CENTRAL FLORIDA EXPRESSWAY AUTHORITY

DATE: October 29, 2019
TO: Central Florida Expressway Authority
FROM: Robyn Hartz, Senior Transportation Specialist, RS&H
SUBJECT: Air Quality Screening Test
Osceola Parkway Extension SR 471 to Cyrils Drive
Osceola and Orange Counties, Florida
Contract No.: 001250

The proposed project is located in Osceola and Orange Counties, areas currently designated as being attainment for the following criteria air pollutant(s): ozone, nitrogen dioxide, particulate matter (2.5 microns in size and 10 microns in size), sulfur dioxide, carbon monoxide, and lead.

The project's Build Alternative was subjected to a carbon monoxide (CO) screening model that makes various conservative worst-case assumptions related to site conditions, meteorology and traffic. The Florida Department of Transportation's (FDOT's) screening model for CO uses the latest United States Environmental Protection Agency (EPA)-approved software to produce estimates of one-hour and eight-hour CO at default air quality receptor locations. The one-hour and eight-hour estimates can be directly compared to the current one-and eight-hour **National Ambient Air Quality Standards** (**NAAQS**) for CO.

To be consistent with the 2017 Osceola County Expressway Authority Project Development & Environment Study, the same roadway interchange was used for the updated screening analysis. The interchange used in this screening analysis is the proposed Osceola Parkway and Narcoossee Road diamond interchange. The Build scenario for the design year (2045) was evaluated. The traffic data input used in the evaluation is attached to this memorandum (see Table 1).

Estimates of CO were predicted for the default receptors which are located 10 feet to 150 feet from the edge of the roadway. Based on the results from the screening model, the highest project-related CO one- and eight-hour levels are not predicted to meet or exceed the one- or eight-hour **National Ambient Air Quality Standards** (**NAAQS**) for this pollutant with the Build Alternative. As such, the project "passes" the screening model. The results of the screening model are attached to this memorandum.

As shown in the attached results, the operations of the proposed facility are anticipated to result in maximum one-hour CO concentrations of 6.8 and maximum eight-hour CO concentrations of 4.1 parts per million (ppm). Since these values do not exceed the NAAQS of 35 ppm for a one-hour concentration and 9 ppm for an eight-hour concentration, no adverse air quality impact will result from this project.

Construction activities may cause minor short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts can be minimized by adherence to all applicable State regulations and application of appropriate construction specifications.

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MSAT Analysis

A qualitative analysis provides a basis for identifying and comparing the potential differences among mobile source air toxics (MSAT) emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives.

For the preferred alternative analyzed in this re-evaluation the amount of MSAT emitted would be proportional to the vehicle miles traveled (VMT) if other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative is higher than that for the No-Build Alternative since the proposed project is a new expressway connection. The new capacity increases the efficiency of the overall roadway and may attract some trips from elsewhere in the transportation network.

This increase in VMT would lead to higher MSAT emissions for the recommended alternative, along with a corresponding decrease in MSAT emissions along the parallel or currently congested routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to the EPA MOVES2014 model, emissions of all priority MSAT decrease as speed increases. Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year because of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (Refer to 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 project area are likely to be lower in the future in nearly all cases.

The proposed improvements will have the effect of moving traffic closer to nearby populated areas; therefore, there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives 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 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 significantly lower than today.

Incomplete or Unavailable Information for Project-Specific MAST 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 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). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance 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 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 (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 particulate matter. The EPA states that with respect to diesel engine exhaust, "the absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (EPA IRIS database, Diesel Engine Exhaust, Section II.C. https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0642.htm#quainhal)."

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/284E23FFE079CD59852578000050C9DA/$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.

Table 1: CO Florida 2012 Input Data

Year	Facility	Design Hour Traffic Volumes *	Speed
2045	Osceola Parkway East/West	4,035	65
	Ramps	1,390	45
	Narcoossee Road North/South	3,265	45
*CO 2012 uses the maximum approach volume for each roadway, therefore only one volume is shown			

CO Florida 2012 - Results
Tuesday, October 29, 2019

Project Description

Project Title	2045 Build Screening CFX Osceola			
Facility Name	Osceola Parkway Extensions			
User's Name	RS&H			
Run Name	Narcosse Road Interchange			
FDOT District	5			
Year	2045			
Intersection Type	E-W Diamond			
Speed	Arterial	45 mph	Freeway	65 mph
Approach Traffic	Arterial	3265 vph	Freeway	4035 vph

Environmental Data

Temperature	47.8 °F
Reid Vapor Pressure	13.3 psi
Land Use	Rural
Stability Class	E
Surface Roughness	10 cm
1 Hr. Background Concentration	1.7 ppm
8 Hr. Background Concentration	1.0 ppm

Results
(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	6.4	3.8
2	6.3	3.8
3	6.1	3.7
4	3.2	1.9
5	4.4	2.6
6	5.3	3.2
7	4.0	2.4
8	6.1	3.7
9	5.4	3.2
10	5.3	3.2
11	6.8	4.1
12	6.8	4.1
13	6.5	3.9
14	3.0	1.8
15	4.3	2.6
16	5.3	3.2
17	4.0	2.4
18	5.5	3.3
19	5.7	3.4
20	5.1	3.1

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****************PROJECT PASSES*****************
NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED
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