

Environmental Peer Review Report

For the Noise, Air Quality, and Greenhouse Gas Technical Analyses
prepared for the I-5 Rose Quarter Improvement Project
Environmental Assessment

PREPARED FOR THE URBAN MOBILITY OFFICE, OREGON DEPARTMENT OF TRANSPORTATION

MAY 31, 2020

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ENVIRONMENTAL PEER REVIEW PANEL:

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Peer Review Panel and Process

The Environmental Peer Review Panel was convened to evaluate the noise, air quality, and greenhouse gas technical analyses that were conducted for the Environmental Assessment (EA) prepared by the Oregon Department of Transportation (ODOT) for the I-5 Rose Quarter Improvement Project (Project). The Panel consisted of six practitioners from around the U.S. that are subject matter experts in noise, air quality, environmental, and transportation management:

- Song Bai, Ph.D., P.E., Manager, Emissions and Community Exposure Assessment, Bay Area Air Quality Management District
- Andrew Eilbert, MS, Physical Scientist, Environmental Measurement and Modeling Division, US Department of Transportation Volpe Center
- Deborah Jue, MS, Principal and CEO, Wilson Ihrig, consultants in acoustics, noise and vibration
- Beverly Scott, Ph.D., CEO, Beverly Scott and Associates
- Tim Sexton, MS, MPH, AICP, ENV SP, Assistant Commissioner, Chief Sustainability Officer, Minnesota Department of Transportation
- Charles Shamoon, J.D., Assistant Counsel, New York City Department of Environmental Protection

The views expressed in this report are those of the individuals, not of their agencies or firms. The Panel was facilitated by Grace Crunican, recently retired General Manager from the San Francisco Bay Area Rapid Transit District. Panel members were identified, interviewed, and selected by Grace Crunican. The qualifications of the Panel and facilitator are included in Appendix A.

Also in attendance at the Peer Review Kick-off and Panel Discussion meetings were representatives from the City of Portland (Theresa Boyle, Eric Hesse, Peter Hurley, Christine Kendrick, and Caitlin Reff), Metro (Chris Ford, Ally Holmqvist, and Monica Krueger), and Portland Public Schools (Courtney Westling [first meeting only]). Winta Yohannes from Albina Vision Trust was also invited, but was unable to attend.

The Panel was provided the EA and technical documents supporting the noise, air quality, and greenhouse gas analysis as well as stakeholder and public comments. The Panel was convened on April

30, 2020 for a 4-hour introduction to the Project and to ask questions about the Project and its purpose. During the following week, Panel members provided additional questions to ODOT and they were promptly answered. A second meeting was held on May 8, 2020 where the Panel members asked further questions and articulated their observations about the technical adequacy of the noise, air quality, and greenhouse gas emissions analyses.

The Panel addressed a set of three questions for each technical analysis. The three questions assessed the methodology applied, the appropriateness of the analysis, and whether the proposed conclusions and proposed mitigation measures adequately addressed the impacts identified in the analysis in compliance with FHWA best practices under the National Environmental Policy Act (NEPA) and other relevant regulations and requirements (Appendix B). Panel members were also invited to provide any other comments they had about the project itself, environmental documents, proposed mitigation, or other project- or community-related observations. Notes from the Panel discussion meeting held on May 8, 2020 are included in Appendix C.

This report's conclusions follow the format used by the Peer Review Panel.

Noise Technical Analysis

Methodology

Finding 1: ODOT properly conducted the noise analysis in compliance with the ODOT Noise Manual and appropriately applied FHWA's Transportation Noise Model (TNM) for the I-5 Rose Quarter Improvement Project.

Analysis

Though ODOT followed proper procedures in its analysis, the technical report could be difficult for a layperson to read and fully understand the analysis and findings. The technical report could have been improved with the addition of a single figure showing the Project and the noise measurement and modeling locations. The EA would have benefitted from including charts and figures from the technical report and non-technical explanations provided as to how ODOT conducted its analysis and reached conclusions. The public would benefit from understanding how ODOT drew its conclusions, which were properly drawn from its technical work. ODOT should seek opportunities to present the noise analysis and its findings to the public in an easier-to-understand format as the Project moves forward.

Apart from the analysis of the long-term, operational noise conditions that would occur when the project is completed, construction noise will need to be evaluated in greater detail. It is not required

to be thoroughly modeled at the EA stage of the environmental process. In Oregon, a more in-depth analysis of the construction noise is conducted during the design stage. The EA would have benefitted from a few sentences that mention the Portland Noise Board review process, especially if that process would include a public forum. The Panel recommends that this analysis be advanced and that greater effort be made to translate technical findings into layperson terms. The local community, including the City of Portland and Portland Public Schools (PPS), should be engaged to discuss potential construction noise impacts, a range of mitigation measures for consideration, and a protocol for resolving noise complaints during construction. The Oregon Transportation Commission (OTC) and ODOT need to make a strong commitment to a construction noise mitigation program and ensure that the local community is protected from as much of the noise impact that is affordably possible.

Mitigation

Finding 2. The two noise barriers proposed as Wall 2B and Wall 4B are feasible and reasonable and should be effective at reducing the impact of noise at the Harriet Tubman Middle School and Lillis Albina Park in the north and residences in the south, respectively. Other proposed noise walls were either ineffective at mitigation or were cost prohibitive.

The Review Panel had the following suggestions related to noise issues, including construction noise mitigation, for ODOT's consideration.

1. Though the sound walls that are proposed are appropriate mitigation, the Panel noted that if Wall 2B could be moved onto PPS property (with their full participation in the decision-making process), then it could provide an enhanced level of noise reduction for the school and park. The PPS property at this location is on a slope. If the sloped area is of limited use to the school, the net benefit of noise reduction due to proximity could be worth the loss of (sloped) land. For ODOT, there may be a cost reduction because the height of the wall could be reduced as it would be located higher up on the slope. As is, the ODOT analysis is still valid and the legitimacy of the original proposal is not challenged.
2. ODOT determined that Wall 1 would reduce noise to a residence and two medical facilities' outdoor use areas, but the wall was not cost beneficial to build. The Review Panel recommended that the standard sound wall unit costs, as listed in the ODOT Noise Manual (2011) be updated and that the cost benefit analysis be rerun to ensure that this is not a missed opportunity to provide additional protection to the community within ODOT policies.

3. The Review Panel noted that a great deal of work has been done in the U.S. and Oregon to ensure the minimization of construction noise and vibration impacts on the communities located near major projects. Since a detailed noise analysis for construction activities has not been completed yet, the Panel suggested general mitigation opportunities for consideration as planning and design evolves. Their suggestions include:
 - a. References to the New York City noise ordinance regarding construction equipment regulation and other factors¹
 - b. Use of “quiet pavement”
 - c. Use of sound attenuating drapes and cantilevered plywood tops with blankets
 - d. National Cooperative Highway Research Program (NCHRP) best practices recommendations²
 - e. Contractor equipment requirements identified in the I-5 Columbia River Crossing³ Project EIS that reduce noise impacts (also a co-benefit for air quality)
 - f. Special provisions in Section 8 of the ODOT Noise Manual⁴
 - g. Evaluate potential effects to nearby receptors from reflective noise through increases in total noise or in certain sound frequencies (“sound quality”)
4. Additional considerations for any permanent sound wall are the top edge condition and absorption. Just as cantilevered plywood walls help to improve the noise reduction performance, a top edge detail can improve the performance of a permanent sound wall. If appropriate, sound absorptive materials and/or design would also be beneficial to minimize additional reflections that would be introduced by the new sound wall.

¹ City of New York. 2020. Rules of New York City, Title 15, Chapter 28: Citywide Construction Noise Mitigation. <https://rulesofnyc.readthedocs.io/en/latest/c06/#chapter-28-citywide-construction-noise-mitigation> (accessed May 26, 2020).

² National Cooperative Highway Research Program (NCHRP). 2018. NCHRP Research Report 886: Field Evaluation of Reflected Noise from a Single Noise Barrier. <http://www.trb.org/Main/Blurbs/178305.aspx> (accessed May 26, 2020)

³ U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. 2011. I-5 Columbia River Crossing Final Environmental Impact Statement and Section 4(f) Evaluation, Chapter 3, Section 3.11 Noise and Vibration. September 2011. <https://www.wsdot.wa.gov/accountability/ssb5806/environmental-process-and-permitting.htm> (accessed May 26, 2020).

⁴ ODOT. 2011. ODOT Noise Manual, Section 8: Construction Noise. https://www.oregon.gov/ODOT/GeoEnvironmental/Docs_Environmental/Noise-Manual.pdf. (accessed May 26, 2020)

5. FHWA policy requires noise analyses to use the “average pavement type.” Newer formulations for rubberized, open-graded asphalt have been successful at reducing noise at the road/tire interface, which affects all vehicles on the freeway and would benefit those areas that do not qualify for a sound wall. This cannot be considered as an official noise abatement measure at this time, but it may be a viable choice for the local safety, climate and water shedding requirements.

Air Quality Technical Analysis

Methodology

Finding 3: ODOT properly followed FHWA and US Environmental Protection Agency (EPA) guidance to conduct the air quality analysis for the I-5 Rose Quarter Improvement Project. ODOT exhibited best practices as it followed FHWA guidance on quantitative analysis of Mobile Source Air Toxics (MSATs).

The Portland metropolitan area is currently in attainment for all pollutants under the National Ambient Air Quality Standards (NAAQS); ODOT clearly noted that Transportation Conformity with the State Implementation Plan and hot-spot analysis is not required for criteria pollutants. Though proper analysis procedures were followed, the report can be improved to connect the data and conclusions in a manner more easily understood by the public. ODOT could have reported more clearly on the relationship between Oregon DEQ benchmarks (goals) for pollutant concentrations and the technical report analysis on air toxics.

The Review Panel noted two issues for further exploration, though not required for the EA. First, diesel particulate matter (DPM) was briefly presented in the technical report and EA, and analysis showed a negligible reduction in DPM emissions associated with the Build Alternative compared to the No Build Alternative. DPM is a substantive health concern for communities near transportation facilities where diesel engines operate. The report should highlight DPM instead of, or in addition to, benzene or formaldehyde as a key measure of health impact. Second, when the construction plan is put together, careful attention needs to be given to the impacts of potential truck re-routing on the neighborhood streets and air quality in terms of DPM. An analysis should be made at that time, and mitigation developed to minimize the impacts of additional concentration of DPM in the local community.

It is possible that work completed by Portland State University for PPS in 2018-19 has more recent data on DPM that can be used to help with the Project as the design advances. The existence of the study was not known to ODOT at the time the technical reports and EA were produced, and it is not clear whether the data would have informed the EA. The data, however, may be helpful in assessing the potential air quality benefits that the sound wall could have on the Harriet Tubman Middle School

(providing a dispersion barrier for DPM and other air pollutants coming from traffic on I-5) and may contain information for the analysis of the construction activities.

Nothing in this discussion takes away from the proper analysis and conclusions in the EA and technical report.

Analysis

The MSATs base year and design year analyses were completed correctly. The Review Panel noted that no analysis was conducted for the opening year. ODOT stated that FHWA authorized its omission. The Review Panel has no reason to anticipate any negative finding by not including opening year analysis given the other analyzed years, but noted its absence.

The technical report could have been clearer about the vehicle fleet composition and turnover assumptions that went into the emissions modeling. Any changes to the fleet turnover are clearly not within ODOT's purview, but underlying assumptions about vehicle age impact the air quality analysis and community exposure.

Mitigation

The Panel confirmed ODOT's conclusion was technically correct in that there are no adverse long-term air quality impacts raised in the technical report, and therefore, no mitigation was put forth. As the Project advances and a construction impact analysis is conducted, the Review Panel noted there are measures that can minimize impacts to the neighborhood. Careful consideration needs to be given to minimizing the impacts on the surrounding neighborhoods, in terms of both air quality and noise. The Review Panel had two suggestions:

1. Requiring use of low-emission construction equipment, including electric equipment where feasible, would be of value to the community's health. In practice, such requirements must be placed in the bid documents, otherwise contractors may use older (more affordable) equipment with higher DPM and other MSAT emissions. This requirement will add expense to the Project but will produce a direct benefit to surrounding neighborhoods. Additionally, the I-5 Columbia River Crossing project identified mitigation measures to reduce DPM emissions during construction that should be considered for this Project⁵.

⁵ U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. 2011. I-5 Columbia River Crossing Final Environmental Impact Statement and Section 4(f) Evaluation, Chapter 3, Section 3.10 Air Quality. September 2011. <https://www.wsdot.wa.gov/accountability/ssb5806/environmental-process-and-permitting.htm> (accessed May 26, 2020).

2. The EA acknowledged the harm that was imposed on the neighborhoods many years ago when Interstate 5 (I-5) was constructed. The EA articulated this as an injustice in the beginning of the document, but did not provide any follow up actions to address this issue. NEPA does not require any mitigation regarding restorative justice for impacts not specific to the Project under consideration; however, if ODOT is to regain a healthy working relationship with the community and other Project partners, it will need to incorporate its understanding of restorative justice concepts in its future actions. A Community Benefits Agreement is recommended by the Panel to spell out all actions committed to by the many partners involved in this Project. The Panel noted that the covers over I-5 are a good beginning to literally “bridge” the existing neighborhoods. In addition, ODOT incorporated local street connections and bicycle facilities into the Project to further help reconnect the local neighborhoods. A Community Benefits Agreement can be used to establish roles, responsibilities, and accountability for community improvements.

Greenhouse Gas Technical Analysis

Methodology

ODOT went above and beyond NEPA requirements in conducting the greenhouse gas (GHG) analysis in the Climate Change Technical Report. The use of the Motor Vehicle Emissions Simulator (MOVES), FHWA fuel cycle factors, and Infrastructure Carbon Estimator (ICE) models showed genuine effort to understand how transportation projects address the concern for reduction of GHG emissions in the context of global climate change. To that end, regional GHG inventories and management strategies are important, and the City of Portland is planning to consider the Project in its Climate Action Plan.

Analysis

The Review Panel noted assumptions about electric transit vehicle fleets and the positive impact that Corporate Average Fuel Economy (CAFE) standards would have on GHG and air quality, although acknowledged the 2020 regulatory change to CAFE standards were less restrictive than those known when the technical report was prepared. Much of the GHG analysis stems from the air quality analysis as it relates to the available models and measurements in use.

The technical report references project-level actions that can be undertaken, such as reducing stop-and-go conditions, improving roadway speeds, improving intersection traffic flow, and creating more efficient freight movement. The technical report analysis and EA would have benefitted from

including quantitative data from the analysis to demonstrate how the Project would implement these actions and thereby reduce GHG emissions.

Mitigation

No specific mitigation measures were identified.

Other Considerations

Finding 4: There were several considerations raised by the Partner Agencies which drew the interest of the Peer Review Panel. The Panel provided some suggestions to the Partner Agencies, OTC, and ODOT regarding moving forward with the Project. **That said, the Peer Review Panel found that the EA, as a standalone document, accurately analyzed the environmental issues it was intended to address, including noise, air quality, and greenhouse gases.**

The key message back to all parties was that the EA is adequate and to address the issues raised by the community and Partner Agencies, additional work needs to be done as the Project moves beyond the EA. This work should be a collaborative effort directly engaging the community, Partner Agencies, OTC, and ODOT. This work needs to be done immediately to address the issues with firm commitments and accountability to reestablish trust among all parties. The OTC appears to have set in motion other actions and committee structures that can be used to do all of these things.

The following comments reflect the Panel's discussion on forward-looking steps that the OTC and ODOT could make to further their relationship with the community as they advance the Project:

1. Protecting the local community from the noise and DPM generated from the Project's construction is the least that ODOT can do. Even this will take extensive advanced planning on ODOT's part and will involve a great deal of participation on the part of the community to fully understand the various tradeoffs involved. The project will cost more if these issues are properly addressed and required of the construction contractors that are strictly enforced by a compliance officer. One Panelist recommended that ODOT consider a framework for assessing environmental policies and programs that was developed at the University of Louisville⁶.
2. A program of local enhancements developed in collaboration with Project Partners that can be left behind after Project completion can be a next step toward restorative justice. Coordination among agencies and community partners to fund and implement improvements such as

⁶ Arnold, Craig Anthony, Ernstberger, Audrey, and Schuhmann, Andrew. 2016. The Resilience Justice Policy Assessment Tool. University of Louisville, Center for Land Use and Environmental Responsibility. <https://louisville.edu/landuse/documents/resilience-justice-assessment-tool-poster> (accessed May 26, 2020).

enhanced transit service with electric vehicles, improved ADA service, safe routes to school investments, and improved bike access programs are just a few of the transportation programs that can reconnect the community to itself and the broader Portland area.

3. Utilization of local and disadvantaged businesses does not happen without the intentional investment of time and resources by ODOT, the City, Metro, and the community members. Work needs to begin immediately identifying potential businesses and strategizing on how the Project can be “unbundled” or otherwise creatively bid to allow access by small/local businesses. ODOT cannot rely on larger contractors to ensure small/local business utilization. Their economic interest is in efficiency, not added programmatic costs. It will take creativity on ODOT’s part to reward contractors’ attention to community benefits, either in terms of local business utilization, mentoring, work force development or provision of other community benefits.
4. An exceptional legacy for the Project would be a job training program in transportation-related skill building for the Project, which remained after its completion. This is not something solely within ODOT’s responsibility, but the many community resources could be combined to yield an economic/educational benefit to the community and a labor skill-building resource to ODOT, Partner Agencies, the trades, and the construction industry.
5. A youth/community involvement program could be designed to engage families and inspire kids to understand how and why big projects are constructed and the role this Project (and the original I-5 construction) played in their community (both positively and negatively). Explaining the Project, the work, and the jobs that go into such a Project is an education for the entire family and an opportunity for on-sight tours and other activities that become community-building experiences.
6. The proposed covering of I-5 represents an opportunity and a challenge. It will reconnect the neighborhood, but also the improved connectivity and access may further the gentrification of the last 20 years, thereby increasing housing prices and continuing the displacement of the traditionally African American community. The collaborative involvement of the Albina Vision Trust, City of Portland, Multnomah County, Metro and others will be essential in helping to determine the use of this “new land” created by the I-5 cover and adjoining properties. A commitment to affordable housing, community development, and strategic land use planning/zoning needs to accompany the I-5 Rose Quarter Improvement Project planning.

7. Partner agencies recommended that the OTC implement tolling/congestion pricing in the Portland region and noted that it could affect the traffic inputs to this Project. While the Panel understands that tolling/congestion pricing would affect the traffic, it is not within the purview of the Panel to question alternate traffic scenarios that were not included in the EA. This discussion should instead be brought directly to the OTC.
8. Finally, a Community Benefits Agreement or Funding Framework Agreement should be put in place with all parties represented. This would allow commitments from ODOT, the contractor, the City, Metro, Tri-Met, Portland Trail Blazers, the Faith community, neighborhoods, local business associations and anyone else to be gathered in a single agreement. An auditor could be assigned to report back to all parties to ensure the bigger package of investments is made.

Summary

ODOT has drafted an EA that adequately addresses the issues of noise, air quality and greenhouse gases. In several parts of the analyses, ODOT took a conservative approach to considering the Project's impact on the community. The major criticism of the technical reports was that the technical work was not as well communicated as is necessary to be understood by the public. The technical reports contain information that would explain the conclusions drawn in the EA. As the Project advances, ODOT should present this analysis to the public in a non-technical format.

Beyond the EA lies the design and construction of the Project. It was the Panel's recommendation that ODOT, the Partner Agencies, and local community partners focus on the design and construction phase and not miss the opportunity to repair relations and produce a Project that everyone would take pride in. One Panel member called it a "WE" opportunity.

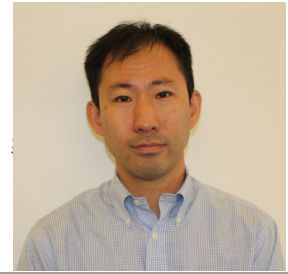
The Panel heard from Partner Agencies. It appears that some trust has been lost between the public and ODOT, and perhaps between the other Partner Agencies and ODOT. The Panel found ODOT to be very cooperative, intelligent, and prompt with their responses. ODOT expressed interest in the Panel's suggestions on improving relations with the community and Partner Agencies. The items presented in the "Other Considerations" section are intended to address ODOT's interest in the Panel's suggestions on moving forward. The Panel also noted that the additional actions that the OTC has proposed, if taken seriously, will provide the means to address disconnects with the community that the "Other Considerations" section intended to address.

Appendix A. Environmental Peer Review Panel and Facilitator Qualifications

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Song Bai

PhD, PE



PROFILE

Senior air quality engineer and manager with extensive experience applying technical knowledge and management skills to perform transportation and environmental engineering activities. Technical expertise includes mobile source emissions modeling and assessment, near-road dispersion modeling and air quality impact analysis, and statistical analysis of emissions and air quality data. Management experience includes supervising and directing air quality engineers/scientists in completing complex technical projects. Career highlights also include developing and managing a large technical service program for the state transportation agency.

EXPERIENCE

2019-present **Bay Area Air Quality Management District** **San Francisco, California**

- Currently manager of the Emissions and Community Exposure Assessment Section; lead the team of eight air quality engineers/scientists in emissions inventory development, air quality modeling, and community-scale health risk assessment.

2008-2019 **Sonoma Technology, Inc. (STI)** **Petaluma, California**

- Manager of the Environmental Modeling Division and member of the Corporate Executive Management Committee; lead the Division team in transportation-related environmental analysis; duties also include senior technical review, business development, and project management.
- Manager of a multimillion-dollar technical program with the California Department of Transportation (Caltrans) on mobile source emissions and air quality assessment; lead study design and technical work on near-road air quality analysis and tool development.
- Previously (2015-2016) Senior Air Quality Engineer and Manager of the Transportation and Emissions Group; lead air quality engineers/scientists to conduct emissions modeling and inventory development work for Caltrans, air districts, US Environmental Protection Agency (EPA), US Department of Justice (DOJ), and industrial clients.
- Started career at STI as an Air Quality Scientist/Engineer, performing technical work on mobile source emissions assessment, dispersion modeling and air quality impact analysis, source apportionment analysis, and statistical data analysis.

2006-2008 **University of California, Davis (UCD)** **Davis, California**

- Postdoctoral Scholar, served as the technical lead and directed several PhD and master students under the UCD-Caltrans Air Quality Project; work included emissions assessment for roadway operation and construction activities and modeling tool development.
- Lecturer, instructed undergraduate students in Transportation System Design core curriculum of the UCD Civil and Environmental Engineering Department.

EDUCATION

PhD, Civil and Environmental Engineering, University of California, Davis	2001-2006
Master of Science, Statistics, University of California at Davis	2005-2006
Master of Science, Civil Engineering, Tsinghua University, China	1999-2000
Bachelor of Science, Civil Engineering, Tsinghua University, China	1994-1998

PROFESSIONAL DEVELOPMENT AND AFFILIATION

Professional Engineer (Civil), license number #74841, California Board for Professional Engineers and Land Surveyors, since 2009.

Appointed Member, Transportation and Air Quality Committee, Transportation Research Board (TRB), since 2015.

SKILLS

Skilled user of emissions models (EMFAC, MOVES, OFFROAD, NONROAD), dispersion models (AERMOD, CALINE4, CAL3QHC/R), and source apportionment model (PMF); lead designer of Caltrans modeling tools for mobile source air toxics (CT-EMFAC) and construction emissions (CAL-CET).

Skilled user of statistical data analysis packages (SPSS and R) and Microsoft Office Suite.

Chinese (mandarin), proficient level (spoken and written).

SELECTED REPORTS/PUBLICATIONS

Seagram A. and Bai S. (2019) CT-EMFAC2017 user guide. Final report prepared for the California Department of Transportation, Sacramento, CA.

Bai S. and Erdakos G. (2018) Caltrans Construction Emissions Tool (CAL-CET2018) technical support document. Final report prepared for the California Department of Transportation, Sacramento, CA.

Baringer L. and Bai S. (2018) Assessment of paved road dust emissions modeling methods. Technical memorandum prepared for the California Department of Transportation, Sacramento, CA.

Bai S., Craig K., Reid S., Eisinger D., Farstad E., Erdakos G., Du Y., and Baringer L. (2017) Streamlining air dispersion modeling to support quantitative PM hot-spot analysis. Final report prepared for the California Department of Transportation, Sacramento, CA.

Bai S., Du Y., Seagram A., and Craig K. (2017) MOVES-based NO_x analyses for urban case studies in Texas. Final report prepared for the University of Texas at Austin Air Quality Research Program.

Reid S., Bai S., Du Y., Craig K., Erdakos G., Baringer L., Eisinger D., McCarthy M., and Landsberg K. (2016) Emissions modeling with MOVES and EMFAC to assess the potential for a transportation project to create particulate matter hot spots. Transportation Research Record: Journal of the Transportation Research Board, 2570, 12-20, doi: 10.3141/2570-02.

McCarthy M.C., Brown S.G., Bai S., DeWinter J.L., O'Brien T.E., Vaughn D.L., and Roberts P.T. (2015) Baldwin Hills air quality study. Final report prepared for Los Angeles County.

Norris G., Duvall R., Brown S., and Bai S. (2014) EPA Positive Matrix Factorization (PMF) 5.0 fundamentals and user guide. Prepared for the U.S. Environmental Protection Agency Office of Research and Development, Washington, DC, EPA/600/R-14/108; STI-910511-5594-UG, September.

Bai S., Eisinger D., Niemeier D., Benson P., Reid S., and Chenausky B. (2013) Modeling in-use construction equipment emissions for highway projects: framework, methodology, and case analysis. *Transportation Research Record: Journal of the Transportation Research Board*, 2340, 1-9, doi: 10.3141/2340-01.

Erdakos G.B., Craig K.C., Pasch A.N., Bai S., and Eisinger D.S. (2012) Using AERMOD output and monitoring data to calculate design values and determine conformity for quantitative PM hot-spot analyses. Technical memorandum prepared for the California Department of Transportation, Sacramento, CA.

Niemeier D.A., Bai S., and Handy S. (2011) The impact of residential growth patterns on vehicle travel and pollutant emissions. *Journal of Transport and Land Use*, 4(3), 65-80, doi: 10.5198/jtlu.v4i3.226 (STI-4321).

Timoshek A., Eisinger D. S., Bai S., and Niemeier D. (2010) Mobile source air toxic emissions: sensitivity to traffic volume, fleet composition, and average speed. *Transportation Research Record: Journal of the Transportation Research Board*, 2158, 77-85, doi: 10.3141/2158-10.

Chen H., Bai S., Eisinger D.S., Niemeier D., and Claggett M. (2009) Predicting near-road PM_{2.5} concentrations: comparative assessment of CALINE4, CAL3QHC, and AERMOD. *Transportation Research Record, Journal of the Transportation Research Board*, 2123, 26-37, doi: 10.3141/2123-04.

Wang G., Bai S., and Ogden J.M. (2009) Identifying contributions of on-road motor vehicles to urban air pollution using travel demand model data. *Transportation Research, Part D: Transport and Environment*, 14(3), 168-179, doi:10.1016/j.trd.2008.11.011.

Niemeier D. and Bai S. (2008) Urban travel demand modeling. In *Transportation Planning Handbook*, 3rd edition, Institute of Transportation Engineers, Washington, DC.

Bai S., Chiu Y.-C., and Niemeier D.A. (2007) A comparative analysis of using trip-based versus link-based traffic data for regional mobile source emissions estimation. *Atmos. Environ.* 41, 7512-7523, doi: 10.1016/j.atmosenv.2007.05.051.

Bai S., Nie Y., and Niemeier D.A. (2007) The impact of speed post-processing methods on regional mobile emissions estimation. *Transportation Research Part D: Transport and Environment*, 12, 5, 307-324, doi:10.1016/j.trd.2007.03.005.

Andrew C. Eilbert

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US Department of Transportation Volpe Center

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Andrew Eilbert came to the Center in 2016 as an on-site contractor and analyst with Stinger Ghaffarian Technologies and transitioned to the role of physical scientist with the Environmental Measurement and Modeling Division in 2017. Eilbert primarily provides emissions modeling and data analytics support to the Federal Highway Administration, the Federal Aviation Administration, and the Intelligent Transportation Systems Joint Program Office. He is one of the lead developers for the FHWA's Congestion Mitigation and Air Quality (CMAQ) Program Toolkit and JPO's Automated Vehicle Benefits Framework. He has also extensively tested new features to model non-volatile particulate matter in the FAA's Aviation Environmental Design Tool.

Prior to his position at Volpe Center, Eilbert spent four years as a research fellow on the Motor Vehicle Emission Simulator (MOVES) development team at the U.S. Environmental Protection Agency's Office of Transportation and Air Quality. At EPA, Eilbert led national fleet and activity updates for MOVES2014. In addition to MOVES development, he played a critical role in quantifying emission inventories for regulations of heavy-duty vehicles.

Eilbert is an active participant in the Transportation Research Board's Transportation and Air Quality Committee (ADC20) and a young professional member of the Air & Waste Management Association. He regularly presents his work at industry conferences and his research on vehicle emissions and energy efficiency has been cited in journal articles and other publications.



DEBORAH JUE

Principal & CEO

Deborah has been with Wilson Ihrig since 1990, and she has authored or provided input for many environmental documents and technical studies in accordance with NEPA and California's CEQA regulations, most of them related to surface transportation. Deborah has almost 30 years of experienced addressing impacts related to highway noise, rail transit noise and vibration, and construction-related noise, hydroacoustics and vibration.

She has a keen interest in finding solutions and providing clear communication to affected stakeholders to help achieve broad support.

Deborah earned her Bachelor of Science degree in General Engineering with a focus on Acoustics from Stanford University. After graduation, she worked for a medical ultrasound company for two years as an acoustic lab technician before joining Wilson Ihrig, where she worked on a wide range of projects in acoustics, noise and vibration control. Deborah returned to school to earn her Master of Science degree in Mechanical Engineering from the University of California at Berkeley..

As part of her work, Deborah, is a senior technical lead on highway noise models, environmental analyses for all types of projects, and planning for long-term construction noise and vibration, and is also in integral part of the management team for the company.

Professional Associations (Member)

- Transportation Research Board (TRB)
- Women Transportation Seminar (WTS)
- American Society of Mechanical Engineers (ASME)
- Acoustical Society of America (ASA)
- National Council of Acoustical Consultants (NCAC)
- Institute of Noise Control Engineering (INCE)

Research and Published Papers

- ACRP Report 175, ACRP 07-14, *Improving Intelligibility of Airport Terminal Public Address Systems*
- NCHRP 25-25, *Current Practices to Address Construction Vibration and Potential Effects to Historic Buildings Adjacent to Transportation Projects*
- *Transportation Research Record*, V. 2502, "Considerations to Establish Ground-Borne Noise Criteria to Define Mitigation for Noise-Sensitive Spaces"

Relevant Experience

Alameda County Transportation Commission

- State Route 84, I-580 to Pigeon Pass, Pleasanton, CA
- State Route 84 Pigeon Pass to I-680, Pleasanton and Sunol, CA
- I-580 Highway Median Widening, Dublin, CA
- I-880 North Safety Improvement, Oakland, CA
- East-West Connector Project, Fremont/Union City, CA

Caltrans

- State Route 24 Noise Studies, Concord and Oakland CA
- Central Freeway Reconstruction, San Francisco, CA
- LA Metro State Route 710 North Environmental Study, Pasadena, CA
- Cypress Bridge, Redding, CA

Rail Transportation Projects

- California High Speed Rail EIR/EIS, San Francisco to Merced, CA
- SF Peninsula Caltrain Electrification EIR/EA, Santa Clara County, CA
- BART Extensions EIR/EIS (Warm Springs, San Francisco Airport Connection, Dublin)
- Santa Clara VTA (Capitol Expressway, Guadalupe Corridor, Tasman East, Vasona Junction), Santa Clara, CA
- LA Metro (Regional Connector LRT, Crenshaw LRT, Pasadena LRT, Purple Line), Los Angeles, CA
- MARTA On-call, Atlanta, GA
- WMATA EIS (Outer Branch, Glenmont, Inner E Route, Green Line F Route), Washington, DC area

Construction Noise and Vibration (Analyses and/or Monitoring)

- MacArthur BART Garage and Residences Construction Noise and Vibration, Oakland, CA
- San Francisco PUC Clean Water and Hetch Hetchy Conveyance Seismic Upgrades, San Francisco Bay Area, CA
- EBMUD Claremont Tunnel Bypass EA and Seismic Upgrade, Oakland, CA
- Inland Feeder System Tunnel Construction Noise and Vibration Evaluation, San Bernardino, CA
- Chase Center Construction Noise and Vibration Monitoring, San Francisco, CA

Beverly A. Scott, Ph.D. – “People and Communities Matter”

CEO, Beverly Scott Associates, LLC



Dr. Scott is a frequent speaker on the critical need to invest in smart, next generation infrastructure to advance *American competitiveness, sustainable outcomes, and “shared prosperity”*. Beverly Scott Associates, LLC, is an infrastructure-focused executive management consultant practice which specializes in workforce development at all levels; and, advancing practical approaches and solutions to challenging situations that advance equity and inclusion – and help to achieve positive outcomes for “all” people and communities.

Most recently, she founded, Introducing Youth to American Infrastructure, Inc. (“iyai+”), a national non-profit dedicated to inspiring, educating, and engaging today’s youth to be tomorrow’s “community builders” -- American infrastructure leaders, skilled workforce, innovators, and entrepreneurs, – with special emphasis on improving the active participation of our most vulnerable youth and historically underutilized groups in infrastructure careers – people of color and women (www.iyai.org).

She serves as a Senior Fellow at the Transportation Learning Center, the only national transportation labor-management partnership focused on skills training, research, safety and health for the sector’s frontline workforce (www.transportcenter.org); a Research Associate at the Mineta Transportation Institute at San Jose State University (www.transweb.sjsu.edu); and in an Advisory capacity to the Charles Hamilton Houston Institute for Race and Justice at Harvard University Law School in the areas of transportation, infrastructure, and equity (www.charleshamiltonhouston.org).

In 2011, she was appointed by President Obama to the National Infrastructure Advisory Council (NIAC), a panel of experts including top business executives, leading academics and local government officials who report to the White House through the U.S. Department of Homeland Security with responsibility for making policy recommendations to protect and preserve the physical assets that are critical to the U.S. economy and national security. In 2012, she was appointed NIAC Vice-Chair and currently serves in that capacity (www.dhs.gov/national-infrastructure). In 2019, she was appointed by State Treasurer Fiona Ma to the California High Speed Rail Peer Review Group. Dr. Scott served on the San Francisco MUNI (SFMTA) Reliability Working Group assembled in June 2019 by San Francisco Mayor London Breed, with Supervisors Mandelman and Peskin to review performance of the City’s current bus and rail system and recommend actionable steps for consideration by the incoming Director of Transportation. Most recently, she was appointed to serve on PG&E’s Sustainability Advisory Council.

Dr. Scott’s career in the public transportation industry spans more than three decades, including four appointments as General Manager/CEO – the Massachusetts Bay Transportation Authority (MBTA) and Rail & Transit Administrator for the Commonwealth of Massachusetts, the Metropolitan Atlanta Rapid Transit Authority (MARTA), the Sacramento Regional Transit Authority (SRTD), and the Rhode Island Public Transit Authority (RIPTA), one of four

statewide public transit systems. She has also served in senior level positions at the Metropolitan Transportation Authority (New York), New Jersey Transit Corporation (NJT), the Washington Metropolitan Area Transportation Authority (WMATA), Dallas Area Rapid Transit (DART), and the Houston Metropolitan Area Transit Authority (Houston METRO).

Dr. Scott is recognized throughout the U.S. and North American transportation industry for her visionary leadership, results driven management style; focus on people and communities; and progressive approach to labor-management relations. Among her most notable industry contributions is her pivotal leadership role in the critical areas of workforce and leadership development and work to improve outcomes for people and communities – particularly our most vulnerable. In this regard, she is an ardent proponent for significantly increased “people development and investment” at all levels.

Throughout her career, she has received numerous awards and recognitions, i.e., the Hubert Humphrey Award for Distinguished Public Service from the American Political Science Association (APSA), Government Sector Pinnacle Award from the Greater Boston Chamber of Commerce for Outstanding Service, the prestigious Sharon A. Banks Humanitarian Service Award from the Transportation Research Board, National Academies of Science; named Woman of the Year by the Women’s Transportation Seminar (WTS International), and, recognized by the Conference of Minority Transportation Officials (COMTO) as a “Woman Who Moves the Nation”. She was named a “Transportation Innovator of Change” by President Barack Obama and the U.S. Department of Transportation for her long record of exemplary leadership and service in the transportation industry.

A past Chairperson of the American Public Transportation Association (APTA) and Rail-Volution (railvolution.org); Board member, Conference of Minority Transportation Officials (COMTO), American Public Transportation Foundation (APTF), Women’s Transportation Seminar International (WTS), the Transportation Research Board TOPS Committee; Women’s Transportation Seminar Foundation, Dr. Scott currently serves on the national Board of the American Public Transportation Association (www.apta.com), as a Manager/Managing Director, Parker Infrastructure Partners, LLC; and Jobs To Move America (JMA), Vice Chair (jobstomoveamerica.org).

Dr. Scott holds a doctorate in political science, with a specialization in public administration from Howard University; and a Bachelor of Arts in Political Science from Fisk University (magna cum laude and Phi Beta Kappa).

Tim Sexton, MS, MPH, AICP, ENV SP

Assistant Commissioner and the Chief Sustainability Officer
Minnesota Department of Transportation

MS in Urban and Regional Planning, University of Iowa

MPH in Environmental and Occupational Health, University of Iowa



Tim Sexton is an Assistant Commissioner and the Chief Sustainability Officer for the Minnesota Department of Transportation (MnDOT). Mr. Sexton is responsible for implementing state goals to reduce carbon pollution from the transportation sector, increase efficiency of agency operations, improve transportation system resilience, and strengthen connections between the transportation and public health communities.

Mr. Sexton has more than 15 years of transportation experience throughout the United States and has contributed to the state-of-the-practice through leadership roles with AASHTO, mentored young professionals through APA, and nurtured research in committee and section chair roles with the Transportation Research Board. Prior to his current appointment, Tim directed air quality, noise, and energy policy at the Washington State DOT and directed environmental, transit, walking, and biking programs at MnDOT.

Charles Shamoan, J.D.

Assistant Counsel, New York City Department of Environmental Protection,
Bureau of Environmental Compliance

BChE, New York University, Engineering
J.D., New York Law School



Charles Shamoan is an attorney with the Bureau of Environmental Compliance within the New York City Department of Environmental Protection. He has been involved with environmental noise issues since 1989. He is one of the primary writers of the 2007 NYC Noise Code and the Construction Noise Mitigation Rules. His publications are available on ResearchGate and other web resources.

Recent Publications

Park, Tae Hong, Yoo, Minjoon, Shamoan, Charles, Dye, Christopher, Hodge, Stacey & Rahman, Asheque. 2017. Mitigating noise and traffic congestion through measuring, mapping, and reducing noise pollution. *The Journal of the Acoustical Society of America*. 141. 3801-3801. 10.1121/1.4988389.

Mydlarz, Charlie, Shamoan, Charles, Baglione, Melody & Pimpinella, Michael. 2015. The design and calibration of low cost urban acoustic sensing devices: SONYC – Sounds Of New York City. *eurnoise-2015*.

Shamoan, Charles & Park, Tae Hong. 2014. New York city's new noise code and NYU's citygram-sound project. *INTERNOISE 2014 - 43rd International Congress on Noise Control Engineering: Improving the World Through Noise Control*.

Thalheimer, Erich & Shamoan, Charles. 2012. Understanding and complying with New York City construction noise regulation. *Noise News International*. 20. 135-140. 10.3397/1.37023111.

Zwerling, Eric, Shamoan, Charles & Szulecki, Stephen. 2010. Proactive regulation engenders creative innovation: Quietening the jack hammer. *The Journal of the Acoustical Society of America*. 127. 1830. 10.1121/1.3384252.

Grace Crunican

Before opening her own business, Crunican LLC, Grace Crunican has held key leadership posts in the transportation industry for over 40 years. These include:

- General Manager of the San Francisco Bay Area Rapid Transit District for eight years
- Director of the Seattle Department of Transportation for eight years
- Director of the Oregon Department of Transportation for five years
- Deputy Administrator of the Federal Transit Administration
- Director of the Surface Transportation Policy Project
- Deputy Director of the City of Portland's Department of Transportation



She also was a Presidential Intern and served as professional staff to the US Senate Transportation Appropriations Committee. Grace is the coauthor of the book *Boots on the Ground, Flats in the Boardroom*.

Grace earned her BA from Gonzaga University and her MBA from Willamette University. She is currently on the Board of Directors for the Mineta Transportation Institute and Rail~Volution. She has been a member of WTS since 1979 and served as National President from 1988-1990.

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Appendix B. Technical Review Questions

The Peer Review Panelists were asked to comment on the following technical review questions:

1. The air quality, greenhouse gas emissions, and noise technical analyses were conducted in 2018 and documented in final reports on January 8, 2019. To what extent does the methodology for each analysis follow Federal Highway Administration (FHWA) best practices under the National Environmental Policy Act (NEPA) and other relevant regulations and requirements for a transportation project conducted in 2018?
2. To what extent are the correct baseline conditions, model assumptions, input data, analysis, and conclusions reasonable and adequately documented?
3. To what extent were reasonable mitigation measures proposed? Should additional mitigation measures be considered? If yes, what additional measures should be proposed?

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Appendix C. Notes from the Panel Discussion Meeting

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MEETING NOTES: Environmental Peer Review – Panel Discussion

MEETING DATE: May 8, 2020

MEETING TIME: 8:30am – 12:00pm

LOCATION: Zoom

ATTENDEES: Peer Review Panel: Song Bai, Andrew Eilbert, Deborah Jue, Beverly Scott, Tim Sexton, Charles Shamoon
Facilitator: Grace Crunican
Oregon DOT, Owner Representatives and EA Team: Megan Channel, Mike Baker, Daniel Burgin, Angela Findley, Natalie Liljenwall, Craig Milliken, Sarah Omlor, Ray Outlaw, Leslie Riley
City of Portland: Teresa Boyle, Eric Hesse, Peter Hurley, Christine Kendrick, Caitlin Reff
Metro: Chris Ford, Ally Holmqvist, Monica Krueger

OBSERVERS: Oregon DOT, Owner Representatives and EA Team: Liz Antin, Jeff Buckland, April Deleon, Louise Kling, Page Phillips-Strickler, Scott Polzin, Mary Young

Meeting objectives:

- Receive input from the Environmental Peer Review Panel
- Document findings

NOISE TECHNICAL REPORT

Topic	Notes
Q1. Methodology	<ul style="list-style-type: none">• Basis: ODOT Noise Manual (2011), NEPA Do's and Don'ts (2011)• Applied TNM, standard practice
Q2. Analysis	<ul style="list-style-type: none">• Peer Reviewers focused on traffic noise, construction noise and vibration, and vibration with respect to historic resources.• The Peer Review Panel (Panel) stated that the quantitative traffic noise analysis and qualitative construction noise descriptions were appropriately evaluated in the Environmental Assessment (EA) and Noise Technical Report per the ODOT Noise Manual. Two Panel members, who conduct similar work in California, noted that the

Topic	Notes
	<p>level of analysis and documentation in this EA is different than the analysis and documentation required for California Environmental Quality Act (CEQA) documents.</p> <ul style="list-style-type: none"> • The Panel noted that the readability of the EA could have been presented so a layperson could better understand technical terms, methodology, and impacts. In addition, incorporating graphics into the main body of the Noise Technical Report and increasing readability would make it easier for the public to understand the analysis and decisions made. • The Panel confirmed that the Noise Technical Report was conducted according to the ODOT Noise Manual. There were two adaptations to the Project’s noise model that ODOT made to address existing and future conditions: <ul style="list-style-type: none"> ○ In the Project Area, there is a higher percentage of truck volume compared to passenger vehicles; and, trucks produce higher levels of noise. Analysis for truck noise was conducted for free-flow conditions (e.g., 50-55 mph), which generates a higher noise level due to tire noise. One Panel Reviewer noted that at lower speeds (e.g., below 30 mph) truck engine noise is louder than tire noise, which occurs in highly congested conditions. However, by assuming free-flow conditions for all alternatives, the worst-case noise condition was analyzed. This is a standard, conservative approach to analyze highest noise conditions and evaluate noise impacts. If a more congested period would have been analyzed to compare alternatives, the Panel stated that the overall conclusions would not have changed. ○ The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) was applied to model traffic noise. However, the TNM cannot be configured to model highway covers, so ODOT took a conservative approach and evaluated noise impacts along these segments by assuming retaining walls without covers. This scenario results in a louder noise condition to adjacent lands than would occur with covers that act more like a sound barrier. • In reviewing the sound walls analyses one panelist recommended evaluating whether Sound Wall 2B (along northbound I-5 near Harriet Tubman Middle School and Lillis Albina Park) could be moved further up the slope. This would move Wall 2B outside the ODOT right-of-way and onto property owned by Portland Public Schools (PPS). The Panelist thought that the wall could be more effective at reducing noise at the school, possibly shorter in height,

Topic	Notes
	<p>and less expensive for ODOT. This would require coordination with PPS.</p> <ul style="list-style-type: none"> • A Panelist asked about the use of windows at Harriet Tubman Middle School (school). If those windows are operable (opened), it would counteract the noise reduction provided by the building (i.e., the noise inside the building would increase). ODOT committed to discuss the school’s window operations with PPS. • The Panel noted that per the ODOT Noise Manual, construction noise is not typically modeled at the conceptual design phase that supports NEPA documents, such as the Project EA. Thus, the level of analysis in the Noise Technical Report is consistent with the ODOT Noise Manual. The Panel noted that the Noise Technical Report could have been clearer on several elements: <ul style="list-style-type: none"> ○ Impact pile drivers were not included in the noise impact table, although these pile drivers were mentioned in the EA. ○ The ODOT Noise Manual does allow for specialized noise studies to be customized where there is a local noise ordinance. The Portland Noise Ordinance, which is a local regulation that must be complied with during construction, was cited in the Noise Technical Report. ODOT should commit to utilize this local regulatory process to model more specific construction noise impacts, including those during nighttime, and develop mitigation appropriate for the construction noise impacts as the Project advances into the permitting phase. ○ Construction vibration is mentioned in the historic properties analysis section of the Noise Technical Report; this documentation is reasonable and appropriate. The Panel noted that ODOT should add a similar statement about vibration in the construction noise section.
Q3. Mitigation	<ul style="list-style-type: none"> • The Panel confirmed that the evaluation of the sound barriers was reasonable. • Several Panelists noted that the standard process applied to noise mitigation analysis does rule out some walls due to reasonableness and feasibility criteria. In the case of this Project, one sound wall (Wall 1) was evaluated and not recommended due to not meeting the cost/benefit reasonableness criterion. As the ODOT Noise Manual, which includes the cost allowances for the reasonableness criterion, has not been updated since 2011, the Panel recommends that ODOT re-evaluate Wall 1 if the ODOT Noise Manual and associated cost allowances are updated.

Topic	Notes
	<ul style="list-style-type: none"> • Several Panelists noted that Table G-3 in Appendix G of the Noise Technical Report has a calculation error that should be corrected. The Panelists stated this correction would not change the conclusions. • One Panelist questioned whether the TNM should have been configured with a “concrete” land use condition, instead of the “lawn” condition applied by ODOT. ODOT explained that the terrain and land uses vary throughout the study area, so the “lawn” condition was used; the model was validated and proved to accurately reflect the existing conditions. The Panel determined this to be a legitimate approach. • One Panelist stated that there can be unintended effects with the installation of sound barriers. Sound could be reflected to other receptors across the highway, and sound barriers would change the quality of the sound that receptors a few blocks away may experience. Constructing the noise walls to absorb the noise rather than simply deflect the noise, could improve the noise conditions beyond the noise impacted receptors. A Panelist encouraged ODOT to review the findings and consider the recommendations documented in “Field Evaluation of Reflecting Noise from a Single Noise Barrier” (National Cooperative Highway Research Program [NCHRP], Research Report 886, 2018). • As ODOT begins the construction noise analysis and resulting mitigation measures, the Panel suggested that ODOT consider potential noise mitigation measures that have been successful on other projects: <ul style="list-style-type: none"> ○ “Quiet” pavement types could have noise reduction properties along with other safety benefits. ○ Apply sound attenuation drapes during construction; these have been successfully used around schools. ○ Cantilevered tops (plywood) with blankets can also deflect and absorb noise; this mitigation has had success in addressing noise complaints. ○ Noise flanks (noise going over the top and coming down) can be addressed by the blankets. ○ Specifications for construction equipment and tools, can be incorporated into a construction/equipment plan as well as the bid documents. Monitoring and enforcing specified tools can be a good way to control noise as well as minimize complaints. ○ Implement a noise complaint procedure, be proactive and work with the community prior to construction so expectations

Topic	Notes
	<p>are aligned, and engage a liaison or ombudsman to elevate and resolve noise concerns.</p> <ul style="list-style-type: none"> ○ Present the analysis in a readable, visual, and understandable format to the community to communicate the analysis, findings, and mitigation.
Partner Comments	<ul style="list-style-type: none"> ● City of Portland <ul style="list-style-type: none"> ○ Questioned whether the analysis reflects the future land uses, such as the highway covers and changes to land use zonings. Additional noise and air quality “receivers” could be brought to the Project area. ○ Alternate placement of noise walls is appreciated, yet Project needs to consider unintended consequences such as air quality. ○ As a more comprehensive noise plan is developed, would like to see some of the construction mitigation that the Panel recommended (e.g., drapes, cantilevered tops, blankets, equipment plan, complaint procedure/ombudsman). ● Metro <ul style="list-style-type: none"> ○ Also interested in resolution of the land use assumptions; and, supportive of additional mitigation measures recommended. ● ODOT <ul style="list-style-type: none"> ○ As design advances, ODOT will undertake a NEPA re-evaluation if any substantive changes result in additional impacts. ○ Highway covers in the EA were conceptual and the TNM model is limited to address a cover. So, the covers weren’t included (or any land uses on the covers as nothing was planned at the time of the analysis); however, to go above minimum requirements, some modeling of the portals were included in the noise analysis to capture tunnel effects.

AIR QUALITY TECHNICAL REPORT

Topic	Notes
Q1. Methodology	<ul style="list-style-type: none"> ● The Panel stated that the Air Quality Technical Report meets the FHWA standards for air quality analysis. The analysis followed FHWA guidance on mobile source air toxics (MSATs) and demonstrates best practices. Reasonable methods to analyze criteria pollutants were applied based on Portland’s air quality attainment status. The Air Quality Technical Report adequately

Topic	Notes
	<p>covered air quality impacts related to environmental justice populations and construction impacts.</p> <ul style="list-style-type: none"> • One Panelist stated the technical report clearly demonstrated that air toxics would be reduced in the Build scenario compared to the No Build scenario by decreasing traffic incidents and congestion. However, the report could more clearly address the public’s concerns about air quality impacts beyond stating Oregon currently is in National Ambient Air Quality Standards (NAAQS) attainment for all criteria pollutants. The following suggestions may help non-technical readers understand the Project is unlikely to have any meaningful air quality impacts: <ul style="list-style-type: none"> ○ Reference Portland’s CO and ozone maintenance plans to highlight that Oregon has been in attainment for many years. ○ Show recent concentrations from an air quality monitor near the Project area are well below the NAAQS thresholds. ○ Explain that estimated emission reductions for key criteria pollutants between the Build and No-Build scenarios could alleviate long-term air quality concerns. • One Panelist asked about the Oregon Department of Environmental Quality (DEQ) benchmarks that are established for different air toxics. The Air Quality Technical Report identified these benchmarks as goals for planning and evaluation; however, it was unclear in the EA and technical report why the benchmarks were included or how the benchmarks were used in the comparative analysis. ODOT should clarify how the reported benchmarks are useful to the analysis. • A Panelist noted that diesel particulate matter (DPM) was mentioned in the Air Quality Technical Report but not put forth as the key indicator for health. Instead the information on benzene was presented. • One Panelist stated that the analysis was appropriate and met air quality analysis requirements, but offered several recommendations as the Project moves forward: <ul style="list-style-type: none"> ○ Highlight the information on diesel particulate matter (DPM) over Benzene. ○ Evaluate foreseeable development on the highway covers and associated land use and transportation changes upon completion of the on-going highway cover analysis ○ As the Project design advances, evaluate appropriate truck routing during construction to avoid or minimize impacts to local streets and the local community.

Topic	Notes
	<ul style="list-style-type: none"> ○ Ensure that the assumptions in the model about transit and Tri-Met’s commitment to an all-electric fleet are delivered in reality and that this community receives those buses first to compensate for the freeway’s air quality impacts. ● The Panel reviewed reports from the air quality study at Harriet Tubman Middle School that was conducted by Portland State University (PSU) and prepared for PPS. ODOT stated that it was not aware of this study and its findings at the time the Air Quality Technical Report was prepared. The Panel noted that ODOT could consider data from the PSU study as the project advances. The PSU study provides more current air quality data than that obtained from the US Environmental Protection Agency (EPA) sources used in the Air Quality Technical Report. The Panel noted that the community has expressed concerns about impacts to health related to air quality. As the Project advances, further collaboration with PPS and Project area neighborhoods regarding continued air quality analysis and associated mitigation would benefit the community. ● The PSU data may also inform the potential for an air quality benefit resulting from the proposed sound wall (Wall 2B). The wall could help reduce the concentrations of DPM at the school. Other measures such as vegetation barriers may also improve air quality by reducing exposure to air toxics. ● Similarly, a Panelist noted that ODOT could have added further qualitative analysis of the retaining walls along I-5, which would likely have air quality and noise co-benefits. ● One Panelist noted that meteorological conditions can alter direction of DPM toward sensitive receptors such as the school. As additional air quality analysis is conducted, ODOT should factor in the meteorological conditions that may affect air quality. ● One Panelist noted that the output from the MOtor Vehicle Emission Simulator (MOVES) model was used properly in the Air Quality Technical Report. The MOVES model also provides quantitative values that would have further strengthened the report’s conclusions on several criteria pollutants (e.g., CO, N_{ox}, O₃). It was noted that ODOT used MOVES2014a, which was the current version of this model at the time the technical analysis was completed. Any further modeling should use MOVES2014b, which was released in December 2018. ● Qualitative air quality impacts during construction were appropriately presented in the technical report. As the Project advances, further quantitative results and/or qualitative description of the emissions from construction equipment and from any traffic

Topic	Notes
	<p>re-routing, particularly freight trucks, could be shared with the local community.</p>
<p>Q2. Analysis</p>	<ul style="list-style-type: none"> • The Panel found the air quality analysis met all technical requirements and was appropriately conducted. Several recommendations were made for consideration: <ul style="list-style-type: none"> ○ With respect to the MSAT qualitative analysis, the Panel found that the project base year and design year were appropriately presented and analyzed. The Panel noted that the year of opening (first year of operation) is recommended but considered optional in the NEPA analysis per FHWA’s guidance; inclusion of this analysis was preferred by the Panel. However, the Panel noted that a noticeable difference between the Build and No Build impacts for the year of opening would not likely result. ○ The Panel found the application of the MOVES model appropriate for the project. The model provides for custom inputs to be made, such as low emitting vehicles, transit fleet mix, etc. Clarifications on the model assumptions could have been included in the report. ○ Regarding carbon monoxide (CO) hotspots at intersections, the Panel noted the report provided good information. Any trend analysis or other information that was available on monitored CO would have been helpful to include. ○ One Panelist was interested in knowing what other activities at the school are taking place (e.g., community uses of the building and grounds). Inclusion of these activities, associated analysis, and mitigation could also be included in the construction analysis as the Project moves forward. • National Equity Atlas identifies African-Americans are most affected by poor air quality in Portland. Begin to think about bike programs, all electric buses, added service during construction, safe routes to school, work with and require commitments from the other partners, etc. Think about good things to do for the community such as job training and healthy city actions that can begin to address issue of restorative justice.
<p>Q3. Mitigation</p>	<ul style="list-style-type: none"> • The Panel agreed that there were no air quality mitigation measures required for the long-term operation of the Project, given the attainment status of NAAQS in the Portland area. The Panel focused their input on construction activities and associated mitigation measures. • The Panel advised that construction contractors can be required to use low-emission equipment (e.g., meeting Tier 4 engine emissions

Topic	Notes
	<p>standards). However, if not required as specifications in the bid documents, contractors may use older (more affordable) equipment that has higher emissions. Panelists noted that this specification can be difficult to negotiate.</p> <ul style="list-style-type: none"> ● Panelists provided several mitigation recommendations to address construction impacts: <ul style="list-style-type: none"> ○ I-5 Columbia River Crossing project had additional construction mitigation, such as electric generators. That project could be a good model to draw from. ○ Dust control can be a sensitive issue with the community, watering procedures can be specified. ○ Use of electro-static filters on equipment is an option.
Partner Comments	<ul style="list-style-type: none"> ● City of Portland <ul style="list-style-type: none"> ○ Recognize that Portland is in attainment, so we don't typically receive quantitative modeling. City echoed a Panelist's comments on DPM analysis for existing and future conditions. Recommend using existing conditions data in the PSU report. This could help us identify mitigation, not only at the school but also at the adjacent park. ○ Consider information from DEQ's air toxic model, particularly for DPM; and the Portland Air Toxics Solutions (PATS) study (2007), which was included in the information sent by the City and distributed to the Panel. ○ Meeting new standards from Oregon's Clean Diesel Initiative in HB 2007 that is scheduled for implementation in 2020; recommend considering these guidelines for construction. ○ Asked for clarification on how a childcare facility in the project area was addressed in the project area; ODOT confirmed this facility was evaluated as a sensitive receptor. ODOT will consider mitigation possibilities, if the property is not acquired or relocated. ● Metro <ul style="list-style-type: none"> ○ Supportive of restorative justice, glad to see that the PSU study was discussed and would like to see if that leads to any additional mitigation. ● ODOT <ul style="list-style-type: none"> ○ With FHWA authorization, the year of opening scenario was not conducted for the air quality analysis. ○ The Clean Diesel Initiative (Oregon HB 2007) passed in 2019 will be a requirement to meet.

Topic	Notes
	<ul style="list-style-type: none"> ○ ODOT will work with partners in the community on restorative justice; developing an agreement to leverage partner's expertise and develop ideas to support and catalyze redevelopment.

CLIMATE CHANGE TECHNICAL REPORT

Topic	Notes
Q1. Methodology	<ul style="list-style-type: none"> • The Panel stated that a greenhouse gas (GHG) emissions assessment is not required by FHWA and recognized that ODOT exceeded general practice in choosing to conduct this analysis. • Without state or federal regulations/directives for GHG analysis, there are no thresholds on what levels of emissions define an impact. The Panel noted that ODOT's application of the MOVES and Infrastructure Carbon Estimator (ICE) air quality models are appropriate tools to predict GHG emissions and use as a basis of analysis.
Q2. Analysis	<ul style="list-style-type: none"> • The Panel agreed with the overall finding that GHG emissions would decrease over time due to fleet turnover; although, recent federal decisions on lowering Corporate Average Fuel Economy (CAFE) standards may slow the rate of decreased emissions over time that was assumed in the Climate Change Technical Report. • One Panelist stated that GHG benefits from the Build and No Build scenarios would be mostly negligible and that most of the predicted GHG increases through 2045 will be due to citywide and regional growth. • Several Panelists noted that there was a percentage error in the text above Figure 11 on page 37 of the report; this error would not affect the report conclusions. In addition, readability and tone could be improved to enable a layperson to understand the analysis and conclusions. • The Panel offered several recommendations that could be considered to further link the GHG analysis to other Project analyses or goals: <ul style="list-style-type: none"> ○ One panelist suggested that reduced congestion could lead to shorter commute times, thereby encouraging people to move further from the city. An indirect effect could be induced growth. ODOT responded that the traffic analysis did look at the larger transportation network and found that these vehicle trips were redistributed across the Portland Metro area since there were similar volumes in the network, and therefore, analysts concluded that no substantive change in the volume

Topic	Notes
	<p>of vehicles entering the network from outside the region would result from the Project.</p> <ul style="list-style-type: none"> ○ ODOT could clarify the linkage between the GHG analysis in the Climate Change Technical Report to GHG reduction strategies mandated by Oregon and the City of Portland. ○ Similarly, ODOT could clarify how the Project’s contribution to GHG reduction would benefit the local communities in the Project area. ○ The US Department of Energy has a model (Greenhouse gases, Regulated Emissions, and Energy use in Transportation [GREET]) that supports life-cycle cost analysis that could also be helpful in GHG studies for transportation projects. ○ One Panelist sent a link to an example of the Resilience Justice Policy Assessment Tool that could benefit further discussions with the community on GHG or other Project impacts: https://louisville.edu/landuse/documents/resilience-justice-assessment-tool-poster
Q3. Mitigation	<ul style="list-style-type: none"> ● The Panel recommended that ODOT provide opportunities for additional engagement with the community as the Project moves forward so there is a good understanding of this topic and any benefits.
Partner Comments	<ul style="list-style-type: none"> ● City of Portland <ul style="list-style-type: none"> ○ Looking forward to the opportunity to see what we can do in this area, particularly with tolling and the combined benefit with this Project on GHG. ● Metro <ul style="list-style-type: none"> ○ ODOT and Metro will be meeting to validate the application of the Travel Demand Model to the Project. ○ California perspective from several panel members is appreciated.

OTHER PROJECT-RELATED COMMENTS AND CLOSING REMARKS

Topic	Notes
Metro’s 4 Step Traffic Model (Megan Channell)	<ul style="list-style-type: none"> ● Metro 4-Step traffic demand model: ODOT coordinated with partner agencies to refine the modeling tool. Agreement was obtained at the time of the traffic analysis; ODOT will meet with staff at Metro and the City who may have had subsequent staff turn-over.

Topic	Notes
<p>Process – Building Trust with the Community (Panelist)</p>	<ul style="list-style-type: none"> • This is a “we” project. Horrible impacts to this community were done in the past, and we need to work together to move it forward. Need agencies to get involved, engage leadership, community, Trail Blazers, etc. to get things done on the ground. Need responsibilities assigned to all partners and accountability checked. Actions on the ground speaks louder than words. • As the Project moves forward, expand the community outreach to encourage new and additional voices, such as younger generations. • Gentrification looms as a major concern. Housing preference initiatives can help address this issue and it is included in the N/NE Neighborhood Housing Strategy by the City of Portland’s Housing Bureau. This is another issue that would benefit from strong local, regional, and state partnerships. • An interagency agreement to establish commitments may be an appropriate tool. A Community Benefits Agreement can wrap all the transportation related projects together with partner commitments including job training programs, local business utilization, construction impact compensation to impacted businesses and other direct impact mitigation. • Community needs a point of contact to hold agencies accountable.
<p>DPM (Panelist)</p>	<ul style="list-style-type: none"> • This Project has a goods movement focus with a high proportion of trucks. Thus, addressing health impacts is important and benefits the community.
<p>Visualization, Art (Panelist)</p>	<ul style="list-style-type: none"> • In some locations, sound barriers are painted blue or green to make it look like it’s a finished project. Silk screens are often added to the walls during construction for the community’s visualization of what the development will look like when completed.
<p>Air Quality, GHG and DPM (Panelist)</p>	<ul style="list-style-type: none"> • ODOT has done an excellent job, gone above and beyond in several areas. Comments from the Panel are supplemental. Truck traffic and DPM impacts from construction activities, truck rerouting, and operations, particularly on sensitive receptors, is important to consider.
<p>Noise, Barriers (Panelist)</p>	<ul style="list-style-type: none"> • A project like this doesn’t address all the harm of building a freeway through a community in the past. If the freeway was built today, the noise impacts would be great and the mitigation would have been much different. Barriers would have been built everywhere. • When barrier discussions start with partners and community, it’s often helpful to set expectations on barrier types, aesthetics. • As noted by another Panelist, the need to engage leadership to champion the project and commitments is critical to success.

Topic	Notes
City of Portland's Closing Remarks (Caitlin Reff)	<ul style="list-style-type: none">• Appreciated how well the Panel understood the nuances of the Project.• Appreciated the inclusion of the City and Metro.• Excellent recommendations were gained on how to move the Project forward.
Metro's Closing Remarks (Ally Holmqvist, Chris Ford, Monica Krueger)	<ul style="list-style-type: none">• Liked how the topics of the Peer Review can feed into the environmental justice.