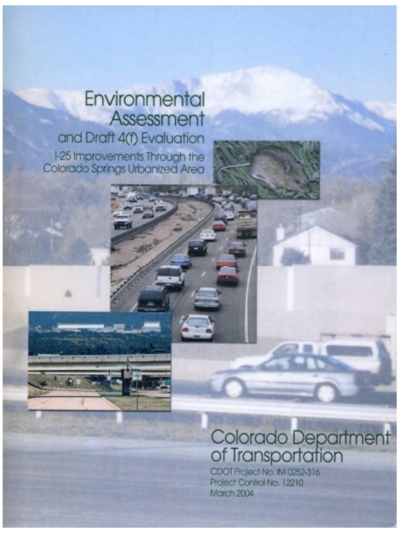
RE-EVALUATION, Mileposts 149 to 161

Interstate 25 Improvements through the Colorado Springs Area Environmental Assessment



AIR QUALITY TECHNICAL MEMO

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Introduction

The Colorado Department of Transportation (CDOT) has prepared this technical memorandum to update findings on air quality described in the original 2004 I-25 Environmental Assessment (EA) with regard to the portion of the Proposed Action between Woodmen Road (Exit 149) in Colorado Springs and State Highway 105 in Monument (Exit 161). The proposed action is to relieve existing traffic congestion and address project future congestion on I-25 within the Colorado Springs urbanized area.

The I-25 EA originally evaluated impacts for the widening of I-25 between South Academy Boulevard (Exit 135) and SH 105, together with reconstruction of various I-25 interchanges within this corridor. Page 2-10 of the EA stated that, "Consistent with projected traffic demand in the I-25 corridor, the conceptual phasing for the Proposed Action calls for:

(1) initially six-laning through central Colorado Springs, then

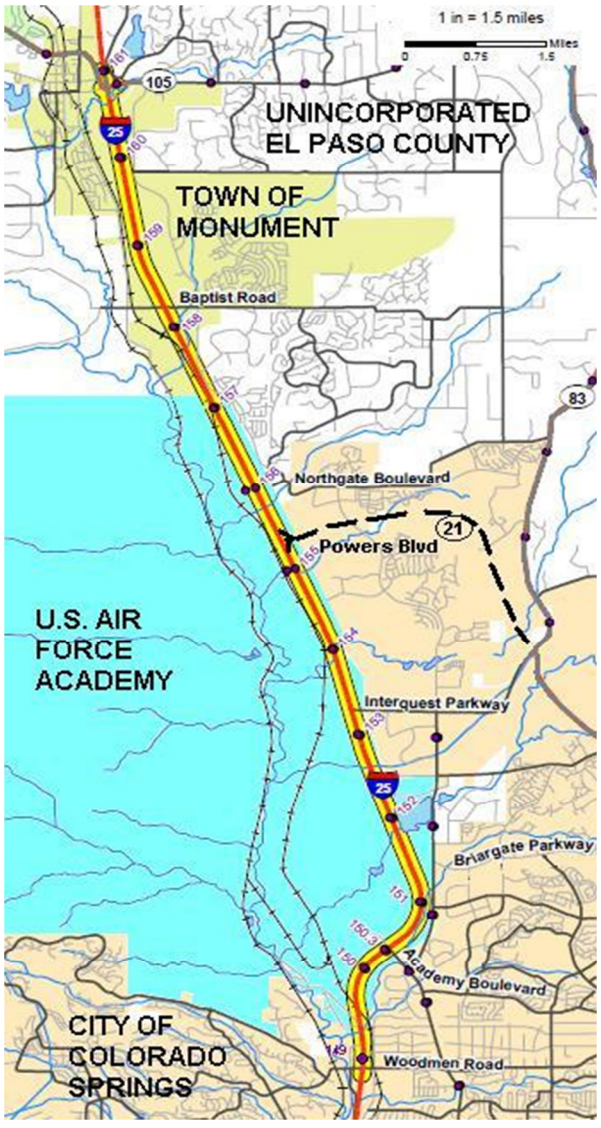
(2) six-laning in northern El Paso County, and finally

(3) adding HOV [High-Occupancy Vehicle] lanes through central Colorado Springs and widening to six lanes south to South Academy Boulevard."

The first of these conceptual phases was undertaken in central Colorado Springs, completed in 2007. The so-called COSMIX project resulted in 12 miles of six-lane freeway, between South Circle Drive (Exit 138) and North Academy Boulevard (Exit 150). It included major reconstruction at several interchanges, notably not including the Cimarron Street interchange (Exit 141) or the Fillmore Street interchange (Exit 145). Additional funding will be needed to complete Phase 1.

For the year 2012, CDOT has received funding to begin the second phase, meaning to widen I-25 to six lanes in northern El Paso County, within the area shown in Figure 1. The EA calls for eventually widening I-25 all the way to SH105. Total funding for this project is yet to be determined. Currently enough is available to widen I-25 from Woodmen Rd to Interquest (Exit 153). Nevertheless, to be prepared for possible additional funding being available to complete the widening to SH 105 with this project or available in the near future, CDOT's current EA re-evaluation effort is

Figure 1. I-25 EA Re-evaluation Project Vicinity



covering all Phase 2 improvements. Therefore, the study area for this re-evaluation extends northward all the way to Monument.

The I-25 EA included a new connection with Powers Boulevard (now State Highway 21), following SH 21 eastward to just past the Powers Boulevard/Voyager Boulevard interchange. The design and analysis of this connection in the I-25 EA superseded what was proposed earlier in the North Powers Boulevard EA that was approved in 1999. The current EA re-evaluation also includes this portion of Powers Boulevard from I-25 to just east of Voyager Parkway.

Summary of the 2004 EA Air Quality Impacts and Mitigation

The Pikes Peak Region has a history of good air quality since the end of the 1980s. When the I-25 EA was approved in 2004, the region had an existing carbon monoxide (CO) emissions budget of 270 tons per day, and was concerned that implementation of its long-range 2025 Transportation Plan was expected to produce 266 tons per day in the year 2025. Under the No-Action Alternative, failure to relieve heavy congestion on I-25, the region's most heavily traveled roadway, and the potential to cause an exceedance of this budget in 2025. If widened, I-25 could carry a much larger volume of traffic, but would do so at much improved travel speeds, compared to bumper-to-bumper traffic on the existing four-lane highway.

However, the EA also reported that a revised CO plan prepared with MOBILE 6.2 emission factors had been approved by the State of Colorado in 2003 and was awaiting approval by the U.S. Environmental Protection Agency. The new plan offered a much higher CO emissions budget of 531 tons per day, providing a much greater safety margin against future exceedances.

For the EA, microscale CO analysis was conducted at 25 locations, in some cases for both morning and evening peak periods, and for as many as three future modeled years (2007, 2015 and 2025). These corresponded to adjacent signalized intersections along I-25's intersecting roadways where the future Traffic Level of Service was predicted to be unacceptable (D, E, or F) for wither the Proposed Action or the No Action Alternative. All 110 predicted future carbon monoxide 8-hour average concentrations at these locations were predicted to be less than (i.e. better than) the National Ambient Air Quality Standard of 9.0 parts per million.

The EA indicated that regional ozone concentrations had been trending slowly upward, getting close to the NAAQS for that pollutant, strongly suggesting the likelihood of an ozone violation before the year 2010.

The EA noted that construction activities for the Proposed Action would generate localized emissions of coarse particulate matter (PM_{10}). Construction contractors would be required to follow Colorado Air Quality Control Regulation No. 1 regarding control of fugitive dust emissions.

The EA briefly discussed the topic of regional haze and visibility, concluding that the I-25 Proposed Action is located downwind and far away from protected Class I visibility areas in Colorado, with negligible likelihood of affecting those areas.

Finally, the EA discussed the topic of Urban Air Toxics. EPA regulations issued in 2001 offered the promise of reducing emissions of many of these compounds, including some vehicle-generated toxics that were expected to be reduced by as much as 67 to 90 percent by the year 2020.

An emissions analysis presented in the EA appendix indicated that future tailpipe emissions in the I-25 corridor for four pollutants (CO, hydrocarbons, oxides of nitrogen and coarse particulate matter: PM_{10}) would be slightly lower with the Proposed Action than for the No Action Alternatives for all three future analysis years noted above. Projected emission would decline through 2025 for HC and NO_x, but would slightly increase between 2015 and 2025 for CO and PM_{10}.

The EA concluded that the Proposed Action met all applicable air quality requirements and could be implemented with no mitigation necessary apart from required compliance with Colorado's fugitive dust regulations during construction.

Changes to the Project that Would Affect Air Quality

Based on the current design, CDOT has not proposed to change the project in any way that would affect air quality differently from what was described in the EA.

Changes in Analysis Data, Analysis Methods or Applicable Regulations

Several changes in applicable data and regulations related to air quality have occurred since the EA was prepared. Since the I-25 Proposed Action was analyzed in 2002 and the EA was approved in 2004, the following changes affecting air quality analysis have occurred:

- PPACG has a new traffic model, new socio-economic projections, and a new Regional Transportation Plan, extending out to 2035. (PPACG, 2008) The EA looked out to only to the year 2025. Regional population growth through 2010 was about 18,000 residents greater than predicted in PPACG's 2025 Regional Transportation Plan.
- Regional growth has continued, other transportation projects have been built, and the I-25 "COSMIX" construction project built most of the Proposed Action's Phase 1. The congested I-25 /Baptist Road interchange (Exit 158) was improved by a corridor taxing district.
- A new regional carbon monoxide "limited maintenance plan" adopted by the Air Quality Control Commission in December 2009 effectively eliminates the regional CO conformity budget.
- EPA now requires the use of MOVES2010a to generate emission rates for air quality analyses. [Use of MOVES2010b, released April 23, 2012, is not yet required.]
- The EPA strengthened the National Ambient Air Quality Standard for nitrogen dioxide (NO_2) on January 22, 2010 to add a one-hour standard at the level of 100 parts per billion. (EPA, 2010) The State of Colorado plans to install a roadside NO_2 monitor along I-25 somewhere in Colorado Springs to meet EPA's requirements for urban centers with a population of 500,000 or more residents. This has no immediate effect on project-level analysis in the region.
- Despite concerns noted in the 2004 I-25 EA, the region has continued to meet the existing ozone NAAQS through the year 2011. In January 2010, EPA formally proposed to tighten the national ozone standard, but President Obama subsequently requested that EPA defer any action to tighten the ozone standard until 2013. Annual fourth-highest ozone levels have declined in the region by about five parts per billion since 2007, and are now lower than they were when the I-25 EA was approved.
- On March 10, 2006, the Environmental Protection Agency (EPA) published a final rule that establishes the transportation conformity criteria and procedures for determining

which transportation projects must be analyzed for local air quality impacts in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. [The Pikes Peak Region is not a nonattainment or maintenance area for $PM_{2.5}$ or PM_{10}.]

- The Federal Highway Administration has developed and updated guidance on the topic of Mobile Source Air Toxics. The version currently in effect is the Interim Guidance that was issued in September 2009. This updates the discussion of Urban Air Toxics that was presented in the 2004 EA.

Updated Air Quality Analysis

An interagency consultation meeting regarding the I-25 EA re-evaluation was conducted on January 4, 2012, attended by staff from CDOT, FHWA, PPACG, EPA, and the Air Pollution Control Division of the Colorado Department of Public Health and Environment. At that meeting, it was agreed that updated air quality analysis for the I-25 Proposed Action should be prepared because the regional planning assumptions and air quality emission factors used for the EA nearly a decade ago have all been superseded. The group agreed that the following analyses would be prepared, and the new long-range horizon year of 2035 would be used in place of 2025:

- Carbon monoxide microscale analysis for representative worst case intersections
- Updated emissions estimates aggregated at the corridor level
- Quantitative MSAT emissions analysis where projected future traffic would exceed 140,000 vehicles per day

CO Microscale Analysis

Traffic model output for the years 2015 and 2035 were obtained from PPACG for future Plan implementation (includes the Proposed Action) and I-25 No-Action scenarios. As PPACG did not have a 2025 model network available, traffic volumes were interpolated for 2025. Future traffic projections were developed (i.e., raw model output not used intact, per PPACG protocols) and the traffic Level of Service was predicted for the nearest signalize intersection accessible from each I-25 exit between Woodmen Road and SH105 in Monument. The three intersections with the worst traffic congestion in 2025 were identified as Exit 161 (SH105 in Monument), Exit 151 (the nearby Briargate/Voyager intersection) and Exit 149 (Woodmen Road). These were the only three locations with LOS F in any modeled year. The future predictions, presented in Table 1, include an APCD-provided CO background concentration of 2.0 ppm.

TABLE 1. Modeled CO projections for Worst Case Intersections

Year & Scenario Location	**2015 Build/No-Build CO concentrations (and PM peak LOS)**	**2025 Build/No-Build CO concentrations (and PM peak LOS)**	**2035 Build/No-Build CO concentrations (and PM peak LOS)**
Exit 149 (Woodmen Rd. NB ramp intersection)	4.62 (D) / 4.57 (D)	4.45 (E) / 4.39 (E)	4.62 (F) / 4.39 (F)
Exit 151 Briargate Pkwy/Voyage Pkwy intersection)	3.54 (D) / 3.43 (D)	3.54 (E) / 3.54 (E)	3.65 (F) / 3.71 (F)
Exit 161 Monument State Highway 105 NB ramp intersection	NA* (C) / NA (C)	3.60 (E) / 3.54 (E)	3.82 (F) / 3.54 (F)

** Intersections with Level of Service C are normally not required to have CO microscale analysis.*

The results of the CO microscale analyses showed predicted concentrations in the range of 3.31 parts per million (ppm) to 4.62 ppm (worst case), as compared with the NAAQS of 9.0 ppm as an 8-hour average. No future CO violations are expected due to implementing the Proposed Action. In the CO microscale analyses performed in 2002 for the 2004 EA, 8-hour average concentrations at I-25-related intersections in northern El Paso County ranged from 4.1 to 6.6 ppm. The new results, based on updated traffic forecasts and MOVES2010a emission factors, are much lower than the corresponding forecasts from the 2004 EA.

Model runs were also performed for all of the above scenarios for the morning peak period. The results in all cases were lower CO concentrations for the AM peak than for the PM peak. The difference between AM and PM concentrations ranged from zero to 0.35 ppm for the 8-hour average.

Emissions Analysis for Selected Tailpipe Pollutants

Tailpipe emissions for 48 miles of roadway in northern El Paso County on I-25, its cross-streets and closest parallel arterials were calculated for four pollutants to update the assessment presented in the 2004 EA. Inclusion of nearest parallel arterials captures traffic shifts off of I-25 that may be caused by congested conditions expected under the No-Action Alternative. Projected traffic volumes, estimated speeds, and roadway link lengths were provided to APCD staff. MOVES2010a emission factors were determined and applied and aggregated to yield total daily emissions (summer day and winter day) by pollutant for the 48-mile roadway network. The results of these calculations are presented in Table 2.

TABLE 2. Projected Pollutant Emissions per Day for the I-25 Corridor in the Re-evaluation Area

Pollutant	**VOC (tons)**			**CO (tons)**			**NO_x (tons)**			**Tailpipe PM_{10} (pounds)**		
Year / **Alternative**	**2015**	**2025**	**2035**	**2015**	**2025**	**2035**	**2015**	**2025**	**2035**	**2015**	**2025**	**2035**
No-Action												
- Summer	0.69	0.66	0.56	10.35	11.88	12.36	1.00	0.62	0.57	74	79	86
- Winter	0.73	0.71	0.58	20.34	23.26	24.39	1.13	0.70	0.65	74	79	86
Proposed Action												
- Summer	0.70	0.69	0.38	11.15	12.57	12.91	1.07	0.65	0.59	79	82	87
- Winter	0.74	0.74	0.39	21.86	24.52	25.38	1.22	0.74	0.67	79	82	87

Three factors affecting the outcome of the emission analysis are increased traffic over time for both the No-Action and Proposed Action alternatives, emission factors that generally decline over time with improved vehicle technology, and shifts of traffic from I-25 to alternate routes with the increasingly congested No-Action Alternative. For all future years, the Proposed Action would result in more vehicle-miles of travel (VMT) than the No-Action Alternative (100,000 more in 2015, 140,000 more in 2025, and 180,000 more in 2025). These VMT increases are large enough to overcome the other factors, resulting in slightly greater emissions for the Proposed Action than for the No-Action Alternative.

The patterns reflected in Table 2 with regard to the build and no-build case over time are the same patterns that were projected in the 2004 EA, using different traffic volumes, different

emission factors, and a different study area (26 miles in the EA, compared to the 12-mile re-evaluation area used above).

Quantitative MSAT Analysis

I-25 is projected to carry traffic volumes in excess of 140,000 vehicles per day in 2035 between Woodmen Road (Exit 149) and North Powers Boulevard (future Exit 155). CDOT estimates that the current traffic mix in this stretch includes approximately 11 percent trucks, of which about 60 percent are combination trucks (i.e. tractor-trailer semis) and 40% are single-unit trucks. Traffic volumes above 140,000 vehicles per day on urban highways trigger the need for quantitative analysis of Mobile Source Air Toxics (MSAT), according to FHWA guidance. This traffic volume will occur in 2035 but not in 2015 or 2025. This analysis was done for the same 48-mile subarea used for the other criteria above.

The results of the analysis for MSAT also showed that emissions would increase slightly for the Proposed Action, compared with the ~~Proposed Action~~No Action. However, all of the MSAT except PM10 decrease by at least 40% between 2015 and 2025 (these numbers not shown), and decrease slightly more by 2035. So for all the MSAT except PM_{10}, future emissions will be less in 2025 and 2035 than they are today, despite the increased traffic over time. The results for 2035, when the 140,000 vehicles-per-day traffic threshold will be reached, are presented in Table 3.

TABLE 3. Projected 2035 Mobile Source Air Toxic Emissions (pounds/day) for the I-25 Corridor in the Re-evaluation Area

Pollutant: **Scenario**	**Acetaldehyde**	**Acrolein**	**Benzene**	**1,3-Butadiene**	**Formaldehyde**	**Diesel Particulate PM_{10}**
2035 No-Action Alternative						
Summer	8.00	0.51	39.75	4.58	13.45	85.58
Winter	10.30	0.70	45.17	5.56	16.17	85.58
2035 Proposed Action						
Summer	8.16	0.52	40.40	4.67	13.73	87.46
Winter	10.52	0.71	45.98	5.67	16.52	87.46

An attached appendix (Technical Support Document) provides more complete documentation of the re-evaluation modeling efforts.

Conclusion

The findings of this memorandum are summarized in Table 4, which follows.

TABLE 4. Summary of Previously and Currently Identified Air Quality Impacts and Mitigation

EA 2004 – No-Action Alternative	EA 2004 – Impacts of Proposed Action	EA 2004 – Mitigation	2012 – What Has Changed	Re-evaluation 2012 – No Action	Re-evaluation 2012 – Impacts of Proposed Action	Re-evaluation 2012 - Mitigation
The region would not meet air quality conformity because congestion would reduce travel speeds and increase emissions per mile traveled. The region's carbon monoxide emissions budget could be exceeded. An analysis of localized carbon monoxide concentrations indicated there would not be carbon monoxide violations at intersections in the project area.	An analysis of localized carbon monoxide concentrations indicates that there would not be any new or worsened carbon monoxide violations at intersections in the project area.	No mitigation is required.	The CO plan in effect at the time of the 2004 EA was replaced with a new plan with a much higher CO emissions budget. Then, the latest CO plan, adopted in 2009, demonstrated that an emissions budget is not needed to ensure CO attainment for the foreseeable future. The COSMIX project that was completed in 2007 eased traffic congestion on I-25 through central Colorado Springs, the region's most heavily traveled roadway. EPA released MOVES2010a, a new emissions factor model now required for use in analyzing road improvements. The planning horizon for the regional transportation plan in 2004 was 2025. The current PPACG plan extends to the year 2035. EPA established a new, tighter 8-hour ozone standard in 2008 and added a one-hour standard for NO_2 in 2010. The CDOT NEPA Manual (2008, updated 2010) calls for more air quality background information than was provided in the 2004 EA.	Based on newer air quality modeling, emission factors, and regional plans, the No-Action Alternative no longer appears to have the potential to result in conformity problems.	Carbon monoxide microscale analysis prepared for the three I-25-related intersections in northern El Paso County with the worst projected congestion in 2035 show future CO concentrations well within the national standard of 9.0 parts per million for an 8-hour average. The results for 2015 and 2025 also comfortably meet the standard. At these three existing intersections, projected traffic volumes, congestion and CO concentrations will increase over time, due to continuing regional growth. Emissions forecasts using MOVES2010a indicate that the Proposed Action will produce slightly more emissions of criteria polluatnts and MSAt than the No-Action Alternative because the Proposed Action would carry more vehicle-miles of travel. Future MSAT emissions will be reduced in future years, compared with 2015.	No mitigation is required.
	The majority of air emissions during construction would be fugitive dust (including PM_{10}) from the excavation of soil and backfill.	Implementation of dust control practices will be followed during construction in accordance with Colorado Air Quality Control Commission Regulation No. 1 regarding fugitive emissions. All contractors will be required to obtain an APEN construction permit and to develop a control plan for particulate emissions.	Construction practices, technologies and regulations regarding PM_{10} are largely unchanged.	No changes to EA-identified construction-related air quality impacts.	No changes to EA-identified construction-related air quality impacts.	No changes to EA-identified construction-related air quality mitigation.