

Chesapeake
BAY CROSSING STUDY
TIER 2 NEPA

AIR QUALITY
TECHNICAL REPORT

JANUARY 2026

MDTA
Maryland
Transportation
Authority

Chesapeake BAY CROSSING STUDY

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ABBREVIATIONS AND ACRONYMS

ADT	Average Daily Traffic
AADT	annual average daily traffic
ARDS	Alternatives Retained for Detailed Study
BRTB	Baltimore Regional Transportation Board
CAA	Clean Air Act and Amendments
CFR	Code of Federal Regulations
CO	carbon monoxide
EIS	Environmental Impact Statement
EMFAC	Emission FACtor
EPA	US Environmental Protection Agency
FAQs	Frequently Asked Questions
FEIS/ROD	Final EIS/Record of Decision
FHWA	Federal Highway Administration
FR	Federal Register

HEI	Health Effects Institute
ICG	Interagency Consultation Group
IRIS	Integrated Risk Information System
LOS	Level of Service
LRP	long-range plan
LRTP	Long-Range Transportation Plan
MD	Maryland
MDTA	Maryland Transportation Authority
MOVES	Motor Vehicle Emissions Simulator
MPO	metropolitan planning organization
MSATs	Mobile Source Air Toxics
MSTM	Maryland Statewide Transportation Model
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
O_3	ozone
Pb	lead
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter 2.5 micrometers or less in diameter
PM_{10}	Particulate Matter 10 micrometers or less in diameter
POM	polycyclic organic matter
ppb	Parts per billion
ppm	Parts per million
PPX	Post Panamax
SHA	State Highway Administration
SIP	State Implementation Plan
SO_2	sulfur dioxide
SUP	Shared Use Path
TDM	Transportation Demand Management
TIP	transportation improvement program
TSM	Transportation Systems Management
µg/m3	Micrograms per cubic meter
U.S.	United States
U.S.C.	United States Code
VMT	Vehicle Miles Traveled

1 INTRODUCTION

The Chesapeake Bay Crossing Study (Bay Crossing Study) is a two-tiered engineering and environmental study being advanced by the Maryland Transportation Authority (MDTA) in coordination with the Federal Highway Administration (FHWA). The Bay Crossing Study is addressing existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301. Each tier of the Bay Crossing Study involves development of an Environmental Impact Statement (EIS), in compliance with the National Environmental Policy Act (NEPA), to describe potential significant environmental effects and inform the evaluation of alternatives. Tier 1 of the Bay Crossing Study (Tier 1 Study) was completed in April 2022. At that time, the FHWA issued a Final EIS/Record of Decision (FEIS/ROD) identifying Corridor 7, the corridor that includes the Bay Bridge and its approaches, as the Selected Corridor Alternative for further evaluation. Tier 2 of the Bay Crossing Study (Tier 2 Study) was launched in June 2022 to focus on a project-level (site-specific) analysis within the Tier 1 Selected Corridor Alternative (Corridor 7). Study limits for the Tier 2 Study analysis are defined in **Section 2.2**. The Tier 2 NEPA process was initiated formally with publication of a Notice of Intent (NOI) to prepare an EIS in the Federal Register on November 15, 2024. This Air Quality Technical Report presents the potential air quality impacts associated with the Study in compliance with NEPA and the Clean Air Act and Amendments (CAA) and has been prepared to support and inform the EIS. This report begins with a description of the study area, followed by a summary of the Purpose and Need, and a description of the alternatives evaluated.

2 BACKGROUND

The Chesapeake Bay is one of Maryland's most important natural, economic, and cultural resources and the largest estuary in the United States. The 64,000-square-mile watershed that flows into the Chesapeake Bay spans six states and the District of Columbia and includes 150 major rivers and over 100,000 tributaries. The Chesapeake Bay has historically shaped the region's identity, culture, and traditions.

The Bay Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The original span opened in 1952, and the second span opened in 1973. Today, the two-lane original span typically carries eastbound traffic, and the three-lane second span typically carries westbound traffic. However, lanes on the bridge can be reversed to accommodate periods of heavy traffic. The approaches along U.S. 50/301 on each shore have six lanes (three lanes for each travel direction). The Bay Bridge has become one of Maryland's most iconic and recognizable landmarks, used by millions of Maryland residents and other travelers every year.

2.1 The Tiered NEPA Process

To study possible solutions that could address transportation issues, specifically as they relate to congestion, the MDTA and the FHWA are conducting the Bay Crossing Study as a tiered NEPA study. The tiered approach to NEPA has allowed the MDTA and the FHWA to focus on broader, planning-level decisions related to the preferred location of a potential new bay crossing in the Tier 1 Study EIS. In the subsequent Tier 2 Study EIS, the MDTA and FHWA analyzed more specific, project-level alternatives and potential impacts.

The Tier 1 Study evaluated 14 possible alternative corridor locations over a broad geographic area that spanned nearly 100 miles of the Chesapeake Bay between Harford and Cecil counties to the north and St. Mary's and Somerset counties to the south. The Tier 1 Study identified Corridor 7 as the Selected Corridor Alternative, which is a two-mile-wide and approximately 22-mile-long corridor that follows existing U.S. 50/301 and includes the location of the existing Bay Bridge.

The Tier 2 Study involves a project-level (site-specific) alternatives analysis within the Tier 1 Selected Corridor Alternative (Corridor 7). The focus of the Tier 2 Study is to identify the environmental impacts associated with alternatives to address the Tier 2 Study's Purpose and Need. This technical report supports the evaluation presented in the EIS.

2.2 Study Limits

The MDTA analyzed the traffic volumes along Corridor 7 and its interchanges to determine appropriate study limits for the Tier 2 Study. The Tier 2 western study limit has been identified as the MD 2/MD 450 interchange just east of the Severn River Bridge, and the Tier 2 eastern study limit has been identified as the U.S. 50/301 split.

2.3 Purpose and Need

The purpose of the Tier 2 Study is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along

the U.S. 50/301 corridor. The Tier 2 Study is evaluating measures to reduce congestion; improve travel times and reliability, mobility, and roadway deficiencies; and accommodate maintenance activities and navigation, while minimizing impacts to local communities and the environment. Five needs have been identified:

- **Adequate Capacity and Reliable Travel Times** – Capacity of the Bay Bridge and its approaches on U.S. 50/301 are not sufficient to accommodate existing and anticipated traffic demand, resulting in traffic congestion on the Bay Bridge and adjacent roadway network.

- **Mobility** – Congestion at the Bay Bridge and its approaches and subsequent spillover effects on local roadways limit the movement of people, goods, and services across the Chesapeake Bay and in adjacent communities.

- **Roadway Deficiencies** – The bridge does not meet current design standards for design or traffic operations because of the existing narrow lane widths, lack of shoulders, and other factors.

- **Existing and Future Maintenance Needs** – Due to the age and design life of the existing Bay Bridge, substantial maintenance of the facility will be needed, leading to lane closures that make incident management more difficult and cause increased traffic and congestion delays.

- **Navigation** – The existing Bay Bridge is a key constraint for the height of ships that travel the Chesapeake Bay, including to the Port of Baltimore.

The MDTA has also identified two study objectives:

- **Environmental Responsibility** – Project alternatives will be developed to avoid and minimize impacts to communities and sensitive environmental resources.

- **Cost and Financial Responsibility** – Cost and financial responsibility will be a factor when analyzing and evaluating potential solutions, with regard to the means of paying for the development, operation, and maintenance of all proposed facilities.

3 ALTERNATIVES

The MDTA identified the Alternatives Retained for Detailed Study (ARDS), which are the NEPA range of reasonable alternatives for evaluation in the Tier 2 Study EIS. The ARDS include the No-Build Alternative and six build alternatives (**Figure 3-1)**. Each build alternative includes removing the existing eastbound and westbound Bay Bridge spans and replacing them with two new bridge spans constructed near the location of the existing Bay Bridge. The ARDS are differentiated by the number of lanes provided across the new bridge and on the approaches as well as the bridge location, and consist of:

- **Alternative A - No-Build**: retains the existing Bay Bridge, the U.S. 50/301 alignment, and the existing number of lanes: 6 lanes along U.S. 50/301 on the Western Shore, 5 lanes across the Chesapeake Bay on the existing Bay Bridge, and 6 lanes along U.S. 50/301 on the Eastern Shore;

- **Alternative B - 6-8-6 North**: 6 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge with one span to the north of the existing spans and one span in-between the existing spans, and 6 lanes along U.S. 50/301 on the Eastern Shore;

- **Alternative C - 6-8-6 South**: 6 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge with one span to the south of the existing spans and one span in-between the existing spans, and 6 lanes along U.S. 50/301 on the Eastern Shore;

- **Alternative D - 8-8-8 North**: 8 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge with one span to the north of the existing spans and one span in-between the existing spans, and 8 lanes along U.S. 50/301 on the Eastern Shore;

- **Alternative E - 8-8-8 South**: 8 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge with one span to the south of the existing spans and one span in-between the existing spans, and 8 lanes along U.S. 50/301 on the Eastern Shore;

- **Alternative F - 8-10-8 North**: 8 lanes along U.S. 50/301 on the Western Shore, 10 lanes across the Chesapeake Bay on a new bridge with one span to the north of the existing spans and one span in-between the existing spans, and 8 lanes along U.S. 50/301 on the Eastern Shore; and

- **Alternative G - 8-10-8 South**: 8 lanes along U.S. 50/301 on the Western Shore, 10 lanes across the Chesapeake Bay on a new bridge with one span to the south of the existing spans and one span in-between the existing spans, and 8 lanes along U.S. 50/301 on the Eastern Shore.

Each of the ARDS will also include an optional pedestrian / bicycle shared use path, tolling, transit-related improvements, Transportation Systems Management (TSM)/Transportation Demand Management (TDM), stormwater management, utilities, and truck weigh and inspection stations. These common items, in addition to the improvements associated with each build alternative, informed the development of the limit of disturbance (LOD) for each build alternative. Additional detail on the ARDS can be found in the Tier 2 Study Draft EIS.

3.1 Alternative A: No-Build

Alternative A (6-5-6), the No-Build Alternative, would retain the existing Bay Bridge, the U.S. 50/301 alignment, and the existing number of lanes. This alternative would retain six lanes on the approaches on the Eastern and Western Shores and five lanes on the two-span Bay Bridge. The No-Build Alternative will include regular maintenance of the Bay Bridge and U.S. 50/301, but no capital improvements other than currently planned and programmed projects.

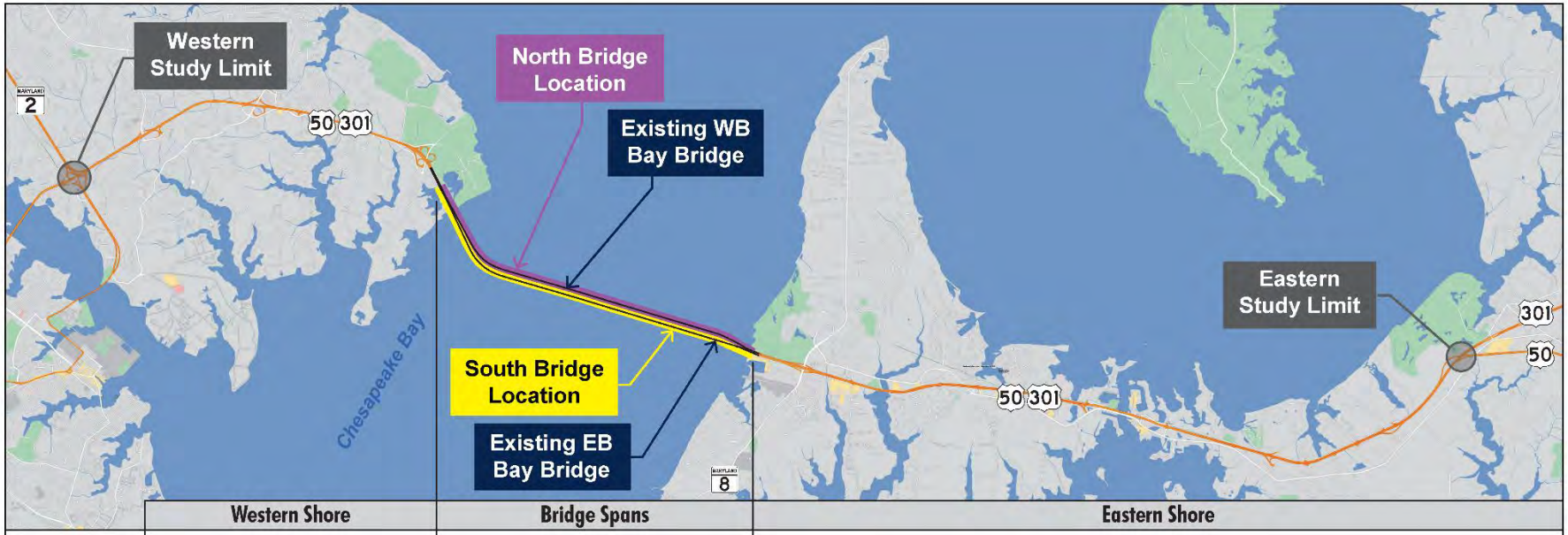
3.2 Alternative B: 6-8-6 North

Alternative B (6-8-6 North) would replace the existing Bay Bridge spans with two new bridge spans and would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction), eight lanes on a new bridge (four per direction), and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). The two new bridge spans would consist of one span to the north and one span in between the location of the existing bridge spans. The approach roadways would remain on the existing roadway alignment, except where necessary to connect to the new bridge spans. Thus, with Alternative B, the five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change and would remain at six total travel lanes beyond the immediate tie-ins to the new bridge spans.

3.3 Alternative C: 6-8-6 South

Alternative C (6-8-6 South) would replace the existing Bay Bridge spans with two new bridge spans and would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction), eight lanes on a new bridge (four per direction), and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). The two new bridge spans would include one span to the south and one span in between the location of the existing bridge spans. The approach roadways would remain on the existing roadway alignment, except where necessary to connect to the new bridge spans. Thus, with Alternative C, the five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change and would remain at six total travel lanes beyond the immediate tie-ins to the new bridge spans.

Figure 3-1: Alternatives Summary



	Western Shore	Bridge Spans	Eastern Shore
Alternative A: No-Build	6 Lanes	5 Lanes	6 Lanes
Alternative B	6 Lanes	8 Lanes NORTH	6 Lanes
Alternative C	6 Lanes	8 Lanes SOUTH	6 Lanes
Alternative D	8 Lanes	8 Lanes NORTH	8 Lanes
Alternative E	8 Lanes	8 Lanes SOUTH	8 Lanes
Alternative F	8 Lanes	10 Lanes NORTH	8 Lanes
Alternative G	8 Lanes	10 Lanes SOUTH	8 Lanes

3.4 Alternative D: 8-8-8 North

Alternative D (8-8-8 North) would replace the existing Bay Bridge spans with two new bridge spans and would consist of eight lanes along U.S. 50/301 on the Western Shore (four per direction), eight lanes on a new bridge (four per direction), and eight lanes along U.S. 50/301 on the Eastern Shore (four per direction). The two new bridge spans would include one span to the north and one span in between the location of the existing bridge spans. Alternative D would increase the number of lanes along the U.S. 50/301 approaches to eight lanes from the MD 2/MD 450 interchange on the Western Shore to the U.S. 50/301 split on the Eastern Shore and would generally remain on the existing roadway alignment except where necessary to connect to the new bridge spans. Thus, with Alternative D, the five existing bridge lanes would be increased to eight bridge lanes and the number of lanes on the Western Shore and Eastern Shore would increase from six total travel lanes to eight total travel lanes.

3.5 Alternative E: 8-8-8 South

Alternative E (8-8-8 South) would replace the existing Bay Bridge spans with two new bridge spans and would consist of eight lanes along U.S. 50/301 on the Western Shore (four per direction), eight lanes on a new bridge (four per direction), and eight lanes along U.S. 50/301 on the Eastern Shore (four per direction). The two new bridge spans would include one span to the south and one span in between the location of the existing bridge spans. Alternative E would increase the number of lanes along the U.S. 50/301 roadway approaches to eight lanes from the MD 2/MD 450 interchange on the Western Shore to the U.S. 50/301 split on the Eastern Shore and would generally remain on the existing roadway alignment except where necessary to connect to the new bridge spans. Thus, with Alternative E, the five existing bridge lanes would be increased to eight bridge lanes and the number of lanes on the Western Shore and Eastern Shore would increase from six total travel lanes to eight total travel lanes.

3.6 Alternative F: 8-10-8 North

Alternative F (8-10-8 North) would replace the existing Bay Bridge spans with two new bridge spans and would consist of eight lanes along U.S. 50/301 on the Western Shore (four per direction), ten lanes on a new bridge (five per direction), and eight lanes along U.S. 50/301 on the Eastern Shore (four per direction). The two new bridge spans would include one span to the north and one span in between the location of the existing bridge spans. Alternative F would increase the number of lanes along the U.S. 50/301 approach roadway to eight lanes from the MD 2/MD 450 interchange on the Western Shore to the U.S. 50/301 split on the Eastern Shore and would generally remain on the existing roadway alignment except where necessary to connect to the new bridge spans. Thus, with Alternative F, the five existing bridge lanes would be increased to ten bridge lanes and the number of lanes on the Western Shore and Eastern Shore would increase from six total travel lanes to eight total travel lanes.

3.7 Alternative G: 8-10-8 South

Alternative G (8-10-8 South) would replace the existing Bay Bridge spans with two new bridge spans and would consist of eight lanes along U.S. 50/301 on the Western Shore (four per direction), ten lanes on a new bridge (five per direction), and eight lanes along U.S. 50/301 on the Eastern Shore (four per direction). The two new bridge spans would include one span to the south and one span in between the location of the existing bridge spans. Alternative G would increase the number of lanes along the U.S. 50/301 approach roadway to eight lanes from the MD 2/MD 450 interchange on the Western Shore to the U.S. 50/301 split on the Eastern Shore

and would generally remain on the existing roadway alignment except where necessary to connect to the new bridge spans. Thus, with Alternative G, the five existing bridge lanes would be increased to ten bridge lanes and the number of lanes on the Western Shore and Eastern Shore would increase from six total travel lanes to eight total travel lanes.

3.8 Other Components of the Build Alternatives

3.8.1 Optional Pedestrian / Bicycle Shared Use Path

All proposed build alternatives include the option for the safe inclusion of a pedestrian/bicycle shared use path (SUP) along a new bridge. The MDTA has identified connections to existing and proposed trails and recreational facilities on the Eastern Shore and Western Shore.

3.8.2 Tolling

The MDTA owns and operates the Bay Bridge and uses tolls from its eight facilities to maintain and operate all their facilities. The Bay Bridge will continue to be a tolled facility and the MDTA will continue to manage it and the toll to address the current and future traffic and the associated congestion.

3.8.3 Transit-related Improvements

Transit-related improvements would be made through a financial commitment from the MDTA that would focus on providing a one-time investment for local transit agencies near the Bay Bridge. The same commitment would be made for all alternatives and would not be used to differentiate between alternatives.

All transit-related opportunities would be determined in the future, closer to the time of construction. The MDTA would coordinate with the Maryland Transit Administration (MTA), local governments, and local transit agencies to help determine the opportunities. However, these agencies would determine the transit-related improvements that would be most beneficial for them at that time, and they would be separate and distinct projects from the Bay Crossing.

3.8.4 TSM TDM Considerations

Two TSM/TDM improvements were considered with the retained build alternatives for potential implementation: congestion pricing and part-time shoulder use (PTSU) lanes.

The Bay Bridge will continue to be a tolled facility. If a build alternative is selected, congestion pricing could be used in the future to provide flexibility for toll management strategies that the MDTA could use to further reduce congestion and achieve transportation goals.

The shoulders on the bridge would be full width (12 feet wide) to accommodate future maintenance needs and incident management; therefore, they would also be wide enough to accommodate a PTSU lane. Although the build alternatives have been developed to accommodate PTSU, the operation of PTSU lanes is not being included as part of the alternatives. Future implementation of PTSU is not precluded.

3.8.5 Stormwater Management (SWM)

A planning-level, conceptual SWM analysis was completed that identified the stormwater needs and potential treatment locations throughout the study area for each build alternative.

3.8.6 Utilities

The study area along U.S. 50/301 contains public utilities including: potable water, sanitary sewer, natural gas, electric power/distribution, communications, and cable television. The build alternatives would impact some of these utilities that are in close proximity to U.S. 50/301, and the impacts to these utilities and associated replacements have been included in the build alternatives.

3.8.7 Truck Weigh and Inspection Station

There are two existing Truck Weigh and Inspection Stations (TWIS) along U.S. 50/301 between Oceanic Drive and the Bay Bridge, one in each direction. As part of the build alternatives, these facilities would be upgraded and relocated where necessary.

3.8.8 Limits of Disturbance (LOD)

The LOD is the proposed boundary that would include all construction, erosion and sediment control, SWM, and right-of-way offsets. The LODs for the alternatives were developed from the proposed horizontal and vertical geometry, typical sections, roadside design, and proposed interchange modifications. For Alternatives B and C, the number of lanes on the Western Shore and Eastern Shore would not change and would remain at six total travel lanes beyond the immediate tie-ins to the new bridge spans. This would mean the limits of roadway improvements associated with Alternatives B and C would end at the immediate tie-ins to the new bridge spans, compared with the limits of roadway improvements for Alternatives D through G, which would end at the study limits (MD 2/MD 450 and the U.S. 50/301 Split). Due to the shorter distance of proposed roadway modifications associated with Alternatives B and C, the LODs associated with these two build alternatives are smaller than the LODs associated with the other build alternatives.

4 REGULATORY CONTEXT

4.1 Background

Various federal and state regulations and guidance require that potential impacts on air quality be considered during the NEPA review of transportation projects. Major regulations and guidance that apply to the potential air quality impacts of transportation projects are listed below:

- The Clean Air Act (CAA), 42 U.S.C. 7401 et seq.
- National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq. (1969)
- The Transportation Conformity Rule, Title 40, Code of Federal Regulations (40 CFR Parts 51 and 93 subpart A)
- FHWA 1987 Technical Advisory 6640.8A: *Guidance for Preparing and Processing Environmental and Section 4(f) Document*[1]
- Infrastructure Investment and Jobs Act (Public Law 117-58, also known as the "Bipartisan Infrastructure Law") – November 15, 2021
- FHWA Memo: *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* (January 18, 2023)
- FHWA Memo: *Frequently Asked Questions (FAQs): FHWA Recommendations for Conducting Quantitative Mobile Source Air Toxics (MSAT) Analysis for FHWA NEPA Documents* (January 2023)
- U.S. Environmental Protection Agency (EPA): *MOVES4 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity* (August 2023)
- EPA: *Transportation Conformity Guidance for the South Coast II Court Decision* (November 2018)
- EPA Memo: *Using the MOVES and EMFAC Emissions Models in NEPA Evaluations* (February 8, 2011)
- EPA Memo: *Reflecting the Revised PM2.5 National Ambient Air Quality Standard in NEPA Evaluations* (June 25, 2007)
- *General Emissions Standards, Prohibitions, and Restrictions - Particulate Matter*, Code of Maryland Regulations (COMAR) 26.11.06.03
- SHA: *Standard Specifications for Construction and Materials, Section 114 – Truck Staging Areas and Idling Requirements* (July 2022)

4.1.1 National Environmental Policy Act of 1969

Federal requirements for air quality analyses for transportation projects derive from NEPA. NEPA guidance for air quality analyses for transportation projects may be found on or via the FHWA website for planning and the environment.[2]

For purposes of NEPA, general guidance for project-level air quality analyses is provided in the FHWA 1987 Technical Advisory 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*[3].

[1] https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp (Environmental Review Toolkit)
[2] http://www.fhwa.dot.gov/environment/index.cfm
[3] https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

4.1.2 Clean Air Act

The CAA is the overarching statute regulating air quality in the U.S. The CAA requires the EPA to set standards for air pollutants, approve state plans, and enforce deadlines for reducing air pollution, among many other responsibilities. The CAA Amendments of 1990 direct EPA to implement environmental policies and regulations that ensure acceptable levels of air quality. EPA's transportation conformity rule (40 CFR part 93) provides the criteria and procedures for implementing the transportation conformity provisions of the CAA.

4.1.3 National Ambient Air Quality Standards

As required by the CAA, EPA sets the National Ambient Air Quality Standards (NAAQS) for airborne pollutants that have adverse impacts on human health and the environment. The NAAQS are a set of baseline standards over which state governments can choose to impose stricter standards.

Table 4-1 presents the NAAQS established by the EPA for criteria air pollutants, namely: carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), Particulate Matter (PM), nitrogen dioxide (NO_2), and lead (Pb). There are two types of NAAQS—primary and secondary. Primary standards provide public health protection, including protecting the health of "sensitive" populations, such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings."[4]

Table 4-1: National Ambient Air Quality Standards

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 parts per million (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(1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 parts per billion (ppb)	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary	1 year	9.0 µg/m^3	annual mean, averaged over 3 years

[4] From the EPA preamble to the NAAQS table: https://www.epa.gov/criteria-air-pollutants/naaqs-table

Pollutant		Primary/Secondary	Averaging Time	Level	Form
(Particulate Matter [PM])		secondary	1 year	15.0 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 (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	1 year	10 ppb	annual mean, averaged over 3 years

(1) In areas designated nonattainment for the Pb standards prior to 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.
(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clear comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O_3 standards.
(4) 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 one 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 nonattainment 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.

Source: https://www.epa.gov/criteria-air-pollutants/naaqs-table, accessed June 25, 2025.

The EPA is required to publish a list of all geographic areas in and out of compliance with the NAAQS. Attainment status is determined on a pollutant-by-pollutant basis. Areas that routinely exceed a NAAQS for a particular pollutant are designated as “nonattainment areas”. Areas which were designated “nonattainment” but have been redesignated to “attainment” are called “maintenance areas”. The attainment classifications are described in the following bullets:

- Attainment – Area has monitored air quality that meets the NAAQS.
- Nonattainment – Area has monitored air quality that does not meet the NAAQS.
- Maintenance – Once a nonattainment area meets the standards and additional redesignation requirements in the CAA [Section 107(d)(3)(E)], EPA will designate the area as a "maintenance area.".
- Unclassifiable and Unclassifiable/Attainment – An area that cannot be designated based on available information as meeting or not meeting the NAAQS.

When a region is designated as a nonattainment area, it must develop a plan for meeting the appropriate standard. The plan is known as an attainment plan and must be submitted to the EPA for approval. After the area has met the standard, the state may request that the area be redesignated. As part of the request to redesignate the area, the region must develop a Maintenance State Implementation Plan (SIP) to demonstrate that it will continue to meet the

criteria. Transportation plans, programs, and projects in nonattainment and maintenance areas must be found to "conform" to the purpose of the SIP before the project can receive federal funds or approvals. A transportation improvement program (TIP) presents projects over the next several years and a long-range plan (LRP) covers a longer period of time. The metropolitan planning organization (MPO) is designated to develop the TIP and LRP for a region and to document conformity with SIP provisions.

4.1.4 Criteria Pollutants

As shown in **Table 4-1,** pollutants that have established NAAQS are referred to as criteria pollutants. The criteria pollutants are O_3, CO, $PM_{2.5}$ and PM_{10}, NO_2, SO_2, and Pb. Transportation conformity is required in areas designated nonattainment and maintenance by the EPA for the transportation-related criteria pollutants: O_3, PM, NO_2, and CO.[5] Effects on human health and the general environment, as well as how they disperse and are deposited in the atmosphere, vary from pollutant to pollutant. A description of each criteria pollutant is provided in **Table 4-2**.

Table 4-2: Criteria Pollutant Descriptions

Pollutant	Sources	Health and Environmental Effects
Ozone (O_3) Ground-level - A colorless gas that forms as a result of chemical reactions between volatile organic compounds, nitrogen oxides, and oxygen in the presence of heat and sunlight.	Motor vehicles, electric utilities, factories, landfills, industrial solvents, and miscellaneous small sources such as gas stations, lawn equipment, etc.	Causes coughing, chest tightness, wheezing and can inflame and damage lung tissue. Aggravates asthma and can even be a cause of asthma. Irritates the respiratory system, reduces lung function and makes it more difficult to breathe. Aggravates chronic lung diseases and may cause permanent lung damage. May reduce yield of agricultural crops and damages forests and other vegetation.
Carbon Monoxide (CO) - An odorless, colorless gas resulting from incomplete fossil fuel combustion.	Motor vehicles, small engines, some industrial processes, boilers and incinerators. High concentrations can be found in confined spaces like parking garages, poorly ventilated tunnels, or traffic intersections especially during peak hours.	Impairs the ability of blood to deliver oxygen to vital tissues affecting the cardiovascular, pulmonary, and nervous systems. Symptoms include dizziness, headaches, nausea, fatigue, memory and visual impairment, and decreased muscular control.
Nitrogen Dioxide (NO_2) - A brownish gas that forms quickly when fuel is burned at high temperatures. Contributes to the formation of ground-level O_3 and fine particle pollution.	Motor vehicles, electric utilities, industrial boilers, and off-road equipment.	Irritates the lungs and may cause lung damage and lower resistance to respiratory infections such as influenza. May adversely affect terrestrial and aquatic ecosystems through regional transport and deposition.
Particulate Matter (PM) - Mixture of solid particles and liquid droplets in the air; particles may be visible or microscopic.	Formed directly from windblown dust, crushing and grinding operations, unpaved roads and construction, fuel combustion (from motor vehicles, power plants, industrial facilities), wood stoves, and agriculture (plowing, burning off fields). May also be formed in the atmosphere from gases such as SO_2 and nitrogen oxides.	Causes eye, nose and throat irritation, decreased lung function, aggravated asthma, development of chronic bronchitis, irregular heartbeat, nonfatal heart attacks, and premature death in people with heart or lung disease. Serves as a carrier for toxic metals, damages human-made materials, and is a major cause of reduced visibility in many parts of the US.

[5] https://www.fhwa.dot.gov/Environment/air_quality/conformity/policy_and_guidance/faqs/genfaqsmemo.cfm

Pollutant	Sources	Health and Environmental Effects
Sulfur Dioxide (SO_2) A highly reactive colorless gas, odorless at low concentrations but pungent at very high concentrations.	Formed when fuel containing sulfur (mainly oil and coal) is burned in industrial, institutional, utility, and residential furnaces and boilers. Other sources include petroleum refineries, smelters, paper mills, and chemical plants.	May cause breathing problems, respiratory illness, alterations in the lung's defenses, aggravation of existing cardiovascular disease, and permanent damage to lungs. Forms acid aerosols and sulfuric acid, which are associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, and reduced visibility.
Lead - A heavy metal found naturally in the environment and in manufactured products.	Soil, dust, paint, etc., transportation sources using Pb in their fuels, coal combustion, smelters, car battery plants, and combustion of garbage containing Pb products.	Elevated levels can cause brain and other nervous system damage and adversely affect kidney function, blood chemistry, and digestion if ingested or directly inhaled. Children are at special risk due to cumulative effects even at low doses. Pb can also harm wildlife through deposition onto leaves which are a food source for grazing animals.

Source: https://www.epa.gov/criteria-air-pollutants

4.1.5 Transportation Conformity

The CAA, Section 176(c) (42 U.S.C. 7506(c)), requires that highway projects receiving federal funding and approval "conform to" state air quality implementation plans. Pursuant to this statute, the EPA issued the federal transportation conformity rule (40 CFR Parts 51 and 93) pursuant to transportation conformity requirements in the CAA as amended. Copies of the EPA conformity regulation and associated guidance are available on the EPA website. In general, the rule requires conformity determinations for transportation plans, programs, and projects in "nonattainment or maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan" (40 CFR 93.102(b)).

4.1.6 Criteria and Procedures for Determining Conformity

The criteria and procedures for determining conformity of transportation plans, programs, and projects are provided in 40 CFR 93.109.

For projects in nonattainment or maintenance areas, the federal transportation conformity rule requires a currently conforming transportation plan and program at the time of project approval (40 CFR 93.114) and for the project to be from a conforming plan and program (40 CFR 93.115). If the project is of a type that is not required to be specifically identified in the plan, the project must be consistent with the policies and purpose of the transportation plan and not interfere with other projects specifically included in the transportation plan (40 CFR 93.115(b)).

The rule also specifies that projects are considered to be from a conforming transportation program if the design concept and scope of the project as specified in the program at the time of the transportation implementation plan conformity determination were adequate to determine the project's contribution to regional emissions. For projects with specified mitigation measures, written commitments to implement the measures must be obtained from the project sponsor and/or operator (40 CFR 93.115(c)).

In CO and PM nonattainment and maintenance areas, an analysis of localized emissions may be required for federally-funded or approved projects. This analysis is called a "hot-spot" analysis. The CO and PM hot spot test requirements are provided in 40 CFR 93.116.

4.1.7 Mobile Source Air Toxics

On January 18, 2023, FHWA issued updated interim guidance regarding Mobile Source Air Toxics (MSATs) in a NEPA analysis to incorporate new analysis from EPA's MOVES3 emission model along with updated research on air toxic emissions from mobile sources.

The EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer drivers from their 2011 National Air Toxics Assessment. The nine compounds identified were: acetaldehyde; acrolein; benzene; 1, 3-butadiene; diesel PM plus diesel exhaust organic gases; ethylbenzene; formaldehyde; naphthalene; and polycyclic organic matter (POM). While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules.

The January 2023 FHWA updated interim guidance presents a tiered approach for assessing MSATs in NEPA documents. The three levels are for projects with: (1) no meaningful MSAT effects; (2) low potential MSAT effects; and (3) high potential MSAT effects, respectively. The FHWA guidance defines the levels of analysis for each type of MSAT effect as:

- No analysis for projects with no potential for meaningful MSAT effects;
- A qualitative analysis for projects with low potential MSAT effects; and
- A quantitative analysis for projects with high potential MSAT effects.

4.2 Monitored Ambient Air Quality

Maryland Department of the Environment's (MDE) Air and Radiation Management Administration is responsible for implementing and enforcing regulations to ensure that the air Maryland citizens breathe is clean and healthful. One of their functions is to operate a statewide network of air quality monitors that continuously measure air quality. Data from the monitor network is available through the EPA's AirData website.[6] Data provided for the most recent three years (2021-2023) at the monitoring stations nearest the study area are used to describe the existing ambient air quality in the study area and presented in **Table 4-3** through **Table 4-5**: Ozone Monitoring Data (2021-2023) for CO, $PM_{2.5}$, and O_3, respectively. The monitoring locations are also depicted in **Figure 4-1** through **Figure 4-3**.

[6] https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

Table 4-3: Carbon Monoxide Monitoring Data (2021-2023)

Site ID	Location	2021				2022				2023				CO NAAQS	
		1-Hr Avg. (ppm)		8-Hr Avg. (ppm)		1-Hr Avg. (ppm)		8-Hr Avg. (ppm)		1-Hr Avg. (ppm)		8-Hr Avg. (ppm)			
		1st Max	2nd Max	1st Max	2nd Max	1st Max	2nd Max	1st Max	2nd Max	1st Max	2nd Max	1st Max	2nd Max	1-hr ppm	8-hr ppm
110010043	District of Columbia	1.7	1.6	1.6	1.3	1.9	1.9	1.4	1.3	1.3	1.3	1.1	0.9	35	9
110010051	District of Columbia	2.2	2	1.8	1.7	2.1	2.1	1.9	1.8	1.9	1.8	1.6	1.6	35	9
240330030	Beltsville	1.1	0.8	0.7	0.7	1.1	1.0	0.7	0.6	1.0	0.9	0.9	0.8	35	9
240053001	Essex	1.8	1.6	1.4	1.3	1.9	1.6	1.3	1.2	2.6	1.8	1.1	1.1	35	9
240270006	North Laurel	0.8	0.8	0.6	0.6	0.9	0.8	0.8	0.7	1.1	1.1	1.0	0.9	35	9

Source: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

Figure 4-1: Carbon Monoxide Monitoring Locations



Table 4-4: $PM_{2.5}$ Monitoring Data (2021-2023)

Site ID	Monitor #	Location	2021		2022		2023		$PM_{2.5}$ NAAQS	
			24-hour 98th Percentile (ug/m^3)	Weighted Annual Mean (ug/m3)	24-hour 98th Percentile (ug/m^3)	Weighted Annual Mean (ug/m3)	24-hour 98th Percentile (ug/m^3)	Weighted Annual Mean (ug/m3)	24-hour (ug/m3)	Annual (ug/m3)
110010041	1	District of Columbia	20	8.1	15	7.4	30	9.7	35	12
110010043	1	District of Columbia	18	7.6	15	6.9	30	8.7	35	12
	2	District of Columbia	30	8.0	16	7.2	81	9.9	35	12
110010051	1	District of Columbia	21	9.6	17	8.3	29	8.8	35	12
240313001	3	Montgomery	17	7.3	16	7.3	24	6.6	35	12
240330030	1	Prince George's	14	6.7	12	5.5	18	7.1	35	12
	2	Prince George's	28	7.4*	11	6.2*	83	9.3	35	12
	3	Prince George's	14	6.0	11	5.2*	26	7.8	35	12
245100040	1	Baltimore	18	7.7	-	-	-	-	-	-
	3	Baltimore	19	7.7	-	-	-	-	-	-
245105253	1	Baltimore	-	-	15	6.1	22	7.6	35	12
	3	Baltimore	-	-	16	6.9	18	7.2	35	12
240053001	1	Essex	15	7.8	13	6.9	24	8.7	35	12
240251001	3	Edgewood	21	7.9	16	6.3	17	6.5	35	12
240270006	1	North Laurel	16	6.9	15	6.9	19	7.6	35	12

Source: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

*Note: * indicates the mean does not satisfy minimum data requirements. ** 2012 NAAQS*

Figure 4-2: $PM_{2.5}$ Monitoring Locations

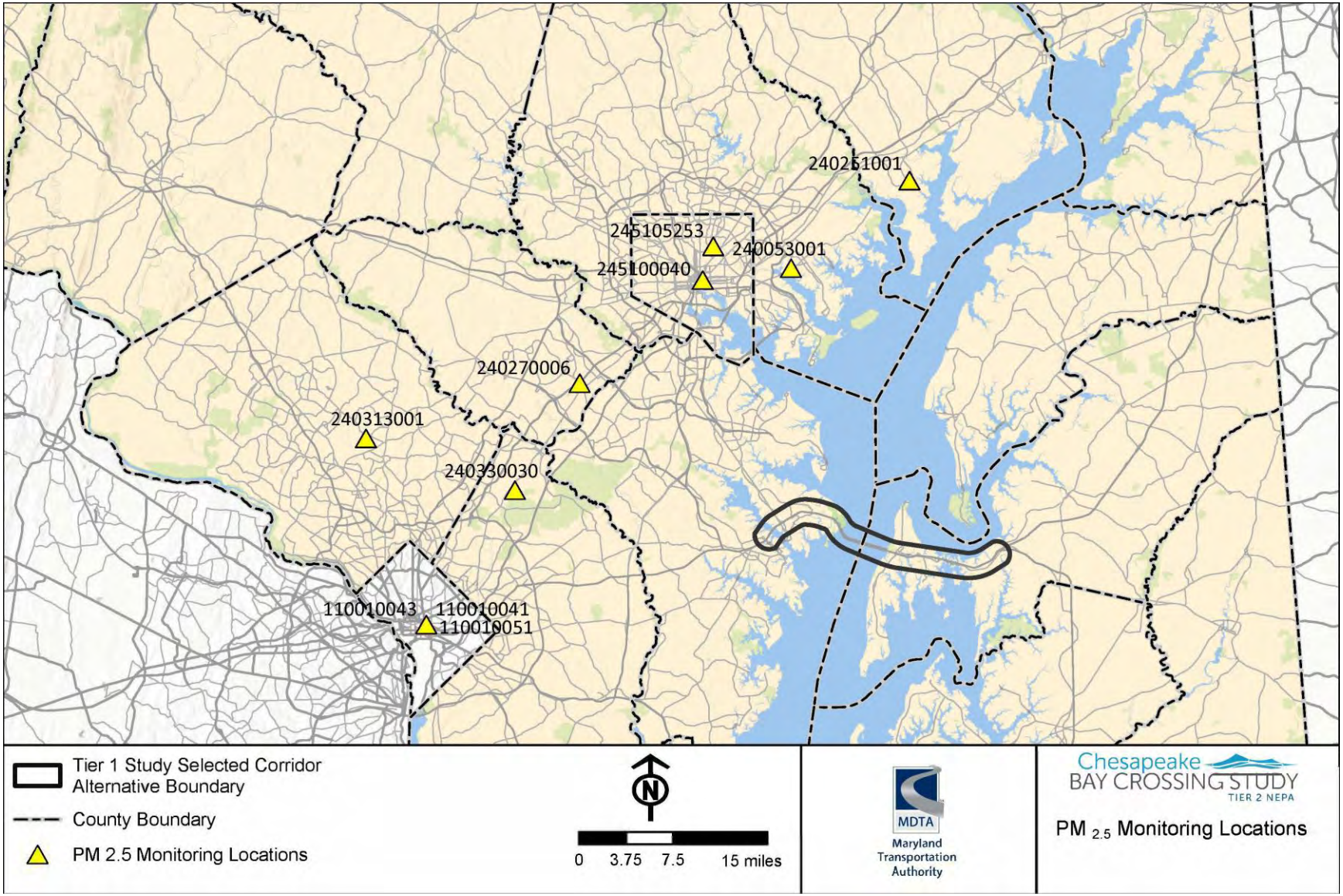
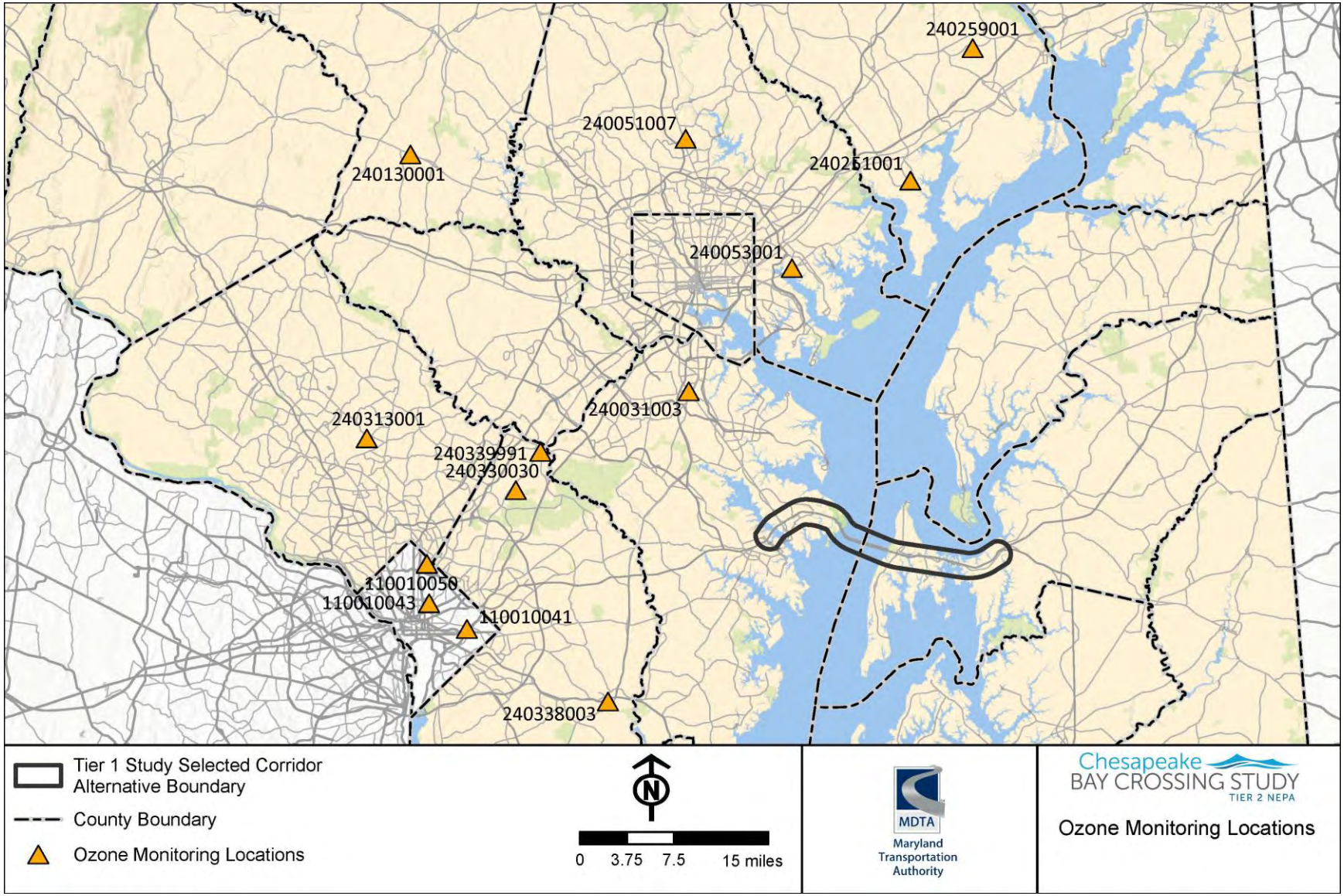


Table 4-5: Ozone Monitoring Data (2021-2023)

Site ID	Location	2021	2022	2023	2015 O_3 NAAQS
		4th Max 8-Hour (ppm)	4th Max 8-Hour (ppm)	4th Max 8-Hour (ppm)	8-hour PPM
110010041	District of Columbia	0.064	0.059	0.058	0.070
110010043	District of Columbia	0.072	0.066	0.076	0.070
110010050	District of Columbia	0.069	0.051	0.073	0.070
240313001	Montgomery	0.068	0.063	0.068	0.070
240330030	Prince George's	0.066	0.061	0.070	0.070
240338003	Prince George's	0.070	0.064	0.073	0.070
240339991	Prince George's	0.071	0.065	0.072	0.070
240031003	Anne Arundel	0.070	0.062	0.065	0.07
240051007	Cockeysville	0.070	0.065	0.069	0.07
240053001	Essex	0.075	0.069	0.068	0.07
240130001	Sykesville	0.067	0.064	0.067	0.07
240251001	Edgewood	0.073	0.066	0.065	0.07
240259001	Churchville	0.072	0.068	0.069	0.07

Source: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

Figure 4-3: Ozone Monitor Locations



4.3 Climate and Meteorology

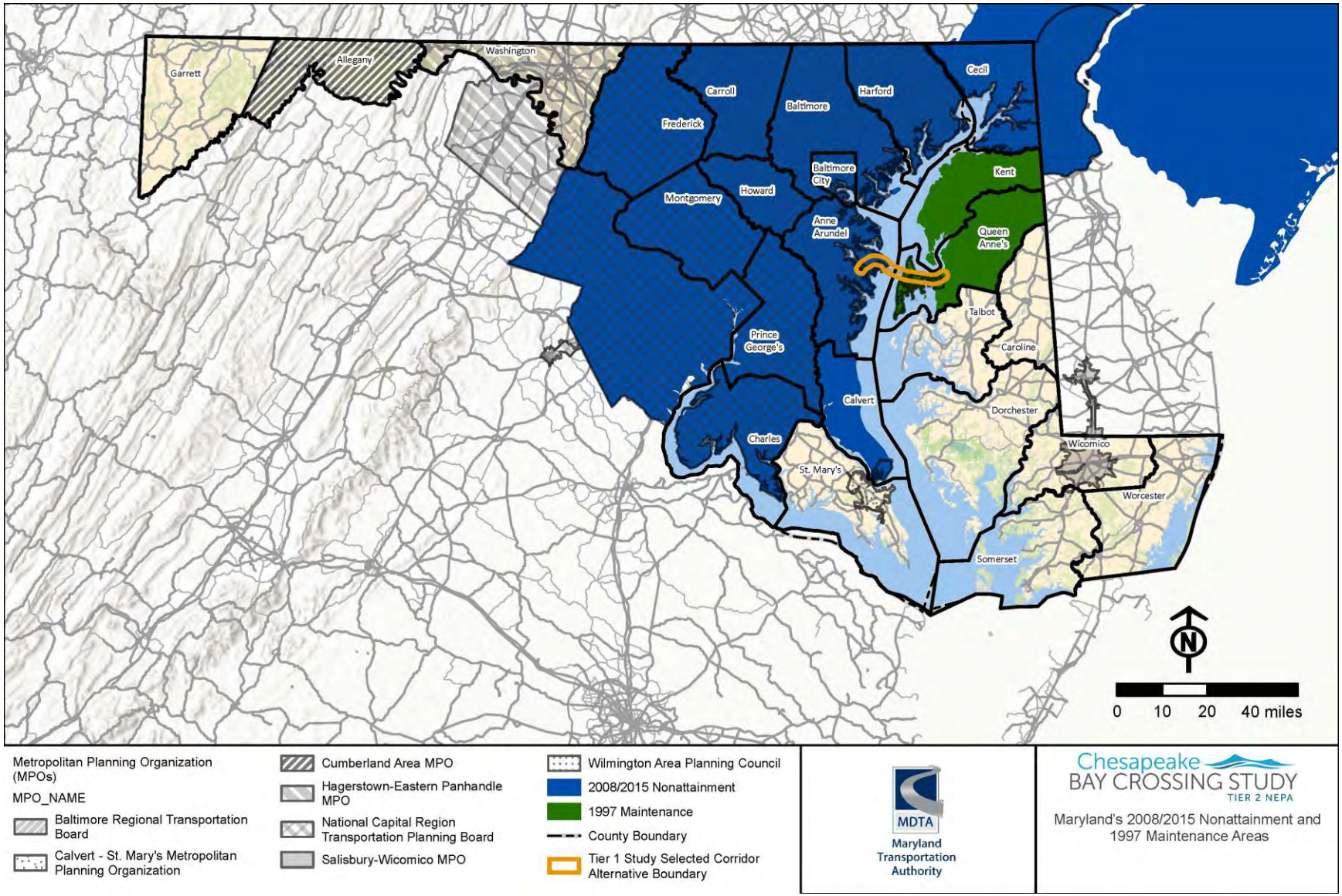
The Tier 2 study area is located along the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. As is typical with many mid-Atlantic cities along the coast, the Baltimore/D.C. area is known for its hot, humid summers, pleasant springs and falls, and mild winters. The combination of heat and humidity in the summer brings frequent thunderstorms which can occasionally produce tornadoes. During the winter, nor'easters can affect the area producing the largest amounts of snowfall. The average annual precipitation is approximately 47 inches. The annual average temperature is 59° F with the lowest temperature occurring in January and the highest in July.[7]

4.4 Attainment Status

The Tier 2 study area falls under the jurisdiction of the Baltimore Regional Transportation Board (BRTB) MPO and is within Anne Arundel County's 2015 O_3 nonattainment area and Queen Anne's County's 1997 O_3 maintenance area (**Figure 4-4**). The easternmost portion of the study area (near the U.S. 50/301 split) is within a 1997 O_3 maintenance area but is not governed by an MPO. Maryland is in attainment for all other NAAQS, including $PM_{2.5}$ and CO.

[7] https://www.usclimatedata.com/climate/annapolis/maryland/united-states/usmd0585

Figure 4-4: Maryland's Nonattainment and Maintenance Areas for Eight-Hour Ozone NAAQS



5 METHODOLOGY

Extensive coordination was undertaken with Lead, Cooperating, and Participating federal, state, and local agencies to obtain agreement or concurrence with the following methodology for the Tier 2 Study air quality analysis. Concurrence or agreement with the methodology was provided by the MDE, SHA, EPA, FHWA, and Baltimore Metropolitan Council. The Tier 2 Study air quality analysis documents potential short- and long-term differences in air quality impacts – either qualitatively or quantitatively - as a result of factors such as construction, forecasted changes in emissions from mobile and marine traffic, changes in vehicle numbers, patterns of congestion, and toll booth design. The MDTA will ensure that the project conforms to applicable air quality plans and would not cause or contribute to new violations of the NAAQS.

5.1 Ozone

Federal conformity requirements, including specifically 40 CFR 93.114 and 40 CFR 93.115, apply as portions of the study area are designated as nonattainment and maintenance for O_3. The conformity determination must satisfy requirements for each nonattainment or maintenance area intersected by the alternatives; therefore, requirements of both the Anne Arundel County nonattainment for O_3 and Queen Anne's County maintenance for O_3 must be satisfied. Additionally, since this project is likely to be considered "regionally significant", and a portion of Corridor 7 in Queen Anne's County near the U.S. 50/301 split is within a 1997 O_3 maintenance area not governed by an MPO, the conformity determination must involve Interagency Consultation Group (ICG) coordination and the selected alternative included in the regional emissions analysis. The ICG is the group tasked by the BRTB with conducting the key processes in determining air quality transportation conformity of the region's short-range transportation program and LRTP.[8] The ICG consists of representatives from the SHA, MDE, FHWA, EPA and the Federal Transit Administration.

5.2 $PM_{2.5}$

Since both Anne Arundel and Queen Anne's counties are classified as attainment for the $PM_{2.5}$ NAAQS, no conformity determination for this pollutant is required. No further analysis is necessary.

5.3 Carbon Monoxide

Since both Anne Arundel and Queen Anne's counties are classified as attainment for the CO NAAQS, no conformity determination for this pollutant is required. No further analysis is necessary.

5.4 Mobile Source Air Toxics

The CAA addresses the need to evaluate toxic emissions and identifies several potential hazardous air pollutants from mobile sources. These pollutants are referred to as MSATs. FHWA has developed guidance on when and how to analyze MSATs within the NEPA review process for highway projects (FHWA 2023). According to this guidance, and as noted below, there are three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances.

[8] https://www.baltometro.org/environment/committees/interagency-consultation-group

- Category 1: No analysis for projects with no potential for meaningful MSAT effects:
  - projects classified as Categorical Exclusions (CE) (23 CFR 771.117),
  - projects exempt from the CAA conformity requirements (40 CFR 93.126), and
  - other projects with no meaningful impacts on traffic volumes or vehicle mix.

- Category 2: Qualitative analysis for projects with low potential MSAT effects:
  - projects 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.

- Category 3: Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects:
  - projects that create new capacity or add significant capacity to urban highways with traffic volumes where the annual average daily traffic (AADT) is projected to be in the range of 140,000 to 150,000 or greater by the design year, and
  - are proposed to be located in proximity to populated areas.

Traffic volumes are anticipated to increase in the design year 2045. The Summer Weekend average daily traffic (ADT) forecast could approach or exceed 140,000 AADT and represent the worst-case traffic (highest ADT) due to seasonal travel demands as compared to Non-Summer Weekdays. Therefore, the project falls within Category 3 (considered one with a higher potential MSAT effect) so a quantitative MSAT analysis was conducted for the Tier 2 Study. The quantitative MSAT analysis was conducted in accordance with 2023 FHWA Updated Interim MSAT Guidance, including the existing and design year conditions. The Maryland Statewide Transportation model output values for existing conditions and each of the alternatives was utilized to calculate vehicle-miles traveled (VMT) for the affected network and develop project specific MOVES files to obtain annual emissions for the nine MSATs identified in the 2023 FHWA Updated Interim MSAT Guidance. EPA's MOVES4 model was used for the MSAT analysis.

Annual MSAT emissions were calculated by averaging the worst-case daily total emissions (i.e., the single worst-case total emission day in each of January, April, July, and October, determined based on summer weekend traffic data) and multiplying by 365 resulting in an inventory for the year for each MSAT. For example, if the Daily Total Diesel PM emissions (grams) were 50g for January, 75g for April, 100g for July, and 75g for October, then the average would be 300g/4 days = 75 g/day and 75 g/day x 365 days results in 27,375g of Diesel PM emissions for the year. This was then converted to US Tons. This method was used as only traffic data, including average vehicle speed distributions that account for the impact of additional capacity of the project specific build alternatives on congestion relief, for summer weekends and non-summer weekdays in 2045 was available from the Maryland Statewide Transportation model output.

5.4.1 Affected Network Development

MSAT analyses are intended to capture the anticipated changes in emissions within an affected environment, defined as the transportation network directly affected by the project. Analyzing MSATs only within a geographically defined "study area" will not capture the emissions effects of changes in traffic on roadways outside of that area, which is particularly important where the proposed project would create an alternative route or divert traffic from one roadway class to another. FHWA recommends analyzing all segments associated with the project, plus those

segments expecting meaningful changes in emissions due to the project (e.g., ± 10 percent or more). To develop the affected network, the study team screened each alternative using FHWA selection criteria as included in Frequently Asked Questions (FAQs): *FHWA Recommendations for Conducting Quantitative Mobile Source Air Toxics (MSAT) Analysis for FHWA NEPA Documents*[9] for identifying segments, or links, within the transportation network where meaningful changes were expected. These criteria included:

- Changes of ± 5% or more in AADT on congested highway links of Level of Service (LOS) D or worse
- Changes of ± 10% or more in AADT on uncongested highway links of LOS C or better
- Changes of ± 10% or more in travel time

A fourth criteria, Changes of ± 10% or more in intersection delay, was not included in the affected network selection criteria for the Tier 2 Study MSAT Analysis, since:

1. Per FHWA MSAT Guidance, the affected network area is defined based on available project-specific information.

2. Intersection delay data is not included in the Maryland Statewide Transportation Model (MSTM), the traffic model used for the Tier 2 Study.

Once links were identified that met the above criteria, a 30-mile buffer from the Bay Bridge was applied to create the area of "reasonable" influence for the affected network links shown as a purple circle in **Figures 5-1 to 5-3**. Links that were not contiguous within the buffer were considered modeling artifacts based on engineering judgement and were removed to create the final affected network shown in **Figures 5-4 to 5-6**.

[9] https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_faq_moves3_.pdf

Figure 5-1: Alternatives B and C Affected Network Pre-Processing

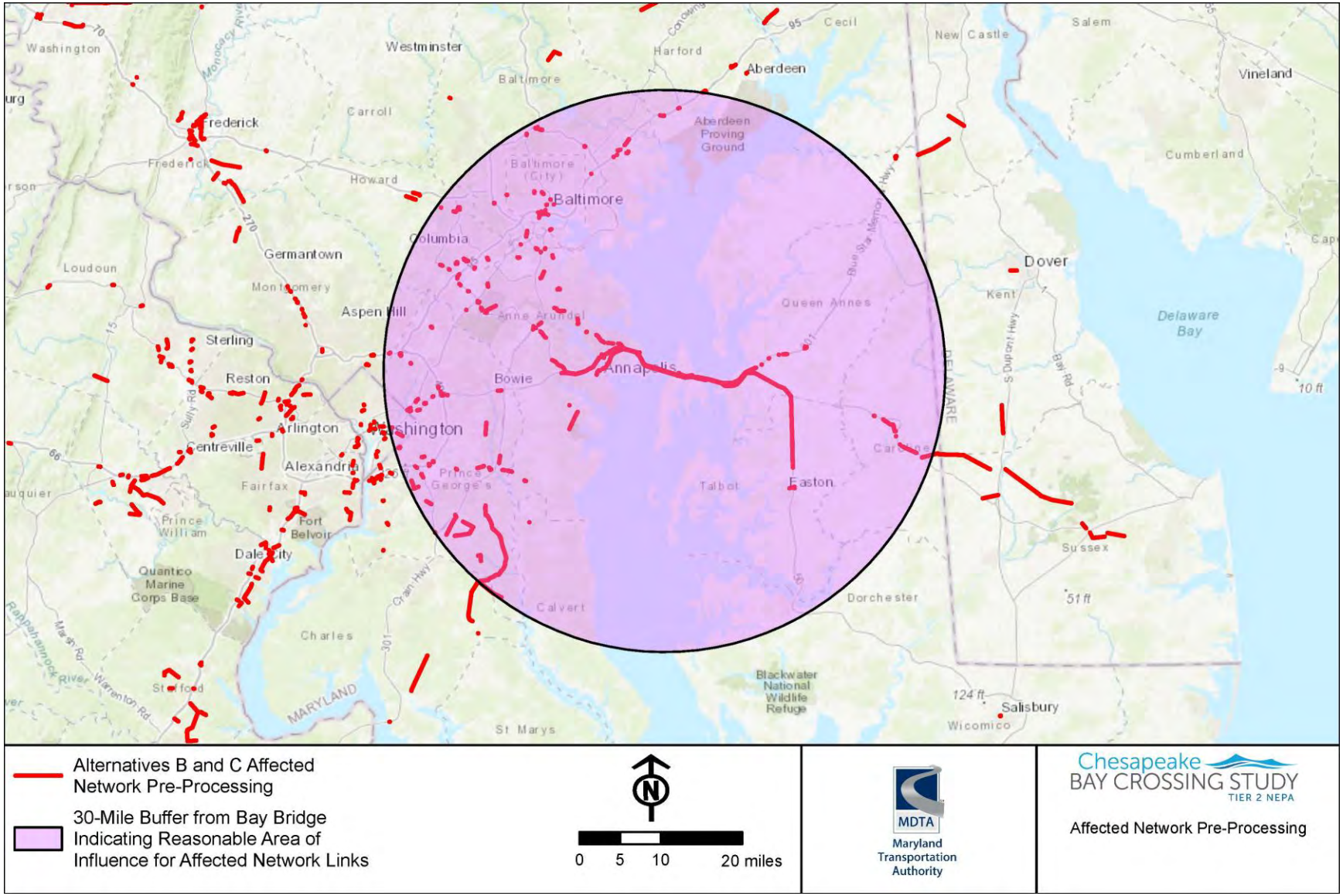


Figure 5-2: Alternatives D and E Affected Network Pre-Processing

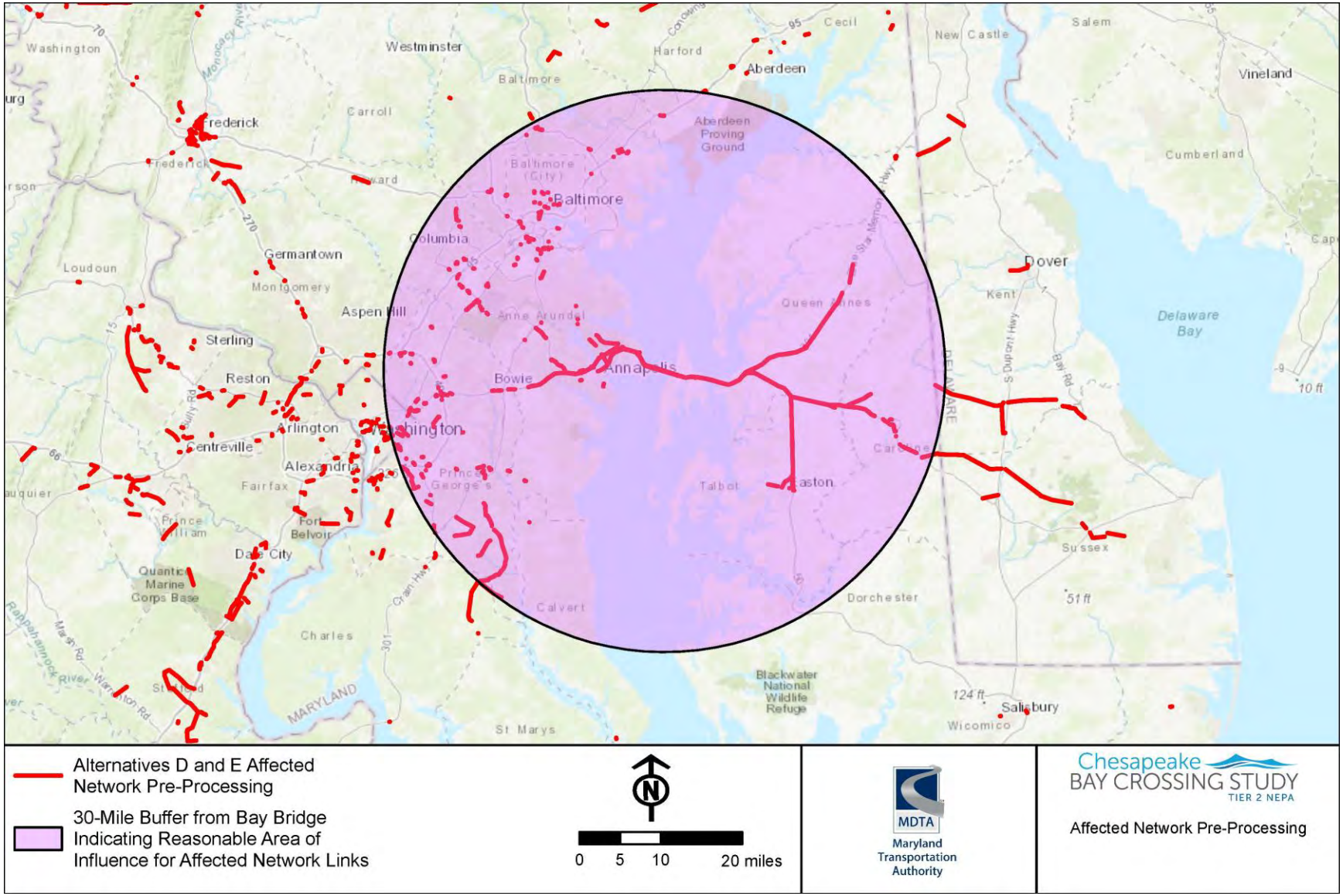


Figure 5-3: Alternatives F and G Affected Network Pre-Processing

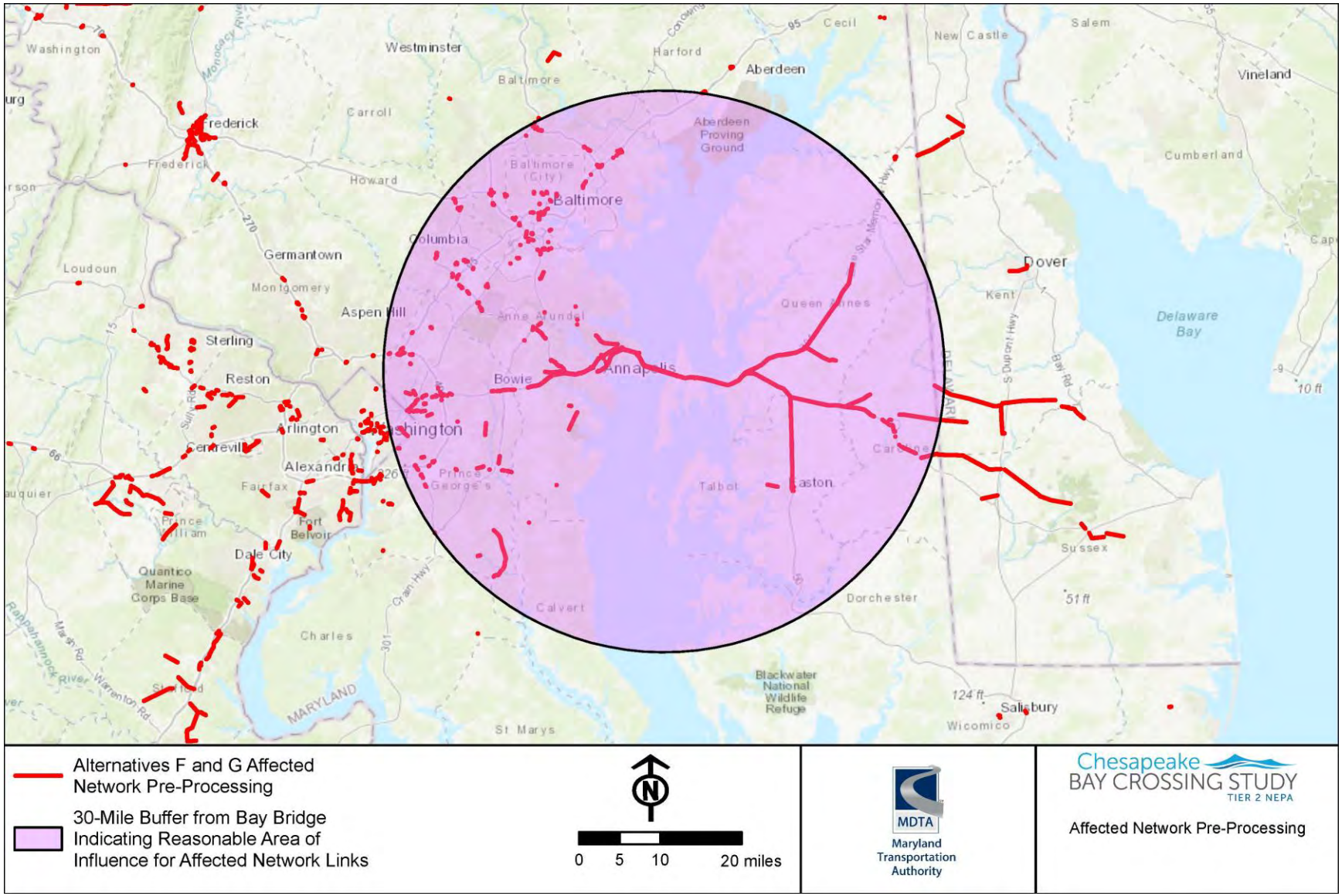


Figure 5-4: Alternatives B and C Final Affected Network Post-Processing

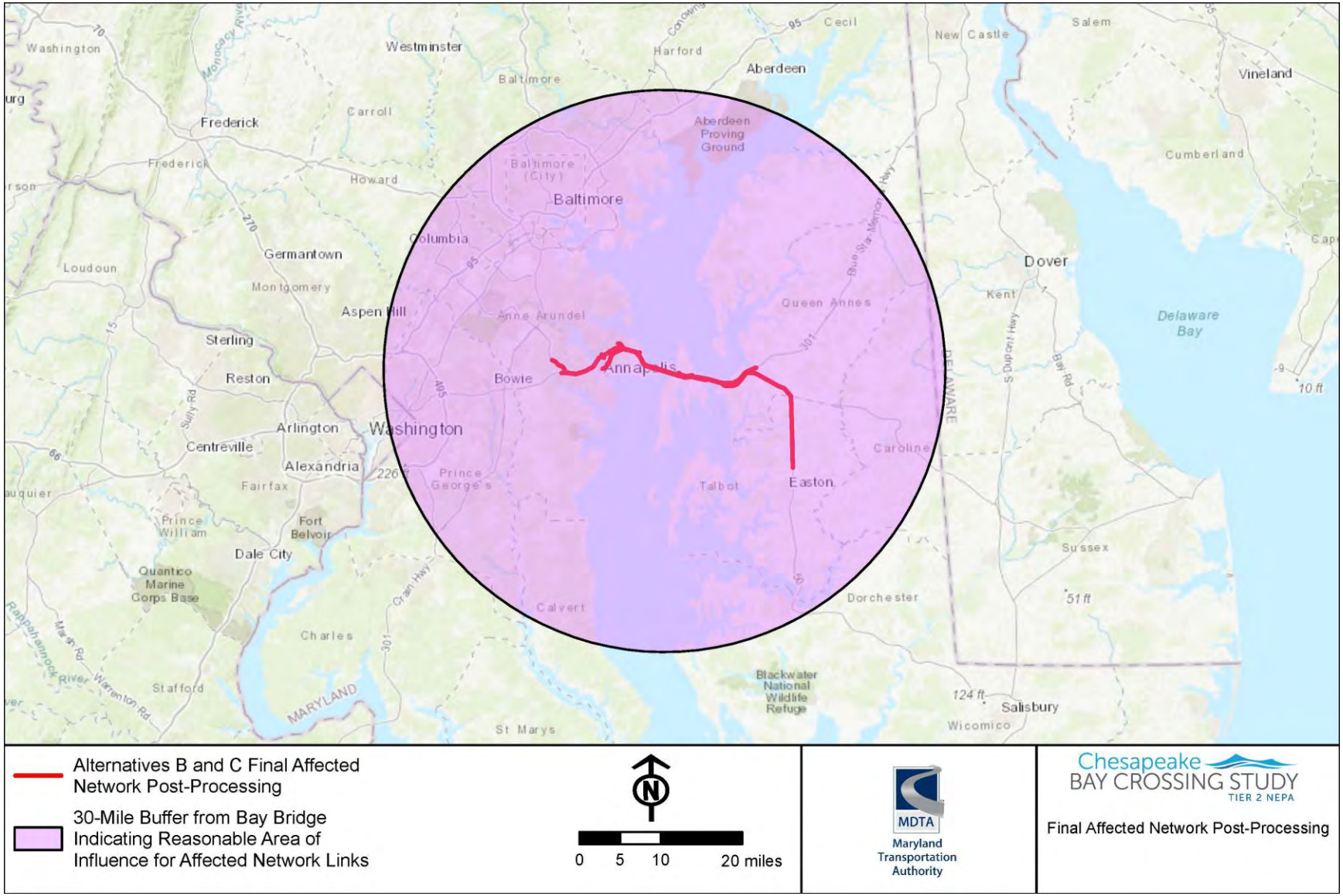


Figure 5-5: Alternatives D and E Final Affected Network Post-Processing

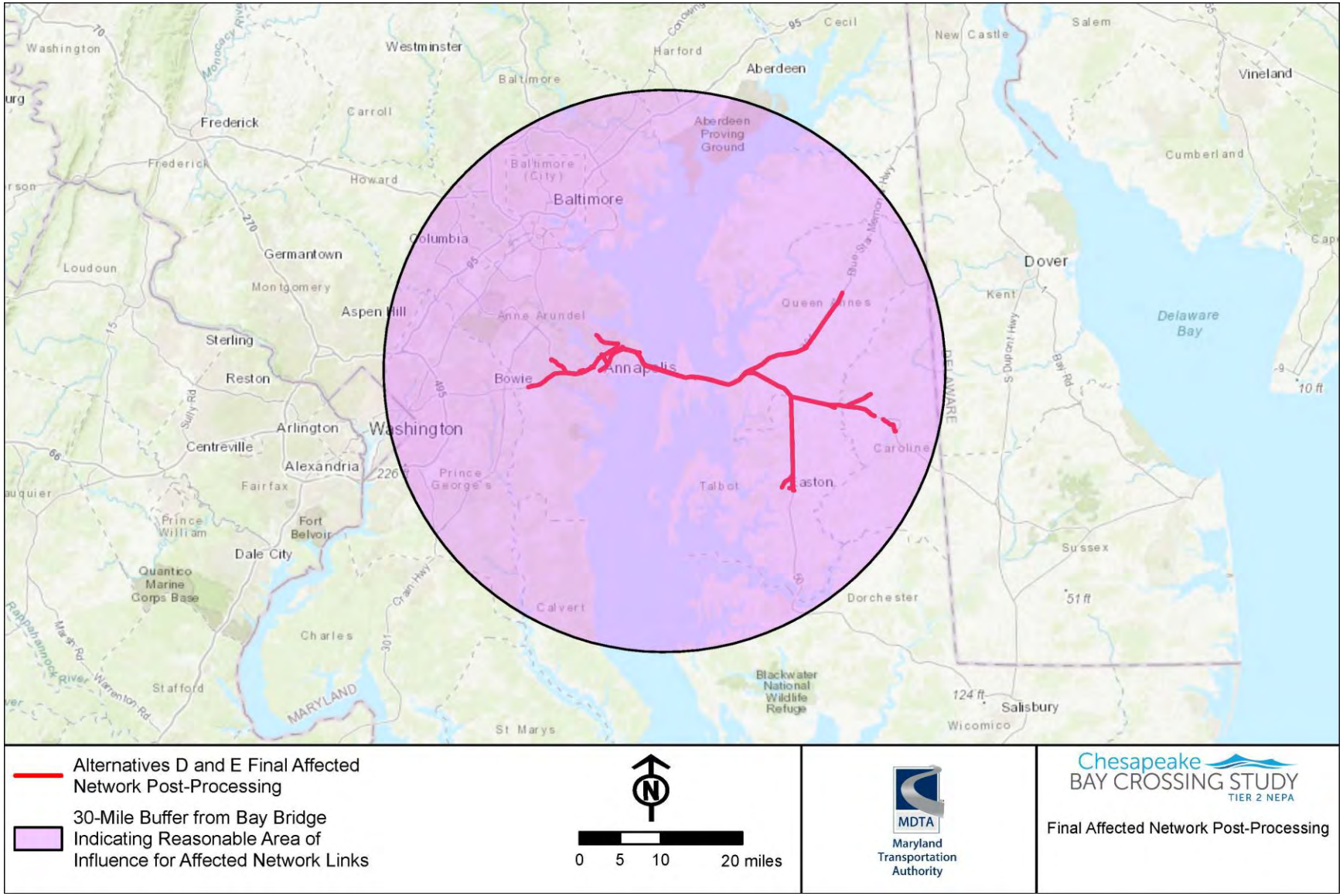
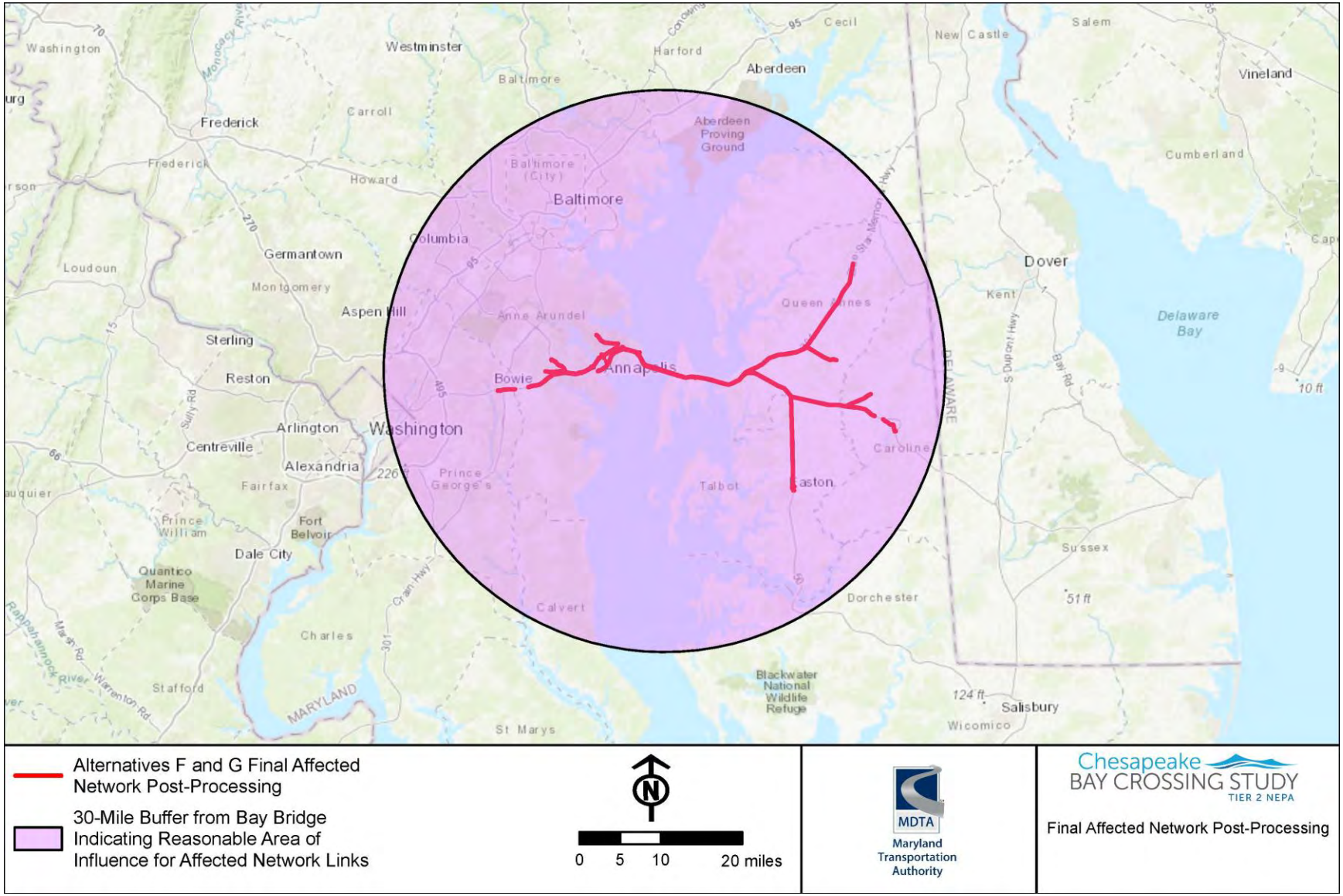


Figure 5-6: Alternatives F and G Final Affected Network Post-Processing



6 EXISTING CONDITIONS

6.1 Regional Conformity - Ozone

6.1.1 Existing Conditions

Since the majority of the study area is governed by the BRTB and covers areas designated as nonattainment for 2015 ozone (O_3) NAAQS and maintenance for 1997 O_3 NAAQS, a transportation conformity determination is required. Additionally, the project must come from a conforming plan and program at the time of project approval (or otherwise meet criteria specified in 40 CR 93.109(b)). The Tier 2 Study is not currently in the 2025-2028 Transportation Improvement Program (TIP). It is included in *Resilience 2050,* the LRTP, as an "Illustrative Project".

6.2 Carbon Monoxide (CO) and Particulate Matter ($PM_{2.5}$)

6.2.1 Existing Conditions

Since the study is located in a region that is in attainment of the NAAQS for CO, EPA project-level ("hot-spot") transportation conformity requirements do not apply. The Maryland counties were redesignated from a nonattainment area to attainment and entered a 20-year maintenance period for CO in March 1996. The area was considered a maintenance area for the 20 years following until March 2016 when the counties completed the maintenance period. Since the Maryland counties have completed the maintenance period, transportation conformity no longer applies for CO. The study area is in an attainment area for fine PM ($PM_{2.5}$), therefore, transportation conformity requirements pertaining to $PM_{2.5}$ do not apply for this Project[10] and no further analysis of $PM_{2.5}$ emissions were evaluated per FHWA guidance.[11]

6.3 Mobile Source Air Toxics (MSAT)

6.3.1 Existing Conditions

Controlling air toxic emissions became a national priority with the passage of the CAA of 1990, whereby Congress mandated that the 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 the nine compounds noted above in **Section 4.1.7** 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.

[10] For background, the EPA issued a final rule (81 FR 58010), effective October 24, 2016, on "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements" that stated, in part: "Additionally, in this document the EPA is revoking the 1997 primary annual standard for areas designated as attainment for that standard because the EPA revised the primary annual standard in 2012." (See: https://www.gpo.gov/fdsys/pkg/FR-2016-08-24/pdf/2016-18768.pdf).

[11] Guidance for Preparing and Processing Environmental and Section 4(f) Documents, October 30, 1987. https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

6.3.2 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.

Air toxics concerns continue to arise on highway projects during the NEPA process. Even as science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute (HEI), 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. An overview of recent research is provided in Appendix D of the 2023 FHWA Updated Interim MSAT Guidance.[12]

[12] https://www.fhwa.dot.gov/ENVIRONMENT/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_appendix_d_2023.pdf

7 IMPACT ANALYSIS

The six build alternatives consist of parings of lane configurations with both a northern and southern alignment of the bay crossing. The northern and southern alignments would not result in substantially different traffic values and therefore emissions quantities. For air quality analysis and MSAT modeling purposes, northern and southern alignments are shown as one modeling run.

7.1 Regional Conformity - Ozone

7.1.1 Environmental Impacts

The Tier 2 Study is not currently in the 2025-2028 TIP. It is included in *Resilience 2050,* the LRTP, as an "Illustrative Project". When a Preferred Alternative is identified, the MDTA will coordinate with BRTB for inclusion of an accurate project design and scope into the latest TIP and LRTP, and accompanying air quality conformity determination (40 CFR 93.109), which will involve conducting a new regional emissions analysis. As part of the conformity requirements, consultation with affected agencies such as the EPA and FHWA, as well as the public, will be completed.

7.2 Carbon Monoxide (CO) and Particulate Matter ($PM_{2.5}$)

7.2.1 Environmental Impacts

Since the study is located in a region that is in attainment of the NAAQS for CO, EPA project-level ("hot-spot") transportation conformity requirements do not apply. The Maryland counties were redesignated from a nonattainment area to attainment and entered a 20-year maintenance period for CO in March 1996. The area was considered a maintenance area for the 20 years following until March 2016 when the counties completed the maintenance period. Since the Maryland counties have completed the maintenance period, transportation conformity no longer applies for CO. The study area is in an attainment area for fine PM ($PM_{2.5}$), therefore, transportation conformity requirements pertaining to $PM_{2.5}$ do not apply for this Project[13] and no further analysis of $PM_{2.5}$ emissions were evaluated per FHWA guidance.[14] On February 7, 2024, EPA set the level of the primary (health-based) annual PM2.5 standard at 9.0 micrograms per cubic meter. The primary and secondary (welfare-based) 24-hour PM2.5 standards and the secondary annual PM2.5 standard remain the same. Currently Maryland counties have not received designations under the 2024 PM2.5 standard.

[13] For background, the EPA issued a final rule (81 FR 58010), effective October 24, 2016, on "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements" that stated, in part: "Additionally, in this document the EPA is revoking the 1997 primary annual standard for areas designated as attainment for that standard because the EPA revised the primary annual standard in 2012." (See: https://www.gpo.gov/fdsys/pkg/FR-2016-08-24/pdf/2016-18768.pdf). Accordingly, Fairfax County is no longer designated as maintenance for PM2.5, and the associated USEPA regulatory requirements for conformity for PM2.5 are eliminated for northern Virginia.

[14] Guidance for Preparing and Processing Environmental and Section 4(f) Documents, October 30, 1987. https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

7.3 Mobile Source Air Toxics (MSAT)

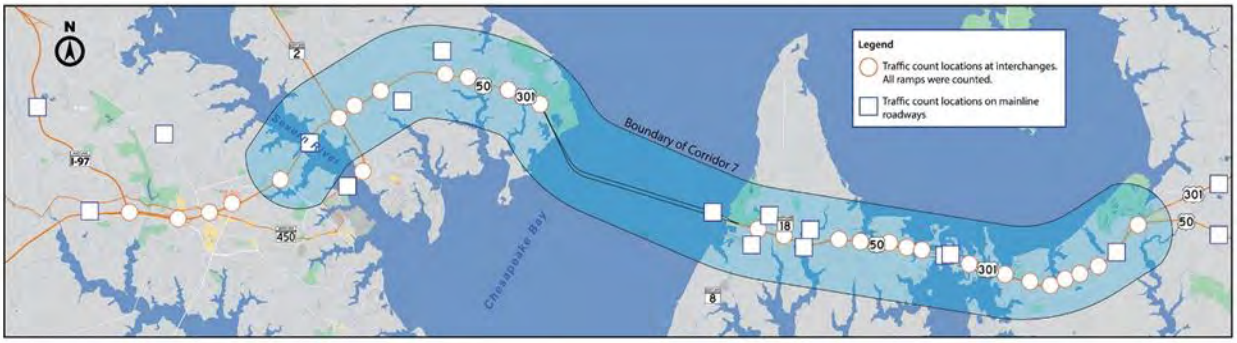
7.3.1 Environmental Impacts

In accordance with the latest MSAT guidance,[15] the Study is best characterized as one with "higher potential MSAT effects" since the projected design year traffic is expected to reach the 140,000 to 150,000 AADT criteria. **Table 7-1** summarizes the ADT throughout the study corridor for each alternative. **Figure 7-1** illustrates the locations where ADT volumes were collected.

Table 7-1: Average Daily Traffic Volumes

Route	Location	Design Year - 2045			
		Alternative A No-Build	Alternatives B/C: 6-8-6	Alternatives D/E: 8-8-8	Alternatives F/G: 8-10-8
U.S. 50/301	West of MD 2	155,100	169,550	175,750	175,800
U.S. 50/301	On Bay Bridge	130,500	143,150	148,600	148,650
U.S. 50/301	On Kent Narrows Bridge	134,050	146,800	152,400	152,450
U.S. 50/301	West of U.S. 50/301 Split	134,950	147,600	153,250	153,300

Figure 7-1: Average Daily Traffic Count Locations



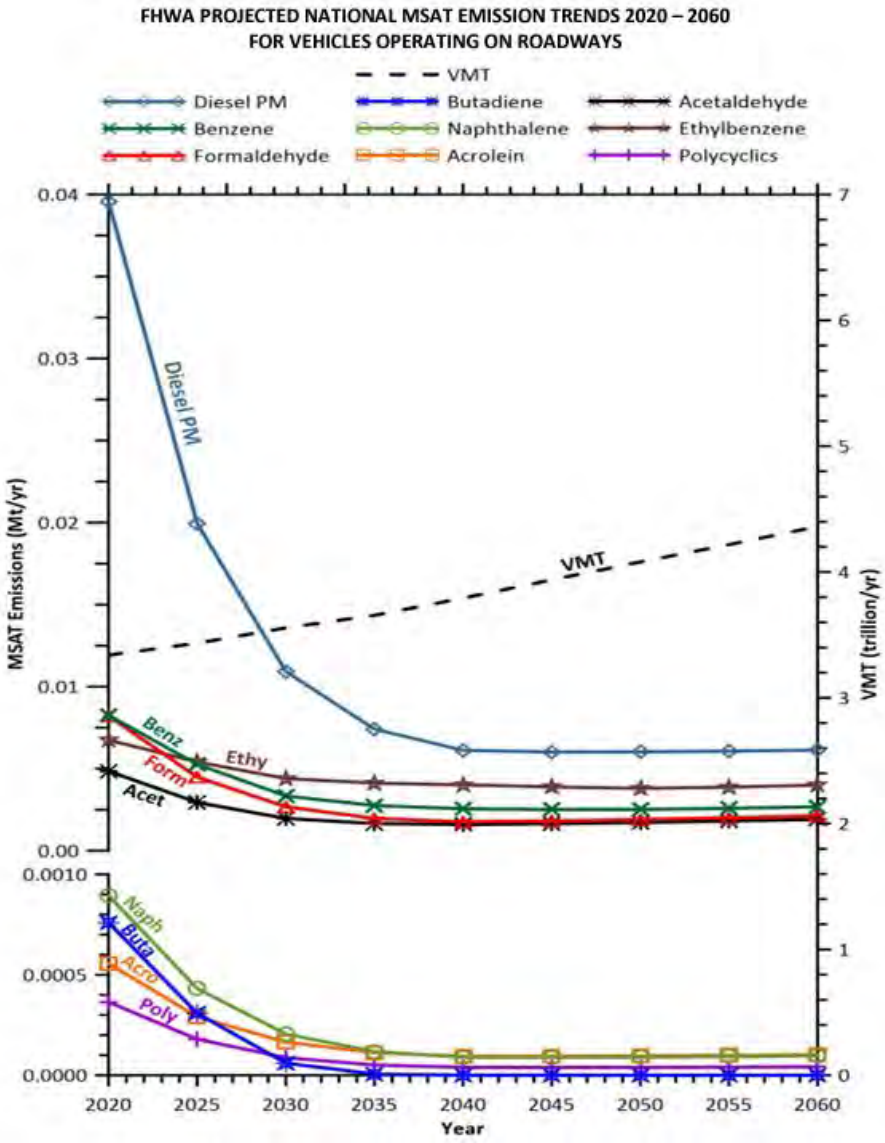
The data presented in **Table 7-1** demonstrates that the predicted summer weekend ADT volumes would be greater than the FHWA Category 3 140,000 to 150,000 AADT MSAT criteria. As a result, a quantitative assessment of MSAT emissions projections was conducted for the Tier 2 Study utilizing the 2023 FHWA Interim Guidance and the Frequently Asked Questions (FAQ) *Conducting Quantitative MSAT Analysis for FHWA NEPA Documents*[16] to develop the Affected Networks and MOVES modeling. A summary of MOVES modeling inputs is presented in **Appendix A**.

Using EPA's MOVES3 model, as shown in **Figure 7-2**, FHWA estimates that even if vehicle miles traveled (VMT) increases by 31 percent from 2020 to 2060 as forecasted, a combined reduction of 76 percent in the total annual emissions for the priority MSAT is projected for the same time

[15] https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/
[16] *Frequently Asked Questions (FAQ) Conducting Quantitative MSAT Analysis for FHWA NEPA Documents*. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/moves_msat_faq.cfm

period.[17] Diesel PM is the dominant component of MSAT emissions, making up 36 to 56 percent of all priority MSAT pollutants by mass, depending on calendar year. The downward trend in emissions is a result of technological improvements (i.e., more stringent vehicle emission and fuel quality standards coupled with ongoing fleet turnover) and is achieved despite increased VMT in this period.

Figure 7-2: National MSAT Emission Trends 2020 – 2060 for Vehicles Operating on Roadways



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: USEPA MOVES3 model runs conducted by FHWA, March 2021.

[17] *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents January 18, 2023* https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/

The EPA MOVES4 model was used to calculate emissions estimates for 1,3-butadiene; acetaldehyde; acrolein; benzene; diesel PM; ethylbenzene; formaldehyde; naphthalene; and POM. **Table 7-2** identifies the MOVES RunSpec inputs that were used for the MSAT emissions modeling.

Table 7-2: Proposed MOVES RunSpec Inputs for MSAT Emissions Modeling

MOVES Panel	Input
Scale	County Scale and Inventory Mode
Time Span	"Hour" aggregation level Base (2022) and Design (2045) Years January, April, July, October Weekend 24 hours
Geographic Bounds	Anne Arundel County
Vehicles/Equipment	All vehicle types for diesel and gasoline and CNG transit buses only along with E-85 capable and electric vehicles
Road Type	Rural Restricted Access, Rural Unrestricted Access, Urban Restricted Access, Urban Unrestricted Access
Pollutants/Processes	Pollutants: Primary Exhaust PM10-Total (as Diesel PM) Benzene 1,3-Butadiene Formaldehyde Acrolein POM-All PAHs minus naphthalene gas and naphthalene particle Naphthalene-naphthalene gas plus naphthalene particle Ethyl Benzene Acetaldehyde Processes: Running exhaust, crankcase running exhaust, evaporation permeation, and evaporation fuel leaks
General Output	Grams and Distance Travelled
Output Emissions Detail	Source Use Type by Fuel type

Table 7-3 identifies the County Data Manager input sources as well as the variation in the use per alternative and year. The MOVES RunSpec files are presented in **Appendix A**.

Table 7-3: MOVES County Data Manager for MSAT Emissions Modeling

Input	Detail	Data Source
Age Distribution	Varies by Year	BMC
Sourcetype Population	Varies by Year	BMC
Meteorology	Same for all Runs	BMC
Fuels	Varies by Year	MOVES Defaults for County
I/M Programs	Varies by Year	MOVES Defaults for County
Highway Performance Monitoring System VMT Vehicle Type	Varies by Year and Scenario	Project Level Traffic Modeling
Average Speed Distribution	Varies by Year and Scenario	Project Level Traffic Modeling
Road Type Distribution	Varies by Year and Scenario	Project Level Traffic Modeling
Day and Month VMT Fractions	Same for all runs	MOVES Defaults for County
Hour VMT Fractions	Same for all runs	MOVES Defaults for County

The Highway Performance Monitoring System (HPMS) VMT Vehicle Type was project-specific for each alternative and year and was calculated from the Maryland Statewide Transportation model output for all modeling scenarios. The total VMT was apportioned into six main MOVES source types for passenger cars, other 2-axle/4-axle vehicles, single-unit trucks, buses, combination trucks, and motorcycles.

The Average Speed Distribution was project-specific for each alternative and year. Vehicle speed fractions were estimated from congested vehicle speeds included in the Maryland Statewide Transportation model output for each link included in the affected network and was apportioned using the MOVES average speed bin table of bins (i.e., 1 to 16) for each road type.

The Road Type Distribution was project-specific for each alternative. The road type distribution fractions were derived from the Maryland Statewide Transportation model for each MOVES road type and source type. The MOVES source types were apportioned from the available vehicle count data within the Maryland Statewide Transportation model. Vehicle miles travelled per vehicle on each road type was calculated and multiplied by the vehicle counts on each MOVES road type to calculate the Road Type Distributions.

7.3.2 MSAT Results

The results of the quantitative MSAT analysis are presented in **Table 7-4** while changes in emissions compared to the 2045 No-Build condition and between the alternatives and base year condition are provided in **Table 7-5**. In general, MSAT emissions are expected to remain the same or very slightly increase for all alternatives when compared to the No-Build condition for 2045 due to an increase in VMT from the no build to the build conditions. Alternatives F/G result in the smallest increase between the no build and build conditions in the design year. This is likely due to less congested speeds associated with those alternatives. All MSAT pollutant emissions are expected to substantially decline in the design year when compared to existing conditions. These reductions occur despite projected increase in VMT from 2022 to the 2045 build scenario.

Table 7-4: Projected Annual MSAT Emissions (Tons Per Year) on Affected Network*

Projected Annual MSAT Emissions in Tons Per Year (TPY) on "Affected Network"		Annual Vehicle Miles Traveled Million Annual VMT	PM10-Total (Diesel Only)	Benzene	1,3-Butadiene	Formaldehyde	Acrolein	Naphthalene	Ethyl Benzene	Acetaldehyde	Polycyclic Organic Matter
2022 Base Year	**Alternative B/C**	1,351.4	6.68	1.34	0.12	1.46	0.09	0.15	0.63	0.86	0.06
	Alternative D/E	1,885.8	9.28	1.87	0.17	2.04	0.13	0.21	0.88	1.20	0.09
	Alternative F/G	2,043.5	10.00	2.02	0.18	2.19	0.14	0.23	0.95	1.29	0.09
2045 Design Year	**Alternative B/C**	1,698.3	0.36	0.53	0.00	0.43	0.01	0.02	0.20	0.32	0.01
	No Build	1,572.9	0.33	0.49	0.00	0.38	0.01	0.02	0.18	0.28	0.01
	Alternative D/E	2,429.0	0.49	0.73	0.00	0.57	0.02	0.03	0.27	0.42	0.01
	No Build	2,176.8	0.45	0.66	0.00	0.52	0.02	0.03	0.25	0.38	0.01
	Alternative F/G	2,629.9	0.53	0.79	0.00	0.60	0.02	0.03	0.29	0.44	0.02
	No Build	2,366.7	0.48	0.72	0.00	0.56	0.02	0.03	0.27	0.41	0.01

*It should be noted that different affected networks were developed for each alternative using FHWA screening criteria, therefore comparing the tons per year MSAT results would not represent a 1:1 comparison of alternatives. Tons per year of MSAT emissions for each alternative have been included for transparency purposes.

Table 7-5: Projected Annual MSAT Percent Change in Emissions on Affected Network

Projected Annual MSAT Percent Change in Emissions on "Affected Network"		Annual Vehicle Miles Traveled Million Annual VMT	PM10-Total (Diesel Only)	Benzene	1,3-Butadiene	Formaldehyde	Acrolein	Naphthalene	Ethyl Benzene	Acetaldehyde	Polycyclic Organic Matter
Alternative B/C	**2045 Build-2022 Existing Difference**	25.67%	**-94.64%**	**-60.40%**	**-100.00%**	**-70.79%**	**-85.84%**	**-84.63%**	**-68.61%**	**-63.38%**	**-82.85%**
	2045 Build – 2045 No Build Difference	7.97%	9.75%	9.55%	0.00%	10.92%	10.69%	9.54%	9.71%	11.43%	9.23%
Alternative D/E	**2045 Build-2022 Existing Difference**	28.80%	**-94.72%**	**-61.03%**	**-100.00%**	**-72.24%**	**-86.45%**	**-84.95%**	**-69.15%**	**-65.50%**	**-82.99%**
	2045 Build – 2045 No Build Difference	11.58%	9.96%	10.14%	0.00%	9.46%	9.68%	10.19%	10.11%	9.22%	10.41%
Alternative F/G	**2045 Build-2022 Existing Difference**	28.70%	**-94.70%**	**-61.08%**	**-100.00%**	**-72.43%**	**-86.43%**	**-84.87%**	**-69.17%**	**-65.85%**	**-82.91%**
	2045 Build – 2045 No Build Difference	11.13%	9.27%	9.47%	0.00%	8.94%	8.66%	9.47%	9.36%	8.64%	9.76%

In general, for each MSAT and each of the ARDS, the long-term trend in emissions is downward. For each MSAT and alternative, the forecast emissions for build alternatives and the No-Build Alternative are small, especially compared to the long-term downward trend in emissions for each MSAT. For each MSAT, emission estimates vary with the build alternatives, which is expected given the differences (i.e., traffic volumes, delays, travel speeds, affected links, etc.). The build alternative conditions are expected to result in substantial reductions in all MSATs compared to the existing year conditions.

7.3.3 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 mobile source air toxic (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 CAA 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 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-airtoxics-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 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." (EPA IRIS database, Diesel Engine Exhaust, Section II.C. https://iris.epa.gov/static/pdfs/0642_summary.pdf).

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 CAA 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 US 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.[18]

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, which are better suited for quantitative analysis.

[18] https://law.justia.com/cases/federal/appellate-courts/cadc/07-1053/07-1053-1120274-2011-03-24.html

7.4 Construction Impacts

Most emissions associated with construction are considered short-term or temporary in nature. The primary air quality concerns during construction would be a potential short-term localized increase in the concentration of fugitive dust (including airborne PM, PM2.5 and PM10), as well as mobile source emissions.

Mobile source emissions include pollutants such as CO and diesel exhaust. Since CO emissions from motor vehicles generally increase with decreasing vehicle speed, disruption of traffic during construction (such as temporary reduction of roadway capacity and increased queue lengths) could result in short-term elevated concentrations of CO. To minimize the amount of CO and diesel exhaust emissions generated, efforts would be made during construction to:

- Limit traffic disruptions, especially during peak travel hours;
- Institute idle-reduction practices for construction vehicles and equipment;
- Include Diesel Emission Reduction specifications or performance standards in contracts;
- Establish a Diesel Emission Reduction Policy for construction projects[19]:
- Encourage participation in the Clean Construction USA program.[20]

All required construction-related permits would be obtained from MDE prior to construction. The construction contractor may use the following dust control measures, to minimize, to the greatest extent practicable, impacts to air quality.

Mitigation measures that could be used during construction could include:

- Minimize land disturbance;
- Cover trucks when hauling soil, stone, and debris (MDE Law);
- Use water trucks to minimize dust;
- Use dust suppressants if environmentally acceptable;
- Stabilize or cover stockpiles;
- Construct stabilized construction entrances per construction standard specifications;
- Regularly sweep all paved areas including public roads;
- Stabilize onsite haul roads using stone;
- Temporarily stabilize disturbed areas per MDE erosion and sediment standards.

7.5 Mitigation

Since the build alternatives are not predicted to increase emission burdens compared to the No-Build Alternative, nor cause or contribute to a violation of the NAAQS, no long-term or regional air quality impacts are anticipated, and no permanent mitigation measures are warranted.

[19] https://www.epa.gov/dera/reducing-diesel-emissions-construction-and-agriculture
[20] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100ABR4.pdf

7.6 Reasonably Foreseeable Effects

BRTB's Air Quality Conformity Analysis[21] represents a reasonably foreseeable impact assessment for purposes of regional air quality. Federal conformity requirements, including specifically 40 CFR 93.114 and 40 CFR 93.115, apply as the area in which the project located is designated as nonattainment and maintenance for ozone. Accordingly, there must be a currently conforming transportation plan and program at the time of project approval, and the project must come from a conforming plan and program (or otherwise meet criteria specified in 40 CR 93.109(b)).

- The existing air quality designations for the region are based, in part, on the accumulated mobile source emissions from past and present actions, and these pollutants serve as a baseline for the current conformity analysis.

- The conformity analysis quantifies the amount of mobile source emissions for which the area is designated nonattainment/maintenance that will result from the implementation of all reasonably foreseeable regionally significant transportation projects in the region (i.e., those proposed for construction funding over the life of the region's transportation plan).

- BRPB's most recent conformity analysis was completed in July 2023, with FHWA participating in the recommendation of a conformity determination to BRTB for approval on July 5, 2023, for the TIP and CLRP covered by that analysis. This analysis demonstrates that the incremental impact of worst-case assumptions for the mobile source emissions, when considering reasonably foreseeable future actions, is in conformance with the SIP and would likely not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by EPA.

[21] Conformity Determination of Resilience 2050, the Long-Range Transportation Plan and the 2024-2027 Transportation Improvement Program. July 25, 2023. https://www.baltometro.org/sites/default/files/bmc_documents/general/transportation/tip/24-27/24-27TIP_conformity_determination.pdf

8 SUMMARY

All the ARDS showed reductions in MSAT emissions ranging from approximately 50 percent to 95 percent, depending on the pollutant, when compared to the 2022 base year emissions. This reduction occurs despite an approximately 28% increase in VMT between the base year and the design year. Alternatives F/G showed the smallest change in emissions between the no build and build conditions in the design year, likely a result of less congested speeds associated with those alternatives. Alternatives D/E and B/C show slightly larger increases in MSAT emissions from the no build to the build conditions, respectively.

What is known about mobile source air toxics is still evolving. Information is currently incomplete or unavailable to credibly predict the study-specific health impacts due to changes in MSAT emissions associated with each of the study Alternatives. Under each of the ARDS, there may be slightly higher or lower MSAT emissions in the design year relative to the No Build Alternative due to increased VMT or increased vehicle speeds. There could also be increases in MSAT levels in a few localized areas where VMT increases. However, lower MSAT levels are expected in the future due to cleaner engine standards coupled with fleet turnover. The magnitude of the EPA-projected reductions is so great that, even after accounting for VMT growth, MSAT emissions in the study area would be substantially lower in the future than they are today, regardless of the build alternative, if selected.

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