, is used to justify its size, and to evaluate the viability of alternatives and to determine financing. Also, the traffic projections are integral to claims made about the environmental effects of the proposed project and alternatives. As the Federal Highway Administration writes:

> Travel and land use forecasting is **critica**l to project development and National Environmental Policy Act (NEPA) processes. Forecasts provide important information to project managers and decision-makers, and provide foundations for determining purpose and need. They are **essential in evaluating**: the performance of **alternatives**; the estimation of **environmental impacts** such as noise and safety (based on traffic volume or exposure) and emissions (based on traffic volume and speed); induced land develop- ment effects (change in land development patterns due to changes in accessibility); and resulting indirect and/or cumulative effects (such as watershed effects). In short, **travel and land use forecasting is integral to** a wide array of corridor and **NEPA** impact assessments and analyses.
> FHWA, Interim Guidance On The Application Of Travel And
> Land Use Forecasting In NEPA, 2010, page 1. (Emphasis added).

If the travel forecasting used in the preparation of an Environmental Impact Statement is wrong, then the selection of alternatives and assessment of environmental impacts is wrong and violates NEPA.

The Interstate Bridge Replacement Project (IBR) is a joint effort of the Washington State Department of Transportation (WSDOT) and the Oregon Department of Transportation (ODOT). It proposes to replace the existing I-5 bridges over the Columbia River, widen about 5 miles of freeway, rebuild seven freeway interchanges and extend light rail transit from Oregon to Vancouver. If constructed, at a cost currently estimated at up to $7.5 billion, it would be the most expensive transportation project in the region's history.

The need for and key design parameters of the project are predicated on projections of future traffic levels across the Columbia River. WSDOT and ODOT have used their projections of future traffic levels to justify the federally required "purpose and need" statement for the project, to reject specific alternatives which they claim (according to traffic modeling) are not workable, and to justify the need for widening the bridge crossing and approaches.

1.2 Oregon and Washington DOTs gather traffic count data.. Traffic projections begin by compiling and analyzing counts of vehicles on existing roadways. These counts are the base data for building travel demand models. ODOT and WSDOT gather traffic data on I-5 and other area roadways. For example, the Oregon Department of Transportation maintains a

Automatic Traffic Recorder (#26-004) at the Interstate Bridge, which counts the number of vehicles crossing the bridge by day and hour, and classifies vehicles by type. The output of this recorder (and hundreds of other recorders on state highways) is reported by ODOT annually on its website. Washington State DOT maintains similar data.

1.3 There are repeated discrepancies between traffic count data reported by the Oregon Department of Transportation and traffic volume levels reported in Metro and IBR reports. The reported I-5 bridge average weekday traffic volume is reported by the IBR variously as 142,400 vehicles per average weekday (per April 2022 presentation to Oregon Legislature) and 143,400 vehicles per day (per July 7 River Crossing Volumes provided to Cortright). IBR documents do not explain this discrepancy between its two estimates or why these figures differ from the traffic recorder data. The IBR and the Stantec Level 2 study both claim that the average weekday traffic on the I-5 bridge in 2019 (the base year for forecasting) was 143,400 vehicles per day.

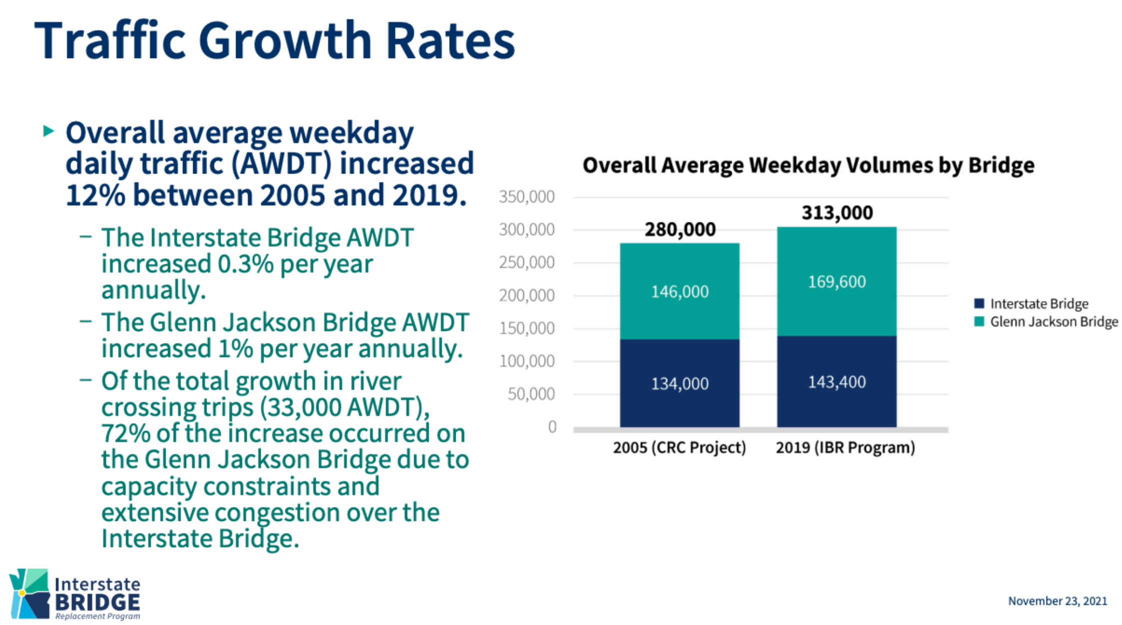
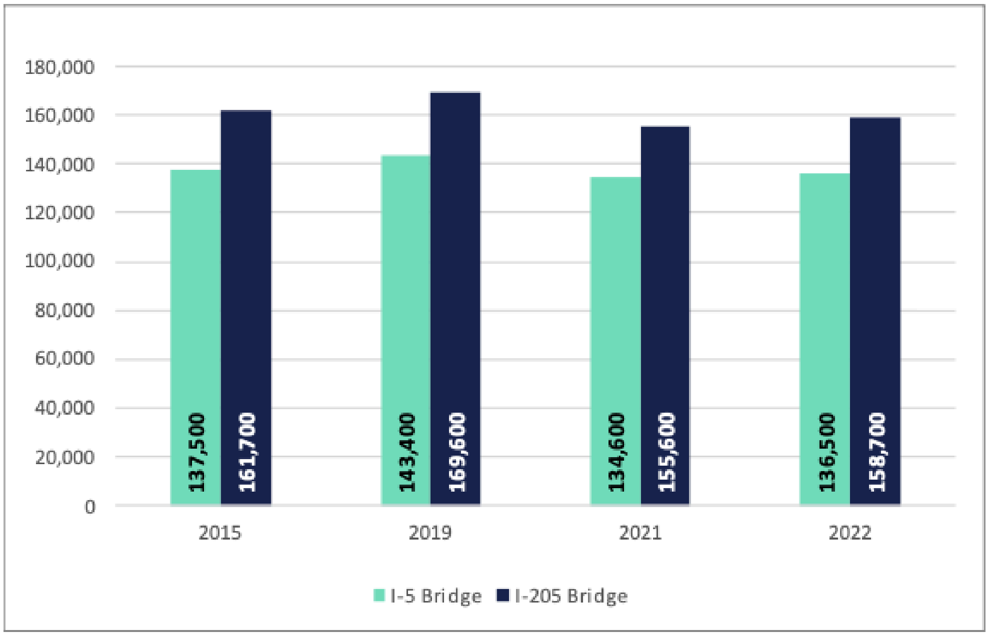


Figure 2-6. Historical Traffic Trends along the I-5 and I-205 River Bridge Crossings



IBR Level 2 Study, November 2023, page 2-10

That figure does not agree with the data from ODOT's automatic traffic data recorder which reports that average weekday traffic in 2019 was 138,780 per day.

ODOT and WSDOT officials have previously overstated I-5 traffic levels. In presenting the Columbia River Crossing from 2008 through 2011, the two states described the average weekday travel crossing the I-5 bridge as 134,000 vehicles per average weekday. In contrast, ODOT's automatic data recorder reports that 2005 crossings were 132,600 vehicles per average weekday. In litigation over the Columbia River Crossing Environmental Impact Statement, federal defendants conceded that the EIS mis-stated actual levels of traffic on the I-5 bridge in 2005:

> COMPLAINT (Paragraph 86): The traffic estimates used by the FEIS, which form the basis of the CRC project's projected need, are the same as those used by the DEIS in 2008 and based on data collected in 2005. According to the FEIS, reported traffic was 134,000 per day in 2005, whereas data from the Oregon Department of Transportation ("ODOT") puts traffic at 132,600 per day. . . .
>
> ANSWER: 86. Federal Defendants admit that traffic projections for the CRC project were developed from a base of 2005 traffic data. Federal Defendants deny the remaining allegations in the first sentence. Regarding the second sentence, Federal Defendants admit that the traffic volumes cited in the FEIS were 134,000 per day in October 2005. Federal

> Defendants admit that ODOT's reported annual average traffic counts for 2005 was 132,600. Federal Defendants deny the remaining allegations in the second sentence. . . .
>
> Coalition for a Livable Future, et al, v. Federal Highway Administration, et al, Modified Answer (Combined Complaint and Answer). 2 July 2012

1.4 IBR committed errors in stating historical growth rates.

The inaccurate traffic count data leads the Stantec Level 2 study to overstate the recent rate of growth across the I-5 bridges. The Level 2 study claims that between 2015 and 2019, traffic increased by 1.1 percent per year.

> The average weekday river crossings along the I-5 and I-205 Bridges since 2015 are presented in Figure 2-6. Between 2015 and 2019, the traffic on the I-5 Interstate Bridge increased at an annual rate of approximately 1.1% . . .
> Stantec, Level 2 Report, page 2-9

According to the average weekday traffic data reported on the ODOT automatic data recorder website, the actual rate of increase was only half as much—0.5 percent. We examined actual data reported on ODOT's website (https://www.oregon.gov/odot/data/pages/traffic-counting.aspx) for the Automated Traffic Recorder for the I-5 Interstate Bridge. In 2015, average weekday traffic was 135,696 vehicles per day. In 2019, average weekday traffic was 138,700 vehicles per day. This represents an annual rate of increase of 0.55 percent per year, half the rate claimed in the Stantec Report.

1.5 Several agencies are involved in preparing traffic projections. Traffic projections for the I-5 bridge project (like its predecessor, the Columbia River Crossing) were prepared by staff and consultants for WSDOT and ODOT. These projections are based substantially on a regional travel demand model (RTDM) developed and maintained by Portland's Metro regional government. The RTDM is a mathematical representation of the Portland-Vancouver transportation network, and the location of households and businesses. It uses a range of data and equations to estimate the number, origin and destination of trips and assigns them to the traffic network. By iteration, the model adjusts traffic routes to reflect the effects of congestion. The output of the model is estimates for current and future years of traffic volumes and traffic speeds for major segments of the region's transportation system

Key variables in the Metro model include the estimation of the origins and destinations of daily trips and a specification of the regional travel system, especially the maximum capacity of individual road segments. Metro uses estimates of the dollar value of travel time to model the impact of tolling on traffic levels. Model results are highly sensitive to the value of travel time: too low a value of travel time overstates the impact of tolls on travel behavior; too high a value of travel time understates the impact of tolls on travel behavior. Value of travel time is a variable that is chosen by the modeler.

While the RTDM was produced by Metro, Metro provided the model, in software form, to third parties to modify the assumptions and key parameters and make other forecasts. Metro provided its model results to IBR staff, it also provided the underlying model to consultants (to Stantec, in 2022 for preparation of a Level 2 study), and to CDM SMith in 2013, to prepare an investment grade analysis of the CRC.

State and regional officials and their consultants have prepared multiple models of traffic associated with the Interstate Bridge Replacement Project.

- 2008 Draft Environmental Impact Statement, Traffic Technical Report, (https://www.wsdot.wa.gov/accountability/ssb5806/environmental-process-and-permitting.htm)
- 2011 Final Environmental Impact Statement, Traffic Technical Report (https://www.wsdot.wa.gov/accountability/ssb5806/environmental-process-and-permitting.htm)
- 2013 CDM Smith, Investment Grade Analysis (IGA)
- 2022 Metro RTDM Outputs (April 29, 2022 Excel File)
- 2022 IBR "Post-Processed" Model outputs (from public records disclosure, July 8, 2022)
- 2023, Stantec "Level 2" modeling (Excel, February 27, 2023)
- 2023 WSP Benefit Cost Analysis (Narrative, Excel Spreadsheet, Public Records Request Response).

Key metrics for each of these forecasts are summarized in the following table.

Summary of CRC/IBR Traffic Forecasts

Average Weekday Traffic (AWDT) I-5 Columbia River bridges

Forecast	Period	Base	No-Build Forecast Level	No-Build Forecast AAGR	Build/LPA Forecast Level	Build/LPA Forecast AAGR
Draft Environmental Impact Statement (2008)	2005-2030	134,000	184,000	1.3%	178,000	1.1%
Final Environmental Impact Statement (2011)	2005-2030	134,000	184,000	1.3%	178,500	1.1%

Investment Grade Analysis (2013)	2012-2036	128,400	138,200	0.3%	109,000	-0.7%
Metro Travel Demand Model (2022)	2019-2045	164,050	190,922	0.6%	164,384	0.0%
IBR Post-Processed (2022)	2019-2045	143,400	176,000	0.8%	175,000	0.8%
Stantec Level 2 Study (2023)	2019-2045	143,400	182,300	0.9%	123,900	-0.6%
Benefit-Cost Analysis (2023)*	2019-2045	11,278	14,291	0.9%	14,211	0.9%

* - Data is Project Area Daily VMT (000s)

1.6 Metro's Kate Travel Demand Model. The foundation of current IBR travel demand estimates is Metro's "Kate" travel demand model. Kate is a regional travel demand model, which estimates daily and hourly travel demand for the Portland Metropolitan area. Of interest for the IBR, the Kate Travel demand model estimates the number of vehicles crossing the Columbia River on the I-5 and I-205 bridges ("screenlines") for the model's base year (2015) and for future years. Metro has produced a series of model runs to estimate traffic on I-5 and I-205 in the current year and through 2045 under a range of assumptions about transportation improvements and varying toll levels for I-5 and other portions of the Portland Metro freeway system. Metro has prepared spreadsheets showing the output of the Kate Model in terms of screenline volumes for the I-5 and I-205 bridges under various scenarios. Data from the April 29, 2022 ("I5_xing_auto_truck_vol_comp_042922.xlsx") version of these estimates is presented here. Metro's modeling results have been substantially similar from October 2021 through February 2023 (latest results provided by Metro in response to a public records request (date). The 2023 estimates of the model remain the same. Metro's Modeling of I-5 traffic for the Locally Preferred Alternative (LPA) has not changed between October 2021 and April 2022. Metro estimates Average Weekday Traffic (AWT) at 190,841 on the I-5 bridges for 2045 in the No-Build Scenario). Similarly, the PM peak hour volumes for 2045 for I5 NB across the Columbia River have also not changed between the October 2021 model runs and the April 2022 model runs. For example, The No-Build Northbound PM peak hour value is 6,375 vehicles per hour in 2045 in the October 5, 2021, April 29, 2022 and February 27, 2023 model runs. The latest results are contained in an February 27, 2023 Excel file labeled, "IBR_L2_SDEIS_I5_I205_xing_auto_truck_022723.xlsx."

1.7 Metro's "Ivan" Travel Demand Model. The previous version of the regional travel demand model, used for the Columbia River Crossing Environmental Impact Statement was prepared by Metro. The data from this model, which estimates traffic for four-hour morning and evening peak travel periods, was "post-processed" by CRC staff (DEIS, Traffic

Technical Report, 2008, page 5-5). The DEIS and FEIS documents disclose neither the original Metro Ivan forecast numbers, nor do they document the calculations used to "post-process" this data. These "post-processed" figures served as the basis for the CRC's purpose and need statement, which was re-adopted verbatim for the current iteration of the IBR project. The post-processed Ivan figures were incorporated into the Columbia River Crossing 2008 DEIS Traffic Technical Report and the 2011 Columbia River Crossing FEIS Traffic Technical Report.

1.8 IBR's "Post Processed" traffic estimates. IBR took the outputs of Metro's Kate Travel Demand Model and "post-processed" them--altered the outputs. IBR's post-processed figures are described in a March 30, 2022 summary of a travel demand review meeting (Regional Modeling Technical Coordination Notes, March 30, 2022) and in a response to a public records request dated June 6, 2022)

1.9 Stantec's "Level 2" traffic estimates. Stantec took Metro's Kate Travel Demand Model and modified several of its parameters, keeping the underlying origin and destination data and network characteristics, but recalibrating the model to better fit observed travel behavior, using a different functional form to model trip choice in response to tolling, and using different values of traveler time. IBR has contracted to pay Stantec $787,000 for this work. In addition, IBR has also paid another consultant, WSP, unspecified amounts to participate in preparing this analysis. Stantec's Level 2 estimates are spelled out in a November, 2023 report: "Level 2 Traffic and Revenue Study."

1.20 CDM Smith's Investment Grade Forecast. CDM Smith was hired by the Oregon and Washington transportation departments to prepare a detailed investment grade analysis of the Columbia River Crossing. CDM Smith took Metro's Ivan Travel Demand model and modified sever of its parameters, keeping the underlying origin and destination data and network characteristics, but recalibrating the model to fit observed travel behavior, using a different method to compute behavioral responses to tolling and using different values of traveler time (computed from a stated preference survey designed to measure local responses to tolling choices created by the Columbia River Crossing project. The Oregon and Washington DOTs paid CDM Smith $1.5 million to undertake this study in 2013-14 (https://projects.oregonlive.com/crc/spending/). CDM Smith's estimates are provided in: Columbia River Crossing Investment Grade Traffic and Revenue Study, December 27, 2013.

1.21 Supplemental Draft Environmental Impact Statement.

The SDEIS contains a different set of estimates for No Build traffic levels on the I-5 Bridges in 2045. In contrast to earlier estimates released by IBR, this table claims that 180,000 vehicles would use the I-5 bridges in the No-Build scenario, rather than the 176,000 vehicles claimed in earlier material. No explanation is provided in the text on how these estimates were obtained.

Table 3.1-11. 2045 Forecast Average Weekday Daily Traffic Volumes on I-5 and I-205

Location	Existing AWDT	2045 No-Build AWDT [a]	2045 Modified LPA AWDT [b]
Total River Crossing	313,000	400,000 (+28%)	389,000 (-3%)
I-5 Bridge	143,400	180,000 (+26%)	175,000 (-3%)
I-205 Bridge	169,600	220,000 (+30%)	214,000 (-3%)

Source: ODOT/WSDOT, Metro/RTC Regional Travel Demand Model, IBR Analysis 2022

a Percentages reflect change from existing conditions.

b Percentages reflect change from 2045 No-Build Alternative.

AWDT = average weekday daily traffic

2. The Metro regional transportation demand model does not accurately predict I-5 bridge traffic.

Metro's regional travel demand model (RTDM), called Kate, doesn't accurately predict current levels of traffic on the I-5 bridges. It consistently over-predicts I-5 traffic, especially at the peak hour. Its predecessor model (Ivan) also incorrectly predicted growth rates for I-5 traffic

The Metro model is seriously flawed: It fails to accurately forecast traffic levels on the I-5 and I-205 bridges, and has failed to accurately project growth rates. Metro's Kate model doesn't accurately predict the future, the present or even the past. Our review of the Metro model outputs and actual traffic recorder data show that the model doesn't accurately reflect either the current level of traffic on I-5 and I-205, or accurately predict the growth of traffic on the two bridges over time.

The Metro model significantly over-estimates traffic on I-5, relative to I-205. The Metro model significantly over-estimates daily and hourly traffic levels on I-5 in the current year, as revealed by Metro's own validation report (which is not published on Metro's website).

2.1. Traffic demand modeling (TDM) is central to the rationale for, evaluation of alternatives to and environmental impact assessment of the proposed Interstate Bridge Replacement Project. IBR staff use TDM estimates of future traffic volumes to specify the size of the project, to include or exclude alternatives (such as a tunnel), and make claims about the different environmental impacts of each alternative.

2.2 The accuracy of travel demand models can be analyzed in several ways. Two important tests are calibration and prediction. Calibration examines whether a model's outputs for current year traffic levels match actual, observed travel levels. Prediction examines whether the growth rate in traffic implied by a model's forecast is borne out in practice.

2.3. Metro's Kate Model validation report shows that Kate systematically over-predicts current year traffic levels on I-5 relative to I-205, and over-predicts overall river crossings. Kate over predicts base year (i.e. 2015/2019) AWDT by almost 20 percent; it also under predicts traffic on I-205. Metro's Kate Model overestimates traffic volumes on the I-5 bridge relative to the I-205 bridge. Metro's Kate model assigns a larger share of cross-Columbia traffic to the I-5 bridge and a lower share of traffic to the I-205 bridge than is observed in practice.

2.4 IBR's own Level 2 study prepared by Stantec concludes that the Metro model overestimates traffic levels on I-5:

> While the calibration of the assignment model was adequate for planning purposes, some limitations were identified in the RTDM assignment process that resulted in overestimated speeds and underestimated travel times along the I-5 and I-205 corridors near the river crossings. As such, additional refinements were performed to the base year 2015 traffic assignment to improve alignment with the observed data. These refinements were performed outside of the RTDM environment, in a base year toll model prepared using RTDM output like demand matrices, highway network, and relevant parameters.
>
> Stantec (https://www.interstatebridge.org/media/sh2lube2/ibr_level-2_tr_report_final_remediated.pdf), page 3-5.

Stantec's Level 2 study corrected for the over-prediction on I-5, and produced a much smaller error. Stantec calibrated its model to the same 2015 base data used in the Metro Kate modeling. Stantec reported a 2.5% RMSE (Root Mean Square Error), just about one-sixth of the error factor for the Metro model. The Stantec version of the model calibrated to within 1 percent of I-5 bridge traffic levels.

2.5 Metro and the IBR continue to use the poorly calibrated Metro RTDM "for planning purposes" even though it substantially over-states actual traffic on the I-5 bridge. It seems clear that Metro and IBR prefer these higher forecasts because (a) they justify a larger project with more vehicle capacity, and (b) they create an inflated "no-build baseline" that systematically conceals or understates the travel-inducing environmental effects of the build alternative.

Comparison of Travel Demand Model Validation

Model (Year)	Calibration Year	Scope	Metric	Error (RMSE)
Metro/Kate (2017)	2015	32 Regional Cutlines	AWDT	14.5%
Stantec/IBR Level 2 (2023)	2015	32 Regional Cutlines	AWDT	2.5%
CDM Smith/CRC IGA (2013)	2010	11 Regional Cutlines	Hourly	2.5%
CDM Smith/CRC IGA (2013)	2010	I5, I205 Bridges	Hourly	0.8%

Sources:

Metro/Kate (2017) Table 14: Auto cutline comparison – Average Weekday

Stantec/IBR Level 2 (2023)	Table 3-3. Toll Model Calibration Summary at Regional Screenlines – Base Year 2015
CDM Smith/CRC IGA (2013)	Table 7-2 Selected Calibration Results for Locations other than the I-5 and I-205 Bridges
CDM Smith/CRC IGA (2013)	Table 7-3 Total Traffic Calibration Results for the I-5 and I-205 Bridge

2.6 As a result of these calibration errors, Metro's model fails to accurately reflect current levels of traffic on the I-5 bridge. Metro's Kate Model estimates of base year (2019) daily screenline volumes are not consistent with observed actual traffic counts. Screenlines are key reference points for computing and reporting traffic volumes in the Kate model. The I-5 and I-205 Columbia River Bridges are both screenlines. The 2019 screenline value estimated by Kate for the I-5 bridge is 164, 500 average weekday traffic (AWT). The value reported by ODOT traffic recorders is 138,530. (For more detailed information on IBR's "post-processed" estimates see section 6, below).

Estimates of Calendar year 2019, Average Weekday Traffic, I-5 Bridge

Source	Estimate	Discrepancy
ODOT, Traffic Count data	138,530	0
Metro, Kate Travel Demand Model	164,500	+18.7%
IBR, "Post-Processed" Estimate	143,400	+3.5%

2.7 In addition to calibrating a model to current or base year levels, we can assess the validity of a model by examining whether it accurately predicts changes in traffic levels over time. The modeled predictions prepared for the Columbia River Crossing using the Metro Model and the CDM Smith toll model provide an indication of the reliability of these two models.

2.8 The Oregon and Washington Departments of Transportation estimated the growth in travel on I-5 in the "No-Build" Scenario using Kate's predecessor model "Ivan,." The results of this model were incorporated in the project's Draft and Final Environmental Impact Statements, issued in 2008 and 2011 respectively. Using a base year of 2005, the model predicted traffic on the I-5 bridges in the "No Build" scenario would rise from 134,000 AWDT in 2005, to 184,000 in 2030. This amounts to an annual growth rate of 1.3% per year over the forecast period.

2.9 The Oregon and Washington Departments of Transportation hired CDM Smith, a national consulting firm to refine the Metro Travel Demand Model (Ivan) for purposes of preparing an Investment Grade Traffic and Revenue Forecast. CDM Smith recalibrated the Ivan model (resulting in a better fit with actual data, i.e. a root mean squared error of 0.8 percent for hourly traffic estimates). The CDM Smith model predicted that traffic in the No-Build Scenario would grow to 138,200 vehicles per day by 2036. The CDM SMith modeling used a base year of 2012, and a base level of traffic of 128,400 vehicles per day. (CDM Smith Figure 2.2). This represents a growth rate of 0.3 percent per year over the forecast period.

2.10 In reality, traffic growth during the first 14 years of that period (2005 to 2019) averaged just 0.3 percent per year. The Metro model predicted a growth rate for this time period of 1.3 percent per year, more than four times faster than the actual growth rate. In contrast, the growth rate prediction of the CDM Smith model almost perfectly corresponds to the observed 2005-2019 growth rate.

2.11 The Metro model is poorly calibrated, inaccurate, and fails to accurately predict future growth. Moreover, all of these errors are biased: the calibration exercise shows the Metro RTDM consistently predicts higher levels of I-5 traffic than actually are observed, and the historical record shows that the Metro model predicts faster levels of I-5 traffic growth than are actually observed.

2.12. Consequences of model over-prediction. Because the model over-predicts current traffic on the I-5 bridges, the growth in traffic on the I-5 bridges in the No-Build scenario, and future levels of traffic on I-5, it exaggerates the traffic congestion that would be expected in the No-Build scenario.

2.13 Millions of Phantom Cars. As the Metro calibration report shows, the Metro model predicted that 2019 average weekday traffic on the I-5 bridge would be 164,050. The actual traffic on the I-5 Bridge was 143,400 according to the IBR project. This amounts to more than 20,000 “phantom” vehicles that appear in the Metro model that do not exist in reality. This amounts to more than 6 million “phantom vehicles” per year.

3. Travel demand models overestimate current and future truck traffic

Metro uses a different model to predict current and future truck traffic on I-5. Its model grossly overstates current truck traffic. Its predecessor also predicted an increase in truck traffic, when in fact truck traffic declined on I-5. The data used to estimate current and future truck traffic levels are inconsistent with reported ODOT traffic counts. Metro's model relies on an outdated, 17-year old survey and hasn't been updated to reflect the latest estimates. The Metro Kate overstates the number of trucks crossing the I-5 bridge by more than 2 million today.

3.1 Truck volumes are estimated separately from passenger vehicles for traffic modeling purposes, in part, because truck traffic is influenced by other factors than passenger traffic, and in part because trucks are expected to pay a proportionately larger share of the cost of the project recovered from tolling. The CRC FEIS describes trucks Trucks are FHWA class 6-13 vehicles.

> ***5.2.7 Service Volumes – Trucks***
> The data and analysis of truck volumes include all medium and heavy trucks. The terms "medium" and "heavy" refer to specific classes in the Federal Highway Administration's (FHWA) 13 vehicle-type classification system. Medium trucks are single unit trucks with three or four axles and comprise FHWA Class 6 and 7. Heavy trucks include all tractor- trailer configurations and may include more than one trailer. Heavy trucks fall into FHWA Classes 8, 9, 10, 11, 12, and 13.
> FEIS, Traffic Technical Report, 2011, page 5-9

The Metro Kate Travel Demand model describes trucks as class 4-13 vehicles.

> Highway vehicle classification counts were used to develop average percentages of heavy vs. medium trucks on the system. This, combined with average weight carried by each vehicle type produced a vehicle split of 70% heavy truck and 30% medium truck. To obtain this split, about 92% of total commodity tonnage is allocated to heavy trucks and the remainder to medium trucks.
>
> Medium trucks are defined as FHWA Class 4-7, or single unit trucks
>
> Heavy trucks are defined as FHWA Class 8 and above, or trucks with one or more trailers
> Metro, Kate TravelDemand Model Methodology, page 73

The Stantec Level 2 study uses the same truck classification scheme

> Vehicle classification count data were obtained from permanent count stations along the I-5 Interstate Bridge and I-205 Glenn Jackson Bridge. The classification data were available by Federal Highway Administration (FHWA) vehicle types, as well as shape-based classes. FHWA classes 4 to 6 were grouped together to represent medium trucks while classes 7 to 13 were considered heavy trucks, which aligns closely with the heavy truck definition in the RTDM, as well as the Oregon Toll Program's proposed shape-based classification approach that would consider vehicles 35 feet or longer as heavy trucks.
>
> Stantec, Level 2 Report, page 2-9

The CDM Smith investment grade analysis uses class 6-13 as medium and heavy trucks because this corresponds to the then-proposed basis for accession tolls based on the number of axles. Class 4-5 vehicles would pay the two-axle toll (same as cars), while class 6-13 vehicles would pay an escalating toll based on the number of axles. (CDM Smith page 2-32).

ODOT reports the number of vehicles by vehicle class crossing the I-5 bridges on its traffic counting website. The following table shows ODOTs data for 2005, 2010, 2015, 2019, and average annual growth rates in truck traffic, by class from 2005 through 2019.

ODOT Traffic Counting Data by Vehicle Class

Class	2005	2010	2015	2019	AAGR 2005-19
1. Motorcycles (Optional)	1,308	444	1,019	192	-14%
2. Passenger Cars	84,493	80,376	102,255	105,760	2%
3. Other Two-Axle, Four-Tire Single Unit Vcles.	20,637	29,420	17,543	20,588	0%
4. Buses	1,130	517	476	451	-7%
5. Two-Axle, Six-Tire, Single-Unit Trucks	6,261	2,390	1,733	2,326	-7%
6. Three-Axle Single-Unit Trucks	3,746	1,084	701	903	-10%
7. Four or More Axle Single-Unit Trucks	152	74	106	27	-12%
8. Four or Fewer Axle Single-Trailer Trucks	1,778	579	688	451	-10%
9. Five-Axle Single-Trailer Trucks	4,051	5,889	5,146	4,145	0%
10. Six or More Axle Single-Trailer Trucks	927	1,565	1,482	1,382	3%
11. Five or fewer Axle Multi-Trailer Trucks	520	320	251	192	-7%
12. Six-Axle Multi-Trailer Trucks	241	123	146	109	-6%
13. Seven or More Axle Multi-Trailer Trucks	1,752	407	754	274	-13%
Class 4-13	20,558	12,948	11,483	10,260	-5.0%
Class 5-13	19,428	12,431	11,007	9,809	-4.9%
Class 6-13	13,167	10,041	9,274	7,483	-4.0%

Source: ODOT, Traffic Volumes and Vehicle Classification,
(http://highway.odot.state.or.us/cf/highwayreports/traffic_parms.cfm)

3.2 Metro relies on the Federal Freight Analysis Framework 3 (FAF3) estimates of current traffic and projections of freight movement from 2005 to 2035.

> The truck model forecasts the quantity, type, and distribution of truck trips generated by the flow of goods into, out from, and within the 4-county region. The model is based on a commodity flow (CF) database that forecasts annual tonnage flows of 44 commodity groups (2-digit SCTG) by primary mode, origin and destination regions and forecast year (2000 to 2035, in 5-year increments). The CF database was initially prepared for the Port of Portland using Freight Analysis Framework (1997 CFS) data. It was updated in 2005 using FAF2 (2002 CFS) data, then validated and augmented by the regional 2006 trade capacity study. It was most recently updated in December 2015, using a FAF3 (2007 CFS) database provided to the Port in April, 2015
>
> Metro, Kate Travel Demand Model Methodology, 2020, page 68.

The FAF3 data used in the Metro Kate model are more than a decade out of date. The FAF3 data have been superseded by FAF 4 (2012 data) and FAF5 (2017 data). The FAF5 data report much lower levels of truck freight activity than predicted by the FAF3 projections. The FAF5 projections predict much lower levels of truck freight growth in the coming decades than the FAF3 projections. By relying on FAF3 data and projections, Metro over-states the current level of truck traffic in Portland and on the I-5 bridges, and overstates expected future growth in truck traffic as well. Metro's latest Regional Freight Strategy also relies on the FAF3 data.

3.3 Metro did not validate its modeled estimates of truck traffic on I-5. Metro's Kate Validation report makes no mention of truck traffic levels. The report contains no data showing how well Kate truck traffic estimates compare to actual recorded levels of truck traffic in the region, or on the I-5 bridges.

The Draft SEIS claims that regional freight traffic will increase by 45 to 65 percent

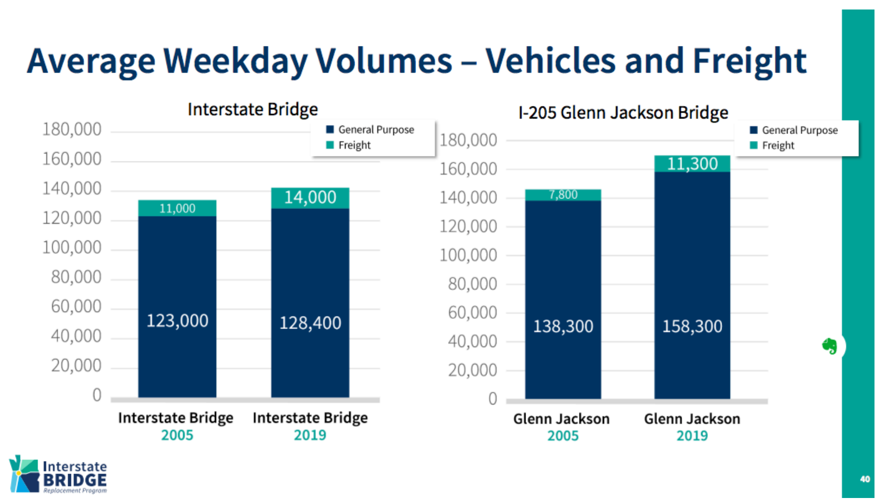
> Freight Mobility and Access
>
> Freight transportation in the Portland-Vancouver metropolitan region is estimated to increase by 45% to 65% in the next 25 to 30 years, based on forecasts by Washington and Oregon.

The report contains no citations to applicable studies.

3.4 Metro's Kate model claims current levels of truck traffic across the Columbia River and specifically on I-5 differ substantially from the values reported by ODOT. Metro's model claims that more than 17,000 medium and large trucks (Class 4-13) per day crossed the I-5 bridge in 2019 (429:cell F7:F10). ODOT's public traffic count data shows that 10,260 Class 4-13 trucks per day crossed the I-5 bridge.

Truck Travel Reported Base Year Volumes					
		Base Traffic (AADT)		ODOT Traffic Count	
	Scope	Year	Level	Level	Difference (%)
CRC Final EIS	Class 4-13	2005	10,985	20,558	-47%
Investment Grade Analysis	Class 6-13	2013	10,512	10,512	0%
IBR Post-Processed	Class 4-13	2019	14,000	10,260	36%
Metro Travel Demand Model	Class 4-13	2019	17,373	10,260	69%
Stantec Level 2 Study	Class 4-13	2019	11,638	10,260	13%

3.5 IBR presented data on historical and current truck usage of the I-5 bridge that differ substantially from values reported by ODOT. In its presentation on traffic forecasting, IBR claimed that daily truck traffic on the I-5 bridge increased from 11,000 trucks in 2005 to 14,000 trucks in 2019 (a growth rate of 1.7 percent per year). According to ODOT's own traffic recorder data, the daily volume of trucks on I-5 declined from 13,167 in 2005 to 9,809 in 2019, an annual decline of -2.1 percent per year.



3.6 Stantec's Level 2 Traffic and Revenue Study confirms that the Metro Travel Demand Model overestimates existing truck traffic by almost 40 percent. The Metro model says trucks make up 9 percent of I-5 current traffic, Stantec says in reality trucks are only 6.5 percent of traffic. This minimizes the overstatement because the Metro model also over-estimates traffic for cars and light trucks as well:

> As shown before in Table 2-3, the heavy trucks constitute approximately 6.5% of total traffic on the I-5 Interstate Bridge. The RTDM estimates heavy trucks to be

> about 9% of the total bridge traffic. As such, adjustments were necessary to reallocate the estimated truck trips to the proposed tolling classifications to be consistent with observed truck shares.
>
> Stantec Level 2 Study, page 4-8

3.7 The modeling done for the Columbia River Crossing—using the previous version of the Metro travel demand model—predicted that truck traffic on I-5 in the No-Build scenario would ***increase*** by 2.3 percent per year from 2005 to 2030. The CRC FEIS predicted that truck traffic on the I-5 bridge in the No-Build Scenario would grow from 10,855 trucks per day in 2005, to 19,405 trucks per day in 2030, an increase of 2.3 percent per year. Between 2005 and 2019 (the last pre-pandemic year), truck traffic on I-5 ***decreased*** at an annual rate of 4 to 5 percent per year.

Summary of Truck Traffic Forecasts						
			No-Build Forecast		Build/LPA Forecast	
Forecast	Period	Base	Level	AAGR	Level	AAGR
CRC Final EIS	2005-2030	10,985	19,405	2.3%	19,405	2.3%
Investment Grade Analysis *	2012-2036	10,512	11,800	0.5%	7,700	-1.3%
Metro Travel Demand Model	2019-2045	17,373	28,384	1.9%	18,882	0.3%
Stantec Level 2 Study	2019-2045	11,638	25,500	3.0%	13,800	0.7%
* IGA is Class 6-13, all others are Class 4-13.						
Growth rates are calculated from claimed base year figures, not ODOT actuals.						

3.8 The CRC EIS predicted that the I-5 bridges will carry 19,405 trucks per day in 2030, under both the No-Build and Build Scenarios.

Exhibit 7-10

Peak Period 2030 I-5 Truck Volume - Bridge Alternatives				
	No-Build		LPA	
Hours	Southbound	Northbound	Southbound	Northbound
AM Peak Period 6 AM - 10 AM	1,140	2,195	1,175	1,960
Midday Peak Period 10 AM - 3 PM	3,525	2,900	3,505	3,225
PM Peak Period 3 PM - 7 PM	2,350	1,635	2,335	1,900
Night 7 PM - 6 AM	2,790	2,870	2,790	2,515
Daily Total	**9,805**	**9,600**	**9,805**	**9,600**
Number hours of congestion[1]	7.25	7.75	3.50	2.00
Number trucks traveling in congestion	2,220	3,075	1,275	770

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis, 2006 and CRC Project, September 2009

CRC, Final Environmental Impact Statement, Traffic Technical Report, Exhibit 7-10

3.9 Metro's Kate and Stantec's Level 2 modeling all predict very rapid growth in truck traffic across the I-5 bridge. The Metro RTDM predicted that truck travel on the I-5 bridge would grow from (an incorrectly estimated 17,373 trucks in 2019, to 28,382 trucks in 2045 (No Build), a growth rate of 1.9 percent. The Level 2 forecasts prepared by Stantec (which concede that the Metro model overstated truck traffic on I-5--See section 3.6) estimated that the number of trucks would rise from 11,638 per year in 2015 (computed at 8.8 percent of total traffic) to 25,500 trucks in 2045 (Stantec Level 2 Study page 2-9).

3.10 The Metro Kate truck modeling is based on the Federal Freight Analysis Framework (FAF), which is out-of-date, and which has consistently over-estimated the rate of truck freight growth nationally. The Chief Economist of the US Department of Transportation wrote that these FAF forecasts were prepared for political purposes, and not used for "real decisionmaking":

> Other federal modal administrations prepare forecasts, but it is done more out of curiosity, to provide talking points for their administrators' speeches. The Federal Highway Administration's Office of Freight Operations has for the last several years prepared the Freight Analysis Framework, which forecasts freight flows out 20 years – not just for trucking, but for all modes of freight transportation. But **we don't actually use the FAF forecasts for any real decisionmaking.** The forecasts help to inform the political process in a general way, and **provide ammunition for politicians who want to spend more on transportation infrastructure.**

Jack Wells, Chief Economist, U.S. Department of Transportation, "The Importance of Transportation Forecasting " Workshop for Transportation Forecasters U.S. Department of Transportation September 22, 2009. Emphasis added.

3.11 FAF forecasts used by ODOT systematically overstate truck traffic growth. The Oregon Department of Transportation relies upon the federal "Freight Analysis Framework" forecasts to predict future truck travel in Oregon. In 2011, ODOT adopted the "Oregon Freight Plan." Its forecasts were based on FAF2 (2002) commodity flow survey data and called for the volume of truck freight to increase 73 percent in 25 years—from 294 million tons to 508 million tons—between 2010 and 2035. This amounts to an annual rate of increase of 2.2 percent per year. In reality, truck volumes have *declined*, rather than increasing. The federal government's latest Commodity Flow Survey, summarized in FAF5, shows total truck volume *lower* now than it was 20 years ago. Trucking volume has declined from 294 million tons per year in 2010 to 229 million tons per year in 2023. We are now nearly half way through the forecast period in the 2011 Oregon Freight Plan, and truck freight has gone down; between 2010 and 2022, truck freight volumes declined at an average annual rate of -1.9 percent per year.

Millions of Tons of Truck Freight Per Year

Oregon Freight Plan (2011 and 2023)

Year	OFP 2011	OFP 2023
2002	259	
2010	294	
2017		218
2023		229
2035	508	
2050		356

Source: Oregon Freight Plan, 2011 (from FAF2), Oregon Freight Plan, 2023 from (FAF5)

3.12 Port activity has almost no effect on truck traffic on I-5. The scale of truck movements associated with Port activity is wildly exaggerated. Much is made about the importance of the I-5 bridge to freight movements in and out of the Port of Portland and Port of Vancouver. As part of the Columbia River Crossing project, a 2013 study commissioned by Oregon DOT to identify truck traffic reported that:

> It was reported that there are relatively few truck trips going to and from the Port of Portland. According to the Port Import Export Reporting Service (PIERS) approximately 10% of the 500 trips at Terminal 6 would use the bridge, meaning about 50 trucks per day from Terminal 6 use the I-5 bridge.

That's about 1 truck every 30 minutes. The small number of trucks is hardly surprising--the Port of Portland overwhelmingly handles low value bulk commodities, like minerals and grain, that are moved mainly by rail and barge, not truck.

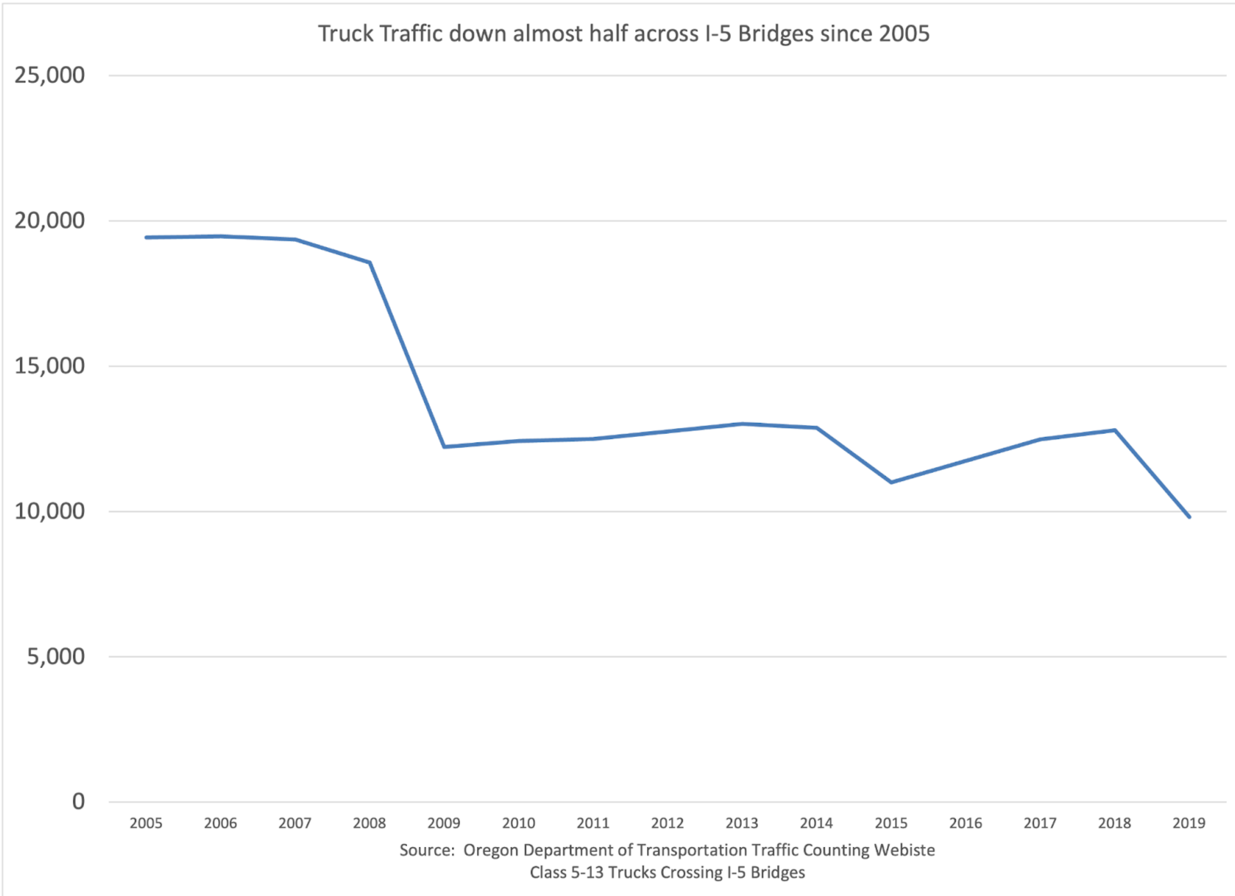
According to the study, neither the Port of Portland nor the Port of Vancouver have data on the origin and destination of trucks traveling to and from the ports. The Port of Vancouver averages about 330 truck trips total, per day, with no evidence of how many cross the I-5 bridge.

3.13 Inaccurate truck forecasts are a major risk to traffic and toll revenue forecasting. Bain calls "less usage by trucks" one of the "common sources of forecasting error:" He quotes Standard and Poor's research showing that forecasts of truck usage were even more unreliable than those made for cars, and concluding:

> The unreliability of truck forecasts combined with the fact that they are often key revenue contributors underscores the importance of understanding the extend to which toll road cash flows rely on trucking demand.
> Bain, page 42

3.14 Millions of Phantom Trucks

The models for the Interstate Bridge Project greatly exaggerate current and likely future truck traffic volumes. Metro's RTDM overstates existing (2019) traffic levels by 69 percent, or about 7,000 vehicles per day. That represents more than 2 million annual phantom truck trips in the base year. Metro's RTDM model also predicts much higher truck traffic growth than is consistent with historical trends. Metro predicts truck traffic will grow 1.9% per year; over the past 20 years, truck traffic over the I-5 bridges has declined by between 4 and 5 percent per year.



The Metro model does not correspond to ODOT traffic count data. Metro has made no attempt to calibrate its model to match observed count data. The Metro RTDM, and other models are based on the out-dated FAF3 data. The FAF data series has significantly over-estimated growth in truck traffic, and according to senior USDOT officials is used for political purposes rather than real decision-making.

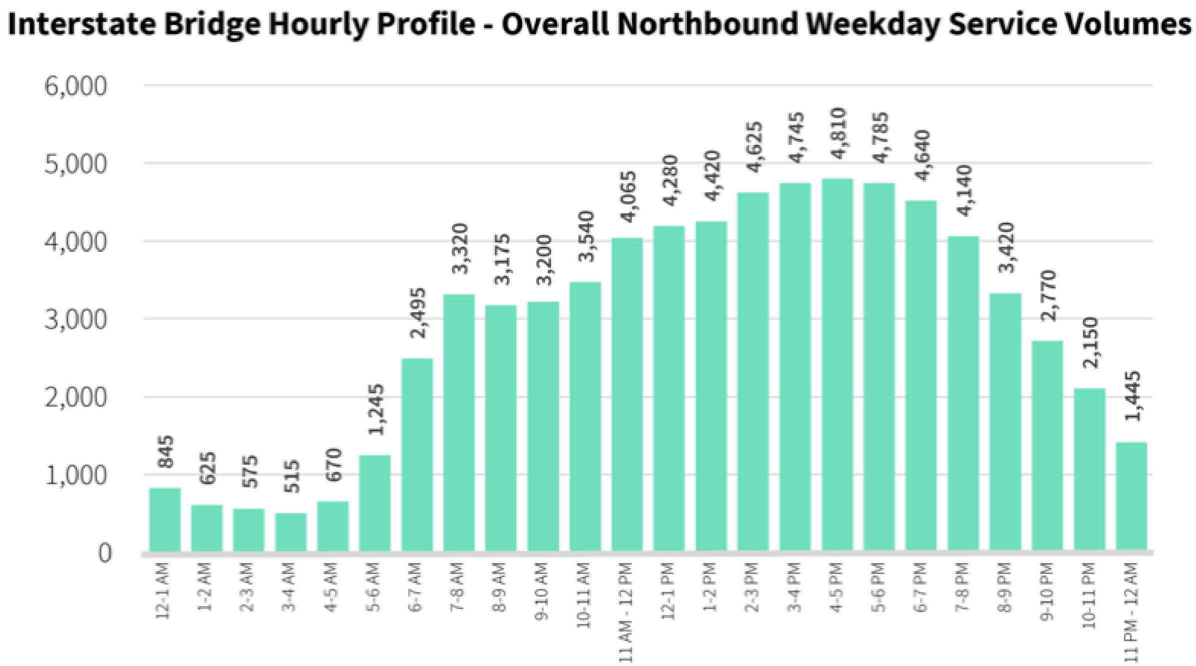
4. Traffic demand models predict traffic that exceeds bridge capacity

The Metro model consistently predicts traffic levels on the I-5 bridge, both in the current year and in future years, that exceed the demonstrated physical capacity of the bridge. The failure to correctly model roadway capacity is a serious model error. The current I-5 bridge can carry no more than about 5,000 vehicles in the Northbound direction in the PM peak hour, yet Metro's model says it now carries more than 6,000. The Metro Model and IBR "post-processed" estimates predict further increases in peak hour volumes in excess of capacity, to 6,700 vehicles (Metro) and 7,700 vehicles (IBR, post-processed) These impossible volumes are then used to predict long delays and justify expanding freeway capacity..

4.1 FHWA Guidance on the preparation of demand estimates requires Metro, WSDOT and ODOT to realistically account for capacity limitations:
https://ops.fhwa.dot.gov/trafficanalysistools/tat_vol3/sect6.htm

> "Constraining demand to capacity. . . care must be taken to ensure that forecasts are a reasonable estimate of the actual amount of traffic that can arrive within the analytical period . . . Regional model forecast are usually not well constrained to system capacity"

4.2 Traffic Count data show that the PM peak hour capacity of the I-5 bridge is currently less than 5,000 vehicles per hour (vph). The IBR reported 2019 hourly traffic counts, as follows:

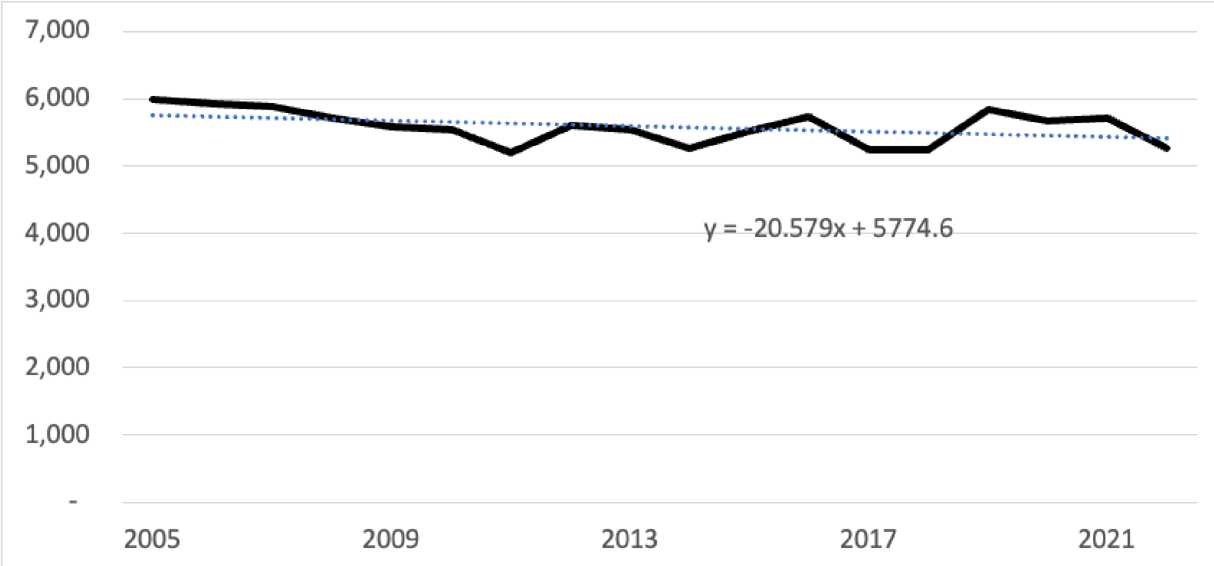


Interstate Bridge Project, Travel Demand Modeling
Coordination Meeting, 30 March 2022, Slide 9. (Obtained by Public records Request).

Maximum Northbound peak 4-hour travel was 4,810 vehicles per hour (vph) between 4pm and 5pm. Annual average weekday peak PM Northbound traffic counts since 2010 have averaged between 4,600 and 4,800 vph, and have not exceeded 5,000 vph. (Regional Transportation Council, Columbia River Bridge Crossings, Average Hourly Traffic Data, https://www.rtc.wa.gov/data/traffic/bridges/hourly.asp?brdg=i5).

Oregon Department of Transportation Automatic Data Recorder counts for the Interstate Bridge show that peak hour, peak direction traffic volumes on the I-5 bridge have been declining since 2005.

Figure 13: Peak Hour Peak Direction Traffic on the Bridge (ODOT Permanent Traffic Count Station)



(Marshall, 2024)

4.3 Traffic forecasters agree that the current I-5 bridges have reached their capacity. The 2013 CDM Smith Investment Grade Analysis prepared for the Columbia River Crossing observed that the I-5 bridges reached capacity in peak hours several years ago and further growth in peak hour traffic wasn't possible due to that physical constraint.

> Traffic under the existing toll-free operating condition on the I-5 bridge **reached nominal capacity several years ago**, especially considering the substandard widths of lanes and shoulders on the facility. The I-5 bridge has little or no room for additional growth in most peak periods, and capacity constraints have limited growth over the last decade.
> CDM Smith, page 8-12.

4.4 IBR has admitted that traffic growth on I-5 has been limited by capacity. In its December 2021 presentation to the Community Advisory Group, it wrote:

> "Of the total growth in river crossings [between 2005 and 2019], (33,000 AWDT), 72% of the increase occurred on the Glenn Jackson [I-205] Bridge **due to capacity constraints** and extensive congestion over the Interstate [I-5] Bridge."
> https://www.interstatebridge.org/media/lafddqwk/12-2-21-cag-meeting-presentation_remediated.pdf (emphasis added)

4.5 Metro's findings of fact for its 2011 Land Use Final Order include a finding that the capacity of the existing I-5 bridges is no more than 5,500 vehicles per hour in each direction. This statement is consistent with data presented in the CRC FEIS showing traffic flows of up to 5,500 in the southbound direction and 5,000 vehicles per day in the northbound direction.

> The existing I-5 crossing provides three lanes each for northbound and southbound travel, which can accommodate approximately 5,500 vehicles per hour in each direction.
>
> Metro, Land Use Final Order, (Exhibit B Metro Council Resolution No. 11-4280, Findings of Fact and Conclusions of Law, South/North Corridor Land Use Final Order Columbia River Crossing Project, August, 2011, page 23)

4.6 The IBR Traffic Technical Report (June 2024 Version) concedes that the maximum hourly capacity of the I-5 bridges is no more than 1,850 v/l/h or about 4,550 vehicles per hour. TTR, Appendix A, Transportation Methods Report.. File: ibr_tra_tr-appxa.pdf

> However, the highest throughput across the Interstate Bridge (the primary bottleneck in the study area) as well as the ramp terminals just north and south of the Interstate Bridge ranges between 1,550 and 1,850 pc/h/ln. This indicates that the capacity of the Interstate Bridge is near 1,550 to 1,850 pc/h/ln, The HCM capacity estimates of 2,100 to 2,200 pc/h/ln are 20 to 30 percent higher than the capacity of the Interstate Bridge, indicating that the HCM model is not an appropriate analysis tool in this case. The HCM process is not accounting for factors that would further reduce the ideal capacity. Some possible contributing factors not accounted for by the HCM process include the influence of limited sight distance across and approaching the Interstate Bridge, closely spaced interchanges, short merge, diverge, and weaving distances.
>
> June 2024 Interstate Bridge Replacement Program | Page 27

4.7 The current PM peak hour Northbound Hourly traffic volumes estimated by the Metro model exceed the actual physical capacity of the I-5 bridge. Metro's model fails to accurately account for PM peak hour capacity restrictions on the I-5 bridges. Metro's Kate model incorrectly over-estimates current (2019) PM peak hour travel as 6,375 vph, when traffic recorder data show it was 4,800 vph. Metro's validation report does not address the discrepancy between estimated and actual base year peak hour travel.

4.8 IBR's traffic estimates show that peak hour traffic on I-5 has not increased at all since 2005. In its traffic modeling, IBR provides PM peak period Northbound estimates of travel comparing the 2005 volumes claimed in the Columbia River Crossing Environmental Analysis with the current 2019 volumes (these are IBR's "post-processed") estimates of volumes, which exceed the ODOT counts by 20 percent).

4.9 Notwithstanding the existing capacity limitations on the I-5 bridge, the "No-Build" scenario in the Stantec Level 2 study predicts that the I-5 bridges will account for a greater share of growth in cross-river traffic (43.5 percent) between 2021 and 2046 than they did between 2005 and 2019 (28 percent). The Stantec model offers no plausible explanation as to why traffic on the I-5 bridges (which are already at capacity) can or should grow faster than they have in the past..

4.10. Modeling done for the IBR over-states I-5 bridge traffic levels in the "No-Build" scenario, which produces a false and biased estimate of the environmental impacts of the "Build Option.' Environmental impacts are estimated by comparing the differences between the "build" and no-build" traffic patterns. By overestimating traffic in the "no-build" scenario, the EIS falsely makes it appear that the "build" option is more environmentally beneficial

4.11 Higher levels of traffic in the "EIS" estimates do not represent an environmental "worst" case. ODOT and WSDOT officials assert that they admittedly exaggerated traffic estimates contained in the EIS represent a "worst" case, and that the "L2" and IGA numbers are valid only for financial purposes.

4.12 IBR uses the term "demand volumes" to characterize future traffic levels. This is a euphemism to conceal the fact that these are not predictions of actual levels of travel, but are modeled predictions of the number of vehicles that *might* use the bridge if there were no capacity constraints. The Metro RTDM model allows predicted traffic levels to exceed highway capacity. The SDEIS repeatedly uses the term "demand volumes" in its Purpose and Need Statement (two instances) and in its Traffic Analysis (four instances). A typical passage reads as follows:

> Both daily and during peak periods, the regional travel demand model predicts increased trips across the Columbia River by 2045. Table 3.1-11 shows year 2045 average weekday traffic **demand volumes** for I-5, I-205, and total Columbia River crossings. These are indications of the **predicted demand** for travel across the Columbia River; however, the Transportation Technical Report also evaluates more detailed operational measures to assess how well the facilities could handle future travel demand.
> IBR, SDEIS, Traffic Chapter, (Emphasis added)

The report never defines what it means by "demand volumes" as differentiated from "actual volumes" or simply volumes.

Other reports, notably the 2013 CDM Smith Investment Grade Analysis and the 2022 WSP Level 2 traffic analysis do not use the term "demand volumes" but instead characterize their predictions as "estimates" or "estimated volumes."

5. Travel demand models don't accurately model driver response to tolling

Tolling is an essential part of the IBR project: it is needed to finance the project and manage traffic levels. The Metro model only indirectly estimates the effect of tolling on traffic. Metro's model makes unwarranted assumptions about the value of travel time, leading it to under-estimate the effect of tolling on travel patterns. The Metro model also fails to account for shifts in the time of day of travel in response to variable tolling. By under-estimating the effects of tolls in reducing traffic, IBR is falsely trying to justify a much larger bridge structure and wider highway than is needed to carry future traffic. IBR, ODOT, and WSDOT all falsely characterize more rigorous and precise "investment grade" or "level 3" studies as inapplicable for assessing the environmental effects of tolled roadways. Investment grade studies are not "worst-case" scenarios, are more accurate than DOT "level 1" and "level 2" studies, and tend to over-estimate traffic levels on tolled roadways.

5.1 The value of travel time is a critical factor in the correct estimation of future travel demand. An incorrectly specified value of travel time will lead to inaccurate estimates of traffic levels in a tolled regime. An international expert in the field, Robert Bain calls miscalculation of the value of travel time savings "a common source of forecasting error."

> As a concept, the value of travel time savings (VTTS) lies at the heart of all toll road traffic forecasting models. . . . Toll road traffic forecasting reports need to explain what values of time savings have been used in models, how they have been estimated and how they have been applied— and provide strong justification in each case. (Bain, page 43)

Higher values of time signifies a greater willingness to pay a toll to save travel time, and results in higher estimates of travel on tolled roadways and less diversion to alternative routes and less trip suppression. Lower values of time signify less of a willingness to pay tolls to save travel time, and results in lower estimates of travel on tolled roadways and more diversion to alternative routes and more trip suppression.

5.2 Metro's Kate model does not directly estimate the impact of tolls on travel demand. The model uses an indirect approach, coding tolls as a "time penalty" or impedance for a tolled road segment. For example, if a road segment is tolled, the model is altered to increase the travel time on that segment, so that the model treats any travel on that segment as slower (and less desirable) than travel on the remaining segments of the model.

5.3. Metro estimates the time penalty associated with a road toll by assuming a value of time, the number of dollars per hour that the average traveler values travel time savings. It uses its assumption of the value of travel time savings to estimate the number of minutes of delay (or time penalty) associated with each dollar of toll charged.

5.4 Different models use different values of travel time. Values of travel time vary by income, time of day, and trip purpose. The Metro TDM uses a value of $24.64 per hour for peak hour travel, CDM Smith uses a value of $15.21 for peak hour travel (for middle income households), Stantec uses a value of $22.74 per hour for middle income households for single occupancy vehicle trips (the category most closely corresponding to peak hour travel). The Metro RTDM uses a value of $16.39 for off-peak trips; CDM Smith uses a value of $13.13 for off-peak trips by middle income households, and Stantec uses a value of $13.99 per hour for single occupancy vehicle home-based shopping trips by middle income households. All values in 2022 dollars.

Comparison of Peak Hour Time Value and Implied Time Impedance

	Value of Time (2010$)	Minutes per Toll Dollar
Metro RTDM (Uncorrected)	19.27	3.1
Metro RTDM (Corrected)	14.28	4.2
CDM Smith (Middle)	11.89	5.0
Stantec Level 2 (Middle)	16.95	3.5

Note: All values converted to 2010$; Stantec reported at $22.74 (2022$); CDM Smith $15.21 (2013$)

Stantec confirms that in the aggregate, the values of travel time it used in its modeling are lower than in the Metro RTDM:

> . . . the VOTs assumed in the toll model for this analysis are generally lower than those in the RTDM . .
> Stantec, Level 2, page 3-4

5.5 Traffic studies offer different bases for their value of travel time estimates. Metro's RTDM says that its value of travel time is taken from a 2015 report from the Oregon Department of Transportation. This publication deals with the economic value of travel, and is not explicitly calibrated to reflect how pricing affects travel behavior. CDM Smith relies on a stated preference survey conducted by the company Resource Systems Group. Stantec does not report the source of its value of travel time figures, which it characterizes as "assumptions."

5.6 Metro's assumption of the value of time is attributed to an Oregon Department of Transportation study.

TollRates_Updated_AAB_JJ.xlsx (Aaron Breakstone_Jennifer John)

Table 1 I-5 Bridge Toll Assumptions & Values of Time for LPA

Time Period	SOV/HOV	Medium Truck	Heavy Truck
Peak Hours			
Value of Time – 2010 dollars	$19.27/hour	$39/hour	$39/hour
Minutes of perceived time per $1.00	3.11	1.54	1.54
Toll Rate	$3.25	$6.91	$13.41
Time equivalent included in assignment	10.34	9.10	17.56
Off Peak Hours			
Value of Time – 2010 dollars	$12.82/hour	$39/hour	$39/hour
Minutes of perceived time per $1.00	4.68	1.54	1.54
Toll Rate	$2.45	$5.28	$10.16
Time equivalent included in assignment	8.01	6.73	12.98

References

[1] The Value of Travel-Time: Estimates of the Hourly Value of Time for Vehicles in Oregon (2015). ODOT PIAU, November 2016

[2] Portland Metro Kate Trip-Based Travel Demand Model, 2018

5.7 As part of its 2013 investment grade analysis for the Columbia River Crossing, under contract to the Oregon Department of Transportation, the traffic analysis firm CDM Smith had conducted a "stated preference" survey. The survey results provided the basis for estimating the value of travel time for Portland area travelers likely to cross the Columbia River and provided separate estimates of the value of time by income and peak and non-peak travel periods. The CDM Smith study estimated that the value of time for middle income travelers at the peak hour was $12.58 in 2013 dollars, or $11.89 in 2010 dollars and $15.21 in 2022 dollars

5.8 The Metro model cites a figure of a value of peak hour travel time of $19.27 (2010$) per hour and $13.82 per off-peak hour. It claims that this figure is taken from a 2017 ODOT report. That ODOT report does not contain a $19.27or the $13.82 figure. The ODOT report identifies three types of travel (personal local, personal inter-city and "on-the-clock" business travel), each with a separate hourly rate. The weighted average of these three values (weighted by share of travel) is $16.06. The values used in Metro's model correspond to 20 percent higher than this amount for the peak hour ($19.27) and 20 percent lower than this amount for the off-peak hour ($12.84). There is no documentation in the Metro spreadsheet or other available documents to show how these figures were determined. Metro provides no bases or citations for inflating peak travel time values by 20 percent above those contained in the ODOT manual. In addition, the estimates in the ODOT report are expressed in current 2017$; the Metro report apparently did not adjust these dollar amounts to 2010$. The Consumer Price Index for Urban Consumers in 2017 was 245.121, while in 2010 it was 218.076; this means that a one dollar in 2017$ n the ODOT report would actually be about 89 cents in 2010$.

Table 2: Details of Estimated Value of One Hour of Travel-Time by Vehicle Class, Oregon 2017

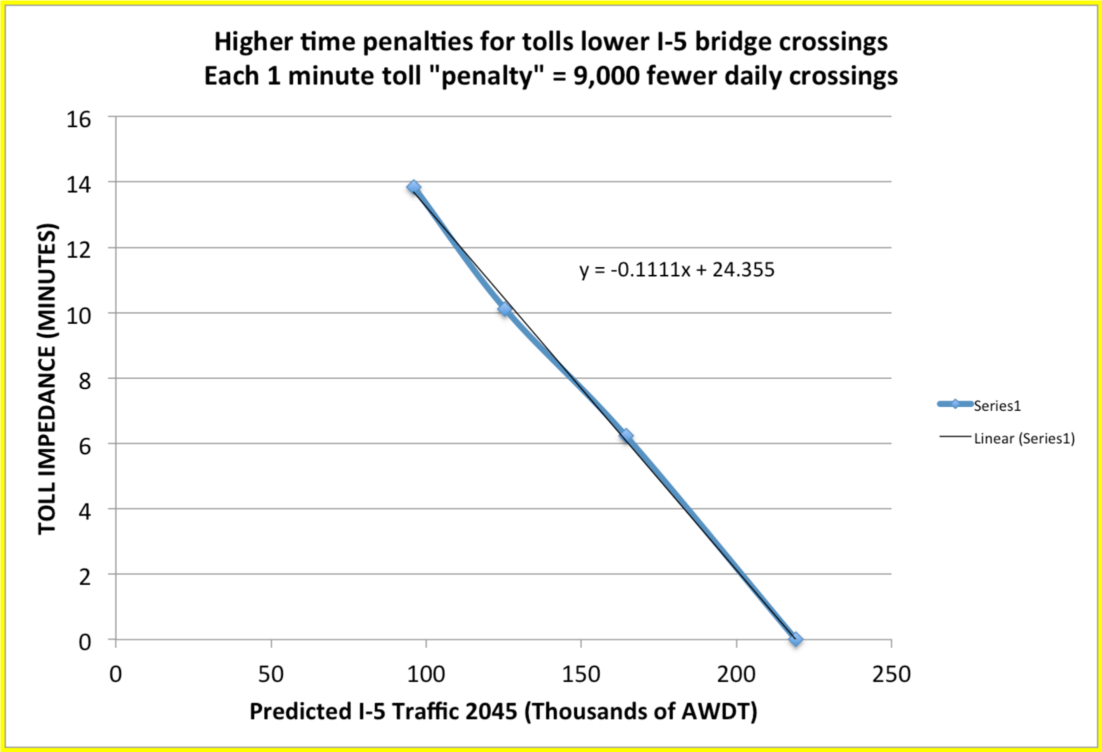
		Hourly Value			
Category	Share		2017$		2010$
Personal Local Travel	82%	$	14.50	$	12.90
Personal Intercity Travel	11%	$	20.31	$	18.07
"On-the-Clock" Business Travel	7%	$	27.34	$	24.32
Weighted Average		$	16.06	$	14.28
Average Minus 20%		$	19.27	$	17.14
Average Plus 20%		$	12.84	$	11.43
Convert to 2010$					
CPI-U	Index				
2017	245.121				
2010	218.076				
Ratio	0.88967				

By failing to correctly adjust for inflation and by arbitrarily inflating the value of travel time in the peak period, Metro has overstated the value of travel time based on the ODOT report. The corrected value of travel time, if one relies on the ODOT report, should be $14.28 per hour in 2010$. This means that Metro's figure of $19.27 per hour is inflated by 35 percent.

Nothing in the ODOT report indicates that this value of travel time is useful or accurate in predicting travel behavior on tolled roadways. Rather, it is a generalized estimate of the aggregate economic value of time; not an indication of the values that drive consumer choice between tolled and un-tolled routes.

The uncorrected Metro travel time estimate implies that each dollar of toll is associated with a time penalty of about 3 minutes. If we correct for the two errors noted above (arbitrarily increasing the estimate by 20 percent and failing to convert to 2010$), the associated travel time penalty associated with each dollar of tolls is more than four minutes. The CDM Smith stated preference survey estimate of $11.89 per hour implies each dollar of toll is associated with a time penalty of about 5 minutes. The value of time in the Stantec survey indicates a dollar of tolls would be associated with about a 3.5 minute time penalty.

In the Metro model, higher time penalties (impedances) are associated with less traffic using the tolled-5 bridge. The following chart shows the relationship between predicted I-5 traffic and the toll impedance (in minutes) implied by the Metro model. Data points are taken from the Metro model. These data show that an expanded I-5 bridge with no tolls would have about 220,000 daily vehicles. A toll equal to a six minute time penalty would reduce traffic to about 160,000 vehicles per day; a toll equal to ten minutes of travel time would reduce traffic to about 130,000 vehicles per day. The line fitted to these points illustrates the "demand curve" for I-5 travel implied by the Metro model.



Because the Metro model uses minute penalties, not actual dollar values, to estimate travel volumes, it is open to question what dollar amount each traveler attaches to a minute of travel time.

5.9 Metro estimated the effect of three levels of tolls, $2.00, 3.25 and $4.45 (in 2010$), equal to $2.56, $4.16 and $5.69 in 2022$. The traffic levels associated with these levels of tolling, as noted above, depend directly on which set of impedance values are chosen. The Metro model uses higher values of time than the CDM Smith and Stantec models.

5.10. Using the CDM Smith stated preference survey estimate of the value of time for middle income travelers instead of the Metro estimate means that the time impedances of each of these tolls would be significantly greater. Metro's (uncorrected) estimates a $2 toll (in 2010$) would impose a time penalty of about 6 minutes, while the CDM Smith value of time estimates that the same toll would impose about a 10 minute time penalty. The difference in the perceived time penalty, according to the Metro travel demand model would have a significant impact on expected ridership. Using the Metro (uncorrected) estimate produces about 164,000 AWDT in 2045; the CDM Smith estimate produces 130,000. The corrected Metro value of time would reduce traffic estimated for 2045 to about 144,000. These are for tolls of $2 (in 2010$). Higher tolls produce even larger reductions in expected future travel on the I-5 bridge. Using the Stantec value of time estimates in the Metro model would produce travel levels between the uncorrected and corrected Metro estimates.

Effect of Value of Time and Toll Assumptions on I-5 Traffic Estimates, 2045

Price Index		Toll Level		
2022$		$ 2.00	$ 3.25	$ 4.45
2010$		$ 2.56	$ 4.16	$ 5.69
Value of Time Assumption	Minutes/$	Minutes/Toll		
Metro RTDM (Uncorrected)	3.1	6.2	10.1	13.8
Metro RTDM (Corrected)	4.2	8.4	13.7	18.7
CDM Smith (Middle)	5.0	10.0	16.3	22.3
Stantec Level 2 (Middle)	3.5	7.0	11.4	15.6
	Implied Average Weekday Trips, I-5 Bridge 2045			
Metro RTDM (Uncorrected)		164,200	129,300	95,800
Metro RTDM (Corrected)		144,400	97,200	51,800
CDM Smith (Middle)		130,000	73,800	19,800
Stantec Level 2 (Middle)		157,000	117,600	79,800

5.11 A value of time consistent with the IGA performed by CDM Smith for the CRC implies that the base level of tolls for the IBR ($2 in 2010$) would reduce traffic on I-5 to 130,000 vehicles per day, according to the Metro model.

5.12 Because estimated future traffic levels depend so directly on the assumptions made about the value of travel time savings, it is important to consider which estimate of the value of time is the most accurate. As noted above, the Metro estimates come from applying data from an ODOT memorandum designed to produce a generalized value of travel time; the ODOT estimates are not based on predictions or observed behavior of people traveling on tolled routes. The CDM Smith estimates of value of time are based on a stated preference survey conducted in the Portland metropolitan area specifically to inform toll-based travel demand modeling. The Stantec estimates are assumptions made by Stantec, with no specific documentation.

The survey method used by CDM Smith is strongly preferred in the professional literature to assumed or borrowed value of time figures. The Transportation Research Board writes:

> It will always be preferable to estimate VOT (and underlying time and cost coefficients in the utility functions) based on local RP [Revealed Preference] and SP[Stated Preference] surveys.
>
> Transportation Research Board, NCHRP 722, Assessing Highway Tolling and Pricing Options and Impacts: Volume 2: Travel Demand Forecasting Tools, page 52.

Assuming a value of time, or borrowing it from another study raises the uncertainty associated with a forecast. It is preferred to estimate the value of time with data specific to the project in question, gathered from a revealed preference or stated preference survey.

> This [value of time] is a fundamental behavioral parameter in the travel model that always represents a source of uncertainty, simply because of the randomness known to be inherent to travel behavior. It should be determined that the average VOT values applied for each segment are reasonable. **A high risk is assigned to this factor if the VOT value was not estimated, but instead was assumed or borrowed.** No matter how well structured and segmented the model system, a ±20% variation in VOT can generally be considered within the 99% confidence interval. For simple models with poor segmentation, the range should be extended to at least ±40%.
>
> Transportation Research Board, NCHRP 722, Assessing Highway Tolling and Pricing Options and Impacts: Volume 2: Travel Demand Forecasting Tools, page 64. (emphasis added)

Metro's Regional Travel Demand Model and the Stantec Level 2 study both use values of time that are assumed or borrowed, rather than estimated from a stated preference survey specific to Metro Portland or the corridor in question. The CDM Smith study uses travel times from a preferred and more reliable source: a stated preference survey conducted that poses questions about travel in this corridor and this project (i.e. a tolled I-5 bridge). The value of time in the CDM Smith study is a more accurate and reliable estimate, according to professional standards.

5.12 The IBR and Metro staff ignored the CDM Smith Investment Grade Analysis, which is much more precise, and has been accurately validated against real world traffic data with an error of less than 1-2%. ODOT and WSDOT spent $1.5 million to commission this model. It is possible to be vastly more accurate. Also, unlike the CRC/Metro Ivan “No build” forecast prepared for the CRC, the No Build forecast prepared by CDM Smith accurately predicted 2005-2019 traffic growth.

5.13 A key element of the tolling scheme for I-5 is “time of day pricing” – charging higher tolls at peak hours to encourage drivers to take trips before or after rush hours. The Metro model is incapable of modeling shifts in travel time due to peak hour pricing. This is especially important in the I-5 corridor because a high proportion of trips are discretionary shopping trips that are heavily motivated by sales tax evasion. These are exactly the kind of trips that are likely to be affected by time-of-day pricing.

6. IBR altered Metro Forecasts, falsely labeling alterations "post-processing"

IBR claims that its traffic forecasts are an output of the Metro Travel Demand Model. IBR did not use the output of the Metro model. Instead, it altered the outputs of the Metro model. These alterations further exaggerate already inflated peak hour traffic levels on I-5. The adjustment of these figures, which IBR falsely labels as "post-processing" don't even follow from the methodology the project claims to have used. IBR has failed to document its so-called "post-processing" adjustments to Metro model outputs.

IBR staff made a series of undocumented changes to Metro model outputs, arbitrarily increasing some traffic volumes and decreasing others, which it characterizes as "post-processing."

6.1 While IBR officials claimed that their future travel forecasts were drawn from the Metro model, they failed to disclose that they did not use the actual outputs of the Metro model, but instead subjected them to a series of alterations, which they call "post-processing." IBR never publicly disclosed its "post-processing" the Metro Kate model outputs until after being challenged to reveal travel demand information in a public records request.

Contrary to public claims made by IBR officials and other project partners, IBR did not simply use the outputs of the Metro Model. IBR project director Greg Johnson testified for example, that the traffic modeling came from Metro. Johnson testified to the Metro Council on January 6, 2022, the IBR's numbers came from Metro travel projections:

> The question regarding the investment grade traffic study. That's one that we're going to have our folks look deeply into as far as the timing, but I do want to want to correct a misnomer. That investment grade traffic study is not to size the bridge. What sizes the bridge is the data that we take from the regional models that are a part of Metro and RTC . . .
> Greg Johnson, Metro Testimony, January 6, 2022

Greg Johnson testified to the IBR Executive Steering Group at its January 20, 2022 meeting that IBR's numbers were the results of Metro's models:

> So we're still working tremendously hard running models. The data gathering is done now. It's data sorting and data input into the models, so that is an ongoing process. we're hoping within the next month and a half to two months to start taking the results of those models and start putting the IBR solution or the locally

> preferred alternative, the draft locally preferred alternative on the table uh for for this group and our advisory groups to start looking at and giving us feedback

Matt Ransom, RTC Director, and member of the IBR Executive Steering Group (ESG) publicly maintained that it was the region's modelers, not agency officials, that determined what went into the models, and that the modelers were "walled off" from the policy people. November 17, 2021 ESG at approximately Timestamp: 1:44
https://youtu.be/k_-uOrevXFk?list=PLlzHp4MXqDjb7vAI42U8Dyb1QCItof9ht&t=6309

> Ryan, thank you for the presentation. I think Ryan was being a little bit too modest: the reality is, and I can vouch for this and I'll say it publicly: the Metro/RTC model is best in class and so what that means I think for this work, and it adds on to I think what President Peterson just said, best in class for comparing alternatives against each other.
>
> I think we need to be careful and just a word of caution for all of us. The absolute numbers are not the prediction of the future -- it's a model, it's a forecast, it's a set of hypotheses about what may occur. But the math that underlies these analysis tools is best in class. So rest assured I think for all partners that are looking at this.
>
> Second is the scenarios themselves. There are a lot of questions being asked and a lot of "do this" "do that" kind of statements being made. I want people to understand, those that are watching this and that will then look at the data when it comes out the team that does this is walled off from people like myself. They're walled off from others that might be around this table, the policy people, let's say the people that are asking these broad questions or proposing different hypotheses.
>
> That's important and the reason why that's important is these people spend their lives work making sure that the tool has the best math, the best integration of social characteristics, economic characteristics, so on and so forth. We want them to be true analysts and they are such so when we see the data that comes out it's best in class and it's also produced by people that don't have a, let's say, a reason to make it be what it ends up.
>
> Being they're siloed; they're walled off. The analysis outputs will be what they are and I think again for the public and public trust in this conversation. There's always so much like. I want to see this in the model with full faith in Ryan's team, full faith in the RTC/Metro teams and I think I look forward to seeing the results.

In 2022, Greg Johnson claimed that the project's modeling was "owned" and "created" by the planning organizations. ODOT's Greg Johnson testifying at the Joint I-5 Bridge Committee hearing on December 12, 2022.

> Rep Boshart--Davis asked:
>
> Mr. Johnson, you had mentioned that the IBR doesn't do the modeling. I think you said RTC and Metro does the modeling and provides that to you. Do you have the breakdown of the assumptions used for or the equation the data and the assumptions used for that modeling? And if so, would you be able to pass it on to the committee?

And Mr. Johnson answered:

> Yes we can. We provide the data. It is a model that is owned by both of these entities. . . . This model has been recognized nationally as an excellent tool; one of the best tools that is owned by planning organizations. It is my understanding of the evaluation of the model that these folks have created and all. So yeah, we can get to what our inputs are, and demonstrate to you what our assumptions are going into the model.

6.2 The term "post-processing" is technical jargon in the traffic forecasting profession. It refers to making alterations to the output of a travel demand model. Two "handbooks" on transportation modeling called NCHRP 255 and 765 describe how to use post-processing to develop more detailed estimates for particular times or particular road segments not estimated directly by a computerized regional travel demand model. Often times the outputs of regional travel demand models only include daily travel volumes (ADT or AWT), or only include multi-hour time periods. Similarly, regional travel demand models may only include travel volumes for a multi-roadway corridor, rather than individual roads. In these cases, the coarser outputs of RTDMs have to be interpolated to provide finer values for specific times (like a peak hour from 5 to 6 pm), or for a particular roadway. Other times, model outputs are for a different forecast year, and must be interpolated or extrapolated to match a planning year. None of these conditions apply to the IBR analysis. In the case of the IBR, neither temporal nor geographic interpolation is required for the Metro RTDM because it directly models hourly volumes for the I-5 and I-205 bridges for the horizon planning year (2045). NCHRP 255. Pedersen, Neil J., and Donald R. Samdahl. "Highway traffic data for urbanized area project planning and design." NCHRP Report 255 (1982)

6.3 IBR failed to document its post-processing changes or produce the required spreadsheets required by Oregon's adopted Analysis Procedures Manual. IBR failed to follow either the practices spelled out in the professional literature for applying such methods or its Oregon DOT's Analysis Procedures Manual. Both of these call for providing spreadsheets or similar written calculations showing input data, describing assumptions, and generally enabling a third party to understand and replicate the calculations. ODOT's own Analysis Procedures Manual (which spells out how ODOT will analyze traffic data to plan for highway projects like the IBR), states that the details need to be fully displayed:

> 6.2.3 Documentation
> It is critical that after every step in the DHV [design hour volume] process that all of the assumptions and factors are carefully documented, preferably on the graphical figures themselves. While the existing year volume development is relatively similar across types of studies, the future year volume development can go in a number of different directions with varying amounts of documentation needed. Growth factors, trip generation, land use changes are some of the items that need to be documented. If all is documented then anyone can easily review the work or pick up on it quickly without questioning what the assumptions were. The documentation figures will eventually end up in the final report or in the technical appendix.
> The volume documentation should include:
> - Figures/spreadsheets showing starting volumes (30 HV)
> - Figures/spreadsheets showing growth factors, cumulative analysis factors, or travel demand model post-processing.
> - Figures/spreadsheets showing unbalanced DHV
> - Figure(s) showing balanced future year DHV. See Exhibit 6-1
> - Notes on how future volumes were developed:
>
> If historic trends were used, cite the source.
> If the cumulative method was used, include a land use map, information that documents trip generation, distribution, assignment, in-process trips, and through movement (or background) growth.
> If a travel demand model was used, post-processing methods should be specified, model scenario assumptions described, and the base and future year model runs should be attached
> ODOT, Analysis Procedures Manual,
> https://www.oregon.gov/odot/Planning/Pages/APM.aspx

6.7. IBR made substantial changes to the outputs of the Metro model. IBR changed both the estimates of average weekday traffic, and peak hour traffic. IBR also altered the estimates of base period (2019) traffic from those used in the Metro model. (Both the IBR base period traffic estimates and the Metro Kate model traffic estimates are inconsistent with Oregon Department of Transportation traffic recorder data (See section 1).

Comparison of 2045 No Build and LPA Forecasts from Kate and IBR (Post Processing)
Average Weekday Volumes

KATE OUTPUT (4/29/22 Spreadsheet)	I-5	I-205	River Total
NB CT (NoBuild)	190,841	200,129	390,970
LPA CT (Locally Preferred Alternative)	164,384	217,482	381,866
Difference between LPA and No Build (%)	-14%	9%	-2%
IBR Post-Processed (7/8/22 PDF)			
NB CT (NoBuild)	176,000	215,000	391,000
LPA CT (Locally Preferred Alternative)	175,000	207,000	382,000
Difference between LPA and No Build (%)	-1%	-4%	-2%
Post Processing Changes			
NB CT	-14,841	14,871	30
LPA CT	10,616	-10,482	134

IBR's post-processing made substantial changes to the outputs of the Metro model. IBR reports totally different volumes for I5 and I205 than Metro's Kate model. IBR reports that PM peak hour 2045 NB traffic will be 6,905 (No Build) and 7,735 (LPA). Metro's 429 modeling reports that peak NB traffic in the No Build will be 6,375 and 6,735 in the LPA. IBR has increased volumes (7735/6735) 8.3% and (6905/6375) 15% respectively. IBR seems to have added exactly 1,000 vehicles to the PM NB peak volume estimate from the Metro model in the LPA.

6.8 The Metro Kate Model directly estimates hourly volumes on the I-5 bridge as a model output. These model outputs don't need to be "post-processed" to produce peak hour estimates of travel volumes on the bridge. Instead, IBR has labeled its changes to the modeling as "post-processing."

6.9 In July 2022, ODOT offered a one paragraph description of its post-processing methodology in response to a public records request. IBR failed to provide any evidence (tables, spreadsheets) showing how these figures were calculated. The actual "post-processed" outputs don't conform to an application of the described procedure. IBR has provided no other documentation showing how Metro Kate Model outputs were "post-processed" to generate the daily and hourly travel estimates.

6.10 IBR described its alterations to the Metro model outputs (what it called "post-processing") as follows:

The general post-processing approach applied to the IBR Program is as follows:

- Calculate the growth rate between the existing Base Year 2015 travel demand model and the Horizon Year 2045 travel demand model (30 years of growth). The 2015 and 2045 travel demand models are developed jointly by Metro and RTC (two regional Metropolitan Planning Organizations).
- The 30 years of growth is factored down to account for the IBR Program using 2019 as the base year and 2045 as the horizon year (only 26 years of growth).
- The factored 26-year growth from the Travel Demand Model is then applied to the existing 2019 count data to estimate future weekday volumes.

IBR, June 1, 2022 Public Disclosure Request—Traffic Volume Interstate Bridge Replacement Program | DOCUMENT: "3_and_5_VolumeForecasts.pdf"

Materials disclosed pursuant to a public records request also summarize the "post-processing" steps undertaken by IBR. The March 30, 2022 Modeling Technical Coordination Meeting Notes describe "post processing" adjustments as follows:

Post Processing

- The IBR team walked through how volumes were post processed.
  - The post-processing steps are documented in the Transportation Methods & Assumptions Report.
  - The IBR team is following the standard methods per National Cooperative Highway Research Program (NCHRP) reports 255 & 765.
  - Process was reviewed and approved by all partner agencies in Fall 2021.

- *Step 1: Summarize 2019 counts*
  - 2019 counts were summarized, and peak period ramp and freeway volumes were adjusted to reflect demand volumes.
- *Step 2: Obtain Regional Travel Demand Model (RTDM) volumes for 2015 and 2045*
  - Traffic volumes from the RTDM were used to calculate growth between base year (2015) and horizon year (2045).
  - This process was completed for both No Build and Build scenarios.

- *Step 3: Calculate and Assign Growth*
  - Growth is calculated at screenline levels because the RTDM is calibrated at screenline levels vs individual ramps.
  - For example, all northbound on-ramps north of the bridge are grouped together and growth is distributed between them.
  - The same process was applied to on- and off-ramps both directions on both sides of the river.
- Draft post-processed I-5 AM Peak and PM Peak 4 Hour Volumes for 2019, 2045 No Build and 2045 Build were presented to the group.

IBR, Regional Modeling Technical Coordination, NOTES, March 30, 2022, IBR_Modeling_Meeting_3.30.22_Notes.pdf (Post Processing Methodology). obtained via public records request

6.11 IBR modelers elide the differences between actual traffic counts and "demand volumes." IBR used two different terms to describe the current (2019) level of traffic on the I-5 bridges. In its response to our public records request IBR says the predicted model growth rate was applied to "the existing 2019 count data." In the Notes from the 30 March 2022 modeling meeting, IBR says the model growth rate was applied to "2019 counts . . . adjusted to reflect demand volumes." IBR never identifies these adjustments. Modelers often describe the difference between actual recorded traffic levels and higher volumes predicted by the models as "unmet demand." This "unmet" demand is not actual, observed traffic; rather, it is cars that the model predicts would use the roadway if sufficient capacity existed. These are at best "potential" trips, and are an indication of how additional roadway capacity would induce additional travel. Using these fictional trips as the basis for calculating "No-Build" traffic levels overstates traffic, exaggerates the "need" for the project, and conceals the fact that expanding the roadway leads to even more trips, and greater environmental impacts.

6.12. What IBR calls post-processing, involves extracting the growth rate from the Metro model and applying it to a different base level of traffic. The table below replicates the steps described in IBR's post-processing methodology: computing a 30-year and 26-year growth factor, revising the base year level of traffic, and applying the 26-year growth factor to the revised base year traffic figure.

6.13 The Kate Model predicts an annual growth rate of 0.63 percent per year in I-5 traffic in the No-Build scenario. IBR's post process model calls for calculating the 30-year growth from the Kate model and factoring down that growth to 26 years. The Kate model predicts 2015 No-Build weekday traffic of 157,990 (again, miscalibrated), and 190,922 in 2045. This implies an annual growth rate of 0.63 percent. For a 30-year period this implies traffic levels will increase to 1.21 times the base traffic level, and for a 26-year period, traffic levels will increase to 1.18 times the base traffic level. (See Steps 1-2 on the table below).

6.14 Altering the base year traffic estimate. Between Metro's travel demand model, IBR's "post-processing," and ODOT's traffic recorder data, we have three different figures for base year traffic data. The Metro Kate model claims that base year 2019 average weekday traffic on the I-5 bridge is 164,050 vehicles per day. The fact that IBR does not use this figure is an implicit acknowledgement of the calibration errors in the Metro model (see Section 2). The IBR claims that 2019 average weekday traffic on the I-5 bridge was 143,400 vehicles per day. ODOT's traffic count data from station ATR-26-004 show that 2019 average weekday traffic on the I-5 bridge was 138,530. (Step 3)

6.15 Applying the growth factor to the 2019 base level weekday traffic. Applying the 26-year growth rate factor of 1.18 (from Step 2), to the 2019 level of base level traffic produces a 2045 estimate of No-Build weekday I-5 traffic of 168,835 (using the IBR base estimate) and 163,102 (using the actual traffic count base estimate). (Step 3). Neither of these estimates is consistent with the IBR projection that 2045 "post-processed" No-Build average weekday traffic would be 176,000 per year. (Step 4)

6.16 The IBR "post-processed" estimate of No-Build average weekday traffic is more than 7,000 vehicles per day higher than the result one obtains by multiplying the 26-year growth factor by IBR's stated 2019 base traffic level. The IBR post-processed estimate of 2045 weekday No-Build traffic is nearly 13,000 vehicles higher than the actual recorded level of 2019 weekday traffic. (Step 5)

6.17 A key question is how much more traffic is projected in 2045 in the "No-Build" Scenario than is extant in the 2019 base year. The IBR post-processing claims that No-Build I-5 traffic will increase by 32,600 vehicles between 2019 and 2045 (176,000-143,400). The replication of the stated post-processing methodology suggests that No-Build I-5 average weekday traffic will increase by about 25,000 vehicles between 2019 and 2045, regardless of base year values.

6.18 The values reported by IBR as the results of its post-processing are not consistent with its described methodology. IBR's base year (2019) estimate of 143,400 vehicles per day and end year (2045) estimate of 175,000 vehicles per weekday imply a growth rate of 0.79 percent per year, much higher than the Kate model growth rate of 0.63 percent per year. Alternatively, if one accepts the end year (2045) estimate of 175,000 vehicles per weekday and the Kate growth rate of 0.63 percent, that implies that the real base year (2019) estimate is actually 149,500. Again, because IBR did not document its post-processing steps, it is impossible to know the source of these discrepancies.

REPLICATE "POST PROCESSING"	I-5 Bridge Average Weekday Traffic			
1. Calculate 30 year growth rate per model from 2015 to 2045				
2015 Metro Base Year Estimate	157,990			
2045 Metro Horizon Year Estimate	190,922			
Annual Growth Rate (LN Estimate-LN Base)/30)	0.63%			
30 Year Growth	1.21			
2. Factor down growth rate to 26 year period (2019 to 2045)				
Annual Growth Rate (from Step 1, above)	0.63%			
26 Year Growth	1.18			
3. Apply 26-year growth rate to "existing 2019 count data"	2019	2045	Delta 2019-45	CAGR
A. IBR "Base"	143,400	168,835	25,435	0.63%
B. ODOT Traffic Count "Base"	138,530	163,102	24,572	0.63%
4. IBR Reported Postprocessed values	143,400	176,000	32,600	0.79%
5. Difference between IBR reported and calculated values (4-3)				
A. Compared to IBR "Base"				
Variance (IBR Reported - Calculated)		7,165	7,165	
Percent		4.1%	22.0%	
B. Compared to ODOT Traffic Count "Base"				
Variance (IBR Reported - Calculated)		12,898	8,028	
Percent		7.9%	24.6%	

6.19 IBR has post-processed the output of Metro's Kate model to try to compensate for the error in Kate's I-5/I-205 split: It has manually re-assigned about 15,000 vehicles per day from I-5 to I-205.

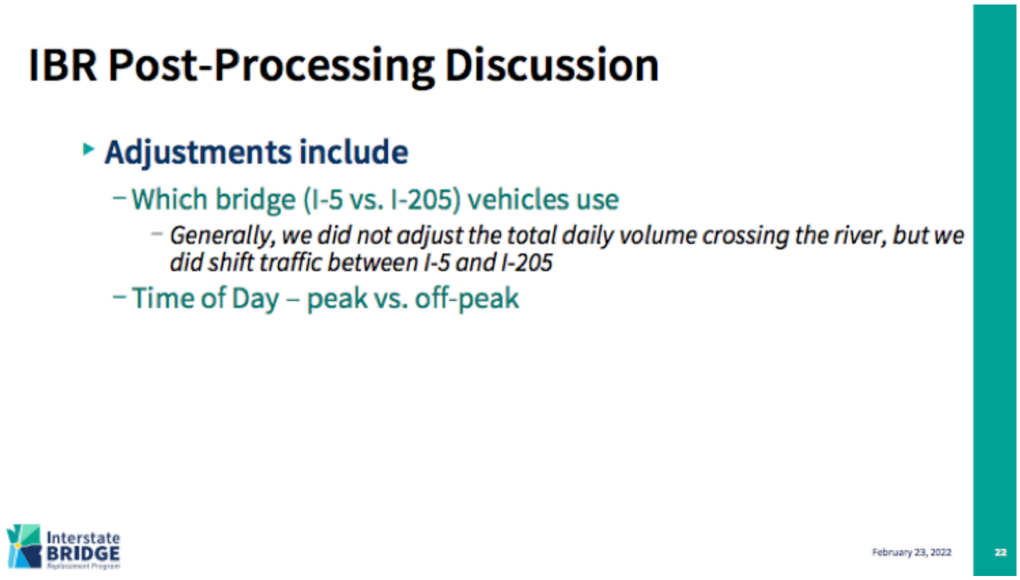
6.20 IBR's alterations to Metro model outputs made contradictory changes to I-5 bridge volumes: decreasing volumes on a daily basis to less than those from the Metro model, and increasing volumes for PM peak hours from the Metro model. While its post-processing moved traffic from I-5 to I-205 on a **daily** basis, IBRs post-processing moved traffic from I-205 to I-5 on a PM **peak hour** basis. IBR's estimate of PM Peak hour travel NB I-5 in 2019 is 6,290, which is higher than both the Kate model (5,740) which overpredicts this volume and the actual recorded data (4,800 vph)(See Section 4, above).

6.21 IBR's post processing admits one error in the Kate forecast (getting the base level of traffic on I-5 wrong), but fails to correct a second error in the Kate forecast (over-predicting the growth of traffic on I-5 relative to I-205). The post-processing between Kate and IBR lowered daily I-5 traffic counts by 15,000, but kept the same predicted growth rate in traffic from 2019 through 2045). Essentially IBR's post processing is saying that even though Kate can't accurately predict the current level of traffic on I-5 (an easy task), we can count on it to accurately predict the rate of growth in traffic for the next 25 years (a much more difficult task)..

6.22 IBR's post-processing produced unexplained and contradictory adjustments to traffic levels on the I-5 and I-205 bridges. For the terminal year (2045), for the No-Build, IBR post processing *increased* the peak hour traffic volumes on the I-5 bridge by 8 to 15 percent compared to Kate estimates. In post-processing, IBR *decreased* the *daily* traffic volumes on the I-5 bridge by 11 percent (190,122 vs 169,600) compared to Kate estimates. In post-processing IBR *increased* pm peak hour NB volumes on the I-5 bridge by 8 percent (6,905 v. 6,375).

6.23 IBR's "post-processing" used the 2045 estimate of total river crossing traffic taken from the Metro Kate Model without alterations. This table shows the estimated 2045 traffic levels on the I-5 and I-205 bridges from the Metro Kate Model and the IBR's post-processed values, for the no-build and for building the locally preferred alternative. The two forecasts predict exactly the same levels of total traffic across the river under the two different scenarios: about 391,000 vehicles in the no-build and 382,000 in the LPA (far right column). These differences are solely due to rounding. So clearly the post-processing accepted the river crossing totals from the Kate model without modification.

6.24 IBR's post-processing changed the allocation of traffic between the I-5 and I-205 bridges, allocating more traffic to I-205 in the no-build scenario and more traffic to I-5 in the build scenario. In the No-Build, post processing moved about 15,000 trips from the I-5 bridge to the I-205 bridge. In the case of the LPA, the post-processing moved about 10,000 trips from the I-205 bridge to the I-5 bridge. This means that the IBR Post processors think the Kate model is wrong by about 15,000 trips in one direction in the no-build, and wrong by about 10,000 trips in the opposite direction in the LPA. No explanation is offered why the two scenarios have such sizable changes with the opposite sign. Clearly IBR is not accepting the allocation of traffic by the Kate Model.



IBR, February 23, 2022 Modeling Presentation,
file: TDM_Modeling_Meeting_2.23.22_PPT_Slides.PDF
(obtained via public records request)

That's apparent when we focus on what the two models say about the differences between the No-Build and the LPA. The Kate Model says that building the LPA will result in 25,000 fewer trips on I-5 than in the No-Build, and about 17,000 more trips on I-205. The post processed estimates claim that building the LPA will reduce the number of trips on I-5 by 1,000 compared to the No-Build, and that the number of trips on I-205 will also decline, by 7,000, compared to the No-Build. In short, Kate says the LPA will have large impacts, and shift traffic from I-5 to I-205 (a 14% reduction on I-5 and a 9% increase on I-205). The post processed numbers say that the effects of building the LPA will be tiny, and will result in a 1 percent reduction of traffic on I-5 and a 4% reduction on I-205. Kate says building the LPA will shift traffic to I-205; IBR's "post-processing" claims that won't happen.

6.25 IBR's adjustments to Kate outputs increase the over-prediction error for I-5 PM NB peak hour traffic. Kate forecasts no-build traffic of 6,375 vehicles in the PM peak hour in 2045; IBR's post processing increases No Build PM peak hour NB traffic to 6,905 an increase of 8 percent.

Comparison of Kate Model Outputs to IBR "Post Processing"					
PM Peak Hour (5PM-6M) Northbound Hourly Volumes					
Kate Model Outputs (4/29/22)				Growth Rates 2019-2045	
	Existing (2019)	2045NB	2045 LPA	No Build	LPA
"Kate"	6,290	6,375	6,735	0.05%	0.26%
IBR "Post-Processed Outputs (7/8/22)					
	Existing (2019)	2045NB	2045Aux1	2045NB	2045Aux1
"Post-Processed"	5,720	6,905	7,735	0.72%	1.16%
Difference					
Volume	(570)	530	1,000		
Percent	-9%	8%	15%		

Peak period data: IBR_Modeling_Meeting_3.30.22.pdf

6.26. If we apply the same post-processing methodology to the hourly data that IBR applied to the weekday data, this implies an even lower level of peak hour traffic. The stated IBR post-processing method is to apply the Kate 2019-2045 growth rate to the actual observed 2019 count. The Kate growth rate for the NB I-5 PM peak hour is 0.05 percent per year (or a 1.33 percent **total** growth over 26 years). If we apply this Kate growth rate to the **recorded** PM peak hour traffic on I5 NB in 2019 (alternately 4,600 or 5,080 vehicles), that implies that "post-processed" peak hour travel should be between 4,660 and 5,150 vehicles per hour in 2045. This implies that IBR's peak hour NB traffic estimate is overstated by between 1,800 and 2,200 vehicles per hour, ie. between 36 and 44 percent.

6.27 Among traffic projections for the I-5 bridge, only the estimates prepared by the Interstate Bridge Project claim to have been "post-processed." A text search of the CDM Smith Investment Grade Analysis shows no occurrences of the term "post-process. " A text search of the Stantec Level 2 study shows no occurrences of the term "post-process." As noted above, each of these studies is based on the Metro model, with a different calibration and a different value of time, and added toll diversion elements.

6.28 IBR uses the term "post-processing" to describe the alterations it made to the outputs of the Metro Regional Travel Demand Model. But "post-processing" of these model outputs are not needed to address either temporal or geographic gaps in the model because Metro's TDM outputs data for the I-5 bridges on an hourly basis. IBR failed to follow professional practice and Oregon DOT's "Analysis Procedures Manual" in documenting its "post-processing" calculations. IBR's post processing made contradictory adjustments to peak hour and daily traffic flows. IBR's adjustments cannot be replicated by following the description of post-processing it has provided.

7. IBR and Metro modelers failed to follow their own professional standards and federal and state guidelines

Traffic modeling is guided by a series of professional and administrative guidelines. IBR and Metro modelers did not follow or violated these guidelines in many ways as they prepared their traffic demand modeling. IBR modelers

- *Didn't assess accuracy of their previous modeling*
- *Failed to calibrate their model to observed traffic levels*
- *Failed to accurately reflect capacity constraints*
- *Failed to use the exhibit scientific integrity*
- *Failed to document their data and methods*
- *Failed to commission an independent review of their analysis*

7.1 Failed to review accuracy of previous modeling

Federal Guidelines direct agencies to look-back at the accuracy of their past forecasts; neither Metro nor IBR reported that their previous forecasts were dramatically in error.

The Federal Highway Administration specifically directs NEPA analysts to examine previous traffic forecasting efforts, prior to undertaking new forecasts.

> Before producing new forecasts, it is useful to critically review past efforts to be aware of the prior work and to improve on or complement that work.
> FHWA, Interim Guidance On The Application Of Travel And
> Land Use Forecasting In NEPA, 2010, page 6.

The National Academy of Sciences report on traffic modeling recommended that agencies (like Metro, ODOT and WSDOT) that undertake traffic modeling periodically report how accurately their previous forecasts predicted actual traffic levels:

> *Recommendation 3: Periodically report the accuracy of forecasts relative to observed data.*
>
> The project team recommends that agencies responsible for producing traffic forecasts periodically report the accuracy of their forecasts relative to the outcomes measured when the roads are in service. Doing so will accomplish several things:

- Such reporting reveals any bias in the traffic forecasts, such as the observation in this research that observed traffic is, on average, 6% lower than forecast. Even if that bias cannot be attributed to a particular source, understanding its presence and magnitude provides more information to the decision making process.

- It also provides the empirical information necessary to estimate the uncertainty surrounding their traffic forecasts, as described in Recommendation 1.

National Academies of Sciences, Engineering, and Medicine. 2020. *Traffic Forecasting Accuracy Assessment Research*. page S-10

The IBR staff and Metro staff failed to analyze the accuracy of their earlier forecasts made for the CRC as directed by federal guidelines and these earlier forecasts dramatically over-estimated future traffic growth on I-5. As part of the CRC, IBR made 25-year projections of traffic levels on I-5 and I-205, using Metro's "Ivan" model—a predecessor of its current "Kate" model. That modeling predicted that traffic would grow 1.5 percent per year between 2005 and 2030. In fact, through 2019, traffic grew only 0.3% per year.

IBR dutifully reported this historic trend in their presentation, but failed to divulge that this was a significantly slower growth rate than their earlier CRC modeling predicted. In short, IBR and Metro modelers have done essentially nothing to "mark-to-market" their traffic predictions: They have ignored the historical evidence of the past decade and a half which shows their earlier modeling was simply wrong. This is contrary to the recommendations of the National Academy of Sciences and the guidelines of the Federal Highway Administration..

The latest iterations of the Metro and IBR models repeat the same mistakes as their earlier modeling, predicting a rapid acceleration in traffic growth from the established patterns of recent years. They predict in the "No-Build" condition, average weekday traffic levels on I-5, which have grown 0.3 percent per year for the past 15 years, will more than double to 0.63 percent (or 0.79 percent) per year for the forecast period from 2019 to 2045.

7.2 Failed to Calibrate Model to Actual Travel Volumes

Travel models are known to have errors and inaccuracies. In order to minimize such errors, FHWA guidance directs states preparing NEPA documents to validate their traffic modeling.

> In the context of a NEPA study, it is important for the study team to **focus any calibration** and validation efforts that they undertake **on the study area**. Typically, a regional travel demand model will have been adequately calibrated and validated at least at a regional level prior to adoption. While it is important for the study team to critically review the

> documentation of this effort, it is suggested that **more emphasis be placed on checks at the study area level**. It is suggested that the study team **scale their calibration and validation effort according to the scale of the analysis, such as its geographic scope**.
> ***Calibration*** A meaningful calibration effort would include: . . .
> • Comparison of modeled traffic volumes with traffic counts both for individual roadway segments and at more aggregate levels such as throughout the study area
> Federal Highway Administration, Interim Guidance On The Application Of Travel And Land Use Forecasting In NEPA, March 2010, page 10 (emphasis added)

IBRs failure to undertake this required calibration of Metro's model is material because the Metro Kate model over-predicts peak hour north-bound travel on this section of I-5. This information is contained in Metro's own model validation result. The traffic screenline corresponding to the I-5 Bridge is "Cutline E-16". According to Metro's validation report, the Metro model overestimates PM peak hour northbound traffic at this cutline by 18 percent (Metro, 2017 Kate v1.0 Trip-Based Demand Model Validation Report for Base Year 2015 DRAFT VERSION, August 2017, Table 15).This over-estimation of traffic leads the model to predict more congestion that actually occurs, and means that the benefits of the project are exaggerated, and its environmental effects are understated.

7.3 Failure to Analyze Capacity Constraints

Metro and IBR have ignored FHWA Guidance to realistically account for capacity limitations: https://ops.fhwa.dot.gov/trafficanalysistools/tat_vol3/sect6.htm

> "Constraining demand to capacity. . . care must be taken to ensure that forecasts are a reasonable estimate of the actual amount of traffic that can arrive within the analytical period . . " Regional model forecast are usually not well constrained to system capacity)
>
> Federal Highway Administration, Traffic Analysis Toolbox, 2019.

As noted in Section 4 (above), the PM peak hour Northbound capacity of the I-5 bridges is about 5,000 vehicles per hour. This fact is independently acknowledged by IBR and ODOT consultants. Even so, the Metro and IBR modeling estimates peak hour Northbound travel flows in 2019 of 5,740 and 6,290 respectively, roughly 16 to 25 percent in excess of capacity. (See Section 6, above). Both the Metro and IBR models predict that in the No-Build Scenario, peak hour Northbound traffic levels will continue to increase, by 2045 reaching (6,375 - Metro) and (6,905 - IBR) (See Section 6, above). As modeling expert Norm Marshall has pointed out, these predictions of traffic that exceed capacity are indicative of model error.

7.4 Failure to Fully Document "Post processing"

As noted in Section 6 (above) the IBR project claims to have "post-processed" the outputs of the Metro travel demand model. Post-processing of model outputs is not technically necessary because the Metro travel demand model directly estimates hourly volumes of the I-5 bridges as a model output. (Post-processing is ordinarily only justified when a model doesn't provide estimates for a roadway segment or time period, and model outputs have to be interpolated to provide these results.)

In addition, ODOT's own rules for conducting "post-processing" require that the modeler document their post-processing calculations. IBR failed to document its post-processing changes or produce the required spreadsheets required by Oregon's adopted Analysis Procedures Manual. IBR failed to follow either the practices spelled out in the professional literature for applying such methods or its Oregon DOT's Analysis Procedures Manual. Both of these call for providing spreadsheets or similar written calculations showing input data, describing assumptions, and generally enabling a third party to understand and replicate the calculations. (See Section 6.3).

7.5 Lack of Transparency

In effect, IBR's traffic modeling is a "black box" that presents only partial and incomplete information about key data values, methodology and actual calculations. This process is not transparent and subject to analysis or replication by independent reviewers. This violates accepted practice for transportation modeling. NCHRP Report #765 states:

> It is critical that the analyst maintain personal integrity. Integrity can be maintained by working closely with management and colleagues to provide a truthful forecast, including a frank discussion of the forecast's limitations. **Providing transparency in** methods, computations, and **results is essential.** . . . The analyst should document the key assumptions that underlie a forecast and conduct validation tests, sensitivity tests, and scenario tests—**making sure that the results of those tests are available to anyone** who wants to know more about potential errors in the forecasts.
> National Cooperative Highway Research Project Report, "Analytical Travel Forecasting Approaches for Project-Level Planning and Design," NCHRP Report #765
> .

See Section 14 for more detail on how the Interstate Bridge Project systematically obstructed public availability of modeling data and methodology.

7.6 Lack of Scientific Integrity

Federal regulations require that material included in and relied upon in an Environmental Impact Statement have scientific integrity.

> Agencies shall ensure the professional integrity, including scientific integrity, of the discussions and analyses in environmental documents. Agencies shall make use of reliable existing data and resources. Agencies may make use of any reliable data sources, such as remotely gathered information or statistical models. They shall identify any methodologies used and shall make explicit reference to the scientific and other sources relied upon for conclusions in the statement. Agencies may place discussion of methodology in an appendix. Agencies are not required to undertake new scientific and technical research to inform their analyses. Nothing in this section is intended to prohibit agencies from compliance with the requirements of other statutes pertaining to scientific and technical research.
> 40 CFR § 1502.23 (Emphasis added).

Courts have said that agencies are required to provide specific references to the scientific research they rely upon:

> The court in its order on the cross-motions for summary judgment found BLM violated NEPA because it did not provide citations in the Environmental Assessment (EA) to the studies upon which it relied in its analysis of the impacts of the grazing decisions on the sage grouse and pygmy rabbit. . . . The court found this omission was a violation because NEPA requires agencies to ensure professional and scientific integrity by setting forth the methodologies used and making "explicit reference by footnote [to] the scientific and other sources relied upon for conclusions in the statement." *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1160 (9th Cir. 2006), *abrogated on other grounds by Winter v. Natural Res. Def. Council, Inc.*, 555 U.S. 7 (2008) (citing 40 C.F.R. § 1502.24).
>
> *Guardians v. Bureau of Land Management*, No. 2:10-cv-02896 KJM KJN (E.D. Cal. Jan. 8, 2014)

The IBR project has failed to incorporate all of the information at its disposal. Notably, it has failed to use the more precise estimates from the CDM Smith Columbia River Crossing study. In 2013, the states of Oregon and Washington commissioned CDM Smith to prepare a revenue forecast for the predecessor version of this project, the Columbia River Crossing. This analysis used the then-current version of Metro's Regional Travel Demand Model, along with different assumptions about value of traveler time savings and behavioral responses to tolling to generate its own forecasts of future traffic levels on I-5. The two states spent more than $1.5 million with CDM Smith to create a "Level 3 model" which the IBR and industry sources indicate is more detailed and more reliable than the Level 1 or Level 2 modeling done for the project (See Section 11, below). CDM Smith validated their model against actual traffic levels on I-5; the CDM Smith model showed a less than 1 percent variance with actual travel levels, compared to an 18 percent over-prediction of traffic levels for Metro's Kate travel demand model. The CDM Smith report predicted much lower growth in traffic in the No-Build scenario, much lower traffic levels in the Build scenario than ODOT and WSDOT included in their estimates for the Columbia River Crossing EIS.

The IBR project makes no mention of the CDM Smith modeling effort. Even though the CDM Smith model is more precise (Level 3, not Level 1 or 2), and even though its validation report shows it is more accurate than the Metro RTDM, the IBR project disregarded this modeling in preparing its estimates for the IBR project. Failing to consider and incorporate more accurate modeling techniques (which these agencies commissioned and paid for) is evidence of a lack of scientific integrity.

7.7 Failure to undertake independent review of traffic projections.

The US Department of Transportation has provided guidance on the preparation of traffic and revenue forecasts for tolled facilities. It calls for an independent review of projections. US DOT writes:

> The professionalism, accuracy, and credibility of traffic and revenue forecasts, and the reports presenting them, are always subject to review. A senior-level peer review, internal and/or external, is therefore necessary. An internal review concurrent with the analyses and report preparation can be very effective (i.e., quality assurance and quality control). An external peer review by an independent third party can greatly improve its credibility with potential investors, lenders, government officials with oversight and approval responsibilities, and others. To improve the credibility of the reviewer, his or her background, contractual charge, timeframe, and budget/cost may be revealed.
>
> U. S. Department of Transportation, Guidebook on Financing of Highway Public-Private Partnership Projects, December 2016, Page A-3
> https://www.fhwa.dot.gov/ipd/pdfs/p3/p3-toolkit_p3_project_financing_guidebook_122816.pdf

The Federal Highway Administration's guidance for preparation of NEPA analyses for highway projects directs agencies to include in their documentation either the results of any peer review or an explanation of why a peer review was not included.

> Other elements to consider for inclusion in the documentation are: . . .
> Results of any peer reviews or an explanation detailing why no peer review was required.
>
> Federal Highway Administration, Interim Guidance On The Application Of Travel And Land Use Forecasting In NEPA, March 2010, page 16

Neither Metro nor IBR commissioned a "senior level" peer review of their modeling efforts. The EIS makes no mention of any peer review of traffic modeling, nor does it contain an explanation of why no independent review was undertaken. An external review of the earlier modeling efforts by ODOT and WSDOT for the predecessor project (the Columbia River Crossing) concluded that the traffic modeling was flawed and significantly overestimated future traffic levels. Bain's independent review, prepared for the Oregon State Treasury, concluded that the description of modeling activity in project reports was confusing and dated, that no mention was made of recent historic traffic patterns, and that the modeling failed to reflect the slowdown in traffic growth compared to earlier years. Bain, Robert, *Columbia River Crossing: Review of Traffic & Revenue Reports and Related Material Summary Report*, RBCONSULT Ltd, London, 4 July, 2011

7.8 Failure to document reasonableness and reliability of value of time estimates. The Federal Highway Administration Guidance on NEPA directs transportation forecasters to document the reasonableness and reliability of their value of time estimates.

> While there are different methods that can be used to estimate demand for a managed lane or a toll facility (e.g., diversion curves, toll mode choice models, or traffic assignment methods that incorporate time and cost), for each approach to be successful it is recommended that the basic components leading to the demand estimate (trip distribution patterns by market segment, **values-of-time**, and travel time differences) **be demonstrated to be reasonable and reliable**.
> Federal Highway Administration, Interim Guidance On The Application Of Travel And Land Use Forecasting In NEPA, March 2010, page 13

As noted in Section 5, above, the Metro Travel Demand model borrowed its estimates of the value of time from another source, and did not establish that these values were reasonable or reliable, especially for predicting behavioral responses to tolling. Stantec's value of time estimates were assumed and not documented, and are specifically disclaimed in the report. Neither Metro nor Stantec utilized the results of CDM Smith's 2013 stated preference survey of project area travelers (which is the preferred source of travel time estimates). The value of time estimates in the Metro and Stantec models have not been demonstrated to be reasonable and reliable for modeling purposes.

7.9 Failure to document assumptions. FHWA guidelines direct NEPA traffic analyses to comprehensively disclose assumptions used:

> It is important for NEPA documentation to include enough technical detail to explain complex information in an understandable manner and present information in a way that is easy to follow for agency reviewers, courts, and the public. In addition to explaining the technical information, it is important for agency reviewers, courts, and the public to understand **the reasoning behind how analytical methods were chosen, what assumptions were made, and who made those choices**. The study team can take several steps to achieve this balance, as outlined in a 2005 NCHRP report:
> Identify and Explain Key Assumptions. The technical analyses contained in NEPA documentation generally are based on a series of assumptions. For example, travel forecasts are based on assumptions about future population and employment trends, and future transportation investments. It is important for decisions regarding these underlying assumptions to be reached using a reasoned approach. Also, **it is important for the assumptions themselves to be reasonable in order for the results of the forecasts to be reasonable**. Therefore, in presenting technical information, it is important for preparers of NEPA documentation to **specifically identify key assumptions and explain why those assumptions were made.**
> Describe Methods Used to Develop Forecasting Results. The persuasive power of technical data depends heavily on the reader's confidence in the methods used to generate those data. **If the reader cannot understand how the data were developed, the reader is essentially being asked to "take it on faith."** Thus, describing the methodologies used to develop the data can enhance the credibility of NEPA documentation. This approach requires more than giving the name and version of the model used; it requires explaining in simple terms how that model works and what type of information it provides. It also means explaining any inherent limitations in that model.
> Federal Highway Administration, Interim Guidance On The Application Of Travel And Land Use Forecasting In NEPA, March 2010, pages 36-37

IBR has failed to document the reasonableness of many of the key assumptions in its modeling, including the value of time estimates (from the Metro Model), and the "post-processing" it did of Metro model outputs.

Other modeling, including the Stantec modeling, specifically refuses to establish whether the assumptions made are reasonable. Stantec's Level 2 forecast concedes that its results are based on assumptions that are open to question, and that alternative, and equally reasonable assumptions could produce materially different estimates of travel behavior (and toll revenue):

> In many instances, a broad range of alternative assumptions could be considered reasonable with the availability of alternative toll schedules, and any changes in the assumptions used could result in material differences in estimated outcomes. (Stantec Level 2 report, page vi).

Stantec specifically disclaims liability for its choice of assumptions. This turns their study into an essentially hypothetical "what if" exercise, based on un-documented assumptions made by the authors. They disclaim liability for use of these estimates.

> By their very nature, assumptions regarding information or data are accepted as true or certain to happen without actual proof of same. **Stantec and WSP used assumptions to generate the Forecasts & Estimates in this Report.** Many statements contained in this document that are not historical facts are forward-looking statements, which are based on Stantec's or WSP's **opinions**, as well as **assumptions** made by, and information currently available to, the management and staff of Stantec or WSP. Because the statements are based on expectations about future events and economic performance, and are not statements of fact, actual results may differ materially from those projected. The assumptions and resulting forecasts could change based on a variety of factors, including but not limited to: (a) economic conditions; (b) social and demographic conditions; (c) force majeure; (d) changes in operations and maintenance of the toll facility represented in the Report; and/or (e) new or changed transportation network or transit systems in the Portland/Vancouver region. These potential risks and uncertainties may be magnified by the transitory or permanent effects of the COVID-19 pandemic on mobility, travel, and the economy.
> (Stantec, Level 2 report, page vii, emphasis added)

8. IBR has used incorrect traffic modeling to create a false purpose and need statement for the project

The NEPA environmental review for the IBR project is predicated on a "Purpose and Need" Statement that relies on demonstrably inaccurate and now outdated forecasts of future traffic levels. The "Purpose and Need" statements exaggerate future traffic growth and are used to justify an over-sized bridge.

8.1 The Purpose and Need Statement for the Interstate Bridge Project (carried forward directly from the 2008 Columbia River Crossing project EIS), assumes that the region will experience and needs to accommodate a 35 percent increase in I-5 traffic, regardless of whether an expanded crossing is built. That projected growth rate has been demonstrated to be incorrect.

8.2 USDOT's guidance on NEPA calls for the "Purpose and Need" statement to be revised to reflect better information.

> "The purpose and need section of the project may, and probably should, evolve as information is developed and more is learned about the project and the corridor. "
>
> U. S. Department of Transportation, NEPA Implementation: The Importance of Purpose and Need in Environmental Documents," September 18, 1990, https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_purpose_need.aspx

8.3 The purpose and need statement of the IBR originated with the Columbia River Crossing in 2005. The project's original purpose and need statement, drafted prior to the publication of the Draft Environmental Impact Statement read as follows:

Project Need

The specific needs to be addressed by the proposed action include:

- **Growing Travel Demand and Congestion:** Existing travel demand exceeds capacity in the I-5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 2 to 5 hours during both the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge-lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Boulevard. and Interstate Avenue increases local congestion. The two crossings currently carry over 260,000 trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by 40 percent during the next 20 years, with stop-and-go conditions increasing to at least 10 to 12 hours each day if no improvements are made.

I-5 Columbia River Crossing, Statement of Purpose and Need, January 17, 2006

Elsewhere, the project's problem statement claims:

> Increased Travel Demand Daily traffic demand over the I-5 bridge is expected to increase by more than 40 percent in 20 years, from 125,000 vehicles in 2000 to 180,000 vehicles in 2020 (traffic is expected to further increase beyond 2020; new travel demand modeling is currently being conducted to predict 2030 levels).

8.4 The purpose and need statement was revised slightly in later work on the Columbia River Crossing. As expressed in the project's 2011 Final Environmental Impact Statement, the purpose and need statement read as follows:

1.3.2 Project Need

The specific needs to be addressed by the proposed action include:

- **Growing travel demand and congestion:** Existing travel demand exceeds capacity in the I-5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 4 to 6 hours daily during the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Jr. Boulevard and Interstate Avenue increases local congestion. In 2005, the two crossings carried 280,000 vehicle trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by more than 35 percent during the next 20 years, with stop-and-go conditions increasing to approximately 15 hours daily if no improvements are made.

The transportation data included in this section are explained in detail in Chapter 3, and in greater detail in the CRC Traffic Technical Report and CRC Transit Technical Report.

Vehicle Trips

Of the 280,000 vehicle trips that crossed the Columbia River daily in 2005, 134,000 vehicles utilized the I-5 Interstate bridges while 146,000 used I-205. The figure includes trips made in single-occupancy vehicles (SOV), high-occupancy vehicles (HOV), trucks, and transit vehicles (buses).

PROJECT PURPOSE AND NEED • 1-5

Columbia River Crossing, FEIS, Chapter 1: Purpose and Need. https://www.wsdot.wa.gov/accountability/ssb5806/docs/6_Project_Development/Environmental_Process_And_Permitting/FEIS_PDFs/CRC_FEIS_Chapter_1.pdf

8.5 When the project was revived as the "Interstate Bridge Replacement" project in 2019, the Federal Highway Administration and Federal Transit Administration re-adopted the same Purpose and Need Statement as used in the Columbia River Crossing.

> In 2019, ODOT and WSDOT reinitiated the CRC Project as the IBR Program. The needs identified in the CRC Purpose and Need statement are still pertinent to the IBR Program. As a result, the Purpose and Need statement for the IBR Program remains the same as in the CRC Project's 2011 Final EIS and ROD.

Supplemental Environmental Impact Statement for the Interstate Bridge Replacement Program, A Notice by the Federal Highway Administration and the Federal Transit Administration on 04/05/2023, Federal Register, 88 FR 20206

https://www.federalregister.gov/documents/2023/04/05/2023-07052/supplemental-environmental-impact-statement-for-the-interstate-bridge-replacement-program

The IBR stated in its -re-evaluation:

> Through work completed over the past year, the IBR program has determined that the needs identified in the CRC Purpose and Need statement are still pertinent. Thus,

the Purpose and Need statement for the IBR program remains the same as in the 2011 ROD for the CRC Project.

MEMORANDUM: CONTEXT FOR NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) REEVALUATION Feb. 4, 2022

https://www.interstatebridge.org/media/uhollzy5/2021-12-29-ibr-reevaluation-final-version-signed_unremediated.pdf

As the IBR website makes clear, the Purpose and Need is unchanged:

Project Need: The specific needs to be addressed by the proposed action include:

- Growing travel demand and congestion: Existing travel demand exceeds capacity in the I5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 4 to 6 hours daily during the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Jr. Boulevard and Interstate Avenue increases local congestion. In 2005, the I-5 and I-205 crossings carried 280,000 vehicle trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by more than 35 percent during the next 20 years, with stop-and-go conditions increasing to approximately 15 hours daily if no improvements are made.
- Impaired freight movement: I-5 is part of the National Truck Network, and the most important freight highway on the West Coast, linking international, national and regional markets in Canada, Mexico and the Pacific Rim with destinations throughout the western United States. In the center of the project area, I-5 intersects with the Columbia River's deep water shipping and barging as well as two river-level, transcontinental rail lines. The I-5 crossing provides direct and important highway connections to the Port of Vancouver and Port of Portland facilities located on the Columbia River as well as the majority of the area's freight consolidation facilities and distribution terminals. Freight volumes moved by truck to and from the area are projected to more than double over the next 25 years. Vehicle-hours of delay on truck routes in the Portland-Vancouver area are projected to increase by more than 90 percent over the next 20 years. Growing demand and congestion will result in increasing delay, costs and uncertainty for all businesses that rely on this corridor for freight movement.

Re-Evaluation of the Interstate-5 Columbia River Crossing Final Environmental Impact Statement and Record of Decision (2011; re-evaluated in 2012 and 2013) December 2021 Interstate Bridge Replacement Program | Page B-2

The statement of Purpose and Need as restated by IBR reads as follows.

Re-Evaluation of the Interstate-5 Columbia River Crossing Final Environmental Impact Statement and Record of Decision (2011; re-evaluated in 2012 and 2013)

ATTACHMENT B. COLUMBIA RIVER CROSSING PROJECT PURPOSE AND NEED

Excerpted from the CRC Project Record of Decision (2011).

Project Purpose

The purpose of the proposed action is to improve I-5 corridor mobility by addressing present and future travel demand and mobility needs in the CRC Bridge Influence Area (BIA). The BIA extends from approximately Columbia Boulevard in the south to SR 500 in the north. Relative to the No-Build Alternative, the proposed action is intended to achieve the following objectives: a) improve travel safety and traffic operations on the I-5 crossing's bridges and associated interchanges; b) improve connectivity, reliability, travel times, and operations of public transportation modal alternatives in the BIA; c) improve highway freight mobility and address interstate travel and commerce needs in the BIA; and d) improve the I-5 river crossing's structural integrity (seismic stability).

Project Need

The specific needs to be addressed by the proposed action include:

- **Growing travel demand and congestion**: Existing travel demand exceeds capacity in the I5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 4 to 6 hours daily during the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Jr. Boulevard and Interstate Avenue increases local congestion. In 2005, the I-5 and I-205 crossings carried 280,000 vehicle trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by more than 35 percent during the next 20 years, with stop-and-go conditions increasing to approximately 15 hours daily if no improvements are made.

8.6 The IBR purpose and need statement relies critically on traffic projections. In each case, the central element of the purpose and need statement was projections of future traffic growth in the I-5 corridor.

8.7 The traffic projections used to produce the IBR purpose and need statement are outdated and wrong. The original purpose and need statement relied on a twenty-year forecast of traffic growth made in 2005. We are now nearly 90 percent of the way through that forecast period, and it is readily apparent that the transportation projection incorporated into the purpose and need statement was demonstrably false. Rather than growing at a rate of 1.7 percent per year as forecast in the 2005 Purpose and Need Statement, or 1.5 percent per year as forecast in the 2011 Purpose and Need Statement, travel has grown at a much lower rate 0.3 percent per year from 2005 through 2019.

Traffic Growth Rates in Purpose and Need Statements

Forecast	Period	Base	Future	AAGR
CRC Purpose & Need (2005)	20 years	n.a.(*)	n.a.(*)	1.7%
CRC Purpose & Need (2008)	20 years	n.a.(**)	n.a.(**)	1.5%
Final Environmental Impact Statement (2011)	2005-2030	134,000	184,000	1.3%
Investment Grade Analysis (2013)	2019-2045	128,400	138,200	0.3%
IBR Re-evaluated Purpose and Need (2022)	20 years	n.a.(**)	n.a.(**)	1.5%
Metro Travel Demand Model (2022)	2019-2045	164,050	190,922	0.6%
IBR Post-Processed (2022)	2019-2045	143,400	176,000	0.8%
Stantec Level 2 Study (2023)	2019-2045	143,400	182,300	0.9%
Actual	2005-2019	132,603	138,530	0.3%

* - " . . . more than 40 percent in the next twenty years . . ."

* - " . . . more than 35 percent in the next twenty years . . ."

None of the traffic modeling done for the IBR project indicates that traffic growth will be anywhere near as fast as claimed in the project's purpose and need statement. The Metro Travel Demand Model predicts a growth rate of 0.6 percent per year, the IBR's "post-processed" data predict growth of 0.8 percent per year, and the Stantec Level 2 study predicts growth of 0.9 percent per year. All of these data sources imply that the traffic growth rates assumed in the Purpose and Need Statement are at least 50 percent too high. Additionally, as noted, none of these three forecasts properly allows for peak hour capacity constraints on the existing I-5 bridge which greatly limit future traffic growth (See Section 4).

8.8 The Draft Supplemental Environmental Impact Statement contains contradictory claims about traffic growth rates. The text of the adopted Purpose and Need Statement claims daily traffic demand will increase by more than 35 percent over the next 20 years; the text box adjacent to the statement says: daily traffic demand is expected to increase more than 25 percent by 2045.

1.3.2 Program Needs

The specific needs to be addressed by the proposed action include:

- **Growing travel demand and congestion:** Existing travel demand exceeds capacity on the Interstate Bridge and associated interchanges. This corridor experiences heavy congestion and delay lasting 4 to 6 hours daily[8] during the morning and afternoon peak travel periods and when traffic crashes, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Jr. Boulevard and Interstate Avenue increases local congestion. In 2005, the two crossings[9] carried 280,000 vehicle trips across the Columbia River daily. Daily traffic demand over the Interstate Bridge is projected to increase by more than 35 percent during the next 20 years, with stop-and-go conditions increasing to approximately 15 hours daily if no improvements are made.
- **Impaired freight movement:** I-5 is part of the National Truck Network, and the most important freight highway on the West Coast, linking international, national, and regional markets in Canada, Mexico, and the Pacific Rim with destinations throughout the western United States. In the center of the Program area, I-5 intersects with the Columbia River's deep water shipping and barging channels, as well as two river-level, transcontinental rail lines. The Interstate Bridge provides direct and important highway connections to the Port of Vancouver

In 2005, 280,000 vehicle trips crossed the Columbia River daily (northbound and southbound) in the Portland-Vancouver metropolitan region, of which 134,000 used the Interstate Bridge. By 2019, the total number of vehicle trips that crossed the Columbia River had increased to 313,000 per day, of which 143,400 used the Interstate Bridge.

Vehicle trips include those made in single-occupancy vehicles, high-occupancy vehicles, trucks, and transit vehicles (buses).

The duration of congestion on the Interstate Bridge has roughly doubled from 2005 to 2019. In 2019, the I-5 corridor experienced heavy congestion and delay in both directions lasting up to almost 12 daily (compared with 4 to 6 hours daily in 2005).

Daily traffic demand over the I-5 Interstate Bridge is projected to increase by more than 25% by 2045.

8.9 The purpose and need of the project is too narrowly defined. By defining the "need" for this project to accommodate a growth rate of about 1.5 percent per year, which is well in excess of observed and predicted future traffic growth, the IBR has effectively eliminated from consideration smaller and less environmentally damaging alternatives (for example, a narrower bridge that utilizing existing intersections and approaches). In effect, the Purpose and Need Statement purports to define a "need" to accommodate 35 percent more vehicles in twenty years, when in fact, we won't need to accommodate that many. This excessively narrow purpose and need statement excludes other reasonable alternatives from consideration, as required by NEPA:

> It is contrary to NEPA for agencies to "contrive a purpose so slender as to define competing `reasonable alternatives' out of consideration (and even out of existence)." *Simmons* v. *U.S. Army Corps of Engineers,* 120 F.3d 664, 666 (7th Cir. 1997) (citing 42 U.S.C. 4332(2)(E)). Constricting the definition of the project's purpose could exclude "truly" reasonable alternatives, making an EIS incompatible with NEPA's requirements. *Id. See also, e.g., Nat'l Parks & Conservation Ass'n* v. *Bureau of Land Mgmt.,* 606 F.3d 1058, 1070 (9th Cir. 2010) ("Agencies enjoy `considerable

discretion' to define the purpose and need of a project. However, `an agency cannot define its objectives in unreasonably narrow terms.'" (internal citations omitted)).

9. By using flawed traffic projections, IBR has failed to accurately reveal the project's environmental effects.

IBR maintains that the Level 2 analysis cannot be used to assess the environmental effects of the IBR project under NEPA. In fact, ODOT, one of the partners in the IBR project, has used its Level 2 forecast of traffic on I-205 in the Portland Metropolitan Area for the environmental assessment of the I-205 project. The Level 2 forecasts are more accurate than Level 1, and show different environmental effects more precisely.

- *Level 2-3 analyses are more rigorous and accurate*
- *Level 2-3 analysis use the same modeling tools and framework*
- *Level 2-3 analyses conducted for IBR are better calibrated, and have fewer errors than Level 1*
- *ODOT has failed to justify the excessively optimistic and error filled predictions of its Level 1 analysis.*
- *Level 3 analyses are not unrealistically conservative, traffic routinely falls below levels predicted in*
- *Level 3 is not a "worst case" analysis.*
- *ODOT has used level 3 analyses for NEPA purposes for other Portland area highway projects*

The traffic modeling in the Stantec Level 2 analysis and the SEIS analysis are functionally identical: they aim to estimate the pattern of traffic in the Portland metropolitan area. Contrary to IBR claims:

- Level 2 and Level 3 analyses are not unrealistically low or worst case estimates of traffic
- Level 2 and Level 3 analyses demonstrate dramatically different environmental impacts as a result of tolling.
- ODOT used its level 2 analysis of I-205 for preparation of the environmental assessment of I-205.

9.1 IBR falsely claims that Level 2 traffic forecasts cannot be used to assess environmental impacts. IBR officials claim that the Level 2 and EIS studies are done "for different purposes."

> ### Traffic Forecasts for Different Purposes
>
> **There are two different types of traffic volume forecasts being prepared for use on the IBR Program:** Financial Planning Forecasts and Environmental Analysis Forecasts.
>
> These forecasts have inherently different purposes. Forecasts for financial planning, such as a toll traffic and revenue (T&R) studies, focus on annual traffic and revenue projections in each year. Typically, these forecasts are conservative so as to not overstate possible revenue.
>
> Forecasts for environmental analysis are prepared to support the National Environmental Policy Act (NEPA) process and focus on traffic impacts for a typical weekday. Generally, these forecasts are intended to avoid underestimating possible environmental impacts and are used for design needs.

https://www.interstatebridge.org/media/jn0njjgt/231101_ibr_tr_factsheet_remediated.pdf

9.2 Level 2 and Level 3 forecasts are more accurate than the "Level 1" forecasts IBR uses in the SDEIS. ODOT officials portray Level 2 and Level 3 analyses as more refined and precise estimates of travel demand than their "Level 1" forecast. Specifically they represent the Level 2 and Level 3 estimates as more "rigorous and precise." Each successive level of forecasting is represented as having an "increased level of accuracy."

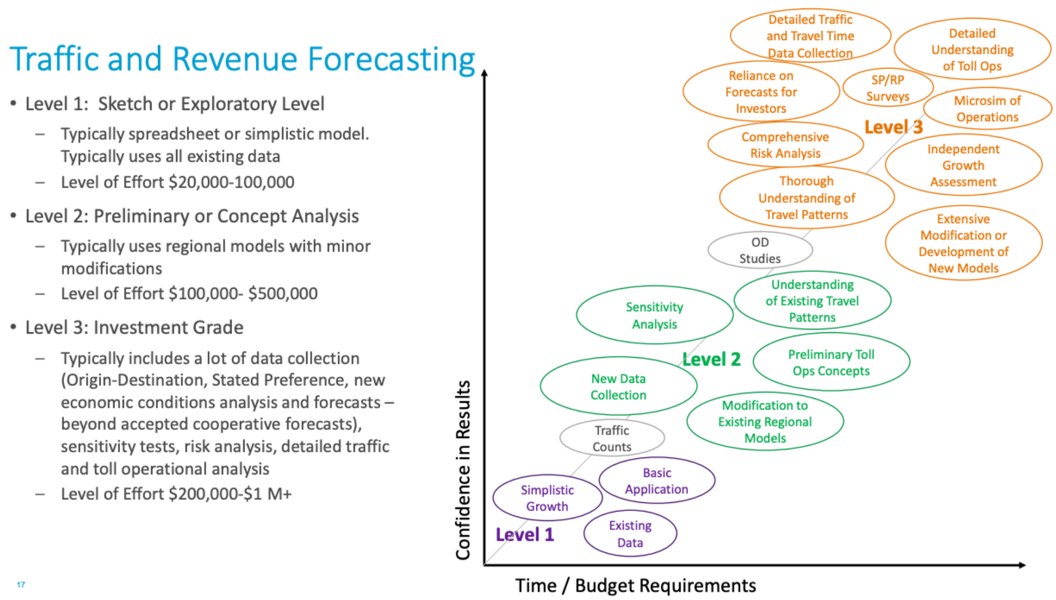
There are three levels of T&R studies, typically performed sequentially and each building upon the previous one to inform the decision-making process. Level 1 is a basic sketch analysis for evaluating high-level feasibility of tolling. This level of analysis was completed during previous bridge replacement planning efforts.

Level 2 includes more detailed analysis conducted to test different toll and policy scenarios to determine their relative traffic and revenue outcomes to inform ongoing financial planning.

This is the level of analysis recently conducted by the Program. A Level 2 toll T&R study is typically conducted concurrent with environmental analysis required by NEPA.

A Level 3 toll T&R study (also referred to as an "investment-grade" study) is the most-detailed level, focused on supporting decision-makers to refine toll rates and policies into the set that are projected to meet project objectives, including all financial obligations. The Level 3 forecasts are prepared with sufficient precision and rigor to secure a credit rating and obtain financing and are typically completed about 6 to 8 months before tolling begins.

An independent review of traffic and revenue forecasting prepared by the Stephen Weller, Travel Demand Forecasting Lead, CH2M, for the Larson Institute of the University of Pennsylvania described Level 3 analyses as the most well-researched and having the greatest "confidence in results" of all three levels of traffic estimates.



Weller, Stephen, "Public Perspective on Traffic and Revenue Forecasts for Public/Private Partnerships," Presentation to the Penn State Transportation and Safety Conference, December 7, 2017 https://www.larson.psu.edu/education/TESC-Sessions/5B-Innovative-Planning-Procurement-Freeway-Congestion-LTI.aspx

Level 2 and Level 3 analyses are more detailed and reliable than Level 1 analyses. According to the Federal Highway Administration,

> Study levels are typically termed I, II, or III, with Level I being conceptual and based on available information. Level II requires current and comprehensive survey data and a full analysis, while Level III is investment grade with the toll plan and other pertinent factors and assumptions detailed with full support, necessary commitments from others when appropriate, and complete documentation.
> Federal Highway Administration, Guidebook On Financing Of Highway Public-Private Partnership Projects, December 2016
> https://www.fhwa.dot.gov/ipd/p3/toolkit/publications/other_guides/financing_of_highway_p3_projects/appendices.aspx

9.3 Level 2 and Level 3 forecasts are neither excessively conservative nor pessimistic.

Level 2 and Level 3 forecasts are not inordinately pessimistic, rather, it is that level 1 forecasts are unjustifiably optimistic. The Transportation Research Board writes:

> Forecasts prepared by project sponsors and bidders (interested parties) are generally higher than prepared by investors/bankers; this optimism bias is estimated at 20% or more.
>
> Transportation Research Board, NCHRP 722, Assessing Highway Tolling and Pricing Options and Impacts: Volume 2: Travel Demand Forecasting Tools, page 30.

9.4 ODOT uses Level 2 forecasts for environmental analysis.

ODOT has relied on “Level 2” Forecasts to document environmental impacts under NEPA for other Portland Area highway expansion projects. ODOT contractor WSP prepared a “Level 2” analysis for the I-205 project in November 2022. That analysis contains traffic and revenue estimates for I-205.

ODOT incorporated WSP’s Level 2 traffic estimates in the Transportation Technical Report for the I-205 Environmental Assessment. It shows on Figure 5.7 on page 3 of the I-205 Traffic Technical Report that average daily volumes across the Tualatin River Bridge in the Build Scenario in 2045 would be 101,700. The transportation technical report narrative confirms that ODOT used the same numbers for **both** the financial analysis and the environmental analysis of the project.

> For environmental analysis and financial planning purposes, a baseline weekday variable-rate toll schedule was identified that balances the objectives of revenue generation sufficient to meet the funding target for capital construction of the I-205 improvements, and alleviating congestion on I-205 during peak travel times.
> . . .
> A recent financial analysis confirmed that under the assumed baseline toll rates, there would be sufficient net toll revenues to leverage bonds that would meet the toll funding contribution target for construction of the planned I-205 improvements.
> I-205_Transportation_Technical Report_FinalDraft.doc
> WSP, I-205 Transportation Technical Report, November 2022, page 7.

ODOT also used these same Level 2 traffic projections in the I-205 Benefit-Cost Analysis it submitted to the federal government. In applying for federal funds for this project, ODOT is legally obligated to demonstrate that a project is cost-effective, i.e. produces economic benefits in excess of its cost. ODOT represented these Level 2 projections as factual and accurate indications of future travel levels if the project is built. They are manifestly saying the Level 2 projections can be used to assess the environmental and socio-economic impacts of this project. They particularly make the point that tolling reduces and re-directs traffic, and that this is essential to estimating project benefits and costs.

In its Benefit Cost Narrative for the I-205 project, ODOT notes:

> Demand management through **tolling significantly improves congestion outcomes** . . . Value of Travel Time savings, or Vehicle Hours of Driving (VHD) benefits are calculated from traffic studies on pre-pandemic traffic levels and modeled traffic volumes **under the addition of tolling**. These traffic figures are provided by WSP USA and their Transportation Engineering team. Volume growth under the baseline is limited by congestion and lack of additional lanes, while **volume growth under the Build scenario sees slower growth over time due to the ability of tolling to manage demand.**
> ODOT, I-205 Benefit Cost Analysis Narrative, 2022 (Emphasis supplied)

In its Benefit Cost Analysis for the I-205 project, ODOT relied on the Level 2 forecast produced by WSP to predict traffic levels and benefits (reductions in vehicle hours of delay).

> VHD reduction factors: VHD reduction is based on traffic volumes and time savings per trip estimates from WSD USA, and can be found in the tables in the "Modeled Travel Times" and "Traffic Count Data" worksheets of the BCA model. These estimates are developed relative to a No Build Baseline, with No Build volumes reported in the "Traffic Count Data" as well. Travel time savings are calculated relative to the No Build baseline, and total travel times can be seen in the top table in the Modeled Travel Times worksheet. Truck share of traffic for Northbound and Southbound lanes can be found in the table starting in cell C20 of the "Modeled Travel Times" worksheet. The worksheet "VHD Savings" calculates the benefits from travel time savings.
>
> Oregon Department of Transportation, I-205 Corridor Widening: Stafford Road to OR43 Benefit Cost Analysis Description, Assumptions, and Factors
> https://www.oregon.gov/odot/About/INFRAI205/I-205%20Corridor%20BCA%20-%20INFRA%202022%20FINAL.pdf

The project's benefit cost excel spreadsheet shows that the benefit cost analysis used exactly the same traffic projections as the Level 2 study, and the Transportation Technical Report of the Environmental Assessment.

In addition, in the case of the I-205 project, ODOT relies on the Level 2 modeling to show that the addition of highway capacity will not result in induced demand (additional travel) because tolling will limit the growth of traffic. Limiting the growth of traffic is central to the EA conclusion that the project will not have adverse environmental impacts.

> Methodology: Value of Travel Time Savings and Congestion Reduction Value of Travel Time savings, or Vehicle Hours of Driving (VHD) benefits are calculated from traffic studies on pre-pandemic traffic levels and modeled traffic volumes under the addition of tolling. These traffic figures are provided by WSP USA and their Transportation Engineering team. Volume growth under the baseline is limited by congestion and lack of additional lanes, while volume growth under the Build scenario sees slower growth over time due to the ability of tolling to manage demand. Volumes and travel times are reduced under the Build scenario relative to baseline. . . . **Induced travel: Induced travel is likely to be zero due to the implementation of tolling and demand management pricing**. This can be seen in the change in traffic volumes assumed in worksheet "Traffic Count Data." The source of this data is modeling done by WSD [sic]USA transportation engineers.
> Oregon Department of Transportation, I-205 Corridor Widening: Stafford Road to OR43 Benefit Cost Analysis Description, Assumptions, and Factors
> https://www.oregon.gov/odot/About/INFRAI205/I-205%20Corridor%20BCA%20-%20INFRA%202022%20FINAL.pdfSCRAP (Emphasis added)

9.5 The failure to use more recent, accurate forecasts of traffic violates NEPA. In one relevant case, court's found USDOT violated the law by failing to use newer, more accurate forecasts when they were available.

> . . . [w]hile NEPA does not require an agency to update its population forecasts whenever new forecasts become available, it ordinarily may not rely on outdated forecasts when it sets out to prepare an EIS even though more recent forecasts from the agency's own experts are readily available. Defendants' decision to do so here was error....Defendants cannot rely on the fact that they discussed the issue in the [post-FEIS] traffic sensitivity analysis] to excuse their failure to directly address it in the FEIS because the TSA was not subject to public comment.
> *Conservation Law Found. v. Fed. Highway Admin.,* 2007 WL 2492737, at *22 (D.N.H. August 30, 2007)

Both the Level 2 (e.g Stantec) and Level 3 (CDM Smith) analyses are more reliable in predicting actual levels of traffic under tolling. It is a violation of NEPA to use less accurate, less valid information, when better information is available.

Tolling is integral to understanding the traffic and environmental impacts of the project. The level of tolls determines the amount of traffic.

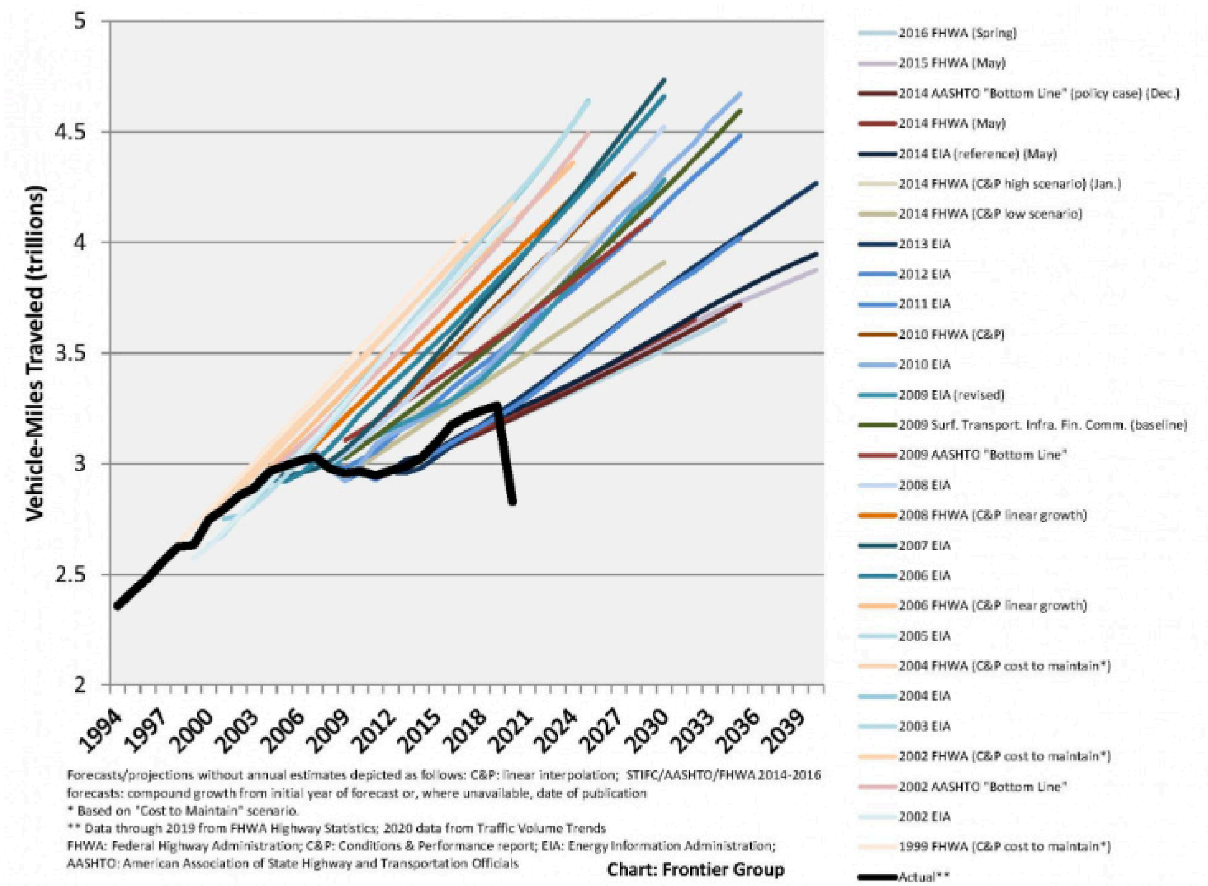
In the case of the Columbia River Crossing, the level of tolls ultimately recommended for the project was substantially higher, and had very different traffic and environmental impacts than those presented in the less accurate “Level 1” forecasts used to prepare the 2011 Environmental Impact Statement. The financial analysis done as part of the Investment Grade Analysis concluded that tolls needed to be as much as twice as high to pay for the project (minimum tolls of $2.60, rather than $1.35), and this produced considerable diversion of traffic to I-205 not predicted in the Investment Grade Analysis.

9.6 Investment Grade Forecasts are not “worst case” estimates

The Oregon and Washington Departments of Transportation and staff of the IBR have claimed that the investment grade analyses are financial “worst case” scenarios that will never be borne out in practice. That’s simply false. The federal government and bond rating agencies require the preparation of independent, investment grade forecasts because state highway department forecasts are unreliable and are generally dramatic over-estimates. Investment grade forecasts are more realistic, but also tend to be over-optimistic; they are not described by their authors as “worst-case” scenarios; traffic levels regularly come in below levels forecast by investment grade analyses.

First, to be sure, highway department forecasts routinely overstate future traffic growth. A comprehensive review of two decades of traffic growth projections prepared by state transportation departments, the Federal Highway Administration and other groups, like AASHTO (the highway agency lobby), shows that they continually predict “hockey-stick” growth patterns that have never been realized in practice.

Predicted Versus Actual VMT Growth (Dutzik 2021)



Dutzik, 2021.

While investment grade analyses are not as egregiously over-optimistic as these highway department "hockey-stick" forecasts, they also tend to consistently over-estimate actual traffic levels. The problem of over-estimating traffic levels (and associated toll revenues) is endemic. Bond rating agency Fitch issued a scathing report on toll forecast errors. They warned that over-estimating revenue is common in the industry and is a key cause of financial problems for toll-financed projects. The Fitch message, summarized in the trade publication, Toll Roads News, is clear and stark:

> They [Fitch] call demand forecasting "a key vulnerability," adding: "The probability of over-estimation remains high despite decades of experience with forecasting demand on transport projects. Many greenfield projects over the years across many jurisdictions have suffered from this… While other risks have been manifested in

> many cases, defaults on debt have largely been driven by under-performance relative to original projections."
> (emphasis added)
> Toll Road News, "Global PPP Lessons Learned," Toll Roads News, October 7, 2013
> http://www.tollroadsnews.com/node/6769

Investment grade forecasts also routinely suffer from optimism bias, as demonstrated by international expert (and Oregon State Treasury adviser) Robert Bain's comprehensive review of industry practice:

> "The standard of some traffic and revenue studies, supporting infrastructure investments worth billions of dollars, is truly appalling," Bain said. "Forecasts are commonly used to 'sell' deals to potential investors, insurers or rating agencies — so they are exposed to manipulation."
> Bain, quoted in Pittman, 2016

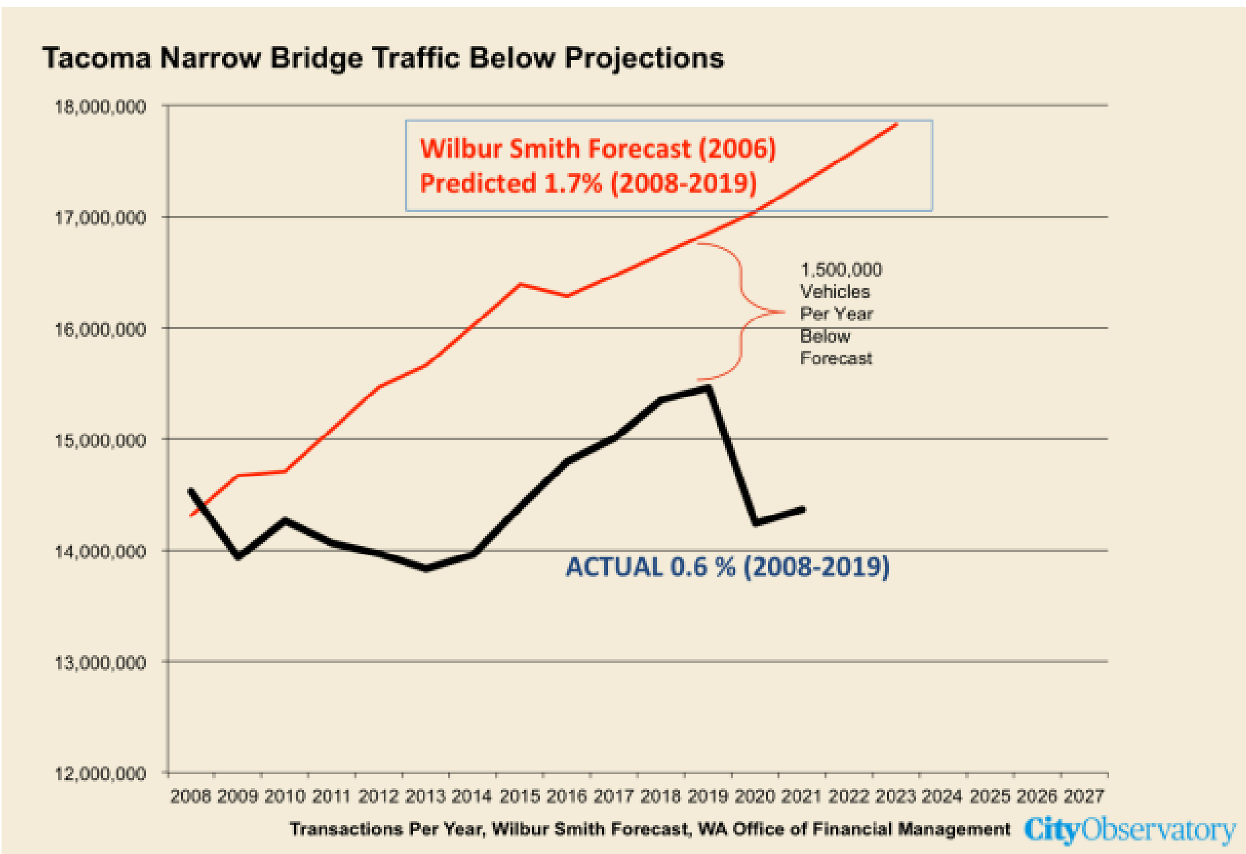
Over-predicting traffic is commonplace for toll road studies, even those done for "investment grade" forecasts. Streetsblog reported that:

> In 2012, the Reston (Virginia) Citizens Association completed a study [PDF] examining traffic projections provided by engineering firm Wilbur Smith (the company that did the very wrong Indiana Toll Road projections, now called CDM Smith). The group collected data from 26 toll road projects on which Wilbur Smith had produced the traffic projections. During the first five years that were forecast, traffic projections overshot actual traffic every single year, and by an average of 109 percent, according to the report.

In short, investment grade toll revenue forecasts are not as excessively optimistic as the promotional forecasts produced by state highway agencies, but they still consistently over-estimate traffic volumes and toll revenues on newly tolled-roadways. They are decidedly not unrealistic worst-case scenarios as portrayed by state DOT and IBR officials. As a practical matter, the results of the Investment Grade Analyses confirm that overall traffic levels will be lower, and diversion to un-tolled parallel routes (in this case I-205) will be higher than acknowledged in IBR's less rigorous "Level 1" forecasts that are used in its environmental analysis. That will lead to vastly different community, environmental and economic impacts than portrayed in the project's environmental impact statement.

9.7 Investment Grade Analyses of tolled highway facilities do not tend to under-estimate future traffic levels; if anything, investment grade traffic and revenue studies tend to over-state future traffic levels. The criticism that investment grade studies are "too conservative" implies that such studies routinely under-estimate traffic levels on tolled roads (i.e. that actual traffic levels are significantly higher than shown in the investment grade analysis). While the IBR asserts that this is true, they present no actual statistical evidence to show that investment grade studies under estimate traffic. In fact, studies that have been done show that actual traffic levels on tolled facilities are lower than forecast.

One need look no further than the Tacoma Narrows Bridge in Washington State, the nearest highway project that has been subjected to an investment grade forecast. Wilbur Smith (the predecessor of CDM Smith) prepared the investment grade forecast for the Tacoma Narrows Bridge.



It predicted that traffic on the bridge would grow at an annual rate of 1.7 percent per year after the capacity of the bridge was doubled. In fact, through 2019 (i.e. prior to the pandemic) actual traffic growth was only about a third that fast (traffic up 0.6 percent). The result is that toll revenues are dramatically lower than projections, necessitating repeated bail outs from state highway funds.

9.8 Higher forecasts are not environmentally more conservative. State DOT officials try to rationalize the exaggerated Level 1 forecasts as helping to minimize the environmental effects of the project. In essence, they imply that build traffic levels will be "no worse"--i.e. Not higher than shown in the Level 1 forecast. This is wrong for two reasons. First, as noted above, the environmental impact of the project is determined by comparing the build forecast against the no-build, and the traffic models overstate the no-build forecasts by an even larger amount (and thus falsely claim that the project will have less environmental impact). Second, tolling produces diversion, which has its own environmental effects. Failing to appropriately model the effects of tolling on patterns of traffic--in this case the diversion of tens of thousands of vehicles from I-5 to I-205, according to the project's own Level 2 study.

The IBR SDEIS claims that tolling the expanded I-5 bridge will produce no net shift of traffic from I-5 to I-205. According to the SDEIS, traffic in the "No-build" scenario on I-205 would be 220,000 vehicles per average weekday in 2045, and if I-5 were tolled, traffic on I-205 for the average weekday would be 214,000 vehicles, a decrease of 6,000 vehicles. This is an obviously implausible result: IBR argues fewer vehicles will use I-205 bridge if the alternative route (I-5) is tolled than if the I-5 route is free.

Transportation Technical Report

Interstate BRIDGE Replacement Program

Table 4-56. 2045 Forecast Average Weekday Daily Traffic and Transit Volumes and Total Person-Trips for Vehicles and Transit Only

Location	2045 No-Build AWDT	2045 No-Build Transit Trips	2045 No-Build Total Person-Trips	2045 Modified LPA and Options AWDT [a]	2045 Modified LPA and Options Transit Trips [a]	2045 Modified LPA and Options Total Person-Trips [a]
Total River Crossing	400,000	17,200	523,200	389,000 (-3%)	30,800 (+79%)	522,600 (-.1%)
I-5 Bridge	180,000	14,800	241,500	175,000 (-3%)	29,100 (+96%)	249,400 (+3%)
I-205 Bridge	220,000	2,400	281,600	214,000 (-3%)	1,800 (-25%)	273,100 (-3%)

Source: ODOT/WSDOT, Metro/RTC Regional Travel Demand Model, IBR Analysis

a Percentages reflect change from 2045 No-Build Alternative.

AWDT = average weekday daily traffic

That estimate is flatly contradicted by the Stantec Level 2 study, which argues conclusively that tolling I-5 will cause tens of thousands of vehicles to divert to the I-205 bridge. The Stantec study estimates that tolling I-5 would cause more than 50,000 fewer vehicles to use the I-5 bridges, and that between 42,000 and 51,000 of these vehicles would shift to the I-205 bridge.

Table 4-4. River Crossings by Bridge

Year	I-5	I-205	Total	I-5	I-205
No-Build	182,300	216,100	398,400	46%	54%
Scenario A	124,000	258,100	382,100	32%	68%
Scenario B	130,600	257,300	387,900	34%	66%

Note: All traffic forecasts are intended to support financial analysis only; not intended for design purposes.

Stantec, Interstate Bridge Replacement Project, Level 2 Traffic and Revenue Study, February 24, 2023, page 4-10

While IBR and its paid consultant, Stantec, may assert that these forecasts are "not intended" for design purposes, one can logically ask, "whose intent, and why?" It's clear that the highway departments, who want to justify as large a project as possible, and conceal its potential negative traffic and environmental effects don't like the implications of these forecasts. Also, as noted above, the Stantec model has a far smaller error factor (2.5 percent) than the Metro "Kate" model (14 percent) , on which the IBR SDEIS estimates are based.

9.9 It is accurate for highway departments to say that investment grade analyses produced by consultants generate more conservative results than the forecasts produced by state highway departments. But that begs the larger question: why should anyone place any reliance on the grossly exaggerated projections of state highway departments? There's no rational basis for preferring exaggerated promotional forecasts to more conservative ones for the purpose of estimating the environmental impacts of the project.

10. IBR modeling is inconsistent with adopted state and regional climate plans and policies

The Interstate Bridge Project is based on projections that call for accommodating a 26-27 percent increase in vehicle miles traveled; this is inconsistent with adopted Metro and Oregon *policies that call for holding vehicle miles of travel to their current level. IBR modeling, which assumes this large increase in driving violates the provisions of the federally-required, regionally adopted Regional Transportation Plan which calls for holding vehicle miles traveled to approximately their current level through 2045.*

10.1 Oregon and Metro have adopted climate plans and policies calling for a significant reduction in greenhouse gas emissions. Metro has adopted a Climate Smart Strategy which calls for a reduction in greenhouse gasses by 75 percent. Metro and the State have determined that achieving this greenhouse gas reduction goal will require—in addition to expected improvements in vehicle technology— holding the overall level of vehicle miles traveled in the region to about their current level for the next two decades.

10.2 The Land Conservation and Development Commission's Climate Friendly and Equitable Communities (CFEC) Rule requires Metro to plan for a 35 percent reduction in vehicle miles traveled per capita between 2005 and 2050. Oregon Law (ORS 468A.205) calls for Oregon to reduce its greenhouse gas emissions to 25% of 1990 levels by 2050. The Land Conservation and Development Condition has adopted rules (OAR 660-044) that:

- Declare the purpose of Division 44 is to implement ORS 468A.205.
- Require Metro to "change its transportation and land use plans to significantly reduce pollution from light vehicles" and to change its policies accordingly.
- Set emissions reductions targets that Metro is required to use when it "develops, reviews and updates a land use and transportation scenario" "while achieving" greenhouse gas emission reductions by reducing per capita vehicle miles traveled by 20 percent by 2034 and 35 percent by 2050.

Metro is required to adopt a Regional Transportation Plan ("RTP") in which Vehicle Miles Traveled ("VMT") declines by 30 percent from 2005 levels by 2045. OAR 660-012-0160(6) provides:

> Metro **shall** adopt a regional transportation plan in which the projected vehicle miles traveled per capita at the horizon year using the financially-constrained project list **is lower than** the estimated vehicle miles traveled per capita at the base year by an amount that is consistent with the metropolitan greenhouse gas reduction targets in OAR 660-044-0020. [emphasis added]

10.3 Metro's climate plans are required to be incorporated in the adopted, federally required Regional Transportation Plan. Metro adopted the latest version of the Regional Transportation Plan on November 30, 2023 (Metro Ordinance 23-1496). The Climate

Friendly and Equitable Communities (CFEC) update to the Transportation Planning Rule OAR 660-012-0160(6) requires Metro to adopt a regional transportation plan *in which the projected vehicle miles traveled per capita of the financially constrained project list is consistent with the region's metropolitan greenhouse gas (GHG) reduction target.* Further still, Metro's Climate Smart Strategy which was incorporated into both the 2018 and 2023 Regional Transportation Plans calls for a reduction in VMT per capita in the region in order to achieve state-mandated greenhouse gas reduction goals.

10.4 Appendix J of the Regional Transportation Plan illustrates how Metro expects to comply with the Climate Smart Communities rule. Appendix J shows that the region will plan to reduce per capita levels of driving by 35 percent from current levels, and in effect hold the total vehicle miles traveled in the region to about the same level as today—20 million miles per day.

10.5 The Draft SDEIS shows that No-Build and Build traffic volumes used to model regional growth have much higher estimated growth than in the adopted Metro Regional Transportation Plan.

Table 3.1-2 reports that current (2015) daily vehicle miles traveled in the Portland Metropolitan area were 43.1 million.

Table 3.1-2. Regional Travel Measures – Existing 2015 Daily Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay

Area	Vehicle Miles Traveled	Vehicle Hours Traveled	Vehicle Hours of Delay [a]
Portland Metropolitan Region	43,115,600	1,225,400	19,400
Traffic Subarea (I-5, I-205, and I-84)	11,277,600	326,900	10,100

Source: Metro/RTC regional travel demand model.

a Delay is measured as time spent in congestion on network links that exceed 0.9 volume/capacity ratio.

Table 3.1-10 reports that 2045 daily vehicle miles traveled in the Portland region will be 58.5 million in the No-Build, and a tiny amount less (58.7 million) in the various versions of the single Build alternative.

Table 3.1-10. 2045 Weekday Daily Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay

Alternative	Study Area	Vehicle Miles Traveled	Vehicle Hours Traveled	Vehicle Hours of Delay
No-Build Alternative	Portland Metropolitan Region	58,835,800	1,793,400	64,000
	Traffic Subarea	14,291,000	436,400	24,300
Modified LPA (Base Scenario)	Portland Metropolitan Region	58,743,200	1,782,300	57,000
	Traffic Subarea	14,211,400	424,900	17,000
Modified LPA (Two Auxiliary Lane Design Option)	Portland Metropolitan Region	58,751,200	1,781,800	56,700
	Traffic Subarea	14,219,500	424,300	16,600
Change between No-Build and Modified LPA Base Scenario	Regional Difference	-92,700 (<-1%)	-11,100 (-1%)	-7,000 (-11%)
	Subarea Difference	-79,600 (-1%)	-11,500 (-3%)	-7,300 (-30%)
Change between No-Build and Modified LPA Two Auxiliary Lane Design Option	Regional Difference	-84,600 (<-1%)	-11,600 (-1%)	-7,300 (-11%)
	Subarea Difference	-71,400 (-1%)	-12,100 (-3%)	-7,700 (-32%)
Change between Modified LPA Base Scenario and Modified LPA Two Auxiliary Lane Design Option	Regional Difference	8,000 (<-1%)	-500 (<-1%)	-300 (<-1%)
	Subarea Difference	8,200 (<-1%)	-600 (<-1%)	-400 (-2%)

Source: Metro/RTC Regional Travel Demand Model.

These figures imply a growth rate of average weekday VMT of 1 percent annually percent from 2015 through 2045.

These estimated growth rates are inconsistent with the growth rate in VMT allowed for in the Metro RTP. According to the Metro RTP, Appendix J, the region's plan is to reduce VMT per capita by 30 percent by 2045 from 2005 levels, and thereby, with population growth, to hold the growth in VMT between 2020 and 2045 to zero.

Metro's current RTP says it puts the region on a path to reducing greenhouse gas emissions, and comply with state climate policies by making investments in the transportation system that reduce driving. And when it comes to its climate analysis, the RTP projects that the region will cut per capita driving by more than 30 percent from current levels. The Climate Analysis (Appendix J, page 9) makes this claim:

The RTP Climate Analysis (Appendix J, page 9) claims that per capita VMT will decline by 31 percent from 2020 levels by 2045.

> 3. The RTP supports state goals to reduce greenhouse gas emissions and is expected to meet state-mandated targets for reducing per capita greenhouse gas emissions from household light-duty vehicles by 2045.
>
> o By 2045, the plan, together with advancements in fleet and technology, is expected to reduce per capita annual greenhouse gas emissions from light duty household vehicles by 80.1 percent (compared to 2020 levels) and reduce total greenhouse gas emissions from light-duty household vehicles by 76.7 percent (compared to 2020 levels).
>
> o By 2045, the plan, together with advancements in fleet and technology, is expected to reduce VMT per capita of light-duty household vehicles by 39 percent (compared to 2005 levels) and by 31 percent from (compared to 2020 levels).
>
> Metro 2023 Regional Transportation Plan, Appendix J. page 9.
> https://www.oregonmetro.gov/sites/default/files/2023/07/13/2023-RTP-Appendix-J-public-review-draft-20230710.pdf

10.6 The Interstate Bridge Project's Benefit Cost Analysis, is also based on Metro's regional travel demand model, and contains similar estimates of vehicle miles of travel in the "study area," a portion of the region that includes the Interstate Bridge Project. The modeling used by IBR asserts that vehicle miles traveled in the study area will increase from a current level of about 11.7 million miles per day to 14.3 million miles in the No Build and 14.2 million miles per day in the Build Scenario. These represent an increase in vehicle miles traveled of about 0.85 percent per annum, slightly slower than for the region as a whole.

IBR Automobile Travel Data

Travel Demand Modeling Results for IBR Program (Project Study Area) - Daily Results
Travel demand modeling results were estimated as part of the IBR Program 2023.

		Existing	Build		No Build	
Variable	**Units**	**2017**	**2027**	**2045**	**2027**	**2045**
VMT - Study Area - separate for Auto and Truck	veh-miles	11,277,649	12,326,878	14,211,373	12,879,706	14,291,079
Auto	veh-miles	10,754,643	11,678,788	13,269,111	12,187,142	13,354,614
Truck	veh-miles	523,006	648,090	942,262	692,564	936,465

10.7 The RTP assumes that the state and region will implement a series of pricing measures, including a carbon tax, a vehicle miles traveled fee, tolling on some area roadways, and pricing of major throughways, along with implementation of "pay as you drive" per mile insurance. Appendix J of the adopted RTP says that implementation of these measures, which is essential to achieving adopted greenhouse gas reduction goals, will reduce vehicle miles traveled per capita sufficiently to hold aggregate vehicle miles traveled in the metropolitan region to their current level of approximately 20 million vehicle miles per day. These RTP policies should be included in the "No-Build" alternative, but are not.

The DSEIS omits any mention of these climate policies. Specifically, the Climate Analysis for the Interstate Bridge Replacement SDEIS makes no mention of the Oregon's Climate Friendly and Equitable Communities (CFEC) Rule which requires Metro to plan for a 30 percent reduction in per capita vehicle miles traveled in the Portland Metropolitan area. The climate analysis section of the SDEIS recites a litany of Oregon and Washington Greenhouse Gas reduction policies but makes no mention of the Oregon's CFEC rules and Metro's obligation to reduce VMT by 30 percent by 2050 in order to reduce greenhouse gas emissions.

> Washington and Oregon have policies intended to promote a shift away from GHG emissions in the transportation sector. These transportation-related transition policies are summarized in Table 3.19-2.

This table (Table 3.19-2) mentions Oregon's Climate Protection program (focusing on fossil fuel use), Oregon's Clean Fuels Program (mandating biofuels), Oregon's Clean Energy targets (for electricity generation) and three "clean car programs": Zero Emission Vehicles, Clean Cars and Clean Trucks, all of which address vehicle emission rates, but not VMT. Despite claiming to summarize "transportation-related" climate policies, the SDEIS description completely omits any mention of state and regional rules and plans that mandate a reduction in per capita VMT--almost certainly because the projections presented to justify the IBR project are predicated on absolutely no change in per capita VMT.

10.8 The modeling scenario used to compute the "No-Build" level of traffic in the IBR's traffic modeling is not consistent with the region's adopted Regional Transportation Plan (RTP). The RTP calls for extensive implementation of pricing in the region and on the region's roads. The "No-Build" traffic levels shown in the IBR SEIS are artificially (and illegally) high, and thus overstate the environmental benefits of the build alternative. The IBR traffic forecasts for the No-Build alternative need to be consistent with those used in the Climate Analysis of the RTP, which would include no net increase in aggregate regional VMT.

10.9 The modeling scenario used to compute the "Build" alternative also fails to include the pricing policies incorporated in the Regional Transportation Plan. As a result, the level of vehicle travel contemplated in the "Build Scenario)— a 27 percent increase from current levels—is likewise inconsistent with the adopted regional transportation plan, which calls for no overall increase in VMT in the region.

11. Fails to incorporate post-Covid changes in travel behavior and land use patterns

The models used to predict future travel demand for the Interstate Bridge project are based on data, assumptions and relationships that pre-date the Covid-19 pandemic. The pandemic has accelerated a shift toward "work from home" and increased electronic commerce that has had the effect of reducing automobile travel, and likely permanently changing travel patterns.

11.1 The persistent effects of post-pandemic changes in travel behavior are not reflected in IBR revenue forecasts.

11.2 ODOT data show that traffic levels, post-pandemic, have departed significantly from pre-pandemic travel trends. A 2023 report, authored by ODOT traffic counting expert Becky Knudsen reports that traffic volumes on I-5 are lower now than in 2019, and have not increased following the 2020 Covid-19 pandemic. Becky Knudsen, "Pandemic Impacts on Future Transportation Planning: Implications for Long Range Travel Forecasts", ODOT, July 2023. Knudsen's data show that traffic on I-5 in Portland was 7 percent below 2019 levels in 2023, even lower than it had been two years earlier (when it was 6 percent below 2019 levels).

TABLE 1. I-5: Percent Difference in Traffic Volumes Compared to 2019: Month of April 2021, 2022, and 2023

	Year	Portland	Willamette Valley	Southern Segment
Average Weekday	2021	-6%	-2%	5%
	2022	-8%	-5%	-1%
	2023	-7%	-4%	-7%
Average Weekend	2021	-10%	0%	6%
	2022	-5%	0%	0%
	2023	-4%	-2%	10%
Overall Average	2021	-6%	-1%	6%
	2022	-7%	-3%	-1%
	2023	-6%	-4%	-3%

Source: Portland Region Automatic Traffic Recorders (ATRs): 03-011,026-004, 26-016; Willamette Valley: 20-020, 20-025, 22-005; Southern I-5: 10-008, 15-019, 15-002; this table provides averages across the 3 ATRs for each region.

11.3 WSDOT data on travel show that travel levels and congestion have declined significantly from pre-pandemic levels, and continue to be dramatically lower, WSDOT's

Mobility Dashboard reports that traffic congestion is down sharply in Clark County with a persistent and sustained decline in congestion-related travel delays. According to WSDOT data, total vehicle hours of delay in Clark County's three principal roadways are down more than 75 percent from pre-Covid (2019) levels. Washington State Department of Transportation, Multimodal mobility dashboard - Vancouver region, 2023, https://wsdot.wa.gov/about/data/Multimodal-mobility-dashboard/dashboard/vancouver/default.htm

11.4 IBR's own Level 2 forecast reports that traffic across the I-5 Bridge had still not recovered to pre-pandemic levels as of 2022. Average weekday traffic in October 2022 was 136,500, compared to 143,400 in 2019, 4.8 percent below pre-pandemic levels. (Stantec, Level 2 Analysis, Table 2.6). At the pre-pandemic rate of traffic growth (0.3% per year), it will take until 2039 before travel across the I-5 bridge recovers to its pre-pandemic level.

11.5 Since 2019, the Federal Highway Administration has lowered its forecast of the future increase in driving by light duty vehicles by almost half. In 2019, prior to the pandemic the Federal Highway Administration predicted that the 20-year increase in vehicle miles traveled by light duty vehicles would be 1.1 percent per year (Federal Highway Administration, FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2019, https://www.fhwa.dot.gov/policyinformation/tables/vmt/2019_vmt_forecast_sum.pdf).. In 2023, the Federal Highway Administration lowered its predicted 20-year increase in vehicle miles traveled to 0.6 percent per year Federal Highway Administration, FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2023 https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm, .

11.6 Estimates by the Maryland Department of Transportation show that pandemic induced changes in travel behavior have likely reduced future growth in vehicle miles traveled. They conclude:

> VMT under all scenarios is estimated to be less than VMT under "Old normal" (Pre-pandemic conditions) scenario. It is estimated that 2045 total VMT reduction because of COVID-19 ranges between 3 % and 12 % with an average of 7 % across all scenarios. Shemer, L., Shayanfar, E., Avner, J., Miquel, R., Mishra, S., & Radovic, M. (2022). COVID-19 impacts on mobility and travel demand. *Case studies on transport policy*, *10*(4), 2519–2529. https://doi.org/10.1016/j.cstp.2022.11.011

11.7 Stantec concedes in its analysis that the long-term effects of Covid-19 could invalidate its projections of future travel levels.

> The assumptions and resulting forecasts could change based on a variety of factors, including but not limited to: (a) economic conditions; (b) social and demographic

> conditions; (c) force majeure; (d) changes in operations and maintenance of the toll facility represented in the Report; and/or (e) new or changed transportation network or transit systems in the Portland/Vancouver region. These potential risks and uncertainties may be magnified by the transitory or permanent effects of the COVID-19 pandemic on mobility, travel, and the economy.
> (Stantec, Level 2 report, page vii, emphasis added)

12. Traffic modeling has not been transparent

Traffic numbers are generated by a complicated model which is kept secret. Metro and IBR have fought attempts to release this information that would let others gauge the accuracy of their claims about future traffic.

Metro and IBR have resisted the release of data and documentation showing how they came up with their traffic forecasts.

A careful analysis of this previously undisclosed data shows that the models and their predictions are flawed and misleading.

The errors are substantial: they exaggerate the need for the project, making it more expensive than it needs to be to accommodate actual future traffic; it mis-states the project's likely environmental consequences.

The IBR traffic projection process is shrouded in secrecy.

The operation of the Metro Model and the additional operations performed by IBR (microsimulation and post-processing) are generally opaque to outside observers. Presentation materials released by IBR present only the conclusions of its technical efforts and do not fully describe the methods, assumptions or data used to produce those conclusions. As a result, outside observers do not have any reasonable basis for understanding or questioning how the results were obtained nor can they replicate these calculations: The modeling effort is effectively a black box, whose operation and features are known only to selected insiders. Others cannot verify, question or modify any of these assumptions to see how they affect model results.

Courts have recognized that this "black box" approach to producing traffic projections is a violation of the requirements of the National Environmental Policy Act (NEPA). 1000 Friends of Wisconsin v. USDOT, Dist Ct ED Wisconsin (2016) Case No. 11-C-0545. In this case, Federal Judge Lynn Adelman ruled that the agency failed to explain how it reached its conclusions, invalidating its projections.

> In my prior decision, I did not find that the traffic projections were flawed. Rather, I determined that I could not decide whether the projections were flawed because WisDOT had not fully explained how it applied its methodology. See Dec. and Order at 9-14. * * * In my prior decision, I found that although WisDOT had generally explained its methodology for projecting traffic volumes in the impact statement, it had not adequately explained how it applied that methodology. Specifically, I found that WisDOT had not shown how the raw data it used resulted in the bottom-line numbers that appear in the impact statement for each of the project alternatives. Dec. and Order at 11.
>
> * * * because it is clear that the traffic forecasts played an important role in the evaluation of reasonable alternatives, I cannot conclude that WisDOT's failure to follow its own methodology and reach compromise projections was harmless. For these reasons, I conclude that the traffic projections used in the impact statement's evaluation of reasonable alternatives were not produced through a reasoned application of WisDOT's stated methodology, and that the agencies' evaluation of reasonable alternatives was deficient.

12.1 The IBR didn’t disclose the AWDT figures in its April Legislative presentation, which are the most basic measures over overall traffic volume. Instead, it showed only vague but alarming heat maps and conclusory travel time data.

12.2 Neither Metro nor IBR published the output of the Kate RTDM. These were released by Metro pursuant to a public records request, only after Metro rescinded a proposed fee of $2,031.92 to release the records, claiming that the release was not in the public interest. Metro’s delay assured that these records would not be publicly available prior to the Metro Council vote on the LPA. The IBR project, through the WSDOT, failed to release the Metro Kate Data that were in its possession.

12.3 Metro does not publish on its website the Kate Model validation report. The model validation report shows that there is a significant error and bias in the Kate model’s predictions of traffic on the I-5 and I-205 bridges. The Kate model validation report is dated August 2017 and is cover and every content page is stamped “DRAFT,” but no final report has ever been produced.

12.4 Metro undertook 24 different scenario traffic demand model runs with a range of different assumptions about the configuration of the road system and applicable tolling.

Metro did not disclose any of this information until it responded to a public records request.

12.5. In April, 2022, the IBR presented limited traffic information to the Joint Oregon Washington Legislative Oversight Committee.

126. On May 3, 2022, we filed a public records request with the Washington Department of Transportation (the agency that houses the IBR project staff), requesting full documentation of the IBR modeling.

12.7. Only June 6, 2022, WSDOT provided a handful of documents with conclusory information from forecasts, but no information about methodology, or supporting documents showing how forecasts were created.O

12.8. On July 19, 2022 we informed WSDOT that its request was incomplete and non-responsive, inasmuch as it failed to provide detailed information describing the project's data and methodology.

12.9. On August 19, 2022, we provided WSDOT with examples of documents that were in WSDOT's possession (documents either prepared by or submitted to IBR, that we obtained independently). We told WSDOT that the existence of these documentations showed that WSDOT had failed to comply with our public records request as required by Washington Law.

12.10. On October 3, 2022. IBR responded to our provision of these documents by asserting that they were not within the scope of our original request.

12.11. On October 12, 2022, WSDOT asked us to change our request. We declined to do so, and reiterated our original request for all data related to traffic modeling.

12.12 On December 1, 2022, WSDOT responded that it had identified voluminous records that were within the scope of our request, and informed us that they would charge $812 for the release of such documents, and that it might take up to two years to obtain such documents.

12.13. On December 21, 2022, we paid a deposit of $81.20 to WSDOT-under protest-to secure the release of these documents.

12.14 On January 31, 2023, WSDOT provided us with a link to electronic files containing hundreds of documents (totaling several gigabytes of data of data).

12.15 WSDOT went to great lengths to frustrate and delay our access to these documents, all of which are public records, and all of which are essential to a full and fair public debate about the Interstate Bridge Replacement project.

13. Modeling flaws constitute environmental and financial fraud

By over-stating travel demand in the "No-Build" scenario, and failing to accurately account for the effect of tolling on traffic in the build scenario, the IBR modelers have created a fictitious case for expanded road capacity, and falsely portrayed the environmental consequences of the two alternatives.

ODOT, WSDOT and their contractors are engaged in systematic financial and environmental fraud. Their false traffic projections are being used to lobby state and federal authorities for more money for a much larger—and vastly more expensive--project than is actually needed to accommodate future traffic, especially if either the I-5 bridge or the region's freeways are tolled, as the agency says it plans, and as the Oregon Legislature has already authorized. This is financial fraud because federal funds are being sought based on false representations about traffic levels. This is environmental fraud because it falsely claims that the massive I-5 expansion will reduce greenhouse gas emissions.

The practical effects of the consistent over-statement of future travel, especially in the No-Build alternative, is to paint a false picture of future traffic congestion, and to make the No-Build alternative look worse from a traffic and an environmental perspective than it actually is. The IBR forecasts predict higher levels of traffic if the I-5 bridge ISN'T widened than if it is, which allows the IBR to claim its massive expansion will generate less pollution than not widening.

ODOT and WSDOT are keeping two different sets of books for traffic projections: one set, which exaggerates traffic levels, is used to size the project, and to create a false environmental analysis. But ODOT and WSDOT also acknowledge that they will have to create a separate, more realistic set of traffic projections: both private lenders and the federal government require undertaking an independent investment grade analysis. Private markets require this because they know that highway department forecasts are biased and wrong: they refuse to lend money to projects based on such forecasts.

The track record of the so-called "Level 2" forecasts prepared by ODOT and WSDOT for the CRC Environmental Impact Statement compared to the projections made by CDM Smith show that the Level 2 analysis is wildly wrong, and the CDM Smith estimates are highly accurate. State DOT's like to maintain that the Investment Grade Analysis is somehow an unrealistically pessimistic, worse-case scenario: but in fact the CDM Smith IGA for the CRC has proven to be far more accurate than the agency's own forecasts. In addition, Investment Grade Analyses prepared for other toll projects around the country routinely over-estimate traffic and revenue levels: they are not- worst-case scenarios

ODOT and WSDOT, and by extension, the Federal Highway Administration, which has delegated its responsibility for compliance with the National Environmental Policy Act, are using fraudulent traffic projections to demonstrate compliance with environmental laws. Just as European diesel manufacturers rigged automotive software to generate false emission test results, the state DOTs have rigged their traffic projection software to falsely generate high levels of traffic and pollution in the "no-build" scenario, thereby creating the false conclusion that the massive highway expansion project will not increase pollution.

14. IBR has incorrectly defined the "No Build" alternative by failing to include Regional Mobility Pricing, an adopted regional policy

The SDEIS estimates the environmental effects of the IBR project by comparing traffic levels in the "no-build" scenario with traffic levels in the "LPA" or build scenario. If the SDEIS incorrectly specifies the conditions for the "No-Build" scenario (estimated traffic and related emissions in 2045), then its estimates of the net environmental effects of the LPA are incorrect. The IBR has defined the "no-build" alternative to predict an exaggerated level of traffic because it has omitted the effects of road pricing that are called for in adopted state and regional transportation plans.

14.1 Regional Mobility Pricing is part of the adopted Regional Transportation Plan. It is included in the near term constrained RTP project list, to be implemented between 2023 and 2030.

> 8.3.1.7 I-5 & I-205 Regional Mobility Pricing Project The Regional Mobility Pricing Project (RMPP) will apply congestion pricing on all lanes of Interstate-5 (I-5) and Interstate-205 (I-205) to manage travel demand and traffic congestion on these

> facilities in the Portland, Oregon metropolitan area in a manner that will generate revenue for transportation system investments. The pricing varies by time of day according to a set schedule, which can be updated periodically by the Oregon Transportation Commission. Higher fees will be charged during peak travel periods (such as morning and evening peak hours) and lower fees during off-peak hours. Congestion pricing is intended to encourage motorists to plan travel in advance and allows traffic to flow more freely during peak times.
> Metro, Regional Transportation Plan, 2023, page 8-70

14.2 IBR failed to include a "No-Build with RMPP" scenario in its modeling. The "No-Build" scenario modeled by Metro, as well as the No-Build scenarios reported by IBR,

14.3 By 2045, Regional Mobility Pricing (RMPP) will significantly reduce traffic on I-5 and I-205 and reduce or eliminate the need for additional capacity on the Interstate Bridge. Although ODOT did not prepare an analysis of the impact of RMPP for the IBR project, it did prepare such an analysis as a supplement to the environmental work for the I-5 Rose Quarter project, less than 5 miles South of the IBR project location.

14.4 ODOT's analysis of the effect of the Regional Mobility Pricing Program on vehicle travel and traffic congestion for the I-5 Rose Quarter project which shows that RMPP pricing would reduce traffic volumes, vehicle miles traveled and traffic congestion on I-5. (ODOT Memo: RMPP/RQ Regional Travel Demand Model Sensitivity Test Results Summary, July 22, 2022). Because much of the traffic traveling through the Rose Quarter also continues on I-5 and crosses the I-5 Columbia River Bridge, reduced traffic on this roadway segment would directly reduce traffic on the I-5 bridges, something not accounted for in IBR modeling).

For example, the analysis shows traffic between the Broadway-Weidler Interchange and I-405 would be reduced 20 percent if pricing is implemented and the Rose Quarter project isn't built.

14.6 The IBR should revise the "No-Build" traffic projections for I-5 and I-205 to include the full implementation of Regional Mobility Pricing. Correcting the "No-Build" estimates to include the effect of RMPP will significantly reduce expected traffic levels on I-5, and show that the proposed Locally Preferred Alternative has very different traffic impacts (relative to the No-Build) than those disclosed in the current draft environmental analysis.

14.7 In addition to Regional Mobility Pricing, the adopted Regional Transportation Plan is predicated on the assumption that between now and 2045 the State of Oregon will adopt a series of policies to further price vehicle travel in ways which will dramatically reduce vehicle miles traveled per capita in the Portland area. State land use regulations require Metro to plan for a reduction in VMT/capita of 35 percent from current levels by 2050. Metro's adopted RTP states that it is based on the assumption that the State will implement a series of policies including a carbon tax, road pricing, tolling of selected roadways and "pay as you drive" insurance that will reduce per capita driving in the Portland Metropolitan Area by 31 percent by 2045. (Metro, Regional Transportation Plan, Appendix J). This reduction implies that total vehicle miles traveled in the region will remain roughly constant at about 20 million vehicle miles per day through 2045 (i.e. no net, aggregate increase from today's levels). The IBR's "No-Build" scenario does not include any analysis of the effects of these policies, and so overstates the amount of driving that will occur in the region in the No-Build scenario, and also overstates the amount of vehicle traffic which would use the I-5 bridges in the No-Build scenario.

14.8 Metro's "Kate" model confirms the sensitivity of traffic on the existing I-5 system to tolling. This model was used to estimate traffic levels on I-5 with tolling in the No-Build Scenario. Tolling I-5 in the No-Build would be expected to reduce I-5 average weekday traffic on the I-5 bridges from 192,100 vehicles per day in 2045 in the No-Build with no tolling to 153,625 for the No-Build with tolling--a reduction in traffic volume of 20 percent. (Metro, Excel Spreadsheet "IBR_L2_SDEIS_I5_I205_xing_auto_truck_022723" (February 27, 2023, Tab Summary, "SDEIS NB" compared to "SDEIS NB Tolled").

Metro, IBR Modeling, February 2023, 2045 I-5 and I-205 Bridge Average Weekday Traffic

Scenario	I-5	I-205	Total
SDEIS NB	192,100	205,505	397,605
SDEIS NB tolled	153,625	227,362	380,988
Delta Tolls	-38,474	21,857	-16,617
	-20%	11%	-4%
SDEIS LPA	164,455	220,162	384,617
SDEIS LPA No Toll	215,398	192,732	408,129
Delta Tolls	50,943	-27,431	23,512
	31%	-12%	6%

Source: Metro, IBR_L2_SDEIS_I5_I205_xing_auto_truck_022723.xlsx

14.9 Modeling done for the ODOT's Value Pricing study concluded that the preferred implementation of Regional Mobility Pricing (Concept C) would have the effect of reducing total regional VMT by about 2 percent.

> Concept C could produce significant decreases to regional VMT, a daily decrease of 2 percent.
> Oregon Department of Transportation. Portland Metro Area Value Pricing Feasibility Analysis, Final Round 2 Concept Evaluation, Technical Memorandum 4. May 7, 2018. Page 94.

14.10 IBR has been inconsistent in its definition of the No-Build alternative. The No-Build alternative includes the I-5 Rose Quarter project, which has not completed environmental review and which lacks funding. The Rose Quarter project is included as added capacity but not the implementation of the regional mobility pricing program which is, according to state officials, the only way the project is likely to be paid for. It is arbitrary and capricious for IBR to include some elements of the RTP in its "No Build" projects (i.e. the capacity and traffic associated with building the Rose Quarter project) but not other elements of the RTP (i.e. the traffic reductions that would flow from the RMPP, which is also in the RTP).

15. IBR plans to reduce or eliminate tolls after construction bonds are paid and has failed to disclose the environmental effects associated with lower tolls.

The IBR SDEIS assumes that the environmental effects of the I-5 widening will be largely offset by the imposition of tolls. But state policy and political pressure are likely to lead the states to reduce or eliminate tolling on I-5, which would lead to much higher levels of traffic, congestion and pollution. These possible effects are not analyzed or disclosed in the SDEIS, in violation of NEPA.

15.1 The IBR project relies on a high level of tolls to reduce traffic levels and minimize environmental impacts. Cutting or eliminating tolls will induce additional traffic.

15.2 The SDEIS does not evaluate the effect of reducing or eliminating tolls. If tolls are lower than described in the SDEIS, environmental effects, especially traffic levels will be higher. The Metro model forecasts that widening I-5 as recommended in the Locally Preferred Alternative (LPA) and **not** charging tolls will cause 215,398 vehicles per typical weekday to use the bridge in 2045. That would be an increase of 50,000 vehicles per day over the level of traffic in the Locally Preferred Alternative with tolling, and would represent an increase of 23,500 vehicles per day crossing the Columbia River. (These Metro forecast figures were prepared for the IBR, but were not included in the project's environmental impact statement).

Metro, IBR Modeling, February 2023, 2045 I-5 and I-205 Bridge Average Weekday Traffic

Scenario	I-5	I-205	Total
SDEIS NB	192,100	205,505	397,605
SDEIS NB tolled	153,625	227,362	380,988
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SDEIS LPA No Toll	215,398	192,732	408,129
Delta Tolls	50,943	-27,431	23,512
	31%	-12%	6%

Source: Metro, IBR_L2_SDEIS_I5_I205_xing_auto_truck_022723.xlsx

The failure to disclose the reasonably foreseeable effects of reducing or eliminating tolls is a violation of NEPA.

15.3 State officials say that tolls will be reduced or eliminated once IBR toll bonds are repaid.

> Much of what Oregon wants to do with the new Interstate Bridge can be traced back to a law passed back in 2013, according to ODOT assistant director Travis Brouwer. Those include a provision that tolls must be reduced after the bridge construction debt is paid off — but it does not require that the tolls be removed entirely, and it's not very specific about the reduction amount. That will be up to the transportation commissions.

https://www.kgw.com/article/news/local/the-story/interstate-bridge-i-5-toll-vancouver-portland-price-cost/283-f883efc4-c1fe-4e26-b9a2-d01c5e610f2c

15.4 Oregon has demonstrated a propensity to renege on assurances that it would impose tolls on highway projects. The Oregon Department of Transportation indicated that it would use tolls to pay for the reconstruction of the I-205 Abernethy Bridge, but then abandoned this policy after project construction was started. Similarly, Oregon Governor Tina Kotek stopped implementation of the Regional Mobility Pricing Program which would have imposed tolls on I-5 and I-205 in the Portland area. These examples show that it is a reasonably foreseeable possibility that tolls on the I-5 Interstate Bridge will be reduced or eliminated within the lifetime of the project, and that this would produce dramatically different levels of traffic and environmental effects than are analyzed in the DSEIS.

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