APPENDIX 3

AIR QUALITY ASSESSMENT

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UNITED STATES HIGHWAY 183

FROM US 290

TO SH 71

TRAVIS COUNTY

CSJ: 0151-09-036, 0151-09-127
0265-01-080

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PREPARED BY
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Austin District

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1. INTRODUCTION

The Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT) are proposing improvements to United States Highway (US) 183 from US 290 to State Highway (SH) 71 in Austin, Travis County, Texas. Figure 1 is a project location map. The purpose for the proposed improvements on US 183 from US 290 to SH 71 are to enhance safety and improve mobility. There is a need to improve operational characteristics and to add capacity.

US 183 between US 290 and Manor/Springdale Road is a six-lane highway that transitions into a signalized four-lane divided roadway from Manor/Springdale Road to SH 71. The proposed project would consist of a six-lane expressway. Figure 2 illustrates the existing and the proposed typical sections and Figure 3 is a Plan View.

The proposed project is within the city limits of Austin. Figure 4 shows the topography of the project area in 1995 and the topography has not appreciably changed since 1995. Most of the land adjacent to the proposed project on US 183 has been developed for a mix of residential, commercial, and civic uses. The more saturated residential areas primarily exist west of US 183. Figure 5 includes an excerpt from a 2010 aerial photograph of the proposed project area.

Traffic data for the design year (2035) is shown in the following table:

Table 1. Traffic Data for the No-build and the Build Alternatives

Location		Length	Vehicles-per-day
From	**To**	**(miles)**	**(vpd)**
US 290	Springdale Road	0.90	116,400
Springdale Road	Loyola Lane	0.93	95,200
Loyola Lane	FM 969 MLK	1.21	94,800
FM 969 MLK	TechniCenter	0.69	101,400
TechniCenter	Bolm Road	1.72	97,400
Bolm Road	Airport Blvd	0.76	133,400
Airport Blvd	Montopolis Rd	0.40	117,000
Montopolis Rd	SH 71	1.57	105,000

Source: TxDOT Transportation Planning and Programming Division 2012

2. CONFORMITY

The project is located in Travis County, which is in an area in attainment or unclassifiable for all national ambient air quality standards; therefore, the transportation conformity rules do not apply. Additionally, the proposed project is consistent with the current 2035 Regional Transportation Plan (RTP) and the 2013-2016 Statewide Transportation Improvement Program (STIP).

3. CO TRANSPORTATON AIR QUALITY ANALYSIS

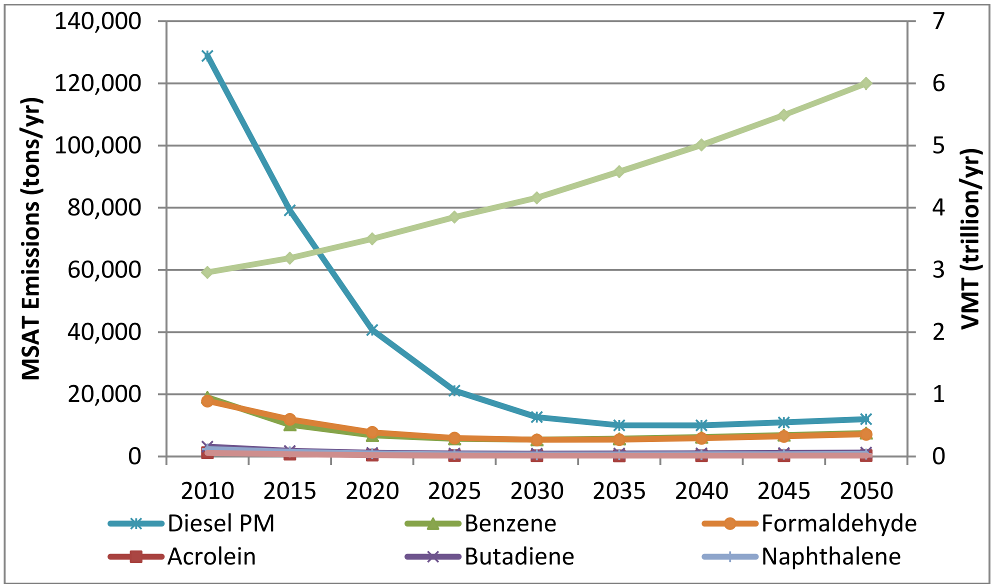
A prior TxDOT modeling study and previous analyses of similar projects demonstrated that it is unlikely that a carbon monoxide standard would ever be exceeded as a result of any project with an average annual daily traffic (AADT) below 140,000. The AADT projections for the project do not exceed 140,000 vpd; therefore, a Traffic Air Quality Analysis is not required.

4. MOBILE SOURCE AIR TOXICS BACKGROUND

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA Mobile Source Air Toxics (MSAT) rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis using EPA's MOVES2010b model, as shown in the following graphic and Table 2, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

PROJECTED NATIONAL MSAT EMISSION TRENDS 2010 – 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA's MOVES2010b MODEL



Source: Table 2 below.

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Table 2:
PROJECTED NATIONAL MSAT EMISSION TRENDS 2010 – 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA's MOVES2010b MODEL

Pollutant / VMT	Pollutant Emissions (tons) and Vehicle-Miles Traveled (VMT) by Calendar Year									Change
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2010 to 2050
Acrolein	1,244	805	476	318	258	247	264	292	322	-74%
Benzene	18,995	10,195	6,765	5,669	5,386	5,696	6,216	6,840	7,525	-60%
Butadiene	3,157	1,783	1,163	951	890	934	1,017	1,119	1,231	-61%
Diesel PM	128,847	79,158	40,694	21,155	12,667	10,027	9,978	10,942	11,992	-91%
Formaldehyde	17,848	11,943	7,778	5,938	5,329	5,407	5,847	6,463	7,141	-60%
Naphthalene	2,366	1,502	939	693	607	611	659	727	802	-66%
Polycyclics	1,102	705	414	274	218	207	219	240	262	-76%
Trillions VMT	2.96	3.19	3.5	3.85	4.16	4.58	5.01	5.49	6	102%

Source: EPA MOVES2010b model runs conducted during May – June 2012 by FHWA.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

5. PROJECT-SPECIFIC MSAT INFORMATION

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at:
http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf

For the No-Build and the Build Alternative, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative is slightly higher than that for the No Build Alternative, 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 preferred action 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 MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases

Also, regardless of the alternative chosen, 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 80 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 in nearly all cases.

The additional travel lanes contemplated as part of the Build Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative than the No-build Alternative (see Figure 3). The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built from just north of Langston Drive to Purple Sage Drive (Sheet 2 of Figure 3), north of Loyola Lane (Sheet 3), at 51st (Sheet 4), just north of FM 969 (Sheet 4 and 5), at Tracor Lane (Sheet 5), at Techni Center Drive (Sheet 6), at Hudson Street (Sheet 7), north and south of Harold Court west of US 183 (Sheet 7), at Thurgood Ave and Shelton Road (Sheet 8), south of Smith Road to Gardner Road west of US 183 (Sheets 9-10), south of Bolm Road to the Colorado River east of US 183 (Sheets 9-10) and from the Colorado River to Patton Avenue (Sheets 12-13). However, the magnitude and the duration of these potential increases compared to the No-build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No-build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be lower than today.

6. INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA’s view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is “a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects” (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA’s Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework.

Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable. Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

7. CONCLUSION

In this document, a qualitative MSAT assessment has been provided relative to the various alternatives of MSAT emissions and has acknowledged that the Build Alternative may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

8. INDIRECT AND CUMULATIVE IMPACTS ANALYSIS

The proposed Build Alternative will not result in any meaningful changes in traffic volumes, vehicle mix, location of existing roadways, or any other factor that would cause an increase in emissions impacts relative to the No-build Alternative. Therefore, the proposed project will not result in actions that could possibly impact air quality. As such, TxDOT has determined that this project would generate minimal indirect and cumulative impacts on air quality. Consequently, an Indirect and Cumulative Impacts analysis for air quality was not required for this project.

9. REFERENCES

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SEE THE FIGURES ATTACHED TO THE ENVIRONMENTAL ASSESSMENT