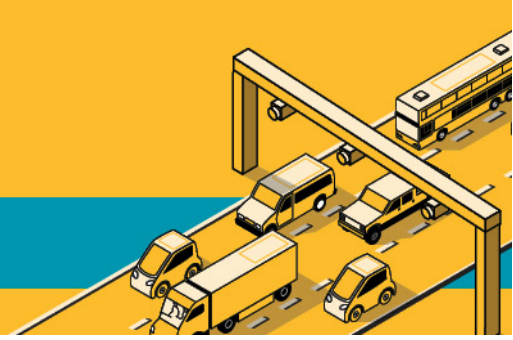
I-205 Toll Project

MEMORANDUM



Date	September 1, 2021
To	Lucinda Broussard, Carol Snead, and Natalie Liljenwall (ODOT)
From	Rebecca Frohning, WSP
Subject	Air Quality Methodology Memorandum
CC	

INTRODUCTION

This memorandum describes the methods that will be used in the I-205 Toll Project (Project) Environmental Assessment (EA) analysis to evaluate air quality impacts of the Project alternatives. The analysis and results will be documented in a technical report and summarized in the EA that will be developed to comply with federal guidelines and regulations, including the National Environmental Policy Act (NEPA) and local and state policies, standards, and regulations.

The air quality analysis will evaluate impacts from the construction operations, and maintenance of the Project and will identify mitigation measures as needed.

LEGAL REGULATIONS AND STANDARDS

Laws, Plans, Policies, Regulations, Guidance

The following is a list of federal, state, and local laws, regulations, plans, policies, and guidance documents that guide or inform the assessment of air quality:

- Clean Air Act (CAA) 42 U.S.C. 7401-7431 et seq.
- CAA Amendments of 1990
- National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act (CAA) of 1970
- Oregon Department of Environmental Quality (DEQ) established the State Ambient Air Quality Standards (SAAQS)
- Oregon Department of Transportation (ODOT) Air Quality Manual (ODOT 2018)
- Transportation Conformity Rule 40 Code of Federal Regulations Part 93 (40 CFR 93)
- Oregon Administrative Rules Chapter 340 Division 252 (OAR 340-252): Transportation Conformity

- Federal Highway Administration (FHWA), Updated Interim Guidance on Mobile Source Air Toxic (MSAT) Analysis in NEPA Documents (FHWA 2016a) (FHWA Interim Guidance)
- FHWA, Frequently Asked Questions (FAQ) Conducting Quantitative MSAT Analysis for FHWA NEPA Documents

AREA OF POTENTIAL IMPACT

The area of potential impact (API) is the geographic boundary within which impacts to the environment could occur with the Project alternatives. The air quality API encompasses the roadway segments (links) that could experience changes in congestion (e.g., traffic volumes and speed) due to the Project. Toll projects have the potential to impact vehicle trips at great distances from the project location because travelers may choose different routes or times of day for their vehicle trips. Analyzing a metropolitan area's entire roadway network will result in emissions estimates for many roadway links not affected by the project, diluting the results of the analysis, and not allowing for a meaningful comparison between alternatives. The air quality analysis will be limited to areas expected to experience a meaningful change in MSAT emissions based on recommendations outlined in the FHWA's FAQ.

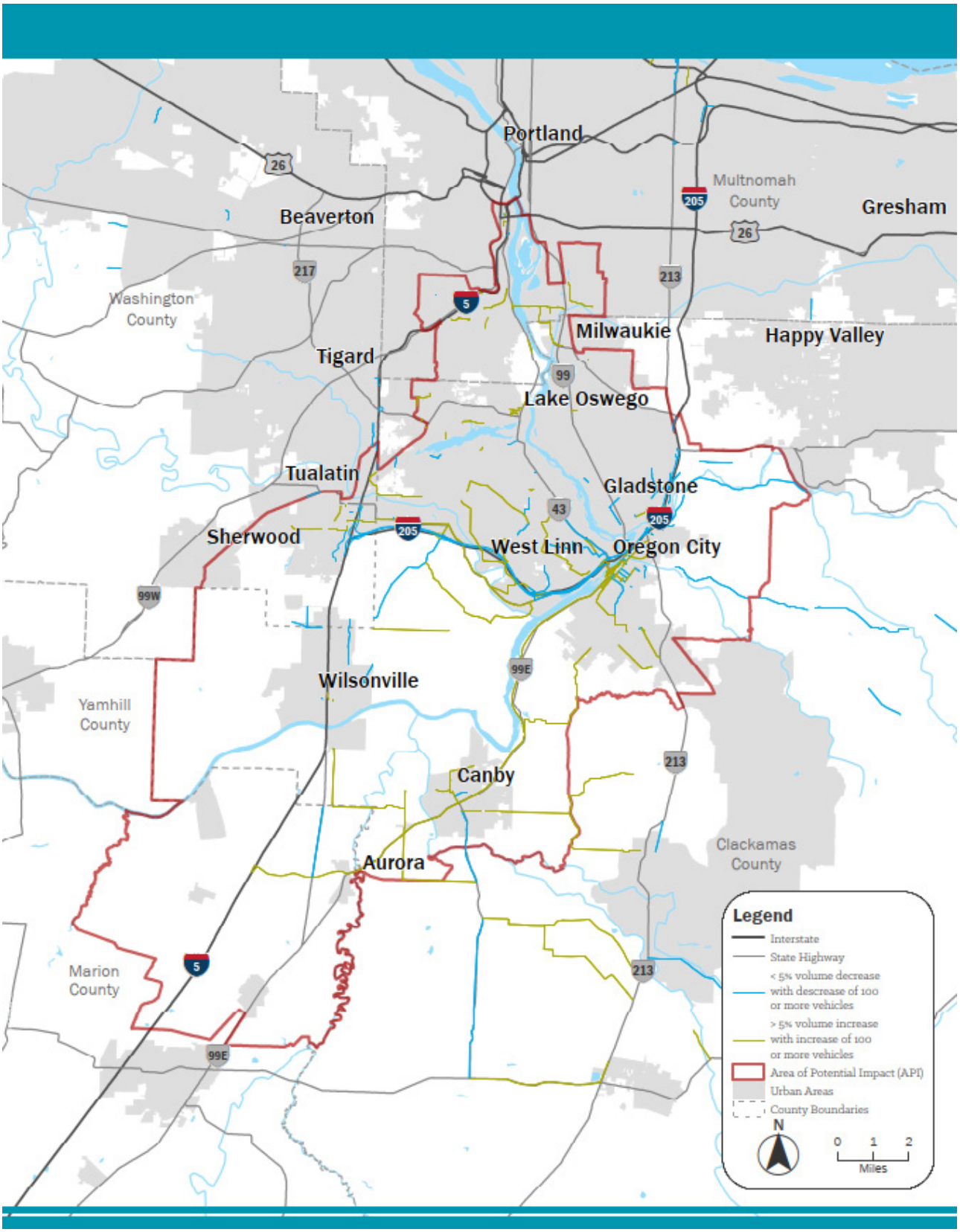
This guidance defines a meaningful change in emissions as approximately plus or minus 10 percent between the future No Build and Build conditions, and it includes recommended metrics to define the affected network and emphasizes using project-specific knowledge and consideration of local circumstances. The air quality API was determined using link-level traffic data to compare the change in volumes on each link (roadway segment) between the 2045 No Build condition and the 2045 Build Alternative expected to result in changes in annual average daily traffic (AADT) with the broadest geographic extents. The API was determined by first identifying roadway links associated with the Project plus roadway links that meet the criteria of:

- Plus or minus five percent or more change in AADT
- Increase or decrease in 100 or more vehicles AADT

The resulting set of links was further refined based on Project-specific knowledge and circumstances. The FHWA FAQ acknowledges that it is possible that low-volume links far removed from the project footprint may appear to show to change in traffic volumes that can be attributed to a modeling artifact. In order to focus on the API on roadways that are expected to capture a meaningful impact on emissions, census tract boundaries were used to develop the API boundary. To the south of the Project area, census tracts were removed that were rural, had relatively lower traffic volumes, and were not part of a connected network. To the north of the Project area, census tracts were removed that were associated with the downtown Portland area because the modeled changes in traffic are not attributed to the Project, and the high traffic volumes would dilute the analysis results.

The API boundary is shown in Figure 1, including the segments with a predicted change in AADT greater than five percent or less than negative five percent that were used to determine the affected network. Only the highlighted links within the boundary will be included in emissions calculations. It is anticipated that the majority of the changes in emissions due to each alternative would occur on the segments identified within the proposed API boundary, and this boundary would capture the majority of changes in emissions associated with direct impacts to air quality. Emissions from the identified roadway segments would be generated within the defined area, and pollutants would then disperse into the atmosphere where no boundary can be defined for the indirect impacts to air quality.

Figure 1. Air Quality API



DESCRIBING THE AFFECTED ENVIRONMENT

Published Sources and Databases

Data used in the 2018 Documented Categorical Exclusion (DCE) prepared for the I-205 Improvements Project will be reviewed to confirm its relevancy and applicability to this study. The following is a list of the data that will be used to determine and describe air quality resources/existing conditions:

- Metro regional travel demand model output
- DEQ air pollutant monitor data
- MSAT emissions trends presented in FHWA's Interim Guidance
- Metro MOtor Vehicle Emission Simulator (MOVES) input files

Contacts and Coordination

Air quality modeling files will be requested from Metro. Metro develops MOVES input files for regional emissions analyses, and these files will be supplemented with Project-specific data to complete the air quality analysis. Regional inputs will be reviewed with DEQ to verify that the data is appropriate for use with the current version of MOVES. The Project data will be provided by the traffic analysis team using output from the regional travel demand model that captures volume and speed changes due to the Project alternatives, described in detail in the Transportation Methodology Memorandum.

Field Surveys or Testing

No field surveys or testing will be performed for the air quality analysis.

IMPACT ASSESSMENT METHODS

The impacts analysis will address the long-term and short-term impacts upon air quality for each of the Project alternatives.

Long-Term Impact Assessment Methods

The API is designated by EPA as in attainment for all NAAQS and does not require a detailed project-level analysis to demonstrate that there would be no exceedance of the NAAQS. A summary of concentration levels at nearby pollutant monitoring sites will be presented in the report.

The analysis of direct long-term air quality impacts resulting from the Project will include an evaluation of projected MSAT emissions due to each of the Build Alternatives as a comparison to the projected emissions from the No Build Alternative in both the interim year (2027) and design year (2045).

FHWA's Interim Guidance provides an approach to analyze MSATs in the NEPA environmental review process for highways. It also provides a recommendation for the level of analysis based on the following tier categories:

1. No analysis for projects without potential for meaningful MSAT effects
2. Qualitative analysis for projects with low potential MSAT effects
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

Based on FHWA's recommended tiering approach, the Project falls within Tier 3 because traffic volumes on I-205 are projected to exceed 140,000 vehicles per day in the design year (2045), the application of tolls has the potential to shift traffic volume from I-205 onto local roadways (diversion effects), and the Project is located in proximity to populated areas. Therefore, a quantitative analysis will be performed to differentiate the impacts due to each Project alternative. The quantitative analysis will be consistent with FHWA's FAQ (FHWA 2016b). The result of the quantitative analysis will be a set of total annual and daily emissions of each MSAT pollutant (1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter) for each combination of Build Alternative and analysis year, including the No Build Alternative.

MSAT Study Area

The MSAT Study Area will consist of all roadway links within the API that were determined to have the potential for meaningful change in MSAT emissions. As described in the API section, this includes all segments associated with the Project, plus those segments with a change of plus or minus five percent or more in AADT. The same network of links will be used for all alternatives and analysis years for a consistent comparison of impacts. The MSAT analysis will be conducted for the Existing (2015), No Build Alternative and Build Alternatives for the Project's design year (2045), and an interim year (2027).

The MSAT Study Area was further refined by using professional judgment and local knowledge to develop one roadway analysis network that allows for a comparison of all alternatives evaluated. The proposed roadways chosen for inclusion in the analysis, along with supporting graphics and data, will be submitted to FHWA and ODOT for their approval of the network.

Model Inputs and Options

EPA's MOVES model version MOVES3.0.1 will be used to estimate emissions from the MSAT network. MOVES is the EPA's state-of-the-art tool for estimating emissions from highway vehicles. The model is based on analyses of millions of emission test results and considerable advances in EPA's understanding of vehicle emissions. Compared to previous versions, MOVES3.0.1 incorporates the latest emissions data, applies more sophisticated calculation algorithms, accounts for new regulations including the Heavy-Duty Greenhouse Gas Phase 2

rule and the Safer Affordable Fuel Efficient (SAFE) Vehicles Rule, and provides an improved user interface. MOVES run specifications as recommended in the FHWA FAQ are summarized in Table 1.

Table 1: MOVES RunSpec Options

MOVES Tab	Model Selections
Scale	County Scale Inventory Calculation Type
Time Span	Hourly time aggregation including all months, days, and hours Analysis years 2015, 2027, and 2045
Geographic Bounds	Clackamas County, Washington County, Multnomah County, Yamhill County, and Marion County
Vehicles/Equipment	Vehicle and fuel type combinations will be consistent with regional emissions modeling analyses Diesel PM will be run separately selecting only the diesel fuel type
Road Type	Rural restricted, rural unrestricted, urban restricted, and urban unrestricted
Pollutants and Processes	FHWA's nine priority MSAT pollutants(*1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter [diesel PM], ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter)* are selected, as well as any precursor pollutants needed to make the calculations Diesel PM is represented by Primary Exhaust PM10 Processes include running exhaust, crankcase running exhaust, evaporative permeation, and evaporative fuel leaks
Manage Input Data Sets	Database provided by Metro will be imported to account for adoption of California's Low Emission Vehicle (LEV) program as well as participation in the Multi-State Zero Emission Vehicle (ZEV) Action Plan
Output	Output will be in an annual and daily inventory of total emissions by pollutant

MOVES input files provided by Metro will be used to represent regional conditions, and these will be combined with input files developed with Project-specific data to characterize the differences in traffic volumes and speeds. Link-by-link traffic data will be used to develop input files to demonstrate the effects of the Project for each scenario analyzed: 2015, 2027 No Build, 2027 Build, 2045 No Build, and 2045 Build. All input data files will be specific to each analysis year with the exception of meteorological data, which is based on historical averages. It is assumed two Build scenarios will be evaluated for the air quality analysis. Specific inputs and their sources are summarized in Table 2.

Table 2: MOVES County Data Manager Inputs

County Data Manager Tab	Data Source
Source Type Population	Metro
Age Distribution	Metro and DEQ
Fuel	Metro and DEQ
Inspection/Maintenance Programs	Metro and DEQ
Meteorological Data	Metro
Vehicle Type Vehicle Miles Traveled (VMT)	Created from project data
Average Speed Distribution	Created from project data
Road Type Distribution	Created from project data

The link-by-link traffic data will indicate the link length and roadway type, and it will include volume and average modeled speed data for every hour of an average weekday. The data will be processed for use in MOVES using the following assumptions:

- Roadway Type: The roadway types (also called functional class) included in the regional travel demand model will be mapped to the four MOVES roadway types: rural restricted, rural unrestricted, urban restricted, and urban unrestricted. The off-network road type will not be used for this analysis.
- Average Speed: The link-level traffic data is provided for each hour of an average weekday. Speeds will be mapped to respective MOVES 5-mile per hour speed bins.
- Vehicle Miles Traveled (VMT): Each MOVES run requires the user to provide an annual VMT. VMT from each hour will be added to develop a daily VMT value for each scenario modeled. The daily VMT will converted to annual VMT using the EPA's AADVMT Converter for MOVES3. The annual VMT must be provided by five highway performance monitoring system (HPMS) vehicle types: motorcycles, light duty vehicles, buses, single unit trucks, and combination trucks. The link-level volume data will be provided by three vehicles types: passenger vehicle, medium truck, and heavy truck. The VMT from these three categories will be applied to the five HPMS vehicle types by using the annual VMT inputs provided by Metro to determine an appropriate distribution. MOVES also requires VMT distribution files that specific how the annual VMT is distributed by month, day, and hour. MOVES inputs from Metro will be used for a consistent representation of the regional assumptions.

MOVES results for individual counties will be added together to estimate the total annual and daily emissions from the MSAT network for each scenario. The VMT within the MSAT Study Area and emissions of each MSAT pollutant will be presented in a table to compare the differences in total MSAT emission for each priority MSAT between the base year, interim year No Build/Build, and design year No Build/Build scenarios.

The Air Quality Technical Report will include relevant language on unavailable information described in Appendix C of the FHWA's Interim Guidance and any applicable mitigation strategies from Appendix E of the FHWA's Interim Guidance.

In addition to the regional-scale analysis, potential impacts to specific sub-areas will be discussed qualitatively by comparing travel model metrics such as VMT and vehicle hours traveled (VHT) within the sub-area. Changes in volumes and speeds will be used as indicators to describe potential increases or decreases in air pollutant emissions. Travel demand model output will be examined for logical sub-areas that represent communities or areas with similar traffic characteristics.

Short-Term Impact Assessment Methods

The analysis of direct short-term air quality impacts that would occur during Project construction will consist of a qualitative discussion of typical sources of pollutant emissions from the types of construction activities needed to implement the Project.

Indirect Impacts Assessment Methods

Induced growth that could result from the Project will be captured in the traffic data used in the air quality analysis. Regional travel demand modeling includes any future transportation projects planned to be completed by the analysis years evaluated, as well as assumptions about expected changes in land use that could result from the project, such as changes in residential or commercial development. Therefore, indirect effects will share the same impact conditions as the direct impact analysis.

Cumulative Impacts Assessment Methods

In accordance with ODOT guidance (ODOT 2010), the cumulative impacts analysis will consist of an eight-step process to identify and evaluate cumulative impacts. The long-term, short-term, and indirect impacts identified for air quality will be used in Step 1 to identify whether the Project has the potential to contribute to cumulative impacts on air quality when considered in combination with other past, present, and future actions. For those resources studied in the cumulative impact assessment, the direct and indirect impacts identified in the respective technical analysis will also be used in Step 4: "Identify direct and indirect impacts that may contribute to a cumulative impact." See the I-205 Toll Project Cumulative Impacts Methodology Memorandum for additional details on the eight-step process and cumulative impacts methodology.

MITIGATION APPROACH

Short-term impacts to air quality from construction will be minimized by compliance with Oregon Administrative Rule (OAR) 340 and ODOT Standard Specifications Section 290. These measures will be described in detail, including a list of reasonable precautions to avoid dust emissions.

PERFORMANCE MEASURES

Table 3 presents a preliminary list of performance measures identified to evaluate how the alternatives compare in terms of impacts and benefits to air quality, as well as the tool(s) that will be used to assess each performance measure.

Table 3. Preliminary Air Quality Performance Measures

Performance Measure	How	Tool and/or Data Source used for Assessment of Measure
Change in annual regional emissions of MSATs from vehicle operations	Quantitative Change in regional vehicle emissions	MOVES model - using 24-hour VMT output by vehicle class and speed bin from the regional travel demand model

Additional performance measures may be identified during the course of analysis.

REFERENCES

Federal Highway Administration (FHWA). 2016a. Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. https://www.fhwa.dot.gov/ENVIRonment/air_quality/air_toxics/policy_and_guidance/msat/2016msat.pdf

Federal Highway Administration (FHWA). 2016b. Frequently Asked Questions (FAQ) Conducting Quantitative MSAT Analysis for FHWA NEPA Documents. FHWA HEP-15-0156. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/moves_msat_faq.pdf

Oregon Department of Transportation (ODOT). 2018. Air Quality Manual. https://www.oregon.gov/odot/GeoEnvironmental/Docs_Environmental/Air-Quality-Manual.pdf

Oregon Department of Transportation (ODOT). 2010. Environmental Impact Statement Annotated Template, Chapter 4: Cumulative Impacts.