Appendix D1 I-205 Toll Project Criteria Pollutant Emissions Memorandum

Criteria Pollutants Memorandum

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Subject	Criteria Pollutants

1 Introduction

The *I-205 Toll Project Air Quality Technical Report* was prepared that included the quantitative analyses required for the National Environmental Policy Act (NEPA) documentation for the I-205 Toll Project. The *I-205 Toll Project Air Quality Technical Report* included a quantitative evaluation of Mobile Source Air Toxics (MSAT) using the U.S. Environmental Protection Agency's (USEPA) MOVES emission factor model to estimate emissions. Criteria pollutant emissions were not evaluated part of the technical report because the area is designated as attainment for all criteria pollutants by USEPA. However, Oregon Department of Environmental Quality and Federal Highway Administration requested an analysis of criteria pollutant emissions to better understand the effects of the Build Alternative. The additional analysis is documented in this memorandum.

2 Regional Analysis Methodology

The methodology for the regional criteria pollutant analysis was consistent with the MSAT analysis presented in the *I-205 Toll Project Air Quality Technical Report*. In order to evaluate regional criteria pollutant emissions, the Time Span and Pollutants and Processes tabs were updated as shown in Table 1. In addition to annual emissions estimates, emissions were also calculated for a maximum winter day and a maximum summer day. Evaluations for MSAT pollutants only consider running emissions, but criteria pollutant emissions evaluations typically include all pollutant processes that may be affected by a project. Since this project was focused on the roadway network, it included all pollutant processes except for those associated with extended idling.

Table 1. Criteria Pollutant MOVES Run Specification Options

MOVES Tab	Model Selections
Scale	• County Scale • Inventory Calculation Type
Time Span	• Annual emissions: hourly time aggregation including all months, days, and hours • Daily Emissions: hourly time aggregation including all hours for weekdays in January and July • Analysis years 2015, 2027, and 2045

MOVES Tab	Model Selections
Geographic Bounds	• Multnomah County was used to represent the region, consistent with Metro's regional emissions model
Vehicles/Equipment	• All on-road vehicle and fuel type combinations
Road Type	• Rural restricted, rural unrestricted, urban restricted, and urban unrestricted
Pollutants and Processes	• Pollutants included Volatile Organic Compounds (VOC), Carbon Monoxide (CO), Oxides of Nitrogen (NOx), Primary Exhaust PM2.5-Total, Primary PM2.5-Brakewear Particulate, Primary PM2.5-Tirewear Particulate, Primary Exhaust PM10-Total, Primary PM10-Brakewear Particulate, Primary PM10-Tirewear Particulate, Sulfur Dioxide (SO2), and all applicable precursor pollutants • Processes included running exhaust, crankcase running exhaust, brakewear, tirewear, start exhaust, crankcase start exhaust, evaporative permeation, evaporative fuel vapor, evaporative fuel leaks, refueling displacement vapor loss, and refueling spillage loss.
Manage Input Data Sets	• Database provided by Metro were imported to account for adoption of California's Low Emission Vehicle program as well as participation in the Multi-State Zero Emission Vehicle Action Plan.
Output	• Output format was annual and daily inventory of pollutant emissions.

The project-specific inputs that represent the traffic network conditions in the API were exactly the same as those used for the MSAT analysis, as described in the *I-205 Toll Project Air Quality Technical Report*.

3 Regional Analysis Results

Estimated criteria pollutant emissions in the API for the base year 2015 are presented in Table 2. Results are presented by winter day, summer day, and annual total emissions. Emissions vary by season because ambient air temperature affects engine efficiency as well as the formation of specific pollutants.

Table 2. 2015 Modeled Criteria Pollutant Emissions

Pollutant	2015 Summer Day (pounds per day)	2015 Winter Day (pounds per day)	2015 Annual (tons per year)
CO	148,235	188,371	29,292
NOx	13,365	12,903	2,322
SO_2	58	53	10
VOC	27,959	24,253	4,448
Total PM_{10}[1]	458	667	99
Total $PM_{2.5}$[2]	261	446	61

[1] Total PM_{10} emissions are the sum of PM10 exhaust, PM10 brakewear, and PM10 tirewear

[2] Total $PM_{2.5}$ emissions are the sum of $PM_{2.5}$ exhaust, $PM_{2.5}$ brakewear, and $PM_{2.5}$ tirewear

A comparison of criteria pollutant emissions for Build and No Build are presented in Table 3, Table 4, and Table 5. For all analysis years and averaging periods, emissions in the Build Alternative are less than the emissions in the No Build Alternative. The analysis results demonstrate that the project is not anticipated to increase emissions of any criteria pollutant in the API. The emissions presented are meant to show the

difference between the Build and No Build Alternative, and the model results do not represent the total emissions for the entire API. There are no thresholds to determine the significance of criteria pollutant emissions for projects within areas USEPA has designated as in attainment of the National Ambient Air Quality Standards.

Table 3. Summer Day Emissions Comparison in Pounds per Day

Pollutant	2027			2045		
	No Build Alternative (pounds per day)	Build Alternative (pounds per day)	Percent Change from No Build	No Build Alternative (pounds per day)	Build Alternative (pounds per day)	Percent Change from No Build
CO	53,433	52,594	-2%	31,491	31,055	-1%
NOX	5,230	5,179	-1%	4,287	4,146	-3%
SO2	22	20	-5%	21	21	-4%
VOC	12,973	12,939	-0.3%	8,257	8,227	-0.4%
Total PM_{10}[2]	462	427	-7%	505	442	-12%
Total $PM_{2.5}$[2]	216	210	-2%	177	168	-5%

[1] Total PM_{10} emissions are the sum of PM_{10} exhaust, PM_{10} brakewear, and PM_{10} tirewear

[2] Total $PM_{2.5}$ emissions are the sum of $PM_{2.5}$ exhaust, $PM_{2.5}$ brakewear, and $PM_{2.5}$ tirewear

Table 4. Winter Day Emissions Comparison in Pounds per Day

Pollutant	2027			2045		
	No Build Alternative (pounds per day)	Build Alternative (pounds per day)	Percent Change from No Build	No Build Alternative (pounds per day)	Build Alternative (pounds per day)	Percent Change from No Build
CO	74,556	73,862	-1%	50,891	50,538	-1%
NOX	5,773	5,720	-1%	5,033	4,882	-3%
SO2	24	23	-4%	24	23	-3%
VOC	12,941	12,909	-0.3%	9,998	9,969	-0.3%
Total PM_{10}[1]	598	564	-6%	592	530	-11%
Total $PM_{2.5}$[2]	337	331	-2%	254	246	-3%

[1] Total PM_{10} emissions are the sum of PM_{10} exhaust, PM_{10} brakewear, and PM_{10} tirewear

[2] Total $PM_{2.5}$ emissions are the sum of $PM_{2.5}$ exhaust, $PM_{2.5}$ brakewear, and $PM_{2.5}$ tirewear

Table 5. Annual Emissions Comparison in Tons per Year

Pollutant	2027			2045		
	No Build Alternative (tons per year)	Build Alternative (tons per year)	Percent Change from No Build	No Build Alternative (tons per year)	Build Alternative (tons per year)	Percent Change from No Build
CO	11,120	10,988	-1%	7,150	7,082	-1%
NOX	966	956	-1%	813	786	-3%
SO2	4	4	-5%	4	4	-4%
VOC	2,243	2,237	-0.3%	1,594	1,589	-0.3%
Total PM_{10}[1]	94	88	-7%	98	86	-12%
Total $PM_{2.5}$[2]	48	47	-2%	37	36	-4%

[1] Total PM_{10} emissions are the sum of PM_{10} exhaust, PM_{10} brakewear, and PM_{10} tirewear

[2] Total $PM_{2.5}$ emissions are the sum of $PM_{2.5}$ exhaust, $PM_{2.5}$ brakewear, and $PM_{2.5}$ tirewear

4 Local Considerations

The project is located in an area designated by USEPA as “attainment” for all criteria pollutants. Localized criteria pollutant modeling is not required for projects located in attainment areas because it is unlikely that emissions from an individual project would exceed the National Ambient Air Quality Standards. Localized increases in air quality emissions can occur in locations where traffic volumes increase or locations where vehicles spend increased time idling at signalized intersections. Data presented in the *I-205 Toll Project Transportation Technical Report* (TTR) was used to determine locations that may experience elevated concentrations of air pollutants as compared to no build conditions.

Figures 5-8 through 5-12 in the TTR show the projected change in daily volumes throughout the API. The figures demonstrate which locations are expected to have increases or decreases in daily traffic volumes due to the Project. Many of these volume changes are expected to occur during peak periods, so an additional analysis of peak-hour volume changes is presented in Table 5-8. The TTR analyzed the operations of 50 signalized intersections in the API, and the expected changes in delay and level of service are summarized in Table 5-14 and Table 5-15. Increased delay or degraded level of service at an intersection may cause elevated air pollutant concentrations in the vicinity.