Cooking the Books: How IBR used "Post-Processing" to alter the Metro Model

By Joe Cortright | 29.10.2024

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To hear project officials tell it, traffic projections emerge from the immaculate and objective Metro "Kate" traffic model

But in reality, IBR traffic projections are not the outputs of the Kate travel demand model. Instead, IBR consultants have altered the Metro numbers, something the label "post-processing."

But what they've done, doesn't meet the professional standards for post-processing—they cooked the books.

Post-processing of Kate's estimates isn't needed because Kate produces detailed, daily and hourly estimates for the I-5 bridges

IBR made contradictory, and unexplained adjustments to Kate predictions: moving thousands of daily vehicles from I-5 to I-205, and hundreds of peak hour vehicles from I-205 to I-5.

IBR consultants failed to follow the accepted and required practice of fully documenting their so-called "post-processing" calculations

IBR traffic estimates can't be replicated using the post-processing steps described in the DSEIS

The Interstate Bridge Replacement project has been caught fudging its traffic numbers. While IBR officials repeatedly claimed their traffic forecasts came directly from Metro's supposedly authoritative regional travel model, internal documents reveal IBR consultants secretly altered these numbers without proper documentation or justification.

Through public records requests, we've learned that IBR staff made substantial undocumented changes to Metro's model outputs, which they misleadingly labeled as "post-processing." These alterations further inflated already questionable peak-hour traffic projections for I-5 and present a distorted picture of the project and its environmental impacts.

The myth of the Metro model

In planning circles, people regularly genuflect to the supposedly infallible Metro "Kate" travel demand model, representing it as an independent and objective source of precise travel information. IBR officials, including project director Greg Johnson, repeatedly assured the public and elected leaders that their numbers came straight from Metro's modeling. Johnson testified to Metro Council in January 2022 that "What sizes the bridge is the data that we take from the regional models that are a part of Metro and RTC." RTC Director Matt Ransom went further, claiming the modelers were "walled off" from policy people to ensure objectivity.

IBR consultants altered the outputs of the Metro Model

These claims were false. IBR didn't use Metro's model outputs - they changed them.

The alterations were substantial. For 2045 "No Build" forecasts, IBR moved about 15,000 daily trips from I-5 to I-205 compared to Metro's model. But then for their preferred alternative, they shifted 10,000 trips in the opposite direction - from I-205 back to I-5. They provided no explanation for these contradictory adjustments.

Here are the receipts. First, the output from the Metro model, taken from a Metro spreadsheet, obtained via public records requests: This is the February 27, 2023 version; rows showing vehicle class, travel direction and columsns showing hourly volumes are suppressed. Values shown are average weekday traffic in both directions for the No Build ("NB") and Locally Preferred Alternative ("SDEIS"). Metro's model outputs are substantially similar or identical for early model runs, such as a spreadsheet dated April 29, 2022, which also says, for example, that the daily No-Build volume would be 190,841.

	A	B	C	U
1			IS NB CT	SDEIS LPA
2	I-5			
3			Daily	Daily
12			190,841	164,455
13				
14	I-205			
15			Daily	Daily
24			200,129	220,162
25				
26	TOTAL			
27			Daily	Daily
36			390,970	384,617

(https://i2.wp.com/cityobservatory.org/wp-content/uploads/2024/10/Kate_Spreadsheet_022723-1.png)

And here are the IBR's "post-processed" data. The first post-processed data was released in response to a public records request of IBR in July, 2022.

Interstate BRIDGE Replacement Program | River Crossing AWDT

Average Weekday Daily Traffic (AWDT)

	2019 Existing	2045 No Build	2045 1 Auxilary Lane	2045 2 Auxiliary Lanes
I-5	143,400	176,000	175,000	175,000
I-205	169,600	215,000	207,000	207,000

Date: 7/8/2022
AWDT traffic forecasts are for preliminary screening efforts only

(https://i0.wp.com/cityobservatory.org/wp-content/uploads/2024/10/IBR_Post-Processed_July2022.png)

The IBR project used its "post-processing" to dramatically shift the picture painted by the Metro travel demand model: In the 2045 No-Build scenario, it moved nearly 15,000 vehicles from I-5 to I-205, changing predicted traffic on I-5 from 190,841 (Metro model) to 176,000 (IBR, post-processed), and changing I-205 traffic from 200,129 (Metro Model) to 215,000 (IBR post-processed). Conversely, "post-processing" shifted trips in the "build" or Locally preferred alternative, from I-205 to I-5. These huge adjustments aren't fully explained; it is clearly a strong indictment of the inaccuracy of

the Metro Model if its predictions are off by such a large amount. In addition, if the model results need to be altered so substantially, then the process, method and calculations used to make those changes need to be more fully documented and explained.

Inflated Peak Hour Estimates

Even more troubling, IBR inflated peak hour traffic estimates above Metro's already high projections. For northbound PM peak traffic in 2045, IBR boosted Metro's forecast by 8-15%. Their "post-processed" estimate of 6,905 vehicles per hour is 530 vehicles higher than Metro's model output of 6,375. As we've noted before (http://cityobservatory.org/ibr-forecasting-the-impossible/), the failure to constrain traffic predictions to the actual peak hour capacity of the I-5 bridges (fewer than 5,000 vehicles per hour in the afternoon peak) produces highly inaccurate forecasts.

This isn't legitimate "post-processing." In transportation planning, post-processing typically means making technical adjustments when a model only provides daily totals or corridor-level data. But Metro's model already generates hourly volumes specifically for the I-5 bridge. No such adjustments were needed.

To be sure, there are serious problems with Metro's Kate model. As we've pointed out, it systematically overstates traffic levels on I-5 (http://cityobservatory.org/kate-metros-wildly-inaccurate-model-overstates-current-traffic-levels/), and predicts traffic that exceeds the freeway's capacity at peak hours (http://cityobservatory.org/ibr-forecasting-the-impossible/). Part of the reason that IBR is altered Kate's outputs is that they too recognize that Kate overstates I-5 traffic levels. What IBR is really saying is something no one in the region will acknowledge: the Kate model is wildly inaccurate, especially when it comes to predicting traffic for this $7.5 billion dollar project.

IBR failed to follow basic professional standards in documenting these changes. Oregon DOT's Analysis Procedures Manual requires detailed documentation of all assumptions, factors and calculations used in traffic forecasting. (See Appendix I below for details). IBR provided only a vague one-paragraph description of their methodology in response to public records requests. They failed to produce the required spreadsheets showing their work.

When we attempt to replicate IBR's stated methodology, their numbers don't add up. They claimed to calculate growth rates from Metro's model and apply them to 2019 base year traffic. But their final outputs don't match what this process would produce. Their "post-processed" 2045 No Build estimate of 176,000 daily vehicles is over 7,000 higher than their own methodology would generate.

IBR made conflicting adjustments in "post-processing."

IBR's adjustments completely change the story about how their preferred alternative would affect traffic patterns. Metro's model shows building the project (moving from the No-Build to the Locally Preferred Alternative) would significantly reduce I-5 traffic (-14 percent) while increasing I-205 traffic (+9 percent). But IBR's altered numbers claim minimal changes: just a 1 percent reduction on I-5 and a 4% decrease on I-205.

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

(https://i2.wp.com/cityobservatory.org/wp-content/uploads/2024/10/IBR_Post_Process_Table.png)

Other models of I-5 traffic required no post-processing

What makes these alterations particularly suspicious is that IBR only claimed to have "post-processed" their numbers after being challenged to reveal their methodology through public records requests. Neither the CDM Smith Investment Grade Analysis nor the Stantec Level 2 study – both based on Metro's model – mention any "post-processing" adjustments. And calibration reports (http://cityobservatory.org/kate-metros-wildly-inaccurate-model-overstates-current-traffic-levels/) show that both the CDM Smith and Stantec Level 2 models have a much better "fit" with existing traffic levels than the Metro model.

“Post-processing” is an industry-wide euphemism for altering model results highway agencies don’t like

Unfortunately, “post-processing” is a widespread practice among highway planners across the nation. A study undertaken by Transportation for America, discussed in the article that Ben Ross and I wrote for *Dissent– (https://www.dissentmagazine.org/online_articles/highway-robbery/)*Highway Robbery–found

> . . . modelers from seven states told the advocacy group Transportation for America that their organizations alter outputs manually based on “engineering judgment” or “long-range trends” as part of their post-processing. Similar reports come from former employees of highway agencies elsewhere.

The pattern is clear: IBR officials misled the public by claiming their numbers came directly from Metro’s model, while secretly altering those numbers without proper documentation or justification. These undisclosed changes conveniently support their preferred narrative about traffic patterns and project needs.

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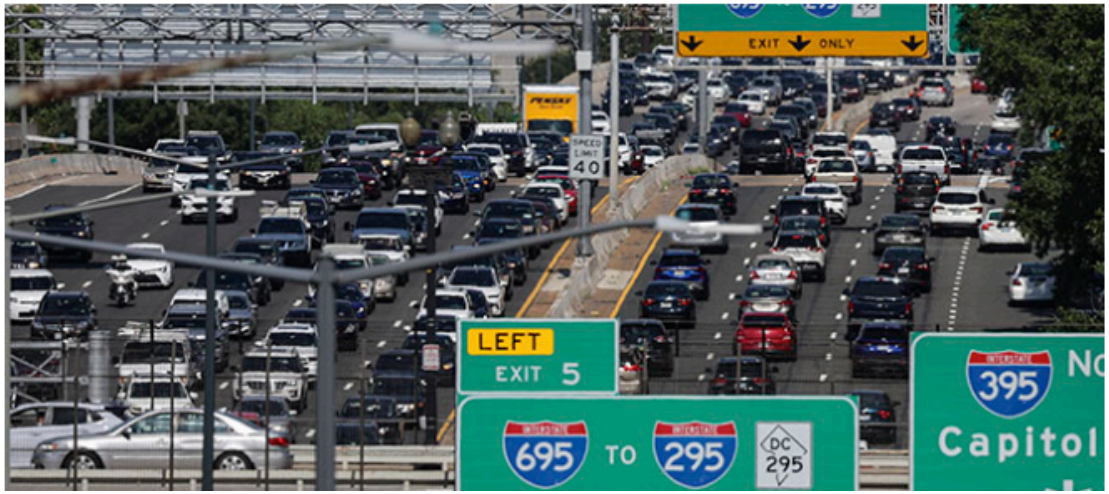
Government highway agencies have enabled the blatant falsification of traffic model results. As a result, the United States wastes billions on road expansions that fail to cure congestion and make it harder to get around without a car.

Benjamin Ross and Joseph Cortright ▪ October 10, 2024



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This revelation raises serious questions about the integrity of IBR's entire analysis process. How can the public trust any of their claims when they've been caught manipulating fundamental traffic data while hiding those manipulations from oversight?

It's time for IBR to come clean. They need to:

1. Release complete documentation of all changes made to Metro's model outputs

2. Provide detailed justification for each adjustment

3. Submit their methodology for independent peer review

Until then, neither the public nor decision makers should trust IBR's traffic projections. The project's basic premise – that we need a massive expansion to handle future traffic – rests on numbers that appear to have been manipulated to support a predetermined conclusion.

False claims about post-processing in the Draft Supplemental Environmental Impact Statement (SDEIS).

The SDEIS offers this explanation of its "post-processing":

> Post-processing is not the substitution of judgment or guesses for the results of a transportation model. Rather, it is a comprehensive, systematic approach to account for the fact that the results of a regional travel demand model may be highly accurate on an aggregated regional basis (e.g., screenlines), but may not be accurate for individual roadways, ramps, or intersections within the modeled region . .
> DSEIS, Transportation Technical Report, page 4-12

Actually, this isn't the definition of post-processing in NCHRP 765. Post-processing refers to adapting a models output for a geography (road section) or time period (for example, hourly, rather than daily) for which the underlying model does not provide estimates. In the case of Metro's RTDM, it directly does provide estimates: the Interstate Bridge is one of the identified screenlines in the Metro model, and the model provides both daily and peak hour volumes.

Critically, while the SDEIS claims that it followed “industry standard” practices, and used the guidance of NCHRP 765 (https://www.princeton.edu/~alaink/Orf467F14/AnalyticalTravelForecastingNCHRP765_091314.pdf), and while it outlines in three vague bullet points (pages 20-21 of the Transportation Methods Report), it fails to show how it got from the values taken from the Metro Regional Travel Demand Model to the “post-processed results” it included in the SDEIS. This is a clear violation of professional practice, federal guidance and Oregon’s Analysis Procedures Manual, all of which require that analysts document their calculations whenever they perform “post-processing.” As noted above: Following the steps IBR described, we were unable to duplicate their estimated values, and their post-processing produced contradictory changes in daily and peak hour travel adjustments.

(https://i0.wp.com/cityobservatory.org/wp-content/uploads/2024/10/cooking_the_books_IBR.jpeg)

In this case, IBR isn't using post-processing for its stated purpose (filling in geographic or temporal gaps in RTDM predictions) but rather for revising and dramatically changing the outputs of the RTDM. IBR is effectively admitting that the Metro Kate RTDM is poorly calibrated and inaccurate, and is trying to "fix" these problems with post-processing.

Appendix A: Required Documentation for Post-Processing

Both the "industry standard" manual for "post-processing" (NCHRP 765 (https://www.princeton.edu/~alaink/Orf467F14/AnalyticalTravelForecastingNCHRP765_091314.pdf)) and ODOT's own Analysis Procedures Manual require a clear documentation of all of the data, assumptions and calculations used in post-processing. IBR violates both of these manuals by failing to document how it "post-processed" traffic data.

NCHRP 765

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 (https://www.princeton.edu/~alaink/Orf467F14/AnalyticalTravelForecastingNCHRP765_091314.pc
(Emphasis added)

ODOT Analysis Procedures Manual (https://www.oregon.gov/odot/Planning/Pages/APM.aspx)

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.

I**f 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, (Emphasis added)
https://www.oregon.gov/odot/Planning/Pages/APM.aspx

Appendix B: Altered Post-Processed Estimates in the SDEIS

The SDEIS as published contains further altered estimates of "No-Build" travel levels. In 2022 and 2023, IBR documents claimed that the "No-Build" traffic level on the I-5 bridges in 2045 would be 176,000 vehicles per average weekday, according to their "post-processed" estimates. As noted, the Metro model continued to estimate I-5 bridge traffic in the No-Build condition in 2045 at 190,841 vehicles per average weekday. In the published version of the SDEIS, IBR has, without explanation, changed the No-Build traffic estimate to 180,000 vehicles per average weekday. Meanwhile, the traffic estimates for I-5 in the Locally Preferred Alternative (175,000 vehicles per average weekday are unchanged. As noted above, IBR does not document its post-processing calculations, and provides no explanation for the shift in estimated No Build traffic from 176,000 vehicles per day to 180,000 vehicles per day.

Table 4-5. 2045 Forecast Average Weekday Daily Traffic Volumes

Location	Existing AWDT	2045 No-Build AWDT [a]	2045 Modified LPA and Options 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 2024

a Percentages reflect change from existing 2019 conditions.

b Percentages reflect change from 2045 No-Build Alternative.

AWDT = average weekday daily traffic

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