April 1, 2019

Oregon Department of Transportation
Attn: Megan Channell, Major Projects Manager
123 NW Flanders St.
Portland, OR 97209

Comments on Rose Quarter Freeway Widening Environmental Assessment

Dear Ms. Channell:

Here are my comments on the Environmental Assessment (EA) prepared for the proposed I-5 Rose Quarter Freeway Widening project.

As written, I believe the EA falls well short of meeting the statutory requirements of the National Environmental Policy Act (NEPA). This document provides no reasonable basis for a Finding of No Significant Environmental Impact (FONSI). It is incumbent under NEPA for the Oregon Department of Transportation to conduct a full Environmental Impact Statement which will fully, accurately and fairly disclose to the public the likely environmental effects of this project, and provide a detailed analysis of alternatives, including congestion pricing, traffic demand management, and transit solutions.

As a resident of the affected area, and a citizen of Oregon and Portland, I reserve my right to challenge any action taken by ODOT and FHWA based on this EA.

I testified in person at the March 12 hearing on the EA in Portland Oregon. I am providing this written testimony in addition to and not in lieu of the comments I offered at that meeting.

1. Information contained in the EA is incomplete and misleading.

Though voluminous, the EA omits many key facts and documents that are essential to ascertaining the environmental impact of the proposed alternatives. Specifically, the document lacks details explaining the assumptions and structure of models used to predict future traffic levels and land use patterns.

The EA, as published contains no data on the average daily traffic (ADT) predicted for the No-Build and Build scenarios. Average Daily Traffic is the most commonly used metric of traffic volume. ODOT collects and publishes ADT statistics for thousands of segments of roadway. ADT statistics are fundamental traffic analysis, safety analysis and traffic modeling. Omitting ADT from a traffic report is the equivalent of omitting dollar-denominated data from an annual financial report. ODOT staff engaged in a deliberate and calculated effort to conceal the most basic aspects of its traffic modeling from public view. (See: Cortright, "The Black Box: Hiding the Facts About Freeway Widening, March 12, 2019, City Observatory Commentary)

On March 4, 2019, the group No More Freeways made the following public records request of the Oregon Department of Transportation:

> The No More Freeways Coalition explicitly requests a confirmation from ODOT that this 2015 version of the TOAS document is the most recent version of this study, and additional clarity regarding whether the Build vs No Build assessments are based on traffic projections for the year 2035 or 2045. The 2015 TAOS report includes traffic projections to 2035, whereas the rest of the EA documents appear to be measuring the project against 2045 traffic patterns. These discrepancies make it difficult for our organization to independently verify and assess ODOT's claims about the proposed freeway expansion would impact traffic (and therefore air pollution and carbon emissions) on the corridor.
>
> No More Freeways to Megan Channell, March 4, 2019

On March 13, 2019, the Oregon Department of Transportation made selected documents available to the group No More Freeways. Documents containing data were formatted as Adobe Acrobat "PDF" files which precluded their direct inclusion in quantitative anlaysis. The provision of this data, which included facts not revealed in the published EA denied No More Freeways, and other reviewers the promised 45 days for review of the EA. The material provided left reviewers a mere 18 days in which to review highly technical material.

On February 15, 2019, Iain Mackenzie, requested that the Oregon Department of Transportation provide him with copies of plans used to produce computer-generated renderings of aspects of the project presented in the EA. Initially, ODOT staff denied that any such plans existed. ODOT staffer Douglas Siu wrote to Mackenize on February 19, "engineering drawings do not yet exist." (See: Mackenzie-Siu Email Thread.PDF)

Mackenzie, based on his technical knowledge of computer rendering, knew that such renderings could not be created without such plans. He pressed his request, and ODOT acceded that such plans, in fact existed. On February 25, 2019, Mackenize filed a public record request for these files. On March 20, 2019, ODOT replied to his public records request, that it would take twenty-five business days and $6,000 to supply such records, meaning such data would be unavailable until after the expiration of the comment period. Mackenzie's attorney then met with ODOT, and following that meeting on March 26, 2019, ODOT released 34 gigabytes of computer data files containing plans of the project. It has only been for the following 5 days prior to the project's April 1 comment deadline that he and other members of the public have had the opportunity to review this highly technical information.

In its public presentations on the project, and in the EA, the Oregon Department of Transportation has repeatedly identified the I-5 Rose Quarter area as the "#1 crash location in Oregon." That is factually untrue, according to ODOT's own data. Several ODOT operated highways in the Portland metropolitan area have significantly higher crash rates, including Powell Boulevard, Barbur Boulevard, 82nd Avenue, and Columbia Boulevard. (See: Cortright, "Safety: Using the big lie to sell wider freeways," March 19, 2019, City

Observatory Commentary). ODOT's own "public involvement" documents betray a calculated strategy to use safety to try to sell the project, in spite of the fact that this is officially characterized as a project with minor safety benefits.

Both the EA and public presentations characterize the I-5 Rose Quarter Freeway Widening Project as a banal "Improvement." The use of terms like "auxiliary lanes" and "improvement" are routinely used to obscure the fact that ODOT contemplates that this project will be undertaken in concert with the $3 billion Columbia River Crossing, and that the right of way it is building would accommodate 8 lanes of freeway traffic (see below). Rather than soliciting public input and comment, the Rose Quarter Freeway Widening's "public involvement" efforts have been a relentless and deceptive marketing of the a pre-determined conclusion. (See: Cortright, "Orwellian Freeway Widening, March 12, 2019, City Observatory Commentary).

These repeated instances of hiding key data and facts, and misrepresenting others shows that the Oregon Department of Transportation has little respect for the National Environmental Policy Act's requirements that it fully and fairly inform the public about the potential impacts of its proposed actions, and the potential alternatives thereto. Rather, ODOT has engaged in a calculated strategy of concealing, withholding and denying key data and information, frustrating the public's right to know and comment on the EA.

On account of these omissions and misrepresentations, ODOT and the FHWA cannot regard the published EA as having met their responsibility under NEPA.

Corrective Action: The public comment period for the EA should be extended an additional 30 days to allow the public to review and comment on facts revealed after the release of the EA. A full environmental impact statement should be undertaken. The full EIS should provide for a fully transparent ongoing process in which the public is made privy to all technical work products under the EIS as they are undertaken, and is also given the opportunity to provide input on the work plan for the EIS, and in the selection of contractors to undertake the EIS.

2. The EA is violates of ODOT's State agency coordination rule.

The state agency coordination rule requires that the plan, including the EA, be consistent with the adopted local plan. Portland's Central City Plan specifically provides that the Rose Quarter project go forward only if congestion pricing is implemented, and implemented prior to the construction of the freeway widening.

NEPA requires for conformity with state and local statutes and plans

NEPA requires that the EIS demonstrate consistency with adopted State and local statues and plans (40 C.F.R. § 1506.2(d))

> **(d)** To better integrate environmental impact statements into State or local planning processes, statements shall discuss any inconsistency of a proposed action with any approved State or local plan and laws (whether or not federally sanctioned). Where an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the plan or law.
>
> https://www.law.cornell.edu/cfr/text/40/1506.2

ODOT Agency Coordination Rule

ODOT's state agency coordination rule requires that project analysis be consistent with the comprehensive plan. The relevant portion of the Comprehensive plan in this case is Portland's adopted Central City Plan. Key words here are "plan compatibility shall be analyzed in conjunction with the development of the . . . Environmental Assessment . . ."

> **731-015-0075**
> **Coordination Procedures for Adopting Plans for Class 1 and 3 Projects**
>
> (2) Goal compliance and plan compatibility shall be analyzed in conjunction with the development of the Draft Environmental Impact Statement or Environmental Assessment. The environmental analysis shall identify and address relevant land use requirements in sufficient detail to support subsequent land use decisions necessary to authorize the project.
>
> https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=181743

The Central City Plan specifically calls for congestion pricing to be implemented in conjunction with the Rose Quarter project:

> ODOT, in partnership with PBOT will implement congestion pricing and TDM options to mitigate for climate impacts as soon as feasible and prior to the opening of the project.
> (Central City Plan, page 139)
> https://www.portlandoregon.gov/bps/index.cfm?&a=689704

The City of Portland Comprehensive Plan makes congestion pricing part of its approval of the RQ freeway widening. This provision constitutes a "land use requirement" under the agency coordination rule, inasmuch as it is contained in the city's adopted land use plan.

The EA doesn't address congestion pricing. The EA contains no information whatsoever about congestion pricing, and therefore procedurally doesn't comply with the rule's requirement that the EA address this provision of the land use plan. Therefore, the EA

is not consistent with the agency coordination rule. This, in turn, is also a violation of the National Environmental Policy Act's requirement that the EA demonstrate consistency with both state and local plans. The EA cannot be characterized as demonstrating consistency if it contains no mention of the policy in question.

Corrective Action: A full project EIS is required. The EIS should both include congestion pricing in the appraisal of the No-Build alternative, and further develop congestion pricing as an alternative to freeway widening.

3. The EA fails to include congestion pricing as a reasonably foreseeable part of the No-Build, and also as an alternative to the project.

Congestion pricing has proven globally to be the only effective means of reducing traffic congestion in urban areas.

The EA violates NEPA by failing to include congestion pricing in the No-Build scenario. The Oregon Legislature has approved congestion pricing of I-5 and directed ODOT to pursue its implementation. It is a reasonably foreseeable part of the region's transportation system (unlike the Columbia River Crossing, which ODOT has unjustifiably assumed to be built as part of the No-Build scenario).

The EA further violates NEPA by failing to advance congestion pricing as an alternative to the freeway widening build scenario. Congestion pricing is more effective, reducing VMT, carbon emissions, congestion, and supporting other modes of transportation. It is also far less expensive that the freeway widening project.

The studies undertaken by the Oregon Department of Transportation conclude that congestion pricing could measurably reduce traffic congestion on I-5. The analysis concludes that the project would reduce congestion and improve travel time reliability on I-5. It would save travel time for trucks and buses. It enables higher speeds and greater throughput on the freeway–because it eliminates the hyper-congestion that occurs when roads are un-priced. Here's an excerpt from page 17, of the report. We highlighted in bold the most salient bits of the analysis:

> Overall, Concept 2 – Priced Roadway, will reduce congestion for all travelers on the priced facility. This will produce overall improvement in travel time reliability and efficiency for all users of I-5 and I-205. [Concept 2 is] Likely to provide the highest level of congestion relief of the initial pricing concepts examined. [It] Controls demand on all lanes and, therefore, allows the highest level of traffic management to maintain both relatively high speeds and relatively high throughput on both I-5 and I-205. Vehicles 10,000 pounds and more (such as

> many freight trucks and transit vehicles) would benefit from travel time improvements on the managed facilities. Pricing recovers lost functional capacity due to hyper-congestion, providing greater carrying volume with pricing than without. This means that diversion impacts may be minimal, but still warrant consideration and study.
>
> This concept is relatively inexpensive to implement, and significantly less expensive than concepts that include substantial physical improvements to the pavement and bridge infrastructure.

Oregon Department of Transportation, (2018). Portland Metro Area Value Pricing Feasibility Analysis Final Round 1 Concept Evaluation and Recommendations Technical Memorandum #3, 2018.

Bottom line: congestion pricing works better for freeway users, freight mobility, and transit riders; in keeps un-priced traffic from causing hyper-congestion and effectively and is vastly cheaper than building new lanes and bridges. It is also likely to result in minimal, if any diversion to local streets.

Omitting pricing as an alternative in the Environmental Assessment violates the National Environmental Policy Act. This is clearly a viable alternative to widening the freeway at the Rose Quarter. Viable is actually a significant understatement: pricing isn't simply a viable alternative, it's arguably, on its face, a superior alternative). But that's beside the point. From a legal standpoint, not seriously evaluating road pricing as an alternative to expensive, environmentally damaging road widening is violates NEPA's requirement for a robust analysis of alternatives.

The substantive requirements for alternative analysis are spelled out in 40 CFR1502. As explained by the Federal Highway Administration,

The Council on Environmental Quality (CEQ) refers to the alternatives analysis section as the "heart of the EIS," and requires agencies to:

> 1. Rigorously explore and objectively evaluate all reasonable alternatives and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
>
> 2. Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

The FHWA guidance requires that the agency clearly state the rationale for not advancing reasonable alternatives:

Alternatives analysis should clearly indicate why and how the particular range of project alternatives was developed, including what kind of public and agency input was used. In addition, alternatives analysis should explain why and how alternatives were eliminated from consideration. It must be made clear what criteria were used to eliminate alternatives, at what point in the process the alternatives were removed, who was involved in establishing the criteria for assessing alternatives, and the measures for assessing the alternatives' effectiveness.

Nothing in the EA describes the criteria used to select or eliminate alternatives, nor is any analysis offered for the failure to advance pricing as an alternative in its own right. It's simply arbitrary and capricious of the Oregon Department of Transportation and the Federal Highway Administration to produce an Environmental Assessment which takes no notice of efforts they are both currently undertaking to implement road pricing on this very roadway.

Moreover, while NEPA requires that congestion pricing be evaluated separately as an alternative, it is also the case that road pricing ought to be incorporated in the analysis as part of the No-Build alternative. The implementation of road pricing in the next decade or so is, in NEPA terms, a reasonably foreseeable event. Just as the Environmental Analysis has incorporated its expectations about the growing electrification and increased fuel efficiency of future vehicles in its forecasts of emissions (due to the future implementation of fuel economy regulations), it should likewise include the analysis of congestion pricing, which is also a reasonably foreseeable part of the regulatory environment in the next decade or so.

In addition, the City of Portland has made implementation of congestion pricing a condition of its approval of the Rose Quarter project in the Central City Plan, a condition ODOT is bound to observe under its state agency coordination plan.

> ODOT, in partnership with PBOT will implement congestion pricing and TDM options to mitigate for climate impacts as soon as feasible and prior to the opening of the project.
> (Central City Plan, page 139)
> https://www.portlandoregon.gov/bps/index.cfm?&a=689704

Congestion pricing is likely to be especially effective because an unusually large fraction of trips across the Columbia River are Washington residents evading their state's sales tax by shopping in Oregon. These cost-motivated shoppers are likely to change the timing of their shopping trips to avoid paying peak hour congestion tolls. (See Cortright, "How tax evasion fuels traffic congestion in Portland," March 15, 2019, City Observatory Commentary).

Corrective Action: A Full EIS should be prepared, specifically including congestion pricing both a full alternative, and as part of the base case traffic analysis. Both the City

of Portland and Metro have endorsed wider application of congestion pricing to manage traffic on all kinds of roadways in the city and region. A broader city-wide or region-wide congestion pricing plan should be developed as an alternative, as it will likely better meet all of the criteria established for this project.

4. The EA fails to comply with Oregon's State Transportation Plan Policy 1G that requires low cost options be implemented before building a major freeway expansion.

NEPA requires that a EA demonstrate how alternatives comply with adopted state and local plans and policies. Federal regulations implementing NEPA make it clear that the EIS must address this issue:

> "To better integrate environmental impact statements into State or local planning processes, statements shall discuss any inconsistency of a proposed action with any approved State or local plan and laws ... [w]here an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the plan or law." 40 C.F.R. § 1506.2(d).

As part of its 1999 State Transportation Plan, the Oregon Transportation Commission adopted Policy 1G, governing implementation of major projects.

> POLICY 1G: MAJOR IMPROVEMENTS
> It is the policy of the State of Oregon to maintain highway performance and improve safety by improving system efficiency and management before adding capacity. ODOT will work in partnership with regional and local governments to address highway performance and safety needs.
> Action 1G.1
> Use the following priorities for developing corridor plans, transportation system plans, the Statewide Transportation Improvement Program, and project plans to respond to highway needs. Implement higher priority measures first unless a lower priority measure is clearly more cost-effective or unless it clearly better supports safety, growth management, or other livability and economic viability considerations. Plans must document the findings which support using lower priority measures before higher priority measures.
> 1. Protect the existing system. The highest priority is to preserve the functionality of the existing highway system by means such as access management, local comprehensive plans, transportation demand management, improved traffic operations, and alternative modes of transportation.
> 2. Improve efficiency and capacity of existing highway facilities. The second priority is to make minor improvements to existing highway

facilities such as widening highway shoulders or adding auxiliary lanes, providing better access for alternative modes (e.g., bike lanes, sidewalks, bus shelters), extending or connecting local streets, and making other off system improvements.
3. Add capacity to the existing system. The third priority is to make major roadway improvements to existing highway facilities such as adding general purpose lanes and making alignment corrections to accommodate legal size vehicles.
4. Add new facilities to the system. The lowest priority is to add new transportation facilities such as a new highway or bypass.
Action 1G.2
Support any major improvements to state highway facilities in local comprehensive plans and transportation system plans only if the improvements meet all of the following conditions:
· The improvement is needed to satisfy a state transportation objective or objectives;
· The scope of the project is reasonably identified, considering the long range projection of need;
· The improvement was identified through a planning process that included:
- Thorough public involvement;
- Evaluation of reasonable transportation and land use alternatives including measures for managing the existing transportation system and for reducing demands for highway capacity; and
- Sufficient environmental analysis at the fatal flaw planning level.
· The plan includes measures to manage the transportation system, but these measures will not satisfy identified highway needs during the planning period or there is a need to preserve a future transportation corridor for future needs beyond the planning period;
· The improvement would be a cost-effective means to achieve the objective(s);
· The proposed timing of the improvement is consistent with priorities established in corridor plans and regional transportation plans and the financing program identifies construction as being dependent on the future availability of funds;
· Funding for the project can reasonably be expected at the time the project is ready for development and construction;
· The local government schedules funding for local street improvements in its local transportation financing program if these are needed to attain the objectives of the major improvement; and
· The plan includes policies and implementing measures that protect the corridor and its intended function.

Corrective action. Prepare an EIS to include an alternative that consists entirely of transportation demand management (TDM) strategies, including but not limited to HOV lanes, and other strategies.

5. The EA violates Oregon's statutory goal of reducing greenhouse gas emissions

NEPA requires that the EIS demonstrate consistency with adopted State and local statues and plans (40 C.F.R. § 1506.2(d)).

Oregon Revised Statutes 468A.205(1) sets goals of reducing greenhouse gas emissions by 10 percent from 1990 levels by 2010, and by 75 percent from 1990 levels by 2050. The EA does not demonstrate how any of the alternatives affect achievement of these goals. By enabling additional automobile travel and more decentralized, lower density development, each of the build alternatives will generate additional greenhouse gases and impede the state's ability to achieve these statutory goals.

> **468A.205 Policy; greenhouse gas emissions reduction goals.** (1) The Legislative Assembly declares that it is the policy of this state to reduce greenhouse gas emissions in Oregon pursuant to the following greenhouse gas emissions reduction goals:
>
> (a) By 2010, arrest the growth of Oregon's greenhouse gas emissions and begin to reduce greenhouse gas emissions.
>
> (b) By 2020, achieve greenhouse gas levels that are 10 percent below 1990 levels.
>
> (c) By 2050, achieve greenhouse gas levels that are at least 75 percent below 1990 levels.

This project is especially salient to the state's greenhouse gas reduction goal because transportation accounts for fully 40 percent of state greenhouse gas emissions, and is the only major source of emissions that is increasing, according to the latest state greenhouse gas commission report (which is not mentioned in the EA). See

Corrective action: Complete an EIS for the project, including transit improvement, transportation demand management and congestion pricing. Evaluate each alternative for compliance with ORS 468A.205. Modify or discard alternatives that fail to comply with this statute. Develop other alternatives that fully comply with this law.

6. The EA fails to properly account for induced demand.

The EA makes no mention of induced demand, the phenomenon by which increases in highway capacity in urban areas generate additional travel that leads to a recurrence of congestion at even higher levels of traffic. (A text search of both the EA and its Traffic Technical Report show no mention of the word "induced").

In all of its analyses, the EA uses a single set of assumptions about future land use and travel demand, including the distribution of jobs and population within the metropolitan area general, and within the Project Impact Area in particular. This analysis assumes that building (or not building) this additional freeway capacity will have no impact whatsoever on the pattern and intensity of traffic over the next two or more decades.

This approach has two effects, both of which subvert the analysis of environment impacts and which violate NEPA. In the "No-Build" scenario, levels of traffic are improperly inflated, producing much higher level estimates of congestion than will actually occur. In each of the "Build" alternatives, levels of traffic are systematically understated. This bias causes the EA to mischaracterize the relative merits of the build and no-build alternatives, and therefore violates NEPA.

The phenomenon of induced demand is so well-established in the academic literature that it is referred to as the "Fundamental Law of Road Congestion." In urban areas, traffic has an estimated elasticity of approximately 1.0 to increases in capacity: a 1 percent increase in roadway capacity is associated with a 1 percent increase in traffic. See Duranton & Turner, 2011. Add as many un-priced lanes as you like in a dense, urban environment and that capacity will elicit additional trip-making that quickly fills new lanes to their previously congested levels. In the extreme, one ends up with Houston's 23-lane Katy Freeway, successively widened at the cost of billions of dollars, but which now has even longer travel times than before its most recent widening. (See: Cortright, "Reducing congestion: Katy didn't," December 27, 2016, City Observatory Commentary).

These findings hold for the Rose Quarter Project as well. Key project staff have publicly conceded that the project will not produce significant improvements in regular, daily traffic congestion, which engineers refer to as "recurring congestion." (See Cortright, "Rose Quarter Freeway Widening Won't Reduce Congestion," March 2, 2019, City Observatory Commentary.)

In addition the Rose Quarter project has no demonstrable real-world evidence that the freeway widening will reduce delays associated with automobile crashes, so called "non-recurring congestion." Just a few years ago, ODOT widened a nearby stretch of I-5 which carries mostly the same traffic, adding a travel lane and widening shoulders (just as it proposes to do at the Rose Quarter). ODOT's own crash statistics show that the rate of crashes on this stretch of road not only did not decrease, but actually increased in the

years following the freeway widening. (See Cortright, "Wider freeways don't reduce congestion," March 4, 2019, City Observatory Commentary.)

ODOT's claims that additional lanes and wider shoulders will reduce crashes are based on it's claim that it used a computer spreadsheet called ISAT to calculate probable crashes (Traffic Technical Report). However, the user manual for the ISAT model says that the model is not applicable to freeway segments that are controlled by ramp meters. (Ramp meters control the flow of traffic onto the roadway and reduce the likeliehood of crashes associated with merging). This model is not a valid basis for predicting crashes or changes in the number of crashes because this segment of roadway includes ramp meters. See Bonneson, et al., 2012.

ODOT's experience with I-5 suggests that widening one bottleneck at one point in the system only speeds and intensifies the process of traffic congestion at other bottlenecks in the system. For example, ODOT has made improvements to I-5 in the area north of Lombard Street, including the freeway widening project described in the previous paragraph). While this has removed some "bottlenecks" in some locations, it has fueled more vehicles, more rapidly into others, with the result that these locations become congested sooner, and actually lose capacity. The I-5 bridges now carry about 10 percent fewer vehicles in the afternoon peak hour than they did 10 and 20 years ago. (See Cortright, "Backfire: How widening freeways can make traffic congestion worse," February 26, 2019, City Observatory Commentary). Similarly, an ODOT project to increase the capacity of the freeway interchange on I-5 at Woodburn also apparently has resulted in no reduction in crashes, and may actually be associated with an increase in more severe crashes (and attendant delays). See, Cortright, "Safety Last: What we've learned from 'improving' the I-5 freeway," March 21, 2019, City Observatory Commentary).

More comprehensive and independent reviews of the literature on induced demand have reached essentially the opposite conclusion from that asserted in the EA. These reviews include: Avin, U., R. Cervero, et al. (2007), Litman, (2007) and Williams-Derry, C. (2007), and Handy & Boarnet (2014). In addition, the conclusion stated in the EA about the literature is contradicted by an earlier literature review undertaken as part of the preliminary work on this project:

> "Travel responses to highway capacity improvements can affect the land use impacts discussed in the previous question. Expected travel responses include: (A) shifts in route, mode, and time of travel; (B) shifts in destinations; (C) new trips generated by new development; and (D) new trips induced by improved accessibility. Decreases in capacity can suppress demand. New trips "induced" by changes in land uses or improved accessibility are most difficult to forecast. The literature overwhelmingly suggests that induced travel is likely to increase facility demand over forecast levels, with up to half of long-term effects due to land use changes. The higher demand can often reduce or eliminate the facility's

> planned congestion relief, curtailing expected delay and air quality benefits. Even with little congestion relief, however, traffic widening projects provide benefits in reducing the duration of the peak period, carrying more vehicles per hour, and supporting access to a larger choice of home, work, and retail/service locations. Despite inconsistencies among studies, induced demand is generally projected to increase 0-10% for each 10% increase in road/lane miles, and 5% for every 10% travel time reduction. Local conditions, such as existing levels of congestion, traveler's value-of-time, and potential travel cost savings, affect the level of induced demand."
> Parsons Brinckerhoff, Land Use-Transportation Literature Review for the I-5 Trade Corridor Regional Land Use Committee, September 17, 2001. Pages 4-5

The Parsons Review is quite clear that within metropolitan areas, the effects of increased capacity are to disperse population, create more and longer trips, and generate induced demand for travel. See for example:

> **1.5. Households reinvest travel time savings in longer trips and more travel.**
>
> Despite differences in travel conditions and opportunities across US cities over the past 20-year, people spend the same amount of time per day, on average, in travel. The stability in commuting travel times suggests that transport accessibility improvements will allow households to locate further away from jobs, and that that any travel time savings may be used for more travel.
> Parsons Brinckerhoff, Land Use-Transportation Literature Review for the I-5 Trade Corridor Regional Land Use Committee, September 17, 2001. Page 12.

Parson's conclusion is that although difficult to quantify **the literature overwhelmingly accepts the notion that induced demand exists.**

> While the literature overwhelmingly accepts the notion that induced demand exists, the quantification of its effects is less understood. Published literature suggests that for every 10% increase in lane-miles, long-term induced travel impacts range from 0-10 percent of initial traffic forecasts. This range of findings is consistent with studies indicating that heavy road building has not abetted US metropolitan congestion; however, each of the studies uses different models, assumptions and/or definitions.
> Parsons Brinckerhoff, Land Use-Transportation Literature Review for the I-5 Trade Corridor Regional Land Use Committee, September 17, 2001. Page 16.

Whether development is consistent with local land use plans or not bears no necessary relationship to whether there is induced demand. Many different levels of development (from vacant to fully allowed density with variances) are possible under any local land use plan. Asserting that the level of development is "consistent" with land use plans is a straightforward evasion of the requirement to consider the impacts of induced demand.

This is simply irrelevant to determining whether there may be impacts. Local land use plans only specify the maximum amount of development that may occur in the area influenced by the project. There is a wide range of possible levels and intensities of development that are possible under these land use plans, from no development to the full maximum allowed by law.

It is also clear that the EA is inconsistent with administrative guidance on the question of induced demand. The Federal Highway Administration guidelines for preparing environmental impact statements clearly instruct the analysis of induced impacts: It specifically anticipates a different analysis for each alternative "substantial, foreseeable, induced development should be presented for each alternative"

> V. Environmental Impact Statement (EIS) -- FORMAT AND CONTENT
> G. Environmental Consequences
> · Land Use Impacts
>
> This discussion should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project.
>
> These plans and policies are normally reflected in the area's comprehensive development plan, and include land use, transportation, public facilities, housing, community services, and other areas.
>
> The land use discussion should assess the consistency of the alternatives with the comprehensive development plans adopted for the area and (if applicable) other plans used in the development of the transportation plan required by Section 134. The secondary social, economic, and environmental impacts of any substantial, foreseeable, induced development should be presented for each alternative, including adverse effects on existing communities. Where possible, the distinction between planned and unplanned growth should be identified.
>
> Federal Highway Administration, U.S. Department of Transportation, TECHNICAL ADVISORY: GUIDANCE FOR PREPARING AND PROCESSING ENVIRONMENTAL AND SECTION 4(F) DOCUMENTS, T 6640.8A
> October 30, 1987
> (http://www.fhwa.dot.gov/legsregs/directives/techadvs/T664008a.htm)

The FHWA has developed substantial technical resources to illustrate how induced demand can be estimated for projects such as the CRC. For example, DeCourla-Souza and Cohen document long-term demand elasticities of traffic with regard to travel time averaging -0.57 and ranging from -0.2 to -1.0. This means that in the long run, all other things being equal, a 10% reduction in travel time in a corridor would be associated with

a 5.7% higher level of traffic. (Patrick DeCorla-Souza and Harry Cohen, Accounting For Induced Travel In Evaluation Of Urban Highway Expansion, 1998.) More recent estimates by Duranton and Puga (2011) put the long-term elasticity of traffic with respect to capacity at 1.0: an increase in capacity is exactly offset by an increase in travel.

A recent review of transportation models used in estimating future demand and project benefits, including the type used in this process, concludes:

> "Failure to account for indirect demand effects likely exaggerates the travel-time savings benefits of capacity expansion and ignores the potentially substantial land use shifts that might occur because of the marginal increase in accessibility provided."
> Avin, U., R. Cervero, et al. (2007). Forecasting Indirect Land Use Effects of Transportation Projects. Washington, DC, American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on the Environment. (Page 5).

Corrective action: A full EIS should be prepared to include estimates of the impact of increased transportation capacity on inducing demand for additional travel in the project area and elsewhere in the metro area. Models should include assumptions about induced demand consistent with the academic literature as presented herein.

7. The EA traffic model uses static traffic assignment which exaggerates traffic congestion in the no-build and presents a distorted picture of the benefits of the build alterative.

Traffic projections for the Rose Quarter EA are based on a static-assignment model which fails to accurately account for changes in driver behavior in response to traffic congestion. Such models inherently over-predict traffic levels and congestion levels, and systematically bias comparisons between build and no-build alternatives See: Marshall, 2018.

In laymen's terms, the static assignment models that the ODOT planners are based on a kind of "Lemming Theory" of travel behavior. Predictions that rush hour will last most of the day, and that travel speeds will fall precipitously assume that in spite of this congestion, more and more people drive on I-5. Like the famous lemmings in the Walt Disney film—who leap mindlessly off the cliff even though they see other lemmings falling to their death—people keep using the I-5 bridge no matter how slow or congested it becomes. (In real life, even lemmings are smarter than this, in the Disney film, the terrified lemmings were actually chased off the cliff by the film's producers). See

Cortright, "The Lemming Model of Traffic," March 28, 2019, City Observatory Commentary).

A review of this kind of models by the Government Accountability Office concluded:

> Another source of error when calculating transportation projects' potential benefits and costs occurs because current travel demand models tend to predict unreasonably bad conditions in the absence of a proposed highway or transit investment. Travel forecasting, as previously discussed, does not contend well with land-use changes or effects on nearby roads or other transportation alternatives that result from transportation improvements or growing congestion. Before conditions get as bad as they are forecasted, people make other changes, such as residence or employment changes to avoid the excessive travel costs. Government Accountability Office (2005). Highway and Transit Investments: Options for Improving Information on Projects' Benefits and Costs and Increasing Accountability for Results. Washington, DC GAO-05-172.

Corrective Action: Undertake a fully Environmental Impact Statement. Develop and apply a fully dynamic trip assignment model that does not assign traffic in excess of capacity to system links.

8. The EA violates NEPA by failing to give separate consideration to transit alternatives as means of reducing congestion in the corridor.

The only build alternative considered in the EA is major increase in highway capacity. The failure to include alternatives that do not involve constructing a large additional increment of highway capacity is on its face a violation of NEPA's requirement that the EA consider a wide range of reasonable options.

ODOT has considered a diverse range of such opportunities in the past. The Environmental Impact Statement prepared on behalf of the Oregon Department of Transportation and the Federal Highway Administration for the proposed Mount Hood Freeway 35 years ago considered a wide range of alternatives including: two widths of freeways (four lane and eight lane), several types of transit (surface street, and grade separated), and a variety of demand reduction measures, including road user charges, increasing the gas tax, and changes in parking policies and land use regulations (Skidmore, Owings & Merrill, et al, 1973, see files page-9 and page-33).

Corrective action: The EA should be re-written with additional alternatives that include transportation demand management-only, tolling only, and transit only improvements, with no increase in highway capacity.

9. The EA violates NEPA because it does not develop and evaluate a Transportation Demand Management (TDM) alternative as required by FHWA guidelines.

In its regulatory guidance on the preparation of Environmental Impact Statements for transportation projects, the Federal Highway Administration requires an analysis of transportation demand management strategies, including, but not limited to the operation of High Occupancy Vehicle lanes. The EA does not include TDM as a separate alternative. The FHWA Guidance on EIS preparation provides:

> "Alternatives
> This section of the draft EIS must discuss a range of alternatives, including all "reasonable alternatives" under consideration and those "other alternatives" which were eliminated from detailed study (23 CFR 771.123(c)). The section should begin with a concise discussion of how and why the "reasonable alternatives" were selected for detailed study and explain why "other alternatives" were eliminated. The following range of alternatives should be considered when determining reasonable alternatives:
> 1. "No-action" alternative: The "no-action" alternative normally includes short-term minor restoration types of activities (safety and maintenance improvements, etc.) that maintain continuing operation of the existing roadway.
> 2. Transportation System Management (TSM) alternative: The TSM alternative includes those activities which maximize the efficiency of the present system. Possible subject areas to include in this alternative are options such as fringe parking, ridesharing, high-occupancy vehicle (HOV) lanes on existing roadways, and traffic signal timing optimization. This limited construction alternative is usually relevant only for major projects proposed in urbanized areas over 200,000 population.
> For all major projects in these urbanized areas, HOV lanes should be considered. Consideration of this alternative may be accomplished by reference to the regional transportation plan, when that plan considers this option. Where a regional transportation plan does not reflect consideration of this option, it may be necessary to evaluate the feasibility of HOV lanes during early project development. Where a TSM alternative is identified as a reasonable alternative for a "connecting link" project, it should be evaluated to determine the effect that not building a highway link in the transportation plan will have on the remainder of the system. A similar analysis should be made where a TSM element(s) (e.g.,

> HOV lanes) is part of a build alternative and reduces the scale of the highway link."
> (U.S. Department of Transportation, Federal Highway Administration Technical Advisory: Guidance For Preparing and Processing Environmental and Section 4(F) Documents, T 6640.8A (October 30, 1987) (http://www.fhwa.dot.gov/legsregs/directives/techadvs/T664008a.htm)
> V. Environmental Impact Statement (EIS) -- FORMAT AND CONTENT, G. Environmental Consequences, Alternatives)

A wide range of TDM measures exist, and have been proven to be effective in reducing traffic levels, reducing congestion, and improving safety (Litman, 2014)

Excluding the TDM/HOV alternative from consideration is a serious omission because such measures can reduce traffic, and traffic congestion and the environmental effects associated with congestion. These alternatives can also result in lower levels of induced demand, and as noted by the Department of Transportation, enable a reduction of the scale and expense of a proposed project.

Corrective action: The EA should include a comprehensive TDM-only alternative.

10. The EA violates NEPA by failing to advance analysis of transit alternatives.

NEPA requires the evaluation of reasonable alternatives to the proposed action. By excluding transit and providing only an expansion of highway capacity its only build alternatives, the EA deprives the public and decision makers of any information about the separate value and merits of transit. It would be a simple matter to undertake either transit (light rail or busway) or highway capacity improvements separately. Additional transit on routes parallel to the I-5 freeway would reduce peak hour traffic and do so while producing fewer carbon emissions and pollution, and supporting regional goals of reducing VMT. The published literature on different modes shows conclusively that highway capacity has a negative effect on traffic levels (i.e. it stimulates additional travel), while transit and tolling have the effect of reducing traffic (and associated environmental impacts).

Corrective action: The EA should be re-written to include one or more transit alternatives.

11. The EA fails to consider commuter rail as an alternative

The EA does not include consideration of commuter rail between Vancouver and Portland as a means of reducing demand for travel over the I-5 bridges. In 1997, the two

states ran a commuter rail operation over existing rail lines. Such a system has the capacity to handle thousands of additional peak hour travelers (Oliver, 1997). Portland Metro operates diesel powered commuter rail between Beaverton and Wilsonville on existing railroad rights-of-way.

Corrective action: The EA should include an alternative that evaluates the impact of commuter rail as a means of reducing traffic in the I-5 corridor.

12. The EA fails to provide a basis for its estimates of traffic levels generated by the Columbia River Crossing.

The EA's traffic projections assume that the Columbia River Crossing, a 12-lane- five mile wide freeway project was built in 2015. (In fact, the project has never been built, and should arguably not be used in generating the no-build traffic forecasts. However, if it were appropriate to include the CRC in the forecast, the EA doesn't describe the basis of the modeling used to generate traffic assumed to use the CRC. Not disclosing the basis of these estimates violates NEPA by precluding any independent objective review of their reliability.

ODOT has published multiple and conflicting estimates of the amount of traffic that would be generated on I-5 by the CRC. It has published a Final Environmental Impact Statement (2011) and also published an Investment Grade Analysis of CRC traffic (CDM Smith, 2013). The FEIS estimates that 180,000 vehicles would use I-5 in 2030; the Investment Grade Analysis estimates fewer than 100,000. The EAdid not disclose that its modeling assumed that the CRC was built as part of its projections, nor, for that matter did it disclose on what basis it estimated CRC traffic.

The difference in the two forecasts reflects different assumptions about assumed toll levels, with the FEIS assuming lower toll rates (Cortright, Toll Diversion Analysis, 2013). In addition, the Investment Grade Analysis has a much more sophisticated and realistic assessment of the effect of tolling on trip demand. It's estimates of I-5 travel are much lower because it reflects the high probability that many trips on I-5 will divert to other routes. Moreover, tolling is integral to the construction of the CRC, neither Oregon nor Washington has the resources to complete this project without tolling. It is unreasonable to assume that the CRC bridge would be built and not tolled.

The current level of traffic on the I-5 bridges is about 130,000 vehicles per day. That would decline by 30,000 vehicles under tolling in 2030, according to the "high" estimates from the investment grade analysis. That lower level of traffic on I-5 would produce dramatically lower levels of traffic at the Rose Quarter that assumed in the EA.

Corrective Action: A Full EIS should be prepared. If the CRC is assumed to be built in any traffic modeling, the EIS should provide detailed reviewable information on inputs, assumptions and data including the toll regime assumed for the CRC. This analysis should affirmatively demonstrate why the much lower levels of traffic estimated in the Investment Grade Analysis are not likely to be realized.

13. The EA fails to allow for effect of policies to implement reduction carbon emissions—either cap and trade or carbon taxes—on growth in future demand.

Oregon and Washington have already enacted goals for the reduction of greenhouse gases (see items 2 and 3 above). The U.S. Congress is poised to enact a cap and trade regime in the next few years. These measures will require a reduction in the emission of CO2, and are likely to be achieved by policies that reduce vehicle miles traveled. ODOT's modeling assumes that there will be no additional constraint on carbon emissions. This is clearly unrealistic, and has the effect of artificially inflating the 2030 levels of traffic.

Recommended corrective action: A full EIS should be prepared which explicitly addresses the likely effect of carbon restrictions on the future growth in traffic.

14. Claims about carbon are undocumented, misleading, contrary to published literature and untrustworthy.

The EIS claims that the Build scenario will result in slightly less air pollution and carbon emissions than the No-Build alternative.

The EIS provides only conclusory statements about carbon emissions. It does not document the inputs or assumptions employed in the models used to generate build and no-build estimates. It relies on traffic projections, which as illustrated above, assume that the Columbia River Crossing was built in 2015, which is contrary to fact.

Additional freeway capacity will induce additional total miles of travel. The University of California, Davis's induced demand calculator, calibrated for freeways in similar sized metropolitan areas in California, suggests that the Rose Quarter project will induce 10 to 17 million additional vehicle miles of travel per year, and which in turn will lead to an additional million 4,700 to 7,900 tons of carbon emissions annually. (Cortright, Widening the I-5 Freeway will add millions of miles of vehicle travel, March 4, 2019, City Observatory Commentary).

Claims that the project will result in less carbon emissions are based on the the discredited theory that smoothing traffic flow and reducing idling results in lower carbon emissions. That claim has been discredited by Bigazzi and Figgliozzi (2010), Williams-Derry (2007), Noland & Quddus (2006). (See also, Cortright, Urban Myth Busting, Congestion, Idling and Carbon Emissions, 2017, City Observatory Commentary).

Also, experience has shown that carbon estimates prepared by the Oregon Department of Transportation are untrustworthy. In 2015, The Director of the Oregon Department of Transportation conceded publicly to the Legislature that ODOT had exaggerated by a factor of more than four the possible carbon emission reductions associated with certain transportation projects. (Cortright, 2015, Climate concerns crush Oregon highway funding bill, March 6, 2015, City Observatory Commentary)

Because this agency has a demonstrated track record of distorting carbon emission estimates to help convince the public or lawmakers of the merit of its proposed projects, the public is entitled to a much higher standard of proof.

Corrective Action: A full EIS should be prepared which presents detailed information on the data, models and assumptions used to generate carbon emission estimates. The models should specify the traffic levels assumed in the build and no-build scenarios, and should incorporate induced demand. In addition, because ODOT has a history of presenting distorted carbon estimates, any estimates should be submitted to and reviewed by an independent review panel for verification.

15. The EA fails to analyze opportunity costs of spending $500 million on this project in terms of reductions in other projects, and the economic impacts of this investment on the regional economy.

The EA makes it clear that this project will divert money otherwise available for other transportation investments in the Portland-Vancouver metropolitan area to the construction of the I-5 freeway widening project.

Spending these monies on widening I-5 at the Rose Quarter will mean that they are not available for other projects in the Portland Vancouver metropolitan area. This means that the region will have upwards of $500 million less in transportation improvements than would otherwise be the case. The EIS does not evaluate the economic or environmental consequences of diverting money from projects that would otherwise be funded from these sources.

There will be significant economic impacts to the region for spending this $500 million in construction costs. The EA does not consider the impact of these diversions of money from other uses, and therefore omits a significant impact.

The economic consequences of building regional infrastructure in a way that reduces vehicle miles traveled are significant. One recent study estimates that the residents of the Portland metropolitan area save in excess of $1 billion annually in fuel and vehicle costs because they drive shorter distances than the typical resident of a U.S. metropolitan area (Cortright, Green Dividend, 2008).

Corrective action: The EA should be revised to include an analysis of the economic effects and opportunity costs of spending $500 million on this project, rather than on other transportation projects (and likely consumer expenditures) in the region.

16. The EA failed to consider changes to land use plans as a means to reduce demand for travel over the I-5 corridor.

A significant fraction of the traffic in the Rose Quarter is Clark County residents commuting primarily by single occupancy private vehicles to and from jobs in Oregon. Clark County has a dysfunctional, one-way relationship with the Oregon portion of the metropolitan area. Relative to the rest of the region, it has a huge surplus of households and a huge deficit of employment. As a result, there are huge and imbalanced flows of workers commuting from housing in Clark County to jobs in the Oregon portion of the metropolitan area.

The need for this project is a direct result of the failure of Clark County to plan for and encourage the development of a sufficient number of jobs to provide local employment opportunities for its resident population. The EA failed to consider whether changes in land use policies and economic development policies in Clark County to encourage additional job development locally would reduce the expected future demand for travel across the Columbia River.

In addition, the disparity in tax systems between Oregon and Washington is a major source of trips across the Columbia River. Washington residents can evade their state's 8.2 percent state and local sales taxes by driving to stores in Oregon. Clark County residents evade approximately $120 million in sales taxes annually, and shopping trips likely account for between 10 and 20 percent of traffic on I-5 and I-205. Measures to discourage interstate shopping would likely reduce traffic congestion. Likewise, tolling the I-5 and/or I-205 bridges would dramatically reduce shopping trips. (See Cortright, "How tax evasion fuels traffic congestion in Portland," March 15, 2019, City Observatory Commentary).

Clark County has developed at extremely low densities relative to the rest of the region, and this project would only contribute to a much higher level of sprawl than would be experienced in the absence of the project. For a graphic comparison of exurban sprawl in Clark County compared to the Oregon portion of the region, see the Sightline Institute's map of population growth in the region.

This seems unlikely to occur—especially in the absence of the project--because of the dramatic decline in demand for housing in more exurban areas throughout the United States. See, for example, Cortright, 2008, which documents a consistent pattern of decline in values of outlying suburban markets—including Clark County, Washington—while home values in close-in neighborhoods have remained stable or actually increased.

Again, such considerations are hardly unusual in an Environmental Impact Statement. The EIS for the Mount Hood Freeway, completed 35 years ago evaluated the effect of providing more jobs locally (in East Multnomah County) as a way of reducing the demand for travel in the proposed freeway corridor (Skidmore, Owings & Merrill, et al, 1973, see page-33).

Corrective action: A full EIS should be prepared which include an alternative that would change land use patterns in the Project Area and in the region in ways that would reduce traffic flows in the I-5 corridor.

17. The EA build alternative includes a right –of-way sized for an eight-lane freeway but fails to analyze the potential effects of the re-striping of that right-of-way for more vehicles. This is a reasonably foreseeable potential outcome of the project.

The Rose Quarter freeway widening project is billed as adding "auxiliary" lanes and widening shoulders. The EA's right-of-way appendix discloses that the project is engineering a 126-foot wide right-of-way, sufficient to accommodate an eight-lane freeway, utilizing exactly the same lane-widths as ODOT uses in urban locations in Portland today. These shoulders and lane widths are also held up by the Federal Highway Administration as a best practice.

The very wide right of way conceals ODOT's plan to actually construct a much wider freeway. Once this project is complete, only re-striping would be required to have eight lanes. The EA neither examines the potential cumulative impact of a likely eight-lane striping of its proposed project, nor does it evaluate a narrower right of way, which would have less disruptive impacts on adjacent uses and users.

See Cortright, The Hidden Rose Quarter Megafreeway, City Observatory Commentary, March 13, 2019.

ODOT violated NEPA by failing to consider a narrower right-of-way, which would reduce the current and likely future impacts of this project. Federal courts have ruled that the right of way width for highways must be addressed in the environmental review. In Utahns for Better Transit v. US DOT (305 F.3d 1152), the federal district court found the project's EIS violated NEPA for "failure to consider whether a narrower median was a practicable alternative."

Corrective Actions: A full EIS should be prepared which assesses the potential for providing the same number of auxiliary lanes with a narrower right of way, i.e. one which does not create the future opportunity for future widening to eight travel lanes. The EIS should also examine the environmental effects of a wider right of way compared to a narrower one.

18. The traffic forecasts use in the EA conflict with other forecasts developed by ODOT; the choice of forecast is arbitrary and capricious

The Oregon Department of Transportation has prepared multiple, conflicting forecasts of future traffic on I-5 in the project area, and has arbitrarily chosen a forecast designed to put its preferred project in a favorable light. Alternative forecasts would show the build and no-build alternatives to have very different environmental impacts that those portrayed in the EA. The existence of conflicting forecasts is not revealed in the EA, nor is the reason for choosing the forecast advanced in the EA explained. The decision to use that forecast, rather than others, is arbitrary and capricious. Failure to adequately document the basis for traffic projections is a violation of NEPA (1000 Friends of Wisconsin v. US DOT, Eastern District of Wisconsin Case 2:11 (2016)).

18.1 The No-Build forecasts grossly exaggerate traffic in 2015, by including non-existent vehicles coming into the project area from an un-built bridge and freeway.

Table 18.1 is drawn from information not included in the EA, but subsequently provided on March 13, 2019 in response to a public records request (effectively denying opportunity for full review as provided in NEPA). These data show that the EA uses baseline 2015 levels of traffic in the No-Build that exceed by 39 percent to 46 percent the actual level of traffic recorded in 2016. It is apparent that these high levels of traffic are a product of developing 2015 estimates that pretend that the 12-lane CRC project was built (which it was not). This exaggerated level of baseline traffic drives many of the conclusions in the environmental analysis.

Table 18.1: I-5 Rose Quarter Peak Hour Forecasts, Modeled v. Actual

I-5 North Volumes Modeled v. Existing					
		Northbound	Southbound	Total	Difference
Time Period		**RQ VISUM Model (2015)**			
AM Peak	8AM-9AM	3,945	6,204	10,149	39%
PM Peak	5PM-6PM	5,052	5,175	10,227	46%
		RQ Existing Conditions (2016)			
AM Peak	8AM-9AM	2,146	5,133	7,279	
PM Peak	5PM-6PM	3,360	3,639	6,999	
RQ VISUM Model, "Mainline North of Going, 2015 No Build"					
RQ Existing, "2016 Existing Conditions" "Mainline North of Going"					

Existing Volumes and VISUM data is from pages 333-340 of ODOT "Volume Tables", dated 5-21-18

Congestion Pricing Baseline Traffic Performance volumes are from
Portland Metro Area Value Pricing Feasibility Analysis, Technical Memorandum 4: Final, May 7, 2018

Corrective Action: A full EIS should be performed. Baseline No-Build estimates for 2015 should be prepared with the transportation system that was in place in 2015, excluding the un-built CRC. The CRC should not be included in the No-Build. If the CRC is included in any traffic projections, it should be shown in the year that it might actually be built, which could be no earlier than 2030, if ever.

18.2 ODOT's estimates of traffic on I-5 as a result of the CRC prepared for the Rose Quarter EIS conflict directly with estimates of traffic on I-5 prepared for the CRC EIS.

In 2011, the Oregon Department of Transportation co-authored with the Washington State Department of Transportation, a Final Environmental Impact Statement for the Columbia River Crossing (CRC FEIS), which included traffic forecasts for Interstate 5, including the project area of the Rose Quarter Freeway Widening. A comparison of the "Locally Preferred Alternative (LPA)" build forecast from the CRC FEIS, shows that these forecasts are dramatically different from those prepared for the Rose Quarter EA.

While the Rose Quarter EA (see 18.1, above) predicts that completion of the Columbia River Crossing will cause I-5 peak hour traffic at N. Going Street to increase by 39 to 46 percent above 2016 levels if the Columbia River Crossing were (counterfactually) called into existence in 2015. In contrast, the CRC FEIS predicts that the construction of the Columbia River Crossing will cause I-5 peak hour traffic at N. Going Street to increase by 11 to 16 percent above 2005 levels if the CRC were in operation in 2030.

Table 18.2: CRC I-5 Peak Hour Forecasts, Modeled v. Actual

Columbia River Crossing, Traffic Technical Report				
Final Environmental Impact Statement, 2011				
Exhibits 4-2 through 4-5				
Peak Hour I-5 Volumes at N. Going Street				
"Existing (2005)"		Northbound	Southbound	Total
AM Peak	6AM-10AM	14,400	23,000	37,400
PM Peak	3PM-7PM	17,000	19,300	36,300
"LPA 2030"		Northbound	Southbound	Total
AM Peak	6AM-10AM	17,500	24,000	41,500
PM Peak	3PM-7PM	20,000	22,200	42,200
Change	AM Peak	21.5%	4.3%	11.0%
	PM Peak	17.6%	15.0%	16.3%

These are wildly different and irreconcilable forecasts of the traffic response to construction of the Columbia River Crossing, coming from the same agency. At N. Going Street, the Rose Quarter EA forecasts a much higher growth in traffic, instantaneously, during the peak hour than the CRC FEIS forecasts over a decade in which the CRC was assumed to be in place (with completion in 2020).

The CRC FEIS forecasts suggest a far lower volume of peak hour traffic on I-5 in the project area if the CRC is built than is the case with the Rose Quarter EA. ODOT should be required to demonstrate why its estimates in the Rose Quarter EA have so much higher traffic than those in the CRC FEIS.

In addition, comparing the Rose Quarter Freeway Widening EA forecasts with those prepared for the Columbia River Crossing FEIS shows wildly different estimates of traffic growth rates in the "No Build" scenario in each forecast. We computed the compound annual growth rate (CAGR) of AM and PM peak hour traffic at the N. Going cutline between the base and terminal years of each forecast (2005 and 2030 for the CRC FEIS; 2015 and 2040 for the RQ EA).

Table 18.3: Comparison of compound annual growth rate of traffic in No-Build Scenarios, Columbia River Crossing FEIS v. Rose Quarter EA

Forecast	RQ VISUM	CRC FEIS	
Time Period	2015-2040	2005-2030	Disparity
AM Peak	0.15%	0.78%	5
PM Peak	0.02%	0.65%	27

The Rose Quarter EA is asserting that in the No-Build scenario, there will be near zero rates of growth in traffic on I-5 between 2015 and 2040. In contrast, in its No-Build Scenario the CRC FEIS forecasts that growth rates will be robust, between two-thirds and three-quarters of one percent per year—between 5 and 25 times higher than in the Rose Quarter EA. This is a product of including a fictional CRC in the 2015 base case. Essentially, the RQ EA forecast biases the No-Build by pulling forward to 2015 nearly all of the expected growth in traffic over 25 years. The Rose Quarter EA is effectively trying to disguise the induced traffic from the two projects by counterfactually assuming the CRC existed in 2015.

18.3 ODOT's estimates of traffic on I-5 prepared for the Rose Quarter EIS conflict directly with estimates of traffic on I-5 prepared its Congestion Pricing Study

In May 2018, at exactly the same time ODOT was preparing its estimates of I-5 traffic volumes associated with the proposed Rose Quarter Freeway Widening Project, it was also undertaking estimates of future traffic volumes on theis same roadway for its legislatively mandated development of congestion pricing. Like the Rose Quarter EA, these forecasts predict traffic volumes in a baseline case (i.e. without congestion pricing) and then also predict traffic volumes on the same roadways if congestion pricing were implemented.

Table 18.3 compares the baseline No-Build forecasts for the model used to produce the Rose Quarter EA (labeled RQ VISUM model 2015) and the model used to produce the baseline no-build scenario for the Congestion Pricing Technical Memorandum (labeled Congestion Pricing Study 2027). There are two differences between these models. The RQ VISUM model is (theoretically) for the year 2015, but as noted above, assumes the counterfactual existence of the 12-lane Columbia River Crossing project), while the congestion pricing model is for 2027. The second difference is that the RQ VISUM model reports data for a cutline at N. Going Street, while the Congestion Pricing Study uses a cutline of N. Skidmore (2 blocks away).
A quick comparison of these two studies shows that the baseline predicted for the Rose Quarter EA is dramatically higher (33 to 54 percent higher) than for the Congestion Pricing Study. This is particularly surprising because the congestion pricing baseline is for the year 2027—twelve years later than for the Rose Quarter EA baseline (2015). Ordinarily, given population and economic growth, one would expect higher levels of traffic for the later baseline year.

Table 18.4: Rose Quarter Modeled Baseline Compared to Congestion Pricing Modeled Baseline

I-5 North Volumes from two ODOT models					
		Northbound	Southbound	Total	Difference
Time Period		**RQ VISUM Model (2015)**			
AM Peak	8AM-9AM	3,945	6,204	10,149	54%
PM Peak	5PM-6PM	5,052	5,175	10,227	33%
		Congestion Pricing Study (2027)			
AM Peak	8AM-9AM	3,255	3,337	6,592	
PM Peak	5PM-6PM	3,803	3,860	7,663	
RQ VISUM Model, "Mainline North of Going, 2015 No Build"					
Congestion Pricing Study, "Interstate Br.-Skidmore" Baseline Traffic Performance					

What this comparison shows is that a baseline level of traffic in any model is highly subject to the assumptions used to build the model. The same agency, commissioning or conducting traffic studies for the same stretch of roadway, and attempting to describe "baseline" levels of activity, in the very same month (May 2018) can construct models

with traffic levels that vary from one another by 33 to 50 percent (and likely more, if done for the same year). Because modeled results are so sensitive to inputs and assumptions, it is critical that the agency's presenting model results spell out those assumptions so that independent parties can assess the validity and accuracy of the model.

The wide variation in these modeled results is an indication of both the subjectivity and opacity of traffic modeling practice. The same agency, estimating the impacts for the same project, and estimating traffic volumes for the same location, comes up with wildly different results, which are not explained. It is worth noting that in the cases of the Rose Quarter and CRC traffic estimates, the modeled results are well suited to confirming the performing agency's biases. In the case of the CRC, ODOT and its partners wished to minimize the apparent traffic impacts on the Rose Quarter area, to assuage concerns that the CRC would worsen traffic congestion in that area. (See for example, Cortright 2011, Independent Review Panel 2010). In the case of the Rose Quarter, ODOT's bias is exactly the opposite: it is trying to make it appear that massive congestion is a *fait accompli* as a result of the assumed construction of the CRC. What this illustrates is that there is sufficient subjectivity in the modeling process to allow the modeler to make assumptions that deliver whatever results the sponsoring agency most desires. This, coupled with the agency's suppression of these model results (its peak hour traffic numbers were not included in the EA, and were not provided until March 13, 2019) and the opacity of the modeling assumptions, methodology and process, means that the public is being presented with an impenetrable "black box" which conveniently always generates just the answer that the sponsoring agency is seeking. (See Cortright, The Black Box: Hiding the facts about freeway widening," March 12, 2019, City Observatory Commentary).

Corrective Action: A full EIS should be prepared which is based on traffic forecasts that reflect accurate No-Build conditions, including, but not limited to, traffic levels associated with the current 6-lane Interstate 5 bridge.

19. "Auxiliary" Lanes are a fictional label to conceal the effects of adding capacity to the I-5 corridor.

The EA describes some of the lanes on the proposed replacement bridge "auxiliary" lanes. They define auxiliary lanes on page S-18 of the EA. There is no physical or functional difference between a traffic lane and a so-called auxiliary lane. In theory, the distinction is that "thru" lanes carry traffic past the exits and intersections in the bridge influence area, while auxiliary lanes carry traffic that enters and exists from these intersections in the bridge influence area.

If the build alternative can be defined as consisting of two thru-travel lanes and one additional so-called auxiliary lane in each direction, then the existing roadway (and the

no-build) can be similarly described as consisting of one travel lanes plus one auxiliary lane. A lane is a lane is a lane, and calling it by some other name has no effect on whether it provides capacity or not.

See, Cortright "Orwellian Freeway Widening, March 5, 2019, City Observatory Commentary."

In addition, the project makes no justification for its auxiliary lanes. The purpose of these lanes, according to the EA, is to improve safety and reduce congestion by accommodating cars and trucks entering or exiting the highway or traveling short distances between adjacent interchanges . . . " (EA, page S-18). But the EA offers no analysis of why more than one auxiliary lane is required to achieve this purpose, much less any evidence that three are needed. Moreover, it violates NEPA by failing to have a range of alternatives with different numbers of lanes, regardless of the justification for those lanes.

Corrective Action: A full EIS should be prepared. References to "auxiliary lanes" should be deleted.

20. The EA improperly includes retroactive construction of the un-built Columbia River Crossing in its No-Build traffic forecasts, distorting the estimate of environmental impacts.

As noted above, the Environmental Assessment's traffic modeling assumes the counterfactual existence of the Columbia River Crossing in 2015. Not only was this project not built in that year, it has never been built, and its future existence is conjectural. The project has been abandoned by both Oregon and Washington. The earliest time that such a bridge might be built would likely be 2030, and more likely later.

It is a violation of NEPA for the baseline traffic forecasts to assume the existence of the CRC 15 years earlier than it could possibly exist. The EA fails to accurately describe the impacts of the Rose Quarter Freeway project in the years after it is built, and fails to describe the impacts of the Rose Quarter Freeway widening project (and the no-build) if, in fact, the Columbia River Crossing is never built.

Corrective Action: A full environmental impact statement should be prepared which is based on current actual traffic levels and which does not assume construction of the Columbia River Crossing in the No-Build analysis. Any scenario which does include traffic projections that assume the existence of the CRC should only be for years in which the CRC could plausibly exist, i.e. for 2030 or 2035 and later. The Oregon Department of Transportation does not have a time machine, and should not be allowed to pretend that it has one for the purposes of preparing its environmental assessment.

21. The EA exaggerates crash rates and fails to show the project will improve safety.

The EA claims that the project area is "the #1 crash location in Oregon". This should not be surprising given the high number of vehicles using the corridor. Data on crash rates, however, expressed as the number of accidents per million vehicle miles traveled, show that this portion of I-5 has considerably lower crash rates that many other facilities operated by the Oregon Department of Transportation in the Portland area.

See Cortright "Safety: Using the Big Lie to sell wider freeways, March 19, 2019, City Observatory Commentary. ODOT data disproving claims about crash rates are in Ness (2017).

Corrective Action: A full EIS should be prepared which accurately states crash data for the project area and which appropriately prioritizes this project relative to other ODOT locations with higher crash rates.

22. Rose Quarter freeway widening endangers the stability of the Albina neighborhood

Widening the I-5 freeway at the Rose Quarter will lead to additional automobile traffic in and through the Albina neighborhood reducing its livability, and jeopardizing its health. For the past half century, it has been clear that freeways and their associated traffic are detrimental to the health and stability of adjacent urban neighborhoods. The original construction of Interstate 5 through the Albina neighborhood in 1962 was instrumental in the neighborhood's economic collapse and population decline. Further capacity improvements will lead to additional vehicle traffic in the Albina neighborhood, threatening the area's nascent recovery.

See: Cortright, How a Freeway Destroyed a Neighborhood, and May Again, March 18, 2019, City Observatory Commentary.

Corrective Action: An EIS should be prepared which addresses the effect of greater automobile traffic on the health and stability of the Albina neighborhood.

23. Rose Quarter freeway widening diminishes bicycle and pedestrian safety and accessibility

The proposed Rose Quarter freeway widening would demolish significant local bike routes, construct relatively less accessible and useful infrastructure, and modify area

streets to make them more dangerous to cyclists and pedestrians. There are several aspects of the problem that are problematic and make transportation worse for cyclists and pedestrians, while accelerating cars.

Demolition of the Flint Avenue Bridge, and calm local street that provides bike and pedestrian access in the neighborhood. See Cortright, "The death of Flint Street," May 12, 2017, City Observatory Commentary.

Construction of a "Diverging Diamond" interchange. The Rose Quarter Freeway widening project calls for turning a portion of North Williams Avenue into a two-way street with traffic running in the "wrong" direction, i.e. in the left-hand side of the street. This arrangement is inherently hostile to bike and pedestrian traffic. See Cortright, "Diverging Diamond Blues," December 19, 2017, City Observatory Commentary.

Increased radius of curvature. At many corners in the project area, the area devoted to sidewalk is proposed to be cut-away and turned into automobile turning lanes. These corners with a large radius of curvature are designed to accelerate car movement. They make crosswalks more dangerous for pedestrians: lengthening the distance they must walk to cross the street, decreasing their visibility to automobile drivers, and increasing automobile speeds. See Cortright, "Distorted image: Freeway widening is bad for pedestrians," March 14, 2019, City Observatory Commentary.

In addition, proposed bike routes on Hancock and Clackamas streets are steep and indirect. They are likely to discourage biking and walking through the area and represent a decline in bike and pedestrian friendliness in this area.

Corrective Action: A full EIS should be performed which addresses the effect of all of the project's features on pedestrian and bike access in this area. The No-Build option is strongly preferred to protect cyclists and pedestrians.

24. Rose Quarter freeway widening is unjust to neighborhood residents, especially the poor, persons of color and those who don't own automobiles

The Rose Quarter freeway widening project privileges higher income, non-residents over lower income residents, persons of color, and those who live in the neighborhood of the project.

Peak hour, drive-alone commuters—the primary beneficiaries of the freeway widening have incomes that are generally much higher than neighborhood residents, especially those who walk, cycle or take transit to work. This project advantages the interests of

those who own cars and who are traveling through the area over those who don't own (or choose not to travel by car) and who live, work, or simply want to be in the project area.

See: Cortright "Freeway Widening for Whomst?" March 6, 2019, City Observatory Commentary

Residents of the neighborhood bear the environmental costs associated with the freeway, and also its prospective widening. For example, students at the Tubman Middle School adjacent to the freeway have been urged by health experts not to play outside due to freeway-related pollution; their school district has also had to bear the cost of $12 million to provide air filtration systems to make the air in the school safe to breathe.

See: Cortright "Why do poor school kids have to clean up rich commuters' pollution?" March 6, 2019, City Observatory Commentary

Corrective Action: A full EIS should be performed which gives equal, if not greater weight to the interests of residents of the project area, especially those who cannot or choose not to travel by automobile.

25. So-called freeway covers do not provide meaningful pedestrian amenities or public space

The Rose Quarter freeway widening project claims that slightly expanded freeway over-passes will augment pedestrian movement and potentially provide public space that will mitigate the damage to the neighborhood done by past and present freeway construction.

The proposed covers over the Rose Quarter freeway are small, badly fragmented, and overwhelmed by noise and traffic from the freeway, and major arterial streets. They are not desirable for use as public spaces. They are likely to remain inhospitable, trash-strewn areas, operating as a visual and perceptual barrier between neighborhoods on either side of the I-5 freeway.

See: Cortright, "The great freeway cover-up" December 13, 2017, City Observatory Commentary.

Corrective Action: An EIS should be prepared that accurately assesses the utility of spaces on the so-called "covers" for use as public space. The No-Build Option is preferred.

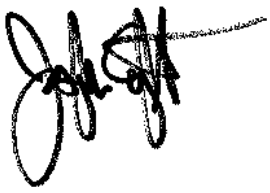
CONCLUSION

The Environmental Assessment for the proposed I-5 Rose Quarter widening project falls well short of meeting the requirements of the National Environmental Policy Act. It excludes key information that the public would need in order to ascertain the relative environmental results of different alternatives. It has systematically and unjustifiably narrowed the scope of alternatives to two—do nothing or build a wider freeway. It has failed to seriously consider the effects of transit, congestion pricing, transportation demand management and commuter rail, as means of mitigating congestion at far lower financial and environmental cost. It violates, or fails to show compliance with key state policies on transportation investment, climate change and vehicle travel. It violates the City of Portland's adopted comprehensive plan requiring implementation of congestion pricing in concert with this investment, and therefore violates its own agency coordination rule. It has completely ignored the issue of induced demand, and also created an intentionally exaggerated picture of traffic levels and congestion in the no-build scenario. It has concealed the underpinnings and assumptions of the traffic models it has used to produce the traffic, pollution and carbon emission estimates on which its most important conclusions depend.

The purpose of an EA ought to be to shed light on an issue, present alternatives, and facilitate discussion. Such an undertaking is neither excessively burdensome, nor an unknown art. This document is neither as comprehensive in its consideration of alternatives nor as informative as the Mt. Hood Freeway EIS completed more than 35 years ago (Skidmore, Owings & Merrill, et al, 1973). This EA, for all its heft (or perhaps because of it) does just the opposite—it conceals critical issues, it buries and ignores reasonable alternatives, and it is a profound barrier to a meaningful public dialogue about how best to deal with transportation in this area. If NEPA means anything at all, this project should go back to the drawing board and start over.

Finally, in light of the very limited time allowed for review of this voluminous document, and your omission of many documents containing vital information about the rationale for the project, I reserve the right to submit additional comments on this EA as the heretofore unreleased information becomes available.

Cordially,



Joseph Cortright
1424 NE Knott Street
Portland, OR 97212
jcortright@gmail.com
503-213-4443

Attachments:
Please consider the documents attached in the CD and electronic files accompanying this letter an integral part of my comments on the EA.

Documents Prepared by Joseph Cortright
Commentaries published at City Observatory,
www.CityObservatory.org

The Lemming Model of Traffic, March 28, 2019
FILE: CO_Lemming.pdf

Widening the I-5 Freeway will add millions of miles of vehicle travel, March 4, 2019
FILE: CO_VMT_Calculator.pdf

Climate concerns crush Oregon highway funding bill, March 6, 2015
FILE: CO_ODOT_2015_Lie.pdf

Urban Myth Busting: Congestion, Idling and Carbon Emissions, July 6, 2017
FILE: CO_Idle_Myth.pdf

The death of Flint Street, May 12, 2017
FILE: CO_Flint.pdf

Diverging Diamond Blues, December 19, 2017
FILE: CO_Diamond.pdf

How tax evasion fuels traffic congestion in Portland, March 15, 2019
FILE: CO_Evasion.pdf

How a freeway destroyed a neighborhood, and may again, March 18, 2019
FILE: CO_Destroy_Neighborhood.pdf

Why do poor school kids have to clean up rich commuter's pollution?, March 6, 2019
FILE: CO_Tubman.pdf

Reducing congestion: Katy didn't, December 27, 2016
FILE: CO_Katy.pdf

Housing reparations for Northeast Portland, April 16, 2018
FILE: CO_Reparations.pdf

Safety: Using the big lie to sell wider freeways, March 19, 2019
FILE: CO_Safety_Lie.pdf

Backfire: How widening freeways can make traffic congestion worse, February 26, 2019
FILE: CO_Backfire.pdf

Orwellian Freeway Widening, March 5, 2019
FILE: CO_Orwell.pdf

The Black Box: Hiding the facts about freeway widening, March 12, 2019
FILE: CO_Black_Box.pdf

Freeway widening for whomst? March 6, 2019
FILE: CO_Whomst.pdf

Distorted Images: Freeway widening is bad for pedestrians, March 14, 2019
FILE: CO_Bike_Ped.pdf

The great freeway cover-up, December 13, 2017
FILE: CO_Covers.pdf

Safety last: What we've learned from "improving" the I-5 freeway, March 21, 2019
FILE: CO_Woodburn.pdf

Wider freeways don't reduce congestion. March 4, 2019
FILE: CO_Non_Recurring.pdf

Rose Quarter freeway widening won't reduce congestion, March 2, 2019
FILE: CO_Recurring.pdf

Congestion pricing is a better solution for the Rose Quarter, March 26, 2019
FILE: CO_Pricing.pdf

The Hidden Rose Quarter MegaFreeway, March 13, 2019
FILE: CO_Eight_Lanes.pdf

There's a $3 billion bridge hidden in the Rose Quarter Project EA, March 27, 2019
FILE: CO_Hidden_Bridge.pdf

CRC's Hidden Toll Increase, October 13, 2013
FILE: Cortright_Hidden_Toll_Increase.pdf

Other Material Prepared by Joseph Cortright

Cortright, J., Analysis of CRC Traffic Forecasts: Tolls will cause half of I-5 traffic to divert to other routes, April 2013
FILE: Cortright_CRC_Diversion_Analysis_April_2013.pdf

Cortright, J., Comments on Columbia River Crossing Final Environmental Impact Statement, October 24, 2011
Cortright_FEIS Comments.pdf

Cortright, Financial Risk Memorandum
FILE: Cortright_Financial_June_2008.pdf

Cortright, Planning Commission Powerpoint Presentation
FILE: Cortright_Planning_April_2008.pdf

Cortright, J. (2008). Driven to the Brink: How the gas price spike popped the housing bubble and devalued the suburbs. Chicago, CEOs for Cities.
FILE: Cortright_Driven_to_the_Brink_2008.pdf

Cortright, J. (2007). Portland's Green Dividend. Chicago, CEOs for Cities.
FILE: Cortright_Green_Dividend_2007.pdf

Documents from other sources.

Avin, U., R. Cervero, et al. (2007). Forecasting Indirect Land Use Effects of Transportation Projects. Washington, DC, American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on the Environment.
FILE: Avin_2007.pdf

Bain, Robert, Columbia River Crossing, Review of Traffic and Revenue Reports and Related Material, Summary Report, 4 July 2011.
FILE: Bain_CRC_Report_July4.pdf

Bonneson, J., Pratt, M., and Geedipally, S., (et al), Enhanced Interchange Safety Analysis Tool: User Manual, National Cooperative Highway Research Program, Project 17-45, Enhanced Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges, May 2012.
FILE:ISAT_UserManual.PDF

CDM Smith, (2013). Columbia River Crossing Investment Grade Traffic and Revenue Study, December 2013.
FILE: CDM_Smith_Investment_Grade_Analysis_2013.pdf

Transportation Research Board, Committee for Determination of the State of the Practice in Metropolitan Area Travel Forecasting. (2007). Metropolitan Travel Forecasting: Current Practice and Future Direction Washington: Transportation Research Board of the National Academies.
http://onlinepubs.trb.org/onlinepubs/sr/sr288summarytrnews.pdf
FILE: TRB_2007.pdf

Bigazzi, A. and Figliozzi, M., 2010, An Analysis of the Relative Efficiency of Freeway Congestion as an Emissions Reduction Strategy.
FILE:Bigazzi_Figliozzi_2011_congestion_emissions.pdf

DeCorla-Souza, P. and H. Cohen (1998). Accounting For Induced Travel In Evaluation Of Urban Highway Expansion. Washington, Federal Highway Administration.
FILE: DeCourla_Souza_1998.doc

Duranton, G., & Turner, M. A. (2011). The fundamental law of road congestion: Evidence from US cities. American Economic Review, 101(6), 2616-52.
FILE: Duranton_Turner_2011.pdf

Federal Highway Administration, U.S. Department of Transportation, TECHNICAL ADVISORY: GUIDANCE FOR PREPARING AND PROCESSING ENVIRONMENTAL AND SECTION 4(F) DOCUMENTS, T 6640.8A October 30, 1987 (http://www.fhwa.dot.gov/legsregs/directives/techadvs/T664008a.htm)
FILE: FHWA_NEPA_Guidance.pdf

Government Accountability Office (2005). Highway and Transit Investments: Options for Improving Information on Projects' Benefits and Costs and Increasing Accountability for Results. Washington, DC GAO-05-172.
FILE: GAO_2005.pdf

Handy, S., & Boarnet, M. G. (2014). Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions. California Environmental Protection Agency, Air Resources Board, .
File: Handy_Boarnet_2014.pdf
https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkgd.pdf

Independent Review Panel, Columbia River Crossing Independent Review Panel Final Report, July 30, 2010
FILE: IRP_Report_July30.pdf

Kriger, D., S. Shiu, et al. (2006). Estimating Toll Road Demand and Revenue. Washington, DC, Transportation Research Board of the National Academies 364.
FILE: Kriger_2006.pdf

Litman, T. (2019). Generated Traffic and Induced Travel Implications for Transport Planning. Victoria, BC, Victoria Transport Policy Institute.
FILE: Litman_2019.pdf

Litman, T. (2014). TDM Encylopedia. Victoria, BC, Victoria Transport Policy Institute.
FILE: Litman_2014.pdf

Mackenize, Iain & Siu, Douglas, Email Thread, February 15-19, 2019.
FILE: Mackenize-Siu_Emails.pdf

Marshall, N. L. (2018). Forecasting the impossible: The status quo of estimating traffic flows with static traffic assignment and the future of dynamic traffic assignment. Research in Transportation Business & Management. https://www.sciencedirect.com/science/article/pii/S2210539517301232?via%3Dihub
FILE: Marshall_2018.pdf

Ness, Robyn, 2016 Oregon State Highway Crash Rate Tables, Oregon Department of Transportation, July 2017,
FILE: Crash_Rate_Tables_2016.pdf

Noland, R. B., & Quddus, M. A. (2006). Flow improvements and vehicle emissions: effects of trip generation and emission control technology. Transportation Research Part D: Transport and Environment, 11(1), 1-14.
FILE: Noland_Quddus_2006.pdf

No More Freeways, Letter to Megan Channell, March 9, 2019.
FILE: 030419-nmf-request-for-additional-ea-data.pdf

Oliver, Gordon, (1997). "Closure of I-5 bridge demonstrates transit's value: Officials are giving a second look to car pool, van and bus lanes as well as railroad freight lines to move commuters," The Oregonian, September 23, 1997.
FILE: Oliver_1997.pdf

Columbia River Crossing Project/Oregon Department of Transportation, (2011). Columbia River Crossing Final Environmental Impact Statement.
FILE: CRC_FEIS_2011.pdf

Columbia River Crossing Project/Oregon Department of Transportation, (2011). Columbia River Crossing Final Environmental Impact Statement.
FILE: FEIS_Traffic_Technical_Report_2011. pdf

Oregon Department of Transportation, (2018). Portland Metro Area Value Pricing Feasibility Analysis Final Round 1 Concept Evaluation and Recommendations Technical Memorandum #3, 2018
FILE: ODOT_TM3_2018.pdf

Oregon Department of Transportation, (2009). Travel Demand Model Sufficiency, Tolling White Paper 3, February 2009.
FILE: ODOT_Tolling White Paper 2009.pdf

Parsons Brinckerhoff, Land Use-Transportation Literature Review for the I-5 Trade Corridor Regional Land Use Committee, September 17, 2001. Pages 4-5 http://nepa.fhwa.dot.gov/ReNEPA/ReNepa.nsf/All+Documents/CCECF4D789DB510E85256CE6006142A0/$FILE/land_use_literature_review.pdf
FILE: Parsons_2001.pdf

Pacific Environmental Advocacy Center, Comments on September 2011, Final Environmental Impact Statement for the Interstate 5 Columbia Crossing Project, October 24, 2011
FILE: PEAC Comments on CRC FEIS.pdf

Sightline Institute, Core-GIS. (Map of 1990 to 2000 exurban housing development in Northwest Oregon and Southwest Washington).
FILE: clark_county_sprawl_1990_2000.jpg

Skaer, Fred (Director, Office of Project Development and Environmental Review, U.S. Department of Transportation, Federal Highway Administration), Letter to Joseph Cortright, June 20, 2008 (Reference HEPE).
FILE: Skaer_to_Cortright_2008_06_20.pdf

Skidmore, Owings & Merrill, DeLeuw, Cather & Co., Cornell, Howland, Hayes & Merryfield, The Perron Partnership, Pritchard Research, Bolt, Beranek & Newman, Environmental Systems Laboratory, (1973). I-80N environmental study: range of options, volume 2. Portland, Oregon State Highway Division.
FILES: Mt_Hood_EIS_1973/page-1.jpg to page-57.jpg
Note: Document captured as page images, multiple pages per image; citations refer to image numbers, not original document page numbers.

Southwest Washington Regional Transportation Council, Columbia River Bridge Crossings, 1961 – 2024, http://www.rtc.wa.gov/data/traffic/brdgawd.asp
FILE: RTC_2008.pdf

Williams-Derry, C. (2007). Increases in greenhouse-gas emissions from highway-widening projects. Seattle, Sightline Institute.
FILE: Williams_Derry_2007.pdf