APPENDIX D
AIR QUALITY TECHNICAL REPORT

I-375 IMPROVEMENT PROJECT
AIR QUALITY TECHNICAL REPORT

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MDOT
Michigan Department of Transportation

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1 Executive Summary

This report evaluates the potential air quality impacts for the I-375 Improvement Project. It was prepared in compliance with the Clean Air Act and the 1990 Clean Air Act Amendments, related Federal regulations and Federal Highway Administration (FHWA) Guidance, and the Michigan Department of Transportation (MDOT) procedures which follow related Federal regulations and FHWA Guidance, and it addresses regional and project level conformity in accordance with 40 CFR Part 93. The report discusses carbon monoxide (CO), discusses fine particulate matter ($PM_{2.5}$), and provides a qualitative discussion on Mobile Source Air Toxics (MSAT).

I-375 is an urban freeway stub approximately one-mile in length which connects I-75 to Jefferson Avenue in Downtown Detroit. The 350 feet-wide depressed (below grade) facility is crossed by seven bridges carrying surface streets. Originally built in the 1960's, the I-375 corridor is in need of reconstruction and maintenance. Also included in this evaluation is the I-75/I-375 Interchange. The I-375 Environmental Assessment (EA) was initiated, following completion of a Planning and Environmental Linkages Study (PEL) in 2014, to identify and evaluate alternatives for the corridor, and several adjacent facilities, which would address the need for near- and long-term rehabilitation, meet the transportation needs of all users in a cost-effective manner, and improve the connectivity, vibrancy, and economic development potential of the corridor. Several alternatives were analyzed throughout development of the EA and were eliminated based on stakeholder and public input. The Preferred Alternative is discussed in this report.

The I-375 project corridor is located within the Metropolitan Detroit-Port Huron Intrastate Air Quality Control Region (AQCR #123). Wayne County is currently in attainment status for four (4) of the six (6) criteria pollutants. A portion of Wayne County has been classified as being in non-attainment for Sulfur Dioxide SO_2 (2010), but the project is not located in that portion of the county.[1] Wayne County is considered a Maintenance Area for the 24-hour $PM_{2.5}$ standard. Wayne County is also in maintenance for the 1997 8-hour ozone standard and non-attainment for the 2015 8-hour ozone standard. As such, the project is required to meet Transportation Conformity Rule requirements found in 40 CFR Part 93.

The Southeast Michigan Council of Governments (SEMCOG) is the Metropolitan Planning Organization (MPO) with jurisdiction in Wayne County. This project is included in SEMCOG's 2045 Regional Transportation Plan (RTP) for Southeast Michigan, RTP project #13286, and FY 2020-2023 Transportation Improvement Program (TIP) for Southeast Michigan, TIP project #522. SEMCOG's 2045 RTP was adopted on March 14, 2019 in conformance with the transportation planning requirements of Titles 23 and 49 USC, the Clean Air Act Amendments, and related regulation. The date of the United States Department of Transportation (USDOT) conformity determination for the 2045 RTP was July 15, 2019. The FY 2020-2023 TIP was officially adopted on July 25, 2019

[1] https://www.epa.gov/green-book/green-book-gis-download

by the MPO Executive Committee. The date of the USDOT conformity determination for the FY 2020-2023 TIP was September 17, 2019. The project design for the Preferred Alternative has not changed significantly from what is included in the RTP and TIP.

MDOT and FHWA received a letter from the United States Environmental Protection Agency (USEPA) on December 18, 2019 confirming Wayne County is in full attainment for CO as of July 30, 2019. Because CO was in maintenance when the EA analyses were started, a CO microscale air quality analysis was completed for previous project alternatives that were analyzed throughout development of the EA. The results of the CO microscale air quality modeling indicated that CO concentrations for the project would not exceed the 1-hour (35 ppm) or 8-hour (9 ppm) National Ambient Air Quality Standards (NAAQS); however, the detailed results of the CO microscale analysis are not included in this report because the analysis is not required with the full attainment designation for CO in Wayne County.

The SEMCOG Michigan Transportation Conformity Interagency Workgroup (IAWG) has established a process to be used in Southeast Michigan for identifying transportation projects of local air quality concern requiring a $PM_{2.5}$ hot-spot analysis (see Appendix A). The IAWG has established general criteria for projects requiring $PM_{2.5}$ hot-spot analysis, based on EPA guidance and interagency consultation. These criteria have been passed on to MDOT project-level review staff, and MDOT is responsible for bringing potential projects of air quality concern for $PM_{2.5}$ to the IAWG for interagency consultation and determination on whether the project is or is not a project of air quality concern.

The MDOT 2015 traffic data for the project corridor shows annual average daily traffic (AADT) of 43,800 – 72,100 and commercial annual average daily traffic (CAADT) of 270 (for full project corridor), which makes the diesel traffic less than 1% of the traffic. AADT traffic in the future year (2040) is projected to increase to between 49,600 and 81,700 with a similar increase in CAADT to 310 diesel vehicles. Therefore, the I-375 corridor does not have the diesel traffic that warrants it a project of air quality concern for $PM_{2.5}$ based on the IAWG general criteria and was not brought forth for interagency consultation. Based on the air quality analyses completed for the proposed improvements, this project will not contribute to any violation of the CO nor $PM_{2.5}$ NAAQS.

The I-375 Project meets FHWA's definition of a project with low potential MSAT effects because AADT traffic is projected to increase to between 49,600 and 81,700 with a similar increase in CAADT to 310 diesel vehicles. Therefore, based on FHWA's three levels of analysis, the I-375 project has a low potential for meaningful increases in MSAT emission and meets FHWA's criteria for a qualitative assessment.

FHWA and MDOT have provided a qualitative analysis of MSAT emissions relative to the No-Build Alternative and the I-375 Improvement Project. Under the Preferred Alternative in the design year, it is expected that there would be little appreciable differences in overall MSAT emissions relative to the No-Build Alternative. There could be increases in MSAT levels in a few localized areas where the surface boulevard is closer to the public.

However, EPA's vehicle and fuel regulations will bring about significantly lower MSAT levels for the area in the future than today. The *Interim Guidance on Air Toxics in NEPA Documents* (FHWA, October 18, 2016) indicates that presently there is not adequate science to reliably include exposure modeling or risk assessment in the air quality analysis. Because of this uncertainty, the health effects from these emissions cannot be reliably estimated.

2 Introduction

2.1 Purpose

In compliance with the Clean Air Act and the 1990 Clean Air Act Amendments, the National Environmental Policy Act (NEPA), related Federal regulations and FHWA Guidance, along with MDOT procedures, this report discusses the potential air quality impacts of the I-375 Improvement Project. This report is the technical document to support the Environmental Assessment of the proposed project.

The process described will ultimately be used to:

- address the status of this project's conformity in accordance with 40 CFR Parts 51 and 93, *Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 USC or the Federal Transit Act*;
- present a discussion on carbon monoxide (CO);
- present a discussion on fine particulate matter ($PM_{2.5}$); and
- qualitatively discuss mobile source air toxics (MSAT)

2.2 Project Description

After more than 50 years of use, I-375 is nearing the end of its useful service life, including the I-75/I-375 Interchange and the bridges, and it requires modernization. The current condition is one of the primary drivers of the study's Purpose and Need, along with the opportunity to help the city of Detroit meet certain economic development and land use planning goals for the vicinity.

The I-375 freeway was constructed as a limited access, depressed, urban freeway approximately one mile in length. The project area is contained within the city of Detroit, in Wayne County; see Figure 1. The project area is defined as:

- I-375 from I-75 to south of Jefferson Avenue to Atwater Street.
- I-75 south of Mack Avenue to east of John R.
- I-75/I-375 Interchange, including all ramps, and the Gratiot Avenue Connector.
- Gratiot Avenue from south of Beaubien Street to the Dequindre Cut Greenway.
- Jefferson Avenue from Woodward Avenue to Rivard Street.

I-375 is a median-divided below grade urban freeway with two lanes each northbound and southbound between Jefferson Avenue and Larned Street. Between Larned Street and Lafayette Avenue, the freeway is three lanes in each direction. The freeway then transitions to four lanes wide in each direction from Lafayette Avenue to the I-75 interchange. Along the I-375 freeway, there are seven bridges connecting surface streets over I-375.

I-375 is at the east edge of the city of Detroit's central business district (CBD) and provides freeway access directly to the riverfront, the Renaissance Center, Hart Plaza and the financial district. Land uses in this area include businesses, residential, and urban open spaces.

2.3 Preferred Alternative

The Preferred Alternative includes a new I-75/I-375 interchange and a six-lane boulevard with direct left-turns to local streets south of Gratiot Avenue. The I-375 below-grade freeway would become an at-grade boulevard at Gratiot Avenue, creating a new intersection and improved access to Gratiot Avenue. Continuing south of Gratiot Avenue, the boulevard will have signalized intersections with direct left-turns to and from the side streets. The I-75/I-375 Interchange will be an urban-type interchange with right-sided ramps to Gratiot Avenue and Eastern Market and will allow for through traffic for I-75 along the left-side.

Roadway refinements were made to the local street design in the Eastern Market area. This includes an extension of Montcalm Street to Jay Street, east of Gratiot Avenue, providing connectivity between neighborhoods north and south of Gratiot Avenue. A New Local Connector roadway will connect Gratiot Avenue to the west to Brush Park to the east and will provide additional local connectivity east and west.

The Preferred Alternative includes a 10-foot wide two-way cycle track along the east side of the boulevard and extends from Montcalm Street in the north to Atwater Street in the south. A cycle track along the north side of Montcalm Street extends from Brush Street in the west to the Dequindre Cut Greenway in the east.

The full Preferred Alternative is described in the *I-375 Improvement Project Environmental Assessment.*

Figure 1. Project Location

3 Basics of Air Quality Pollutants

3.1 Criteria Pollutants

Under the Clean Air Act of 1970 (last amended in 1990), the United States Environmental Protection Agency (EPA) established the NAAQS to protect public health, safety, and welfare from known or anticipated effects of air pollutants. EPA has established NAAQS for six criteria pollutants:

- Sulfur dioxide (SO_2)
- Particulate matter (PM_{10}, 10 micrometers and smaller along with $PM_{2.5}$, 2.5 micrometers and smaller)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Lead (Pb)

Table 1 presents the NAAQS. When concentrations of pollutants do not exceed the standards, an area is considered in attainment of the NAAQS. An area that is equal to or exceeds the NAAQS standards for one or more pollutants is designated by the EPA as a nonattainment area.

The Clean Air Act Amendments of 1977 and 1990 required all states to submit a list to EPA identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions that exceed the NAAQS for any criteria pollutant are designated as non-attainment areas for that pollutant. The Clean Air Act Amendments also established time schedules for the states to attain the NAAQS. The primary pollutants from motor vehicles are unburned hydrocarbons, nitrogen oxides, carbon monoxide and particulates.

Ozone is created from volatile organic compounds and nitrogen oxides reacting in the presence of sunlight. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are regional problems. The modeling procedures for ozone require long-term meteorological data and detailed area wide emission rates for all potential sources.

Table 1: National Ambient Air Quality Standards (NAAQS)

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3-month Average	0.15 µg/m^3 [a]	Not to be exceeded
Nitrogen Dioxide ($N0_2$)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb [b]	Annual mean
Ozone (0_3)		primary and secondary	8 hours	0.070 ppm [c]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24-hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years.
Sulfur Dioxide ($S0_2$)		primary	1 hour	75 ppb [d]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: https://www.epa.gov/criteria-air-pollutants/naaqs-table, accessed March 8, 2018

[a] In areas designated non-attainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar-quarter average) also remain in effect.

[b] The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

[c] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards. On April 23, 2018 the FHWA published a memorandum providing interim guidance on the reinstated 1997 8-hour ozone standard. The standard was revoked in April 2015 with the establishment of the 2008 8-hour ozone standard. A Federal court decision reinstated the 1997 standard.

[d] The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated non-attainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Carbon monoxide is a colorless and odorless gas that is the by-product of incomplete combustion and is the major pollutant from gasoline-fueled motor vehicles. CO emissions are greatest from vehicles operating at low speeds and prior to complete engine warm-up (within roughly eight minutes after starting). Congested urban roads tend to be the principal problem areas for carbon monoxide.

Particulate matter includes microscopic solids or liquid droplets. Motor vehicles (i.e., cars, trucks, and buses) emit direct PM in their exhausts, as well as from brake and tire wear. Vehicles also cause dust from paved and unpaved roads to be re-suspended in the

atmosphere. Gaseous precursors in vehicle exhaust may react in the atmosphere to form PM, including nitrogen oxides (NO_X), volatile organic compounds, sulfur oxides (SO_X) and ammonia (NH_3). PM can penetrate deep into the lungs and cause health problems, such as heart attacks, aggravated asthma, coughing, or difficult breathing. People with heart or lung diseases, children, and older adults are the most susceptible to particle pollution exposure, although healthy people may also experience temporary symptoms from exposure to elevated levels of PM pollution.[2]

Exceeding the NAAQS pollutant level does not necessarily constitute a violation of the standard. Some of the criteria pollutants (including carbon monoxide) are allowed one exceedance of the maximum level per year, while for other pollutants, criteria levels cannot be exceeded. Violation criteria for other pollutants are based on recorded exceedances. Table 1 lists the allowable exceedances for EPA criteria pollutants.

3.2 Attainment Designation

The I-375 project corridor is located within the Metropolitan Detroit-Port Huron Intrastate Air Quality Control Region (AQCR #123). Wayne County is currently in attainment status for four (4) of the six (6) criteria pollutants. The USEPA designated Wayne County in full attainment for CO on July 30, 2019. A portion of Wayne County has been classified as being in non-attainment for Sulfur Dioxide SO_2 (2010), but the project is not located in that portion of the county.[3] Wayne County is considered a Maintenance Area for the 24-hour $PM_{2.5}$ standard. Wayne County is also in maintenance for the 1997 8-hour ozone standard and non-attainment for the 2015 8-hour ozone standard. As such, the project is required to meet Transportation Conformity Rule requirements found in 40 CFR Part 93.

SEMCOG is the MPO with jurisdiction in Wayne County. This project is included in SEMCOG's 2045 RTP for Southeast Michigan, RTP project #13286, and FY 2020-2023 Transportation Improvement Program for Southeast Michigan, TIP project #522. SEMCOG's 2045 RTP was adopted on March 14, 2019 in conformance with the transportation planning requirements of Titles 23 and 49 USC, the Clean Air Act Amendments, and related regulation. The date of the USDOT conformity determination for the 2045 RTP was July 15, 2019. The FY 2020-2023 TIP was officially adopted on July 25, 2019 by the MPO Executive Committee. The date of the USDOT conformity determination for the FY 2020-2023 TIP was September 17, 2019. The project design for the Preferred Alternative has not changed significantly from what is included in the RTP and TIP.

3.3 Mobile Source Air Toxics (MSAT)

In addition to establishing the NAAQS, EPA regulates air toxics. MSAT are compounds emitted from on-road vehicles, non-road vehicles and equipment that are known to cause serious health and environmental effects. Most air toxics originate from human-made

[2] https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm, accessed January 5, 2018.
[3] https://www.epa.gov/green-book/green-book-gis-download

sources, including on road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).
In April 2007, under authority of the Clean Air Act Section 202(l), EPA signed a final rule, Control of Hazardous Air Pollutants from Mobile Sources, which sets standards to control MSAT. Under the rule, EPA set standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers. Beginning in 2011, refineries were required to limit the annual benzene content of gasoline to an annual average refinery average of 0.62 percent. The rule also sets a new vehicle exhaust emission standard for non-methane hydrocarbon including MSAT compounds, which were phased in between 2010 and 2013 for lighter vehicles and between 2012 and 2015 for heavier vehicles.

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, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their *Integrated Risk Information System* (IRIS).[4] 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).[5] 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 MSAT, the list is subject to change and may be adjusted in consideration of future EPA rules.

In October 2016 FHWA issued updated guidance for the analysis of MSAT in the National Environmental Policy Act (NEPA) process for highway projects (*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*) requiring the use of the most recent version of EPA's *Motor Vehicle Emissions Simulator* (MOVES2014a) model for air quality analysis on documents prepared in accordance with NEPA. The following language is taken from the guidance document and associated appendices.[6]

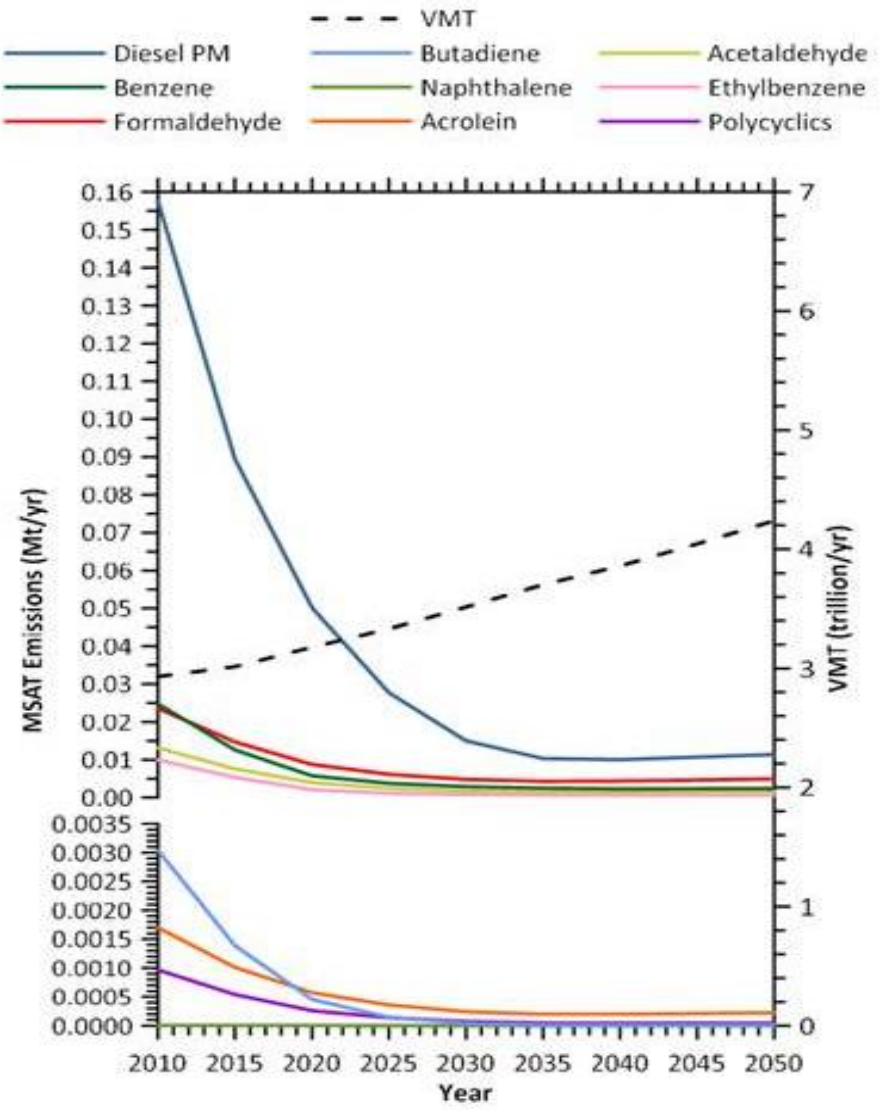
Based on an FHWA analysis using EPA's MOVES2014a model, as shown in Figure 2, even if vehicle-miles travelled (VMT) increases by 45 percent 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

[4] EPA, https://www.epa.gov/iris

[5] EPA, https://www.epa.gov/national-air-toxics-assessment

[6] http://www.fhwa.dot.gov/Environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm, accessed January 5, 2018.

Figure 2: National MSAT Emission Trends, 2010-2050, for Vehicles Operating on Roadways Using EPA's MOVES2014a Model



Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.
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, meteorological, and other factors.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

3.3.1 MSAT Research

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 potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to arise on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. 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 field.

4 Air Quality Analysis

4.1 Carbon Monoxide (CO) Analysis

CO emissions are greatest from vehicles operating at low speeds and prior to complete engine warm-up (within approximately eight minutes of starting). Congested urban roads, therefore, tend to be the principal problem areas for CO. Because the averaging times associated with the CO standards are relatively short (1 and 8 hours), CO concentrations can be modeled using simplified "worst-case" meteorological assumptions. Modeling is also simplified considerably by the stable, non-reactive nature of CO.

A CO analysis was completed in April of 2018 on the then current alternatives when the project area was in maintenance for CO. The results of that CO microscale air quality modeling indicated that CO concentrations for the project would not exceed the 1-hour (35 ppm) or 8-hour (9 ppm) NAAQS. The area has since then been designated full attainment for CO by the USEPA (July 30, 2019). Also, the current Preferred Alternative was identified in January 2020. A new CO microscale analysis was not conducted on the current Preferred Alternative because the project area is in full attainment for CO and the Preferred Alternative is not substantially different from the previous alternatives with regard to the criteria for CO microscale analysis.

4.2 Particulate Matter 2.5 ($PM_{2.5}$) Hot-Spot Analysis

EPA issued the final, amended Transportation Conformity Rule on March 10, 2006. The Rule requires a hot-spot analysis to determine project-level conformity in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. A hot-spot analysis is an assessment of localized emissions impacts from a proposed transportation project and is only required for “projects of air quality concern.”

The SEMCOG Michigan Transportation Conformity Interagency Workgroup (IAWG) has established a process to be used in Southeast Michigan for identifying transportation projects of local air quality concern requiring a $PM_{2.5}$ hot-spot analysis (See Appendix A). The IAWG has established general criteria for projects requiring $PM_{2.5}$ hot-spot analysis, based on EPA guidance and interagency consultation. These criteria have been passed on to MDOT project-level review staff, and MDOT is responsible for bringing potential projects of air quality concern for $PM_{2.5}$ to the IAWG for interagency consultation and determination on whether the project is or is not a project of air quality concern.

The MDOT 2015 traffic data for the project corridor shows annual average daily traffic (AADT) of 43,800 – 72,100 and commercial annual average daily traffic (CAADT) of 270 (for full project corridor), which makes the diesel traffic less than 1% of the traffic. AADT traffic in the future year (2040) is projected to increase to between 49,600 and 81,700 with a similar increase in CAADT to 310 diesel vehicles. Therefore, the I-375 corridor does not have the diesel traffic that warrants it a project of air quality concern for $PM_{2.5}$

based on the IAWG general criteria and was not brought forth for interagency consultation.

4.3 Mobile Source Air Toxics (MSAT) Analysis

4.3.1 Consideration of MSAT in NEPA Documents

The FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

(1) No analysis for projects with no potential for meaningful MSAT effects;

(2) Qualitative analysis for projects with low potential MSAT effects; or

(3) Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

For projects warranting MSAT analysis, all nine priority MSAT should be analyzed.

(1) Projects with No Meaningful Potential MSAT Effects, or Exempt Projects.

The types of projects included in this category are:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117(c) (subject to consideration whether unusual circumstances exist under 23 CFR 771.117(b));
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

For projects that are categorically excluded under 23 CFR 771.117, or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is recommended. However, the project record should document in the EA or EIS the basis for the determination of no meaningful potential impacts with a brief description of the factors considered.

(2) Projects with Low Potential MSAT Effects

The types of projects included in this category are those that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

The FHWA anticipates that most highway projects that need an MSAT assessment will fall into this category. Any projects not meeting the criteria in category (1) or category (3)

below should be included in this category. Examples of these types of projects are minor widening projects; new interchanges, replacing a signalized intersection on a surface street; or projects where design year traffic is projected to be less than 140,000 to 150,000 AADT. For these projects, a qualitative assessment of emissions projections should be conducted.

(3) Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. We expect a limited number of projects to meet this two-pronged test. To fall into this category, a project should:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects; or

- Create new capacity or add significant capacity to urban highways such as Interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000[7] or greater by the design year; and also,

- Proposed to be located in proximity to populated areas.

Projects falling within this category should be more rigorously assessed for impacts.

4.3.2 MSAT Qualitative Assessment

The 2015 traffic data for the project extent shows AADT of 43,800 to 72,100 and CAADT of 270. Diesel traffic is expected to be less than 1% of the total traffic volume.[8] AADT traffic is projected to increase to between 49,600 and 81,700 with a similar increase in CAADT to 310 diesel vehicles. Based on FHWA's three levels of analysis, the I-375 project has a low potential for meaningful increases in MSAT emission and meets FHWA's criteria for a qualitative assessment.

This qualitative assessment should compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, including No-Build, based on VMT, vehicle mix, and speed. It should also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of projects with low potential for MSAT effects typically are low, no

[7] FHWA, https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/

[8] MDOT 2015 Sufficiency Traffic data as per Tom Hanf (HanfT@michigan.gov), RE: I-375 Air Quality - Detroit, MI, e-mail message to John Jaeckel, August 23, 2017.

appreciable difference in overall MSAT emissions among the various alternatives would be expected.

The amount of MSAT emissions emitted for the build alternative would be proportional to the vehicle miles traveled, or VMT. The VMT estimated for the build alternative is very similar to the No-Build because there are no capacity increases with the build alternative and trips will be rerouted elsewhere in the transportation network. Therefore, there would be no appreciable difference in overall MSAT emissions between the No-Build and build alternative.

Emissions will likely decrease for the future 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 accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future for either the No-Build or build alternative.

The conversion of the I-375 urban freeway stub to a surface-level boulevard would have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under the Preferred Alternative there may be localized areas where ambient concentrations of MSAT could be higher than the No-Build scenario. However, the magnitude and the duration of these potential increases compared to the No-Build scenario cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts.

Under the Preferred Alternative in the design year, it is expected that there would be little appreciable differences in overall MSAT emissions relative to the No-Build Alternative. There could be increases in MSAT levels in a few localized areas where the surface boulevard is closer to the public. However, EPA's vehicle and fuel regulations will bring about significantly lower MSAT levels for the area in the future than today.

4.3.3 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis[9]

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

[9] This section comes directly from FHWA guidance. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/page03.cfm.

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".[10] 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 are the adverse human health effects of MSAT compounds at current environmental concentrations[11] 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.[12] 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

[10] *Source: EPA, https://www.epa.gov/iris*

[11] HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects

[12] HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects

develop a sufficiently confident dose- response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk."[13]

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 one 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 safe or acceptable.[14]

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.

[13] EPA IRIS database, Diesel Engine Exhaust, Section II.C.
https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=642

[14] https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf

5 Conclusion

Based on the air quality analyses completed for the proposed improvements, this project will not contribute to any violation of the CO nor $PM_{2.5}$ NAAQS.

FHWA and MDOT have provided a qualitative analysis of MSAT emissions relative to the No-Build Alternative and the I-375 Improvement Project Preferred Alternative. Under the Preferred Alternative in the design year, it is expected that there would be little appreciable differences in overall MSAT emissions relative to the No-Build Alternative. There could be increases in MSAT levels in a few localized areas where the surface boulevard is closer to the public. However, EPA's vehicle and fuel regulations will bring about significantly lower MSAT levels for the area in the future than today.

6 Construction Air Quality

I-375 construction will take place in different locations along the corridor over two construction seasons. During each construction season there would be localized increased emissions from construction equipment and particulate emissions from construction activities. Particulate emissions, whether from construction equipment diesel exhaust or dust from the construction activities, should be controlled as well as possible. Contractors should follow all MDOT's *Standard Specifications for Construction* that address the control of construction equipment exhaust or dust during construction. *Standard Specification for Construction* sections 107.15(A) and 107.19 will apply to control fugitive dust during construction and cleaning of haul roads. MDOT's anti-idling policy (Policy #10179) will address unnecessary engine idling of vehicles and equipment.

Even though construction mitigation measures are not required, there are several measures that could be considered to reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits. Also, technological adjustments to construction equipment, such as off-road dump trucks and bulldozers, could be an appropriate strategy. The EPA recommends Best Available Diesel Retrofit Control Technology (BACT) to reduce diesel emissions. Typically, BACT requirements can be met through the retrofit of all diesel-powered equipment with diesel oxidation catalysts or diesel particulate filters, and other devices that provide an after-treatment of exhaust emissions.

Other strategies that could be considered during construction include:

- Apply water suppression to active construction areas to minimize dust.
- Tarp trucks hauling soil, sand, and other loose materials or require trucks to maintain at least two feet of freeboard.
- Pave, apply water as needed, or apply (non-toxic) soil stabilizers on unpaved access roads, parking areas and staging areas at construction sites.
- Use water sweepers to sweep paved access roads, parking areas and staging areas at construction sites.
- Use water sweepers to sweep streets if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Utilize appropriate erosion control measures to reduce silt runoff to public roadways.
- Replant vegetation as quickly as possible to minimize erosion in disturbed areas.
- Use alternative fuels for construction equipment when feasible.

- Minimize equipment idling time.
- Maintain properly tuned equipment.

7 References

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Appendix A: Southeast Michigan Process for Identifying Projects that Require PM2.5 Hotspot Analysis

Southeast Michigan

Process for Identifying Projects that Require $PM_{2.5}$ Hotspot Analysis

Established by the Southeast Michigan Interagency Working Group
On February 26, 2008

Process for Identifying Projects That Require a PM2.5 Hotspot Analysis:
The following outlines the process to be used in Southeast Michigan for identifying transportation projects that require a PM2.5 hotspot analysis.

- The IAWG will establish general criteria for projects requiring PM2.5 hotspot analysis, based on EPA guidance and interagency consultation. It would pass these criteria on to MDOT project review staff for their use in project-level environmental review.
- General responsibility for PM2.5 hotspot project identification and review would reside with MDOT project-level review staff, just as is done with CO hotspot analysis.
- The IAWG would consider PM2.5 hotspot requirements when reviewing RTP and TIP project lists and flag any projects that might require hotspot analysis. The IAWG would then pass this information on to project-level review staff at MDOT.

Projects Requiring PM2.5 Hotspot Analysis
Using the examples set forth in the USEPA's final rule on PM2.5 project-level hotspot analysis[i] as well as the joint USEPA/FHWA conformity guidance on this subject[ii], the following will be considered "projects of air quality concern" that would require a hotspot analysis:

- New or expanded highway projects that have an average daily traffic volume greater than 125,000 and 8% or more of this traffic is diesel vehicles;
- New exit ramps or other highway facility improvements that would connect a highway or expressway to a freight, bus or intermodal terminal;
- Expansion of an existing highway or other facility that affects a congested intersection (one operating at level-of-service D, E, or F) and has, or will result in, a significant number of diesel vehicles at the intersection.
- New bus or intermodal terminals that will have a significant number of diesel vehicles congregating at a single location (i.e. a terminal considered to be regionally significant under 40 CFR 93.101); and,
- Expansion of bus and rail terminals or transfer points that currently have more than 10 diesel vehicle arrivals in the peak period, and will increase the number of daily diesel vehicle arrivals by 50% or more.

In accordance with EPA's rule, EPA & FHWA's joint guidance, and 40 CFR 93, the following would NOT be considered projects of air quality concern:

- Projects defined as "Exempt" in the federal Transportation Conformity Rule (40 CFR 93.126)

- Traffic signal synchronization projects under the federal Transportation Conformity Rule (40 CFR 93.128);
- A new or expanded highway project that primarily services gasoline vehicle traffic and is not expected to result in a significant increase in diesel traffic;
- Projects that improve traffic flow/operations and speeds, and do not involve increases in idling. Examples of such projects are:
    - An intersection channelization or interchange configuration project that involves turn lanes or movements that are physically separated;
    - Traffic circles or roundabouts; and,
    - Intersection signalization projects at individual intersections and intersection reconfiguration projects designed to improve traffic flow and vehicle speeds.

Projects that do not fit any of the above descriptions would be reviewed by the IAWG on an individual basis to determine the necessity of a PM2.5 hotspot analysis.

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[i] U.S. Environmental Protection Agency. *PM2.5 and PM10 Hot-Spot Analyses in Project-Level Transportation Conformity Determinations for the New PM2.5 and Existing PM10 National Ambient Air Quality Standards; Final Rule.* Federal Register Vol. 71, Mo. 47, March 10, 2006.

[ii] U.S. Environmental Protection Agency & Federal Highway Administration. *Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in PM2.5 and PM10 Nonattainment and Maintenance Areas*. March 2006.