

Project Information

Project Name:	ROUTE 17 I95 BRIDGE TO HOSPITAL BLVD		
Project Number:	0017-088-R72, B616, C501, P101, R201	UPC:	107140
Route Number:	17		
Project Limit - From:	0.616 miles West of Int with Germanna Point Dr / Hospital Bl	To:	0.399 miles East of Int with Germanna Point Dr / Hospital Bl
District	City/County	Residency	
Fredericksburg	Spotsylvania	Fredericksburg	
IPM Project Description:	#HB2.FY17 ROUTE 17 I95 BRIDGE TO HOSPITAL BLVD		
Air Quality:	No		
Additional Project Description:	<p>This project replaces the structurally deficient two lane bridge over I-95 a four-lane bridge, widens Route 17 (Mills Drive) from a two-lane to a four-lane divided road from Route 1 to Hospital Boulevard with bike/ped accommodations.</p> <p>The project provides access management features with the divided four-lane road eliminating left turn movements while adding turn lanes at the intersection of Route 17 and Hospital Blvd in both directions and adding a right in right out only movement at Overview drive to limit left turns onto Route 17 NB from its previous connection.</p>		
Funding Source:	Federal		

PPTA/LAP

Locally Administered?	No	PPTA?	No
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Traffic Data

Design Year:	2042	Design Year Traffic ADT:	37,000
Existing Year:	2014	Existing Year Traffic ADT:	23,000
Project Opening Year:	2022		

TASK INFORMATION

Task/Subtask	PED	AED	Assigned To
Air Determination	09/16/2016	09/15/2016	Grinnell, Daniel T

I. Carbon Monoxide

This project is located in: Attainment Area

CO Microscale Analysis Required for NEPA?No

- The proposed project meets the criteria specified in the current FHWA-VDOT “Programmatic Agreement for Project Level Air Quality Analyses for Carbon Monoxide” and therefore a project-specific analysis for CO is not required.

The proposed project falls within the project types and conditions listed in the current Federal Highway Administration - Virginia Department of Transportation “Programmatic Agreement for Project –Level Air Quality Analyses for Carbon Monoxide” for streamlining the project level air quality analysis process for carbon monoxide. Modeling using “worst-case” parameters has been conducted for these project types and conditions. It has been determined that projects, such as this one, for which the conditions are not exceeded, would not significantly impact air quality and would not cause or contribute to a new violation, or delay timely attainment of the National Ambient Air Quality Standards for carbon monoxide. (See Comments section for additional information)

Comments: The 2042 design year ADT of 37,000 vpd is below the threshold in the 2009 agreement. Additionally the proposed project falls within the project types and conditions listed in the current Federal Highway Administration - Virginia Department of Transportation “Programmatic Agreement for Project –Level Air Quality Analyses for Carbon Monoxide” for streamlining the project level air quality analysis process for carbon monoxide. Modeling using “worst-case” parameters has been conducted for these project types and conditions. It has been determined that projects, such as this one, for which the conditions are not exceeded, would not significantly impact air quality and would not cause or contribute to a new violation, or delay timely attainment of the National Ambient Air Quality Standards for carbon monoxide.

II. Air Quality Status and Regional Conformity

Jurisdiction Description: This project is located within an Attainment area for all of the National Ambient Air Quality Standards (NAAQS), and in a volatile organic compounds (VOC) and nitrogen oxides (NOx) Emissions Control Area. As such, all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions; and 9 VAC 5-50, Article 1, Fugitive Dust precautions.

Comments: None

III. Particulate Matter

The final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in Fine Particulate Matter (PM2.5) nonattainment and maintenance areas was published on March 10, 2006. This project is located in a PM2.5 attainment area and therefore no further discussion of PM2.5 is necessary.

Comments: None

IV. Mobile Source Air Toxics

This project requires: A qualitative MSAT analysis

This project requires a qualitative MSAT analysis. Please see the appendix for the appropriate language to be included in the environmental document.

Comments: See Attached

Comments

General Comments: This project is located within an Attainment area for all of the National Ambient Air Quality Standards (NAAQS), and in a volatile organic compounds (VOC) and nitrogen oxides (NOx) Emissions Control Area. As such, all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions; and 9 VAC 5-50, Article 1, Fugitive Dust precautions.

Qualitative Analysis for Mobile Source Air Toxics

BACKGROUND

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) 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 assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's [Integrated Risk Information System](#) (IRIS). In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the [2011 National Air Toxics](#) Assessment (NATA). These are *1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, 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.

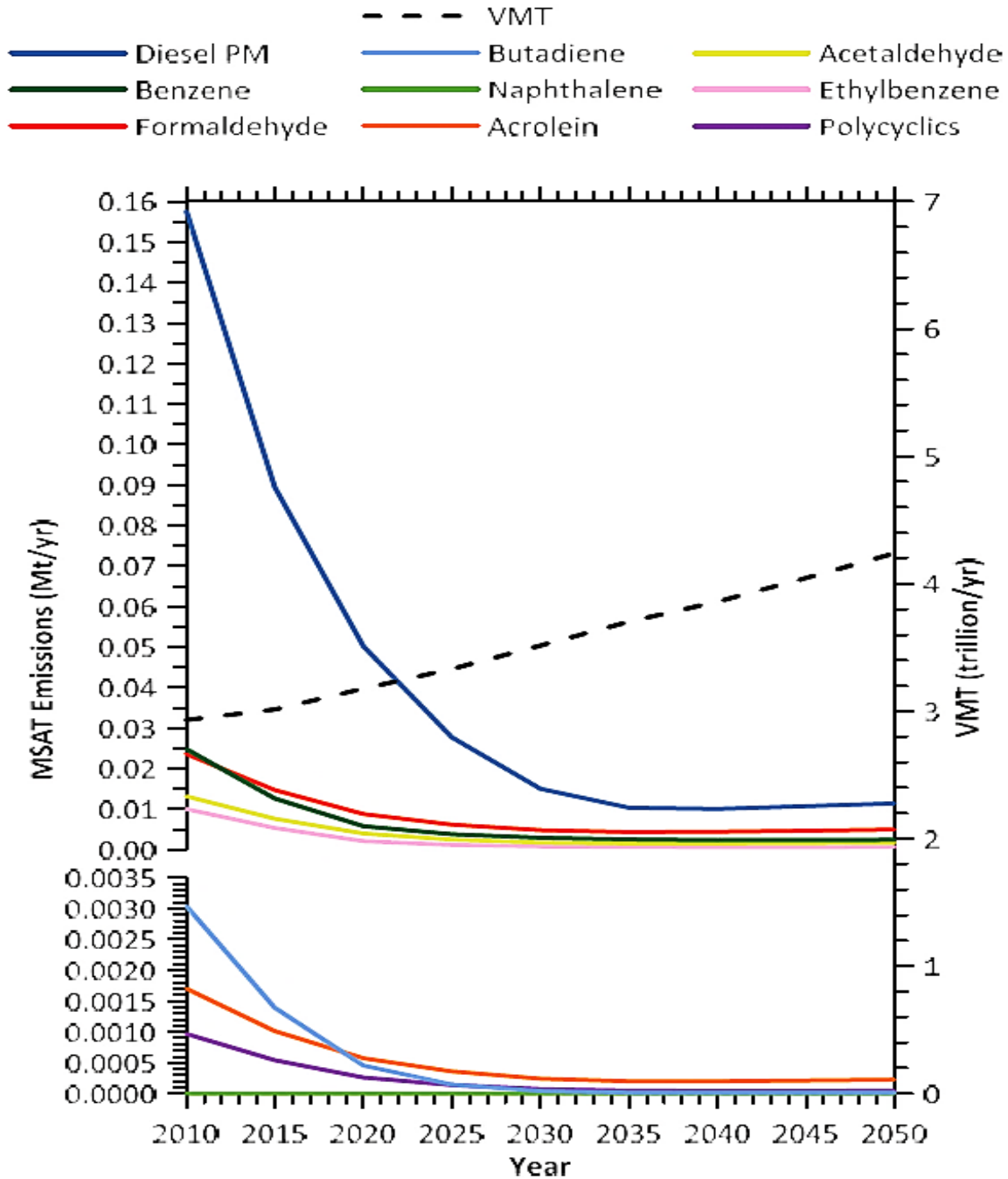
The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis Using EPA's MOVES2014a model, as shown in Figure 1, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

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 (NEPA). 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.

PROJECT-LEVEL MSAT DISCUSSION

Following FHWA's Interim Guidance Update on MSAT Analysis in NEPA dated October 18, 2016 (http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/ajintguidmem.cfm), this project has been determined to have low potential MSAT effects, thereby requiring a qualitative MSAT analysis. A qualitative MSAT 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: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm

**Figure 1: NATIONAL MSAT EMISSION TRENDS 2010 - 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA'S MOVES2014a MODEL**



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
Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.

For each 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 each of the Build Alternative(s) may be slightly higher than that for the No-Build Alternative, because the additional capacity may increase the efficiency of the roadway and attract rerouted trips from elsewhere in the transportation network. This potential increase in VMT could 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 would be offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES2014a model, emissions of all of the priority MSAT decrease as speed increases.

There may also be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations. 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 90 percent between 2010 and 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). 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.

Any additional travel lanes contemplated as part of the project alternatives may have the effect of moving some traffic closer to nearby homes, schools, and businesses; with the result that there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative(s) than the No-Build Alternative. 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 capacity is increased, such as when a highway is widened, the localized level of MSAT emissions for the Build Alternative(s) 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 significantly lower than today.

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, <https://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 Special Report 16, <https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects>) or in the future as vehicle emissions substantially decrease

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 unsupported 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 C-3 occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, <https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects>). 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 states that with respect to diesel engine exhaust, “[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (<https://www.epa.gov/iris>).”

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 ([https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD5985257800050C9DA/\\$file/07-1053-1120274.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD5985257800050C9DA/$file/07-1053-1120274.pdf)).

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.

CONCLUSION

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project at this time. While it is possible that localized increases in MSAT emissions may occur as a result of this project, emissions will likely be lower than present levels in the design year of this project 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. Although local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures, 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.