Record of Decision 4: Appendix B

Air Quality Technical Memorandum

April 2017

EXPRESS LANES | NORTH I-25

AIR QUALITY TECHNICAL MEMORANDUM

SH 56 to SH 392

April 2017

1.0 Introduction and background

This report updates the air quality analyses prepared as part of the 2011 FEIS for ROD4. The Record of Decision 4 (ROD4) documents the final agency decision for improvements to Interstate 25 (I-25) between State Highway (SH) 56 and SH 392.

The Selected Alternative discussed in ROD4 consists of reconstruction and widening of I-25 between SH 56 and SH 392 (approximately 12 miles) to include addition of one buffer-separated express lane in each direction. The improvements included in the Selected Alternative for ROD4 are consistent with 2011 FEIS Preferred Alternative except that no new general purpose lanes will be constructed as part of ROD4 (for more information on the ROD4 Selected Alternative, See Chapter 2 of the ROD4 document).

At the time the 2011 FEIS was issued, funding had not been secured for the entirety of the Preferred Alternative; therefore, the Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) planned the phased implementation of the 2011 FEIS Preferred Alternative. Details of the phasing components are included in Chapter 8 of the 2011 FEIS and are not repeated here. The proposed project is included in the North Front Range Metropolitan Planning Organization (NFRMPO) fiscally constrained 2040 Regional Transportation Plan, and funding for the project is included in the NFRMPO FY 2016 to FY 2019 Transportation Improvement Program.

2.0 Changes in the Regulatory Setting

Changes in air quality laws, policies, and guidance since publication of the FEIS in 2011 include:

- On August 2, 2016, the U. S. Council on Environmental Quality (CEQ) issued *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, which describes how agencies should address climate change in NEPA reviews.
- The Motor Vehicle Emissions Model (MOVES) 2014a model was released in November 2015. This was a major update to MOVES2010 and its minor revisions that corrected errors and added the ability to evaluate additional air toxics (MOVES2010a and MOVES2010b). MOVES2014 includes three new emission control programs associated with regulations promulgated since the release of MOVES2010b, and its minor revision, MOVES2014a, incorporates significant improvements in calculating on-road and non-road equipment emissions. Technical and policy guidance in the use of MOVES2014 for a variety of purposes and pollutants has also been updated.
- The NAAQS for Ozone was lowered from 75 ppb to 70 ppb in October 2015 (EPA's nonattainment designations will be made in late 2017).

- Carbon Monoxide Categorical Hot-Spot Finding (February 2014) allows project sponsors the option to rely on the categorical hot-spot finding in place of doing a carbon monoxide hot-spot analysis as part of a project-level conformity determination in carbon monoxide maintenance areas.
- FHWA's Interim Guidance Update on Mobile Source Air Toxics Analysis in NEPA was updated on October 18, 2016, from the original guidance published in September 2009. The revised guidance reflects changes in methodology for conducting emissions analysis and updates various research topics in mobile source air toxics analyses.
- Transportation Conformity Regulations as of April 2012 (PDF) (EPA, April 2012) includes updated requirements for the preparation, adoption, and submittal of implementation plans.
- In 2016 the Denver-North Front Range 2008 8-hour Ozone nonattainment area designation changed from "marginal" to "moderate" after failure to attain the marginal classification.

3.0 Air Quality Analysis for ROD4

3.1 Criteria Pollutants

A full discussion of the six criteria pollutants was included in the 2011 FEIS. The project is located within the NFRMPO and is in a designated in a moderate non-attainment area for ozone (design value of 0.086 up to but not including 0.100 ppm). None of the other five criteria pollutants are of a concern to this project. Concentrations of lead, sulfur dioxide, and nitrogen dioxide are not significantly affected by transportation projects. The project is located outside of any non-attainment or maintenance areas for PM_{10}, $PM_{2.5}$, or carbon monoxide.

3.1.1 Ozone

The project is located in the nonattainment area for the Denver-North Front Range Area for the 2008 ozone standard. The area was designated as a "marginal" nonattainment area in 2012, but was reclassified to a "moderate" nonattainment area after failing to attain the marginal designation. A new ozone SIP is currently under review, and EPA action on the SIP is expected in 2017. Since ozone is a regional pollutant, there is no requirement to analyze potential impacts and no possibility of localized violations of ozone to occur at the project level. The project is included in the NFRMPO 2016–2021 TIP and the 2040 RTP, as amended and adopted on February 2, 2017, which were found to conform to the ozone SIP. The FHWA conformity determination was made on February xx, 2017.

3.1.2 Mobile Source Air Toxics

FHWA has developed a three tiered approach to analyze the Mobile Source Air Toxics (MSAT) in environmental documents (FHWA, 2016). Under this approach one of the three levels of analysis listed below are to be used depending on the project circumstances and other considerations.

- No analysis required for projects with no potential for meaningful MSAT effects
- Qualitative analysis for projects with low potential MSAT effects

- Quantitative analysis to differentiate between alternatives for projects with higher potential MSAT effects

The ROD4 Selected Alternative is considered a project with low potential for MSAT effects according to the FHWA guidance because it is designed to improve operations of the highway without adding substantial new capacity. Additionally, the design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For the ROD4 Selected Alternative, the amount of MSAT emissions would be proportional to the vehicle miles traveled (VMT). The VMT estimated for the ROD4 Selected Alternative is slightly higher than that if the project was not built, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES2014 model, emissions of all of the priority MSAT decrease as speed increases.

Also, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future (FHWA, 2016).

Incomplete or unavailable information for project-specific MSAT health impacts analysis

In addition to the qualitative assessment, FHWA requires the NEPA document for this category of project to include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)). The 2011 FEIS included this information.

3.1.3 Greenhouse Gases and Climate Change

On August 2, 2016, the CEQ issued *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, which describes how agencies should address climate change in NEPA reviews. The guidance states that updated analysis is not required for projects that have already published their FEIS. Therefore, no additional analysis is required for ROD4.

In addition, the CDOT NEPA Manual was updated in October, 2014. Appendix F of the manual includes standard language for required for inclusion in all NEPA documents, and is provided below.

Climate change is an important national and global concern. While the earth has gone through many natural changes in climate in its history, there is general agreement that the earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) greenhouse gas (GHG) emissions contribute to this rapid change.

Carbon dioxide (CO_2) makes up the largest component of these GHG emissions. Other prominent transportation GHGs include methane (CH_4) and nitrous oxide (N_2O).

Many GHGs occur naturally. Water vapor is the most abundant GHG and makes up approximately two thirds of the natural greenhouse effect. However, the burning of fossil fuels and other human activities are adding to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries. GHGs trap heat in the earth's atmosphere. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate-related phenomena. For example, warmer global temperatures can cause changes in precipitation and sea levels.

To date, no national standards have been established regarding GHGs, nor has the Environmental Protection Agency (EPA) established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO_2 under the Clean Air Act. However, there is a considerable body of scientific literature addressing the sources of GHG emissions and their adverse effects on climate, including reports from the Intergovernmental Panel on Climate Change, the US National Academy of Sciences, and EPA and other Federal agencies. GHGs are different from other air pollutants evaluated in Federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. The affected environment for CO_2 and other GHG emissions is the entire planet. In addition, from a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad scale actions such as actions involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project. Furthermore, presently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

Under the National Environmental Policy Act (NEPA), detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making.[1] Federal Highway Administration (FHWA) has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the proposed action, as discussed below and shown in Table 1, that the GHG emissions from the proposed action will not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 CFR 1502.22(b)). The GHG emissions from the project build alternatives will be insignificant, and will not play a meaningful role in a determination of the environmentally preferable alternative or the selection of the preferred alternative. More detailed information on GHG emissions "is not essential to a reasoned choice among reasonable alternatives" (40 CFR 1502.22(a)) or to making a decision in the best overall public interest based on a balanced consideration of transportation, economic, social, and environmental needs and impacts (23 CFR 771.105(b)). For these reasons, no alternatives-level GHG analysis has been performed for this project.

The context in which the emissions from the proposed project will occur, together with the expected GHG emissions contribution from the project, illustrate why the project's GHG emissions will not be significant and will not be a substantial factor in the decision-making. The

[1] *See* 40 CFR 1500.1(b), 1500.2(b), 1500.4(g), and 1501.7

transportation sector is the second largest source of total GHG emissions in the U.S., behind electricity generation. The transportation sector was responsible for approximately 27 percent of all anthropogenic (human caused) GHG emissions in the U.S. in 2010.[2] The majority of transportation GHG emissions are the result of fossil fuel combustion. CO_2 makes up the largest component of these GHG emissions. U.S. CO_2 emissions from the consumption of energy accounted for about 18 percent of worldwide energy consumption CO_2 emissions in 2010.3. [3] U.S. transportation CO_2 emissions accounted for about 6 percent of worldwide CO_2 emissions.[4]

While the contribution of GHGs from transportation in the U.S. as a whole is a large component of U.S. GHG emissions, as the scale of analysis is reduced the GHG contributions become quite small. Using CO_2 because of its predominant role in GHG emissions, Table 1 presents the relationship between current and projected Colorado highway CO_2 emissions and total global CO_2 emissions, as well as information on the scale of the project relative to state-wide travel activity.

Based on emissions estimates from EPA's Motor Vehicle Emissions Simulator (MOVES) model[5], and global CO_2 estimates and projections from the Energy Information Administration, CO_2 emissions from motor vehicles in the entire state of Colorado contributed less than one tenth of one percent of global emissions in 2010 (0.0348 percent). These emissions are projected to contribute an even smaller fraction (0.0261 percent) in 2040[6]. Vehicle miles travelled (VMT) in the project study area represents 0.159 percent of total Colorado travel activity; and the project itself would increase state-wide VMT by 16.544 percent. (Note that the project study area, as defined for the MSAT analysis, includes travel on many other roadways in addition to the proposed project.) As a result, based on the build alternative with the highest VMT[7], FHWA estimates that the proposed project could result in a potential increase in global CO_2 emissions in 2040 of 0.0002 percent (less than one thousandth of one percent), and a corresponding increase in Colorado's share of global emissions in

[2] Calculated from data in U.S. Environmental Protection Agency, Inventory of Greenhouse Gas Emissions and Sinks, 1990-2010.

[3] Calculated from data in U.S. Energy Information Administration International Energy Statistics, Total Carbon Dioxide Emissions from the Consumption of Energy, http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8, accessed 2/25/13.

[4] Calculated from data in EIA figure 104: http://www.eia.gov/forecasts/archive/ieo10/emissions.html and EPA table ES-3: http://epa.gov/climatechange/emissions/downloads11/US-GHG-Inventory-2011-Executive-Summary.pdf

[5] [5] http://www.epa.gov/otaq/models/moves/index.htm. EPA's MOVES model can be used to estimate vehicle exhaust emissions of carbon dioxide (CO_2) and other GHGs. CO_2 is frequently used as an indicator of overall transportation GHG emissions because the quantity of these emissions is much larger than that of all other transportation GHGs combined, and because CO_2 accounts for 90 to 95 percent of the overall climate impact from transportation sources. MOVES includes estimates of both emissions rates and VMT, and these were used to estimate the Colorado statewide highway emissions in Table 1.

[6] Colorado emissions represent a smaller share of global emissions in 2040 because global emissions increase at a faster rate.

[7] Selected to represent a "worst case" for purposes of this comparison; the Preferred Alternative may have a smaller contribution

2040 of 0.0009 percent. This very small change in global emissions is well within the range of uncertainty associated with future emissions estimates.[8][9]

Table 1. Statewide and Project Emissions Potential, Relative to Global Totals

	Global CO2 Emissions, MMT[10]	Colorado Motor Vehicle CO2 Emissions, MMT[11]	Colorado Motor Vehicle Emissions, % of Global Total	Project Study Area VMT, % of Statewide VMT	Percent Change in Statewide VMT due to Project
Current Conditions (2010)	29,670	10.3	0.0348%	1.599%	(None)
Future Projection (2040)	45,500	11.9	0.0261%	1.189%	0.253%

Table Notes: MMT = million metric tons. Global emissions estimates are from International Energy Outlook 2010, data for Figure 104, projected to 2040. Colorado emissions and statewide VMT estimates are from MOVES2010b.

Mitigation for Global GHG Emissions

To help address the global issue of climate change, USDOT is committed to reducing GHG emissions from vehicles traveling on our nation's highways. USDOT and EPA are working together to reduce these emissions by substantially improving vehicle efficiency and shifting toward lower carbon intensive fuels. The agencies have jointly established new, more stringent fuel economy and first ever GHG emissions standards for model year 2012–2025 cars and light trucks, with an ultimate fuel economy standard of 54.5 miles per gallon for cars and light trucks by model year 2025.

---

[8] For example, Figure 114 of the Energy Information Administration's *International Energy Outlook 2010* shows that future emissions projections can vary by almost 20 percent, depending on which scenario for future economic growth proves to be most accurate.

[9] When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency is required make clear that such information is lacking (40 CFR 1502.22). The methodologies for forecasting GHG emissions from transportation projects continue to evolve and the data provided should be considered in light of the constraints affecting the currently available methodologies. As previously stated, tools such as EPA's MOVES model can be used to estimate vehicle exhaust emissions of carbon dioxide (CO_2) and other GHGs. However, only rudimentary information is available regarding the GHG emissions impacts of highway construction and maintenance. Estimation of GHG emissions from vehicle exhaust is subject to the same types of uncertainty affecting other types of air quality analysis, including imprecise information about current and future estimates of vehicle miles traveled, vehicle travel speeds, and the effectiveness of vehicle emissions control technology. Finally, there presently is no scientific methodology that can identify causal connections between individual source emissions and specific climate impacts at a particular location.

[10] These estimates are from the EIA's *International Energy Outlook 2010*, and are considered the best-available projections of emissions from fossil fuel combustion. These totals do not include other sources of emissions, such as cement production, deforestation, or natural sources; however, reliable future projections for these emissions sources are not available.

[11] MOVES projections suggest that Colorado motor vehicle CO_2 emissions may increase by 14.9 percent between 2010 and 2040; more stringent fuel economy/GHG emissions standards will not be sufficient to offset projected growth in VMT.

Further, on September 15, 2011, the agencies jointly published the first ever fuel economy and GHG emissions standards for heavy-duty trucks and buses.[12] Increasing use of technological innovations that can improve fuel economy, such as gasoline- and diesel-electric hybrid vehicles, will improve air quality and reduce CO_2 emissions future years.

Consistent with its view that broad-scale efforts hold the greatest promise for meaningfully addressing the global climate change problem, FHWA is engaged in developing strategies to reduce transportation's contribution to CDOT's NEPA manual was revised in October 2014. Appendix F of the revised manual includes language for inclusion in NEPA documents, and is provided here.

GHGs—particularly CO_2 emissions—and to assess the risks to transportation systems and services from climate change. In an effort to assist States and MPOs in performing GHG analyses, FHWA has developed a *Handbook for Estimating Transportation GHG Emissions for Integration into the Planning Process.* The Handbook presents methodologies reflecting good practices for the evaluation of GHG emissions at the transportation program level, and will demonstrate how such evaluation may be integrated into the transportation planning process. FHWA has also developed a tool for use at the state-wide level to model a large number of GHG reduction scenarios and alternatives for use in transportation planning, climate action plans, scenario planning exercises, and in meeting state GHG reduction targets and goals. To assist states and MPOs in assessing climate change vulnerabilities to their transportation networks, FHWA has developed a draft vulnerability and risk assessment conceptual model and has piloted it in several locations.

At the state level, there are also several programs underway in Colorado to address transportation GHGs. The Governor's Climate Action Plan, adopted in November 2007, includes measures to adopt vehicle CO_2 emissions standards and to reduce vehicle travel through transit, flex time, telecommuting, ridesharing, and broadband communications. CDOT issued a Policy Directive on Air Quality in May 2009. This Policy Directive was developed with input from a number of agencies, including the State of Colorado's Department of Public Health and Environment, EPA, FHWA, the Federal Transit Administration, the Denver Regional Transportation District and the Denver Regional Air Quality Council. This Policy Directive and implementation document, the CDOT Air Quality Action Plan address unregulated MSATs and GHGs produced from Colorado's state highways, interstates, and construction activities.

As a part of CDOT's commitment to addressing MSATs and GHGs, some of CDOT's program wide activities include:

- Researching pavement durability opportunities with the goal of reducing the frequency of resurfacing and/or reconstruction projects.
- Developing air quality educational materials, specific to transportation issues, for citizens, elected officials, and schools, including development of vehicle idling reduction programs for schools and communities.

[12] For more information on fuel economy proposals and standards, see the National Highway Traffic Safety Administration's Corporate Average Fuel Economy website: http://www.nhtsa.gov/fuel-economy/.

- Offering outreach to communities to integrate land use and transportation decisions to reduce growth in VMT, such as smart growth techniques, buffer zones, transit-oriented development, walkable communities, access management plans, etc.
- Committing to research additional concrete additives that would reduce the demand for cement.
- Expanding Transportation Demand Management efforts state-wide to better utilize the existing transportation mobility network.
- Continuing to diversify the CDOT fleet by retrofitting diesel vehicles, specifying the types of vehicles and equipment contractors may use, purchasing low-emission vehicles, such as hybrids, and purchasing cleaner burning fuels through bidding incentives where feasible.
- Exploring congestion and/or right-lane only restrictions for motor carriers.
- Funding truck parking electrification.
- Researching additional ways to improve freight movement and efficiency state-wide.
- Committing to use ultra-low sulfur diesel for non-road equipment state-wide.
- Developing a low-VOC emitting tree landscaping specification.

Even though project-level mitigation measures will not have a substantial impact on global GHG emissions because of the exceedingly small amount of GHG emissions involved, the above-identified activities are part of a program-wide effort by FHWA and CDOT to adopt practical means to avoid and minimize environmental impacts in accordance with 40 CFR 1505.2(c).

4.0 Summary

This document does not incorporate an analysis of the GHG emissions or climate change effects of each of the alternatives because the potential change in GHG emissions is very small in the context of the affected environment.

Because of the insignificance of the GHG impacts, those impacts will not be meaningful to a decision on the environmentally preferable alternative or to a choice among alternatives. As outlined above, FHWA is working to develop strategies to reduce transportation's contribution to GHGs—particularly CO_2 emissions—and to assess the risks to transportation systems and services from climate change. FHWA will continue to pursue these efforts as productive steps to address this important issue. Finally, the construction best practices described above represent practicable project-level measures that, while not substantially reducing global GHG emissions, may help reduce GHG emissions on an incremental basis and could contribute in the long term to meaningful cumulative reduction when considered across the Federal-aid highway program.

4.1 Construction

The 2011 FEIS included information on the potential effects of construction, including on air quality. During construction, dust and other emissions will cause temporary and localized pollution generated by construction vehicles and earth disturbances. Construction activities associated with the ROD4 Selected Alternative will be temporary, with none lasting longer than the construction

period. To mitigate the effects of fugitive dust from construction activities on air quality, the FEIS included measures to reduce fugitive dust, and no new measures are required. They include:

- An operational water truck will be on site at all times. Water will be applied to control dust as needed to prevent dust impacts off site
- Use wetting/chemical inhibitors for dust control
- Stabilize and cover stockpile areas
- Remove soil and other materials from paved streets
- Operate equipment mainly during off-peak hours
- Limit equipment idling time

5.0 Transportation Conformity

The project is located in the nonattainment area for the Denver-North Front Range Area for the 2008 ozone standard. The area was designated as a "marginal" nonattainment area in 2012, but was reclassified to a "moderate" nonattainment area after failing to attain the marginal designation. A new ozone SIP is currently under review, and EPA action on the SIP is expected in 2017. Since ozone is a regional pollutant, there is no requirement to analyze potential impacts and no possibility of localized violations of ozone to occur at the project level. The project is included in the NFRMPO 2016–2021 TIP and the 2040 RTP, as amended and adopted on February 2, 2017, which were found to conform to the ozone SIP. The FHWA conformity determination was made on February xx, 2017.

Therefore, this project has been determined to not cause an exceedance of any NAAQS. The proposed project will not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the NAAQS or any required interim emissions reductions or other milestones. This project complies with the transportation conformity regulations in 40 CFR 93 and with the conformity provisions of Section 176(c) of the Clean Air Act (CAA)

This page intentionally left blank.