AIR QUALITY REPORT

From: Grinnell, Daniel T. (VDOT)
To: Fluitt, Allison; Ponticello, James (VDOT); Sitler, Owen (VDOT)
Cc: Tworek, Robert; Odell, Caroline
Subject: RE: Draft AQ Report - UPC 120650 Air Quality
Date: Monday, May 20, 2024 10:39:16 AM
Attachments: image001.jpg

> Some people who received this message don't often get email from daniel.grinnell@vdot.virginia.gov. Learn why this is important

Allison,

I've reviewed the report, and all looks good. I have no further comments.

Thanks

-Dan

Dan Grinnell
Environmental Specialist Sr. | Environmental Division | Virginia Department of Transportation | 1401 E. Broad Street, Richmond, VA 23219 | (804) 371-2614 phone | daniel.grinnell@vdot.virginia.gov

---

From: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>
Sent: Friday, May 17, 2024 4:55 PM
To: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Tworek, Robert <Robert.Tworek@kimley-horn.com>; Odell, Caroline <Caroline.Odell@kimley-horn.com>
Subject: RE: Draft AQ Report - UPC 120650 Air Quality

Dan,
I'm attaching our revised air quality report for Project UPC 120650 (Main Street/US 258 at Route 10 Bypass). We addressed your comments and are attaching a Word version with changes tracked as well as a clean PDF version. Please let me know if you have any final comments.

Thank you,
Allison

From: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>
Sent: Thursday, April 25, 2024 11:26 AM
To: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Tworek, Robert <Robert.Tworek@kimley-horn.com>; Odell, Caroline <Caroline.Odell@kimley-horn.com>
Subject: RE: Draft AQ Report - UPC 120650 Air Quality

Allison,

I've reviewed the draft report and had a few minor edits. Take a look and let me know if you have any questions.

Thanks

-Dan

From: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>
Sent: Saturday, April 20, 2024 10:43 PM
To: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Tworek, Robert <Robert.Tworek@kimley-horn.com>; Odell, Caroline <Caroline.Odell@kimley-horn.com>
Subject: Draft AQ Report - UPC 120650 Air Quality

Dan,
Attached please find our draft air quality report for Project UPC 120650 (Main Street/US 258 at Route 10 Bypass). Please let us know what comments or questions you have following your review.

Thank you,
Allison

From: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>
Sent: Tuesday, April 9, 2024 10:03 AM
To: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Tworek, Robert <Robert.Tworek@kimley-horn.com>
Subject: RE: Protocol UPC 120650 Air Quality

Allison,

The protocol looks good. Since this is a CE level NEPA document you can leave out the qualitative IECI as not required. Please submit the draft AQ report for review at your earliest convenience.

Thanks

-Dan

From: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>
Sent: Friday, April 5, 2024 9:18 AM
To: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Tworek, Robert <Robert.Tworek@kimley-horn.com>

Subject: RE: Protocol UPC 120650 Air Quality

Dan,
Thank you for your comments on the protocol for Project UPC 120650 (Main Street/US 258 at Route 10 Bypass). We have made your requested edits and the revised protocol is attached to this email. I am also including your comments for reference. Please let me know if you have any additional questions or comments.

Thanks,
Allison

Allison Fluitt, P.E. (NC, MS)**, AICP |** Vice President
Kimley-Horn | 421 Fayetteville Street, Suite 600, Raleigh, NC 27601
Direct: 919 653 2947 **|** Mobile: 865 898 9410

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From: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>
Sent: Wednesday, February 21, 2024 9:44 AM
To: Riley, Kelsey <kelsey.riley@kimley-horn.com>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>
Subject: RE: Protocol UPC 120650 Air Quality

Kelsey,

I've reviewed the protocol submitted for this project and included comments in the attached. The protocol should be updated to reflect the latest VDOT guidance which can be found on our recently updated website-Environmental | Virginia Department of Transportation. I've also attached the latest version of the VDOT Project-Level Air Quality Template Report which has not yet been posted. Please contact me if you have any questions.

Thanks

-Dan

From: Riley, Kelsey <kelsey.riley@kimley-horn.com>
Sent: Friday, February 16, 2024 2:41 PM
To: Grinnell, Daniel T. (VDOT) <daniel.grinnell@vdot.virginia.gov>; Ponticello, James (VDOT) <Jim.Ponticello@VDOT.Virginia.gov>; Sitler, Owen (VDOT) <Owen.Sitler@vdot.virginia.gov>
Cc: Fluitt, Allison <Allison.Fluitt@kimley-horn.com>
Subject: Protocol UPC 120650 Air Quality

Dan,

Please see the attached protocol table for the Main Street/US 258 at Route 10 Bypass UPC 120650. Please let us know if you have any questions.

Thanks,
Kelsey

Kelsey Riley
Kimley-Horn | 2619 Centennial Boulevard Suite 200. Tallahassee FL 32308
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AIR QUALITY TECHNICAL REPORT

Main Street / US 258 at Route 10 Bypass Intersection Improvements

Intersection of Main Street / US 258 at Route 10
UPC 120650

Hampton Roads District

Prepared for:



Environmental Division

Prepared by:

Kimley-Horn and Associates

May 2024

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ACRONYMS

AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
CAA	Clean Air Act
CEQ	Council of Environmental Quality
CF	Categorical Finding
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FY	Fiscal Year
FTA	Federal Transit Administration
GHG	Greenhouse Gas
HAP	Hazardous Air Pollutant
HEI	Health Effects Institute
HOT	High-Occupancy Toll
HRTPO	Hampton Roads Transportation Planning Organization
I-	Interstate-
IECI	Indirect Effects and Cumulative Impacts
IRIS	Integrated Risk Information System
L&D	Location & Design Division (VDOT)
LOS	Level of Service
LRTP	Long Range Transportation Plan
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MSATs	Mobile Source Air Toxics
MTPY	Metric Tons per Year
NAAQS	National Ambient Air Quality Standards
NCHRP	National Cooperative Highway Research Program
NCRTPB	National Capital Region Transportation Planning Board
NEPA	National Environmental Policy Act

NOAA	National Oceanic and Atmospheric Administration
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OIPI	Office of Intermodal Planning and Investment
O_3	Ozone
PA	Programmatic Agreement
Pb	Lead
PM	Particulate Matter
$PM_{2.5}$	Fine inhalable particulate matter, with diameters that are generally 2.5 micrometers and less
PM_{10}	Inhalable particulate matter, with diameters that are generally 10 micrometers and less
POM	Polycyclic Organic Matter
PPM	Parts per million
Ppb	Parts per billion
RTP	Long-Range Transportation Plan
SIP	State Implementation Plan
S&B	Structure & Bridge Division (VDOT)
SLR	Sea Level Rise
SO2	Sulfur Dioxide
TIP	Transportation Improvement Program
TMPD	Transportation Mobility and Planning Division (VDOT)
TPY	Tons per Year
TSD	Technical Support Document
USACE	U.S. Army Corps of Engineers
USDOT	US Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VA	Virginia
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VDOT	Virginia Department of Transportation
VDRPT	Virginia Department of Rail and Public Transportation
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VPHPL	Vehicles per Hour per Lane
VTRC	Virginia Transportation Research Council

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Executive Summary

The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA), is proposing to improve the Route 258 at Route 10 intersection with the addition of travel lanes along Main Street / US 258. The project will widen Main Street / US 258 from a single thru lane in each direction to two thru lanes in each direction.

The proposed improvements were assessed for potential air quality impacts and compliance with all applicable air quality regulations and guidance. Based on the assessment, the project would meet all applicable federal and state transportation conformity regulatory requirements as well as air quality guidance under the National Environmental Policy Act (NEPA). As such, the project would not cause or contribute to a new violation of the national ambient air quality standards (NAAQS) established by the Environmental Protection Agency (EPA).

Mitigation:

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications.*[1]

The Virginia Department of Environmental Quality (VDEQ) provides general comments for projects by jurisdiction that in part address mitigation. For Isle of Wight County, VDEQ stated that[2] "*…all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions*[3]*; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions*[4]*; and 9 VAC 5-50, Article 1, Fugitive Dust precautions.*[5]"

Project Status in the Regional Transportation Plan and Program: Federal conformity requirements at 40 CFR 93.114[6] and 40 CFR 93.115[7] (as incorporated by reference into the Virginia conformity SIP) apply under a federal court decision affecting former maintenance areas nationwide for the 1997 ozone NAAQS.[8] Accordingly, there must be a currently

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1 https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/technical-guidance-documents/road-and-bridge-specifications/

2 Spreadsheet entitled: "DEQ SERP Comments rev8b", March 2017, downloaded from the online data repository for the VDOT Resource Document. The repository may be accessed via the Environmental Division webpage: https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/environmental/

3 See: https://law.lis.virginia.gov/admincode/title9/agency5/chapter130/

4 See: https://law.lis.virginia.gov/admincode/title9/agency5/chapter45/

5 See: https://law.lis.virginia.gov/admincode/title9/agency5/chapter50/

6 See: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#93.114

7 See: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#93.115

8 Per a 2/16/2018 court decision (South Coast Air Quality Management District v. EPA), all areas in the country that were in nonattainment or maintenance for the 1997 eight-hour ozone NAAQS before its revocation by EPA in 2015 were again made subject to conformity for that standard. This decision in part affects "orphan areas" (as

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 the criteria specified in 40 CFR 93.109(b).[9] As of the date of preparation of this analysis, the project is included in the currently conforming FY 2024-2027 Transportation Improvement Program (TIP) and 2045 Long Range Transportation Plan (LRTP) developed by the designated metropolitan planning organization (MPO) for the region, the Hampton Roads Transportation Planning Organization (HRTPO).[10] This project is not considered regionally significant for conformity.

defined in the ruling), which in Virginia include Fredericksburg, Richmond/Tri-Cities, and Hampton Roads. The court ruling may be viewed at: https://www.cadc.uscourts.gov/internet/opinions.nsf/217B6778AE3EC89C8525823600532AE0/$file/15-1115-1718293.pdf

9 See: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#93.109

10 See: https://www.hrtpo.org/101/HRTPO

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1.0 Project Background

This section presents background information including the project purpose and need, description, alternatives, summary traffic data and the project status in the regional transportation plan.

1.1 Purpose and Need

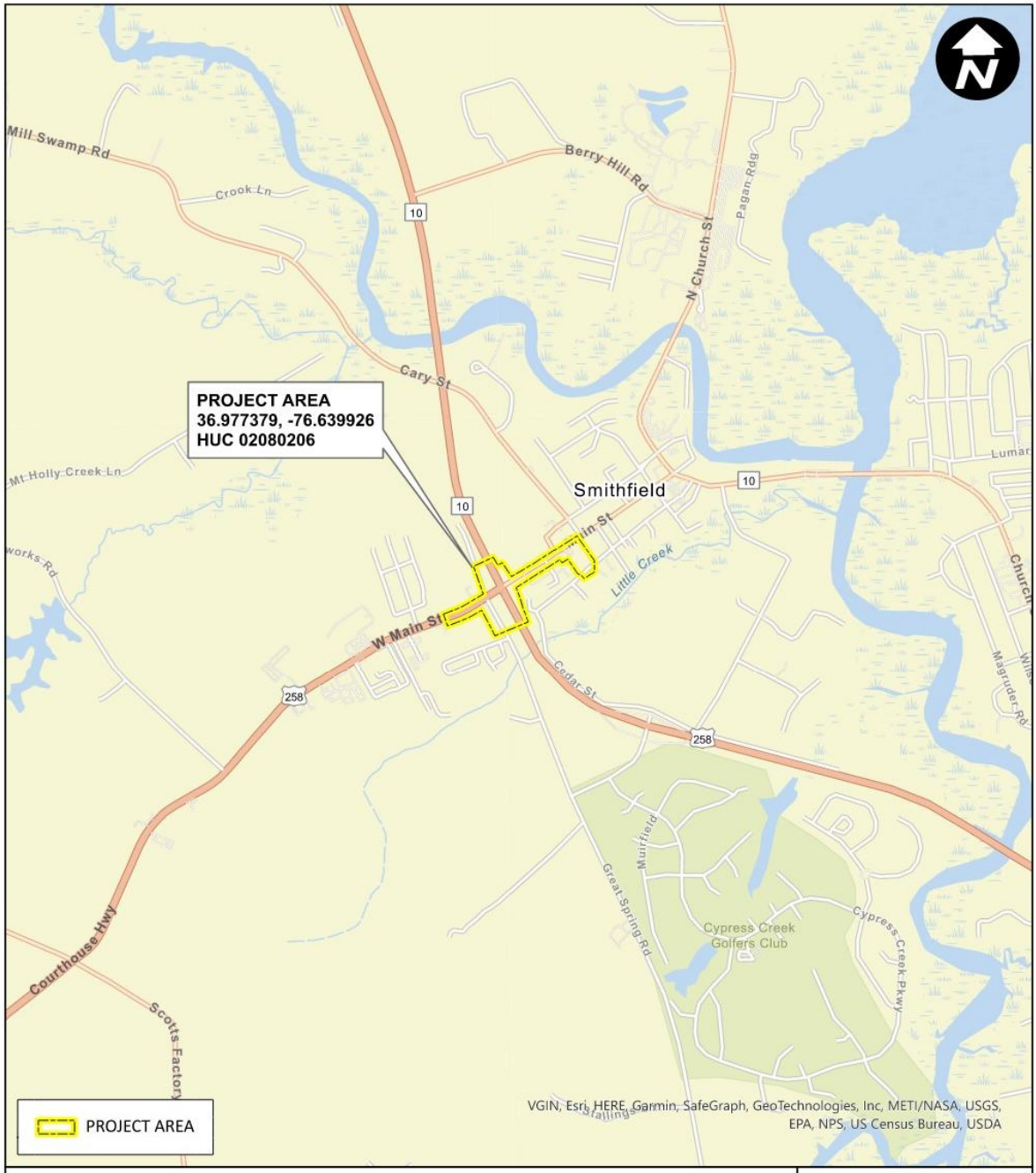
The purpose of the proposed project is to improve the Route 258 at Route 10 intersection with the addition of travel lanes along Main Street / US 258. The proposed project will widen Main Street / US 258 from a single thru lane in each direction to two thru lanes in each direction. In addition, the existing left and right turn lanes will be restored throughout the intersection. The proposed roadway widening improvements will increase the capacity along Main Street / US 258 and increase the overall level of service of the intersection. The additional capacity along Main Street / US 258 will allow for more traffic signal green time to vehicles along Route 10. The proposed project also improves freight reliability for the US 258 west corridor by reducing travel time and vehicle delay through the intersection of Main Street and US 258, the improvements also make the corridor a more viable alternative route when incidents occur on parallel routes. Additional improvements include curb and gutter improvements, drainage and stormwater management improvements, pedestrian accommodations, and traffic signal and pedestrian signal improvements. The improvements also consist of the design of a new park-and-ride lot on the northwest corner of the intersection.

The proposed project expands opportunities for the use of public transportation by improving the Park-and-Ride lot. The existing Park-and-Ride lot entrance will be reconfigured to improve ingress/egress via Pole Road, internal site circulation, and additional parking capacity. The increase in capacity will reduce delay for the existing bus route as well as provide safer internal circulation between the existing intersection, the park-and-ride entrance, and the exiting frontage road immediately adjacent to the lot which is shared with several commercial businesses. This project will also help with economic development, as it will improve an intersection near a major sports complex being constructed nearby, that will serve the region as a tournament venue.

1.2 Project Description

Isle of Wight County received Smart Scale funding for the design and construction of the Main Street/Route 258 at Route 10 Bypass Intersection Improvement Project. The project will widen Main Street / US 258 on both sides of the Route 10 Bypass intersection from a single thru lane in each direction to two thru lanes in each direction and restore the existing left and right turn lanes at the intersection. The proposed improvements will consist of roadway widening, curb and gutter improvements, drainage and stormwater management improvements, pedestrian accommodations, and traffic signal and pedestrian signal improvements. The improvements also consist of the design of a new park-and-ride lot on the northwest corner of the intersection. Exhibit 1.2.1 provides an overview of the study corridor for the proposed project.

Exhibit 1.2.1: Corridor Study Area



PROJECT: MAIN STREET/ US 258 AT ROUTE 10 BYPASS INTERSECTION IMPROVEMENT PROJECT ISLE OF WIGHT COUNTY, VA		**FIGURE 1 SITE VICINITY**
UPC 12065	SCALE: 1:24,000	
DATE CREATED: 11/02/2023	PROJECT NO.: 0258-046-740	

1.3 Alternatives

Based on the project purpose and need, VDOT developed two alternatives: one build alternative and the No-Build alternative. The Build Alternative includes the proposed intersection improvements including the widening of Main Street / US 258 on both sides of the Route 10 Bypass intersection from a single thru lane in each direction to two thru lanes in each direction and restoring the existing left and right turn lanes at the intersection. The No-Build Alternative assumes that VDOT takes no action to address the project purpose and need, other than those typically completed as part of existing system preservation (i.e., resurfacing, landscape management, sign replacement, etc.). In a review of the Transportation Improvement Programs for VDOT and the Hampton Roads Transportation Planning Organization, there are no planned projects that would influence the Build or No-Build Alternatives.

The proposed improvements will consist of roadway widening, curb and gutter improvements, drainage and stormwater management improvements, pedestrian accommodations, and traffic signal and pedestrian signal improvements. The improvements also consist of the design of a new park-and-ride lot on the northwest corner of the intersection.

1.4 Summary of Traffic Data and Forecasts

Environmental traffic data for the Study Area includes hourly volumes and average daily traffic (ADT) forecasts for the roadway segments entering and exiting the intersection for the Existing Conditions, No-Build Alternative, and Build Alternative. Exhibit 1.4.1 presents a summary of the mainline segments' existing (2022) and design year (2037) average daily traffic (ADT) forecasts for the project. As shown in the exhibit, the DT forecast for the No-Build and Build Alternatives are the same for the design year with the peak of 18,139 occurring on Route 10 from S Church Street to US 258/Main Street. Trucks comprise between 1%-9% of total traffic for the segments around the intersection. The Traffic Operational Analysis Report is provided in Appendix A.

Exhibit 1.4.1: Average Daily Traffic Volumes and Truck Percent

Segment	From	To	2022 Existing	2037 No Build	2037 Build	% Truck
US 258/Main St	Dave's Service Center	Route 10	12,000	12,804	12,804	9%
US 258/Main St	Route 10	Grace St	7,600	8,109	8,109	1%
Route 10	US 258/Main St	Mill Swamp Rd	9,000	9,603	9,603	2%
Route 10	S Church St	US 258/Main St	17,000	18,139	18,139	7%

Source: U.S. 258 at Route 10 Bypass Intersection Improvements Traffic Operational Analysis

1.5 Project Status in the Regional Transportation Plan and Program

As of the date of preparation of this analysis, the project is included in the currently conforming FY 2024-2027 Transportation Improvement Program (TIP) and 2045 Long Range Transportation

Plan (LRTP).[11] The LRTP and TIP are developed Hampton Roads Transportation Planning Organization, which is the Metropolitan Planning Organization (MPO) for the region.[12]

2.0 Ambient Air Quality and Attainment Status

2.1 National Ambient Air Quality Standards (NAAQS)

Exhibit 2.1.1 presents the national ambient air quality standards (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.*"[13]

As a requirement of the Clean Air Act, EPA periodically reviews the NAAQS and revises them as needed, e.g., to make them more stringent and/or, on occasion, to revoke previous standards that were less stringent.[14] For example, EPA revoked the 1997 annual primary $PM_{2.5}$ NAAQS effective October 24, 2016, with the implementation of the more stringent 2012 $PM_{2.5}$ NAAQS.[15]

Areas that have never been designated by EPA as nonattainment for one or more of the NAAQS are classified as attainment areas, while areas that do not meet one or more of the NAAQS may be designated by EPA as nonattainment areas for that or those criteria pollutants. Areas that have failed to meet the NAAQS in the past but have since re-attained them may be re-designated as attainment (maintenance) areas, which are commonly referred to as maintenance areas.

---

[11] TIP: https://www.hrtpo.org/DocumentCenter/View/8530/Final-FY-24-27-TIP-PDF
Plan: https://www.hrtpo.org/331/2045-Long-Range-Transportation-Plan

[12] See: https://www.hrtpo.org/101/HRTPO

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

[14] On January 27, 2023, EPA issued a proposed rule for "Reconsideration of the National Ambient Air Quality Standards for Particulate Matter" (18 FR 5558). At the time of preparation of this report, that rule has not been finalized. The NAAQS table presented here may be updated for PM when the rule is finalized.

[15] On August 24, 2016, 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 .

Note the revocation of the 1997 annual primary NAAQS for $PM_{2.5}$ also eliminated the associated conformity requirements. For example, conformity requirements for that NAAQS were eliminated for northern Virginia, which until then had been in attainment (maintenance) for that standard.

Exhibit 2.1.1: National Ambient Air Quality Standards (US EPA Tabulation)

Pollutant [links to historical tables of NAAQS reviews]		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 (1)	Not to be exceeded
Nitrogen Dioxide (NO_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 (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)	$PM_{2.5}$	primary	1 year	9.0 µg/m^3	annual mean, averaged over 3 years
		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	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment 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.

(2) The level of the annual NO2 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.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 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) O3 standards.

(4) The previous SO2 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 nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 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: Excerpted from: https://www.epa.gov/criteria-air-pollutants/naaqs-table, accessed 4/29/2024.

2.2 Air Quality Attainment Status of the Project Area

The EPA Green Book[16] lists non-attainment, maintenance, and attainment areas across the nation. It lists the jurisdictions within the area in which the project is located as being in attainment for all of the NAAQS.

2.3 Ambient Air Quality Monitoring Data and Trends

VDEQ issues an annual report summarizing air quality monitoring data for the previous year, covering criteria pollutants (those for which EPA has established NAAQS) and other pollutants including air toxics.[17] Excerpts of the monitoring data from that report are presented below.

2.3.1 Criteria Pollutants

For transportation sources, the criteria pollutants of primary interest are CO, PM, and NO_2. As the region was previously in maintenance for the 1997 ozone NAAQS, the trend in ozone levels relative to current (more stringent) NAAQS is also of interest.

2.3.1.1 Carbon Monoxide

EPA provides the following background information on CO:[18]

> *"CO is a colorless, odorless gas that can be harmful when inhaled in large amounts. CO is released when something is burned. The greatest sources of CO to outdoor air are cars, trucks and other vehicles or machinery that burn fossil fuels. A variety of items in your home such as unvented kerosene and gas space heaters, leaking chimneys and furnaces, and gas stoves also release CO and can affect air quality indoors."*

As shown in Exhibit 2.3.1, and due primarily to the implementation of more stringent vehicle emission and fuel quality standards, the national trend in ambient concentrations of CO over the past few decades has decreased to a level substantially below the current eight-hour NAAQS of nine parts per million (ppm). The national trend is reflected in the very low ambient CO concentrations currently observed in Virginia, which are presented in Exhibits 2.3.2 and 2.3.3. As noted above, Virginia is in attainment for both the one- and eight-hour NAAQS for CO.

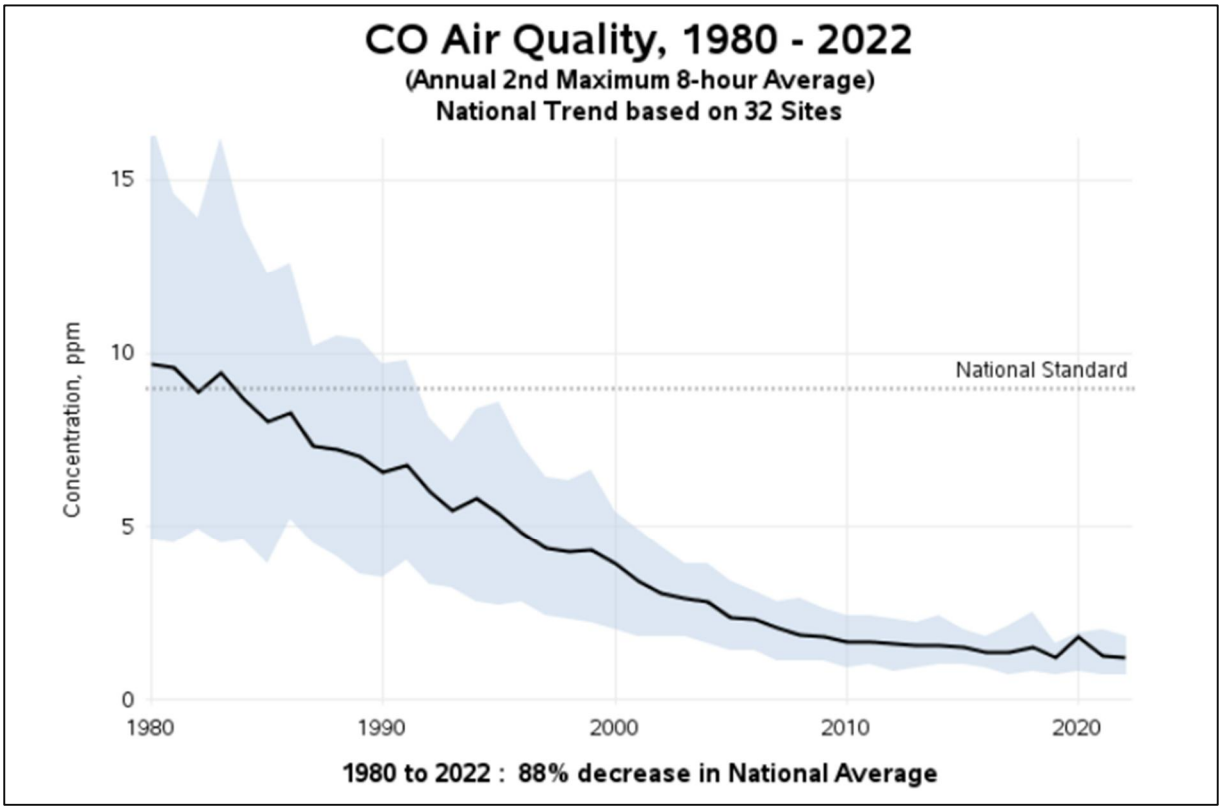
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16 EPA Green Book: https://www.epa.gov/green-book

17 https://www.deq.virginia.gov/our-programs/air/reports

18 https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#What%20is%20CO

Exhibit 2.3.1: National Trend in Ambient CO Concentrations



Source: https://www.epa.gov/air-trends/carbon-monoxide-trends, accessed April 10, 2024

Exhibit 2.3.2: Ambient Concentrations of Carbon Monoxide in Virginia

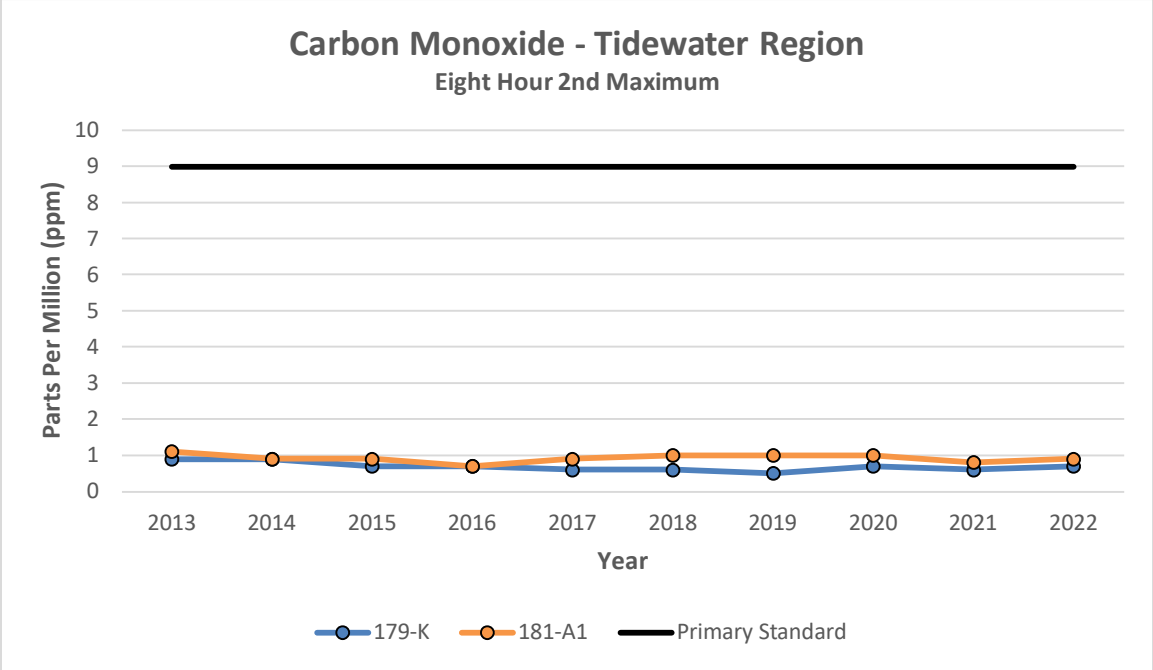
Primary NAAQS: 35 ppm (1-hour) and 9 ppm (8-hour)

Site	2022			
	1-Hour Avg. (ppm)		8-Hour Avg. (ppm)	
	1st Max.	2nd Max.	1st Max.	2nd Max.
(19-A6) **Roanoke Co.**	0.9	0.8	0.6	0.6
(72-M) **Henrico Co.**	1.2	1.1	0.9	0.9
(158-X) **Richmond**	1.3	1.2	0.9	0.9
(179-K) **Hampton**	0.9	0.9	0.7	0.7
(181-A1) **Norfolk**	1.4	1.4	1.0	0.9
(46-C2) **Fairfax Co.**	1.9	1.7	1.1	1.0
(47-T) **Arlington Co.**	1.5	1.4	1.2	1.2

Eight Hour Averages stated as Ending Hour

Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report", 2023. See: https://www.deq.virginia.gov/our-programs/air/reports

Exhibit 2.3.3: Trend in Ambient CO Concentrations



Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report," 2023. See: https://www.deq.virginia.gov/our-programs/air/reports

2.3.1.2 Particulate Matter

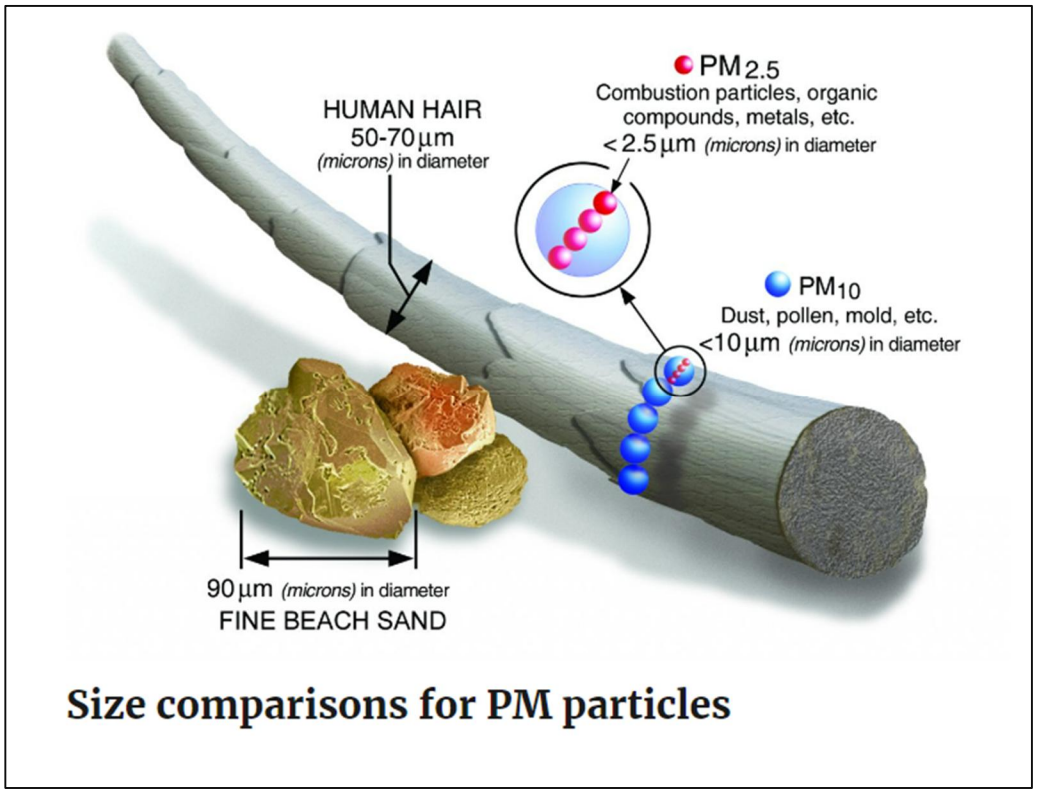
EPA provides the following background information on particulate matter (PM):[19]

> *"PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.*
>
> *Particle pollution includes:*
> - *PM_{10} : inhalable particles, with diameters that are generally 10 micrometers and smaller; and*
> - *$PM_{2.5}$: fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller."*

Exhibit 2.3.4 from EPA shows the size of $PM_{2.5}$ and PM_{10} particles relative to a human hair and to fine beach sand.

[19] See: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics

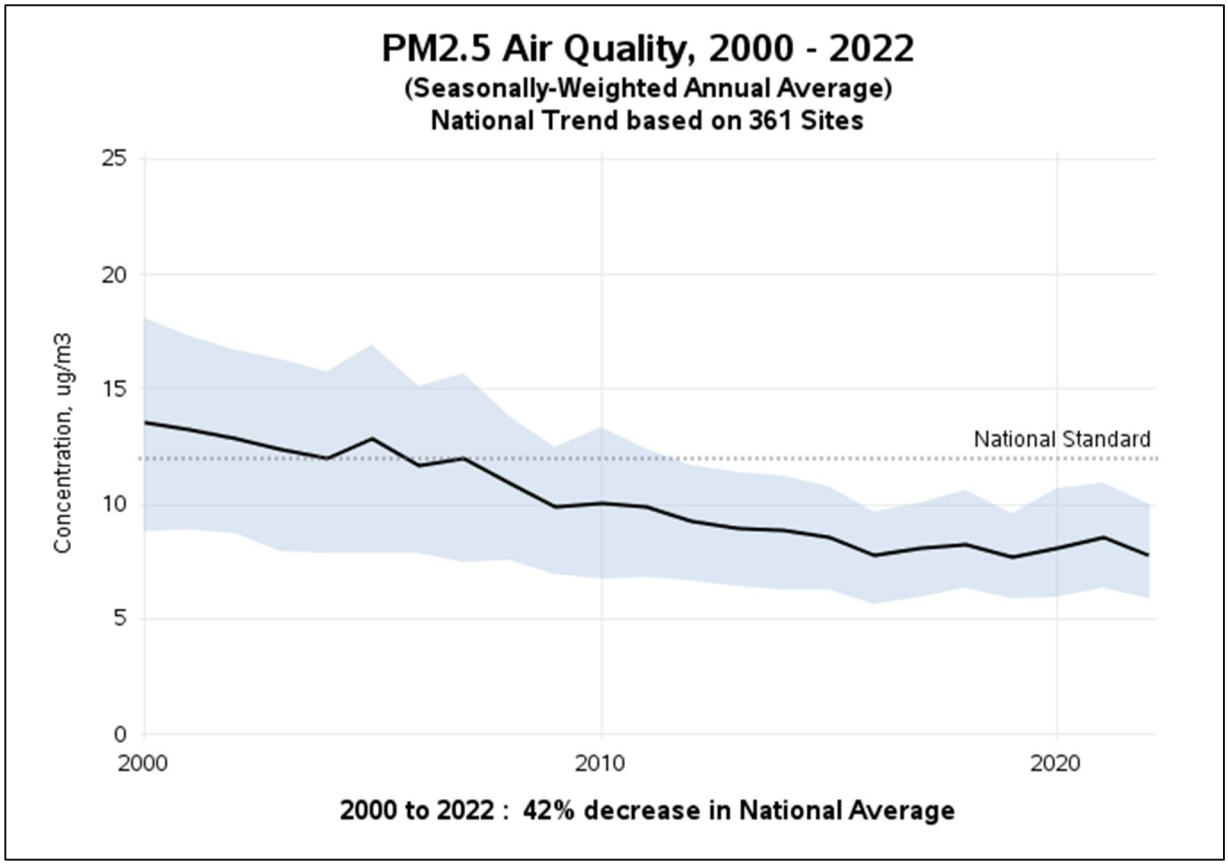
Exhibit 2.3.4: EPA Size Comparisons for PM Particles



Source: US EPA website accessed April 10, 2024. See:
https://www.epa.gov/pm-pollution/particulate-matter-pm-basics

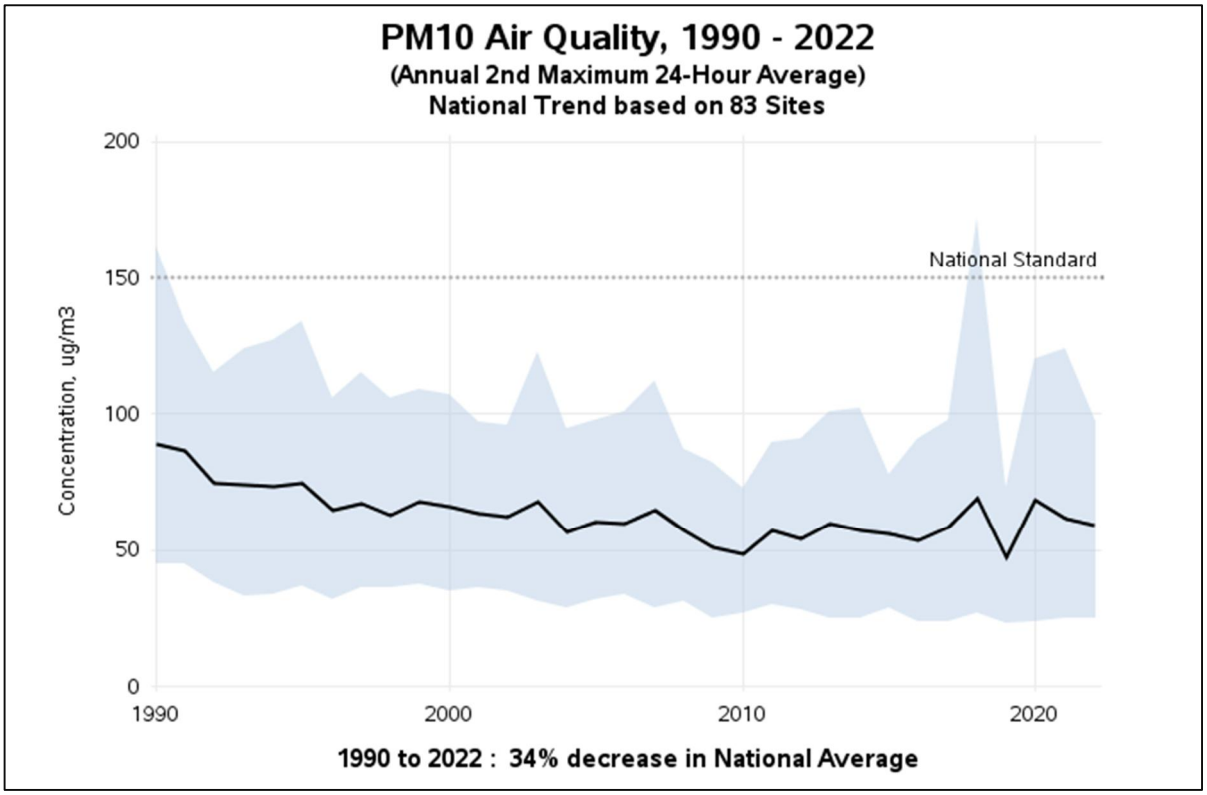
Exhibits 2.3.5 and 2.3.6 present the national trends in $PM_{2.5}$ and PM_{10} levels, respectively.

Exhibit 2.3.5: National Trends in $PM_{2.5}$ Concentrations (Annual Average)



Source: US EPA website accessed April 10, 2024. See:
https://www.epa.gov/air-trends/particulate-matter-pm25-trends

Exhibit 2.3.6: National Trends in PM_{10} Concentrations (24-Hour Average)



Source: US EPA website accessed April 10, 2024. See: https://www.epa.gov/air-trends/particulate-matter-pm10-trends

Exhibits 2.3.7 through 2.3.9 respectively present tabulations of $PM_{2.5}$ (24-hour and annual standards) and PM_{10} (24-hour standard) concentrations, which were excerpted from the referenced VDEQ annual air quality monitoring report. As noted above, all of Virginia is in attainment of the NAAQS for both pollutants.

Exhibit 2.3.7: Ambient Concentrations of $PM_{2.5}$ (24-Hour Average)

2020-2022 $PM_{2.5}$ 24-hour Averages, 98th Percentile Values (µg/m³, LC)				
Site	**2020**	**2021**	**2022**	**3-Year Average**
(101-E) **Bristol**	13.7	16.2	13.0	14.3
(26-F) **Rockingham Co.**	14.0	18.3	13.0	15.1
(28-J) **Frederick Co.**	16.2	21.2	19.2	18.9
(33-A) **Albemarle Co.**	12.3	17.9	15.0	15.1
(19-A6) **Roanoke Co.**	14.7	19.7	15.7	16.7
(110-C) **Salem**	13.5	18.8	12.6	15.0
(155-Q) **Lynchburg**	11.7	17.5	11.5	13.6
(71-H) **Chesterfield Co.**	11.4	18.9	11.9	14.1
(72-M) **Henrico Co.**	14.5	18.0	15.9	16.1
(72-N) **Henrico Co.**	12.7	17.2	11.1	13.7
(75-B) **Charles City Co.**	11.5	17.0	12.9	13.8
(158-X) **Richmond**	15.7*	17.6*	16.4	16.6
(179-K) **Hampton**	12.8	15.5	13.0	13.8
(181-A1) **Norfolk**	12.1*	15.4	12.8	13.4
(184-J) **Va. Beach**	15.1*	15.1	13.6	14.6
(38-I) **Loudoun Co.**	19.3*	16.0	13.0	16.1
(47-T) **Arlington Co.**	17.7	17.1	13.5	16.1
(46-B9) **Franconia, Fairfax Co.**	14.6	17.6	14.0	15.4
(46-C2) **Springfield, Fairfax Co.**	16.3	19.9*	15.7	17.3

* Annual value did not meet completeness criteria

Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report", 2023. See: https://www.deq.virginia.gov/our-programs/air/reports

Exhibit 2.3.8: Ambient Concentrations of $PM_{2.5}$ (Annual Average)

2020-2022 $PM_{2.5}$ Weighted Annual Arithmetic Means ($\mu g/m^3$, LC)				
Site	**2020**	**2021**	**2022**	**3-Year Average**
(101-E) **Bristol**	6.0	7.3	6.2	6.5
(26-F) **Rockingham Co.**	6.1	7.4	6.5	6.7
(28-J) **Frederick Co.**	6.6	8.6	7.7	7.6
(33-A) **Albemarle Co.**	6.5	7.7	7.7	7.3
(19-A6) **Roanoke Co.**	6.7	8.3	7.4	7.5
(110-C) **Salem**	5.9	7.1	6.4	6.5
(155-Q) **Lynchburg**	5.4	6.6	5.7	5.9
(71-H) **Chesterfield Co.**	5.5	7.0	5.8	6.1
(72-M) **Henrico Co.**	6.9	8.3	7.7	7.6
(72-N) **Henrico Co.**	5.6	7.2	6.0	6.3
(75-B) **Charles City Co.**	5.6	7.0	5.8	6.1
(158-X) **Richmond**	6.9*	8.3*	8.0	7.7
(179-K) **Hampton**	5.9	7.0	6.8	6.6
(181-A1) **Norfolk**	6.0*	7.2	6.3	6.5
(184-J) **Va. Beach**	6.2*	7.3*	6.5	6.7
(38-I) **Loudoun Co.**	6.2*	7.4	6.4	6.7
(47-T) **Arlington Co.**	6.6	7.9	6.7	7.1
(46-B9) **Franconia, Fairfax Co.**	6.6	7.9	7.2	7.2
(46-C2) **Springfield, Fairfax Co.**	7.9	9.1*	8.1	8.4

* Annual value did not meet completeness criteria.

Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report", 2023. See: https://www.deq.virginia.gov/our-programs/air/reports

Exhibit 2.3.9: Ambient Concentrations of PM_{10} (24-Hour Average)

2020-2022 PM_{10} 24-Hour Average Concentrations (units in $\mu g/m^3$ STD)							
Site	2020		2021		2022		>150 $\mu g/m^3$
	1st Max	2nd Max	1st Max	2nd Max	1st Max	2nd Max	
(23-A) **Carroll Co.**	16	15	36	27	25	22	0
(28-J) **Frederick Co.***	-	-	51	46	45	42	0
(44-A) **Stafford Co.**	24	16	34	30	18	13	0
(46-B9) **Fairfax Co.***	17	16	45	27	30	23	0
(72-M) **Henrico Co.**	16	15	39	23	29	27	0
(154-M) **Hopewell@**	16	15	34	19	25	16	0
(179-K) **Hampton***	13	10	17	14	28	26	0
(181-A1) **Norfolk**	29	20	24	21	22	20	0

* Continuous monitoring started in 2022
@ Did not meet 4th quarter data completeness criteria in 2022
- No data

Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report", 2023. See: https://www.deq.virginia.gov/our-programs/air/reports

2.3.1.3 Nitrogen Dioxide

EPA provides the following background information on NO_2:[20]

"Nitrogen Dioxide (NO_2) is one of a group of highly reactive gases known as oxides of nitrogen or nitrogen oxides (NO_x). Other nitrogen oxides include nitrous acid and nitric acid. NO_2 is used as the indicator for the larger group of nitrogen oxides.

NO2 primarily gets in the air from the burning of fuel. NO_2 forms from emissions from cars, trucks and buses, power plants, and off-road equipment."

and

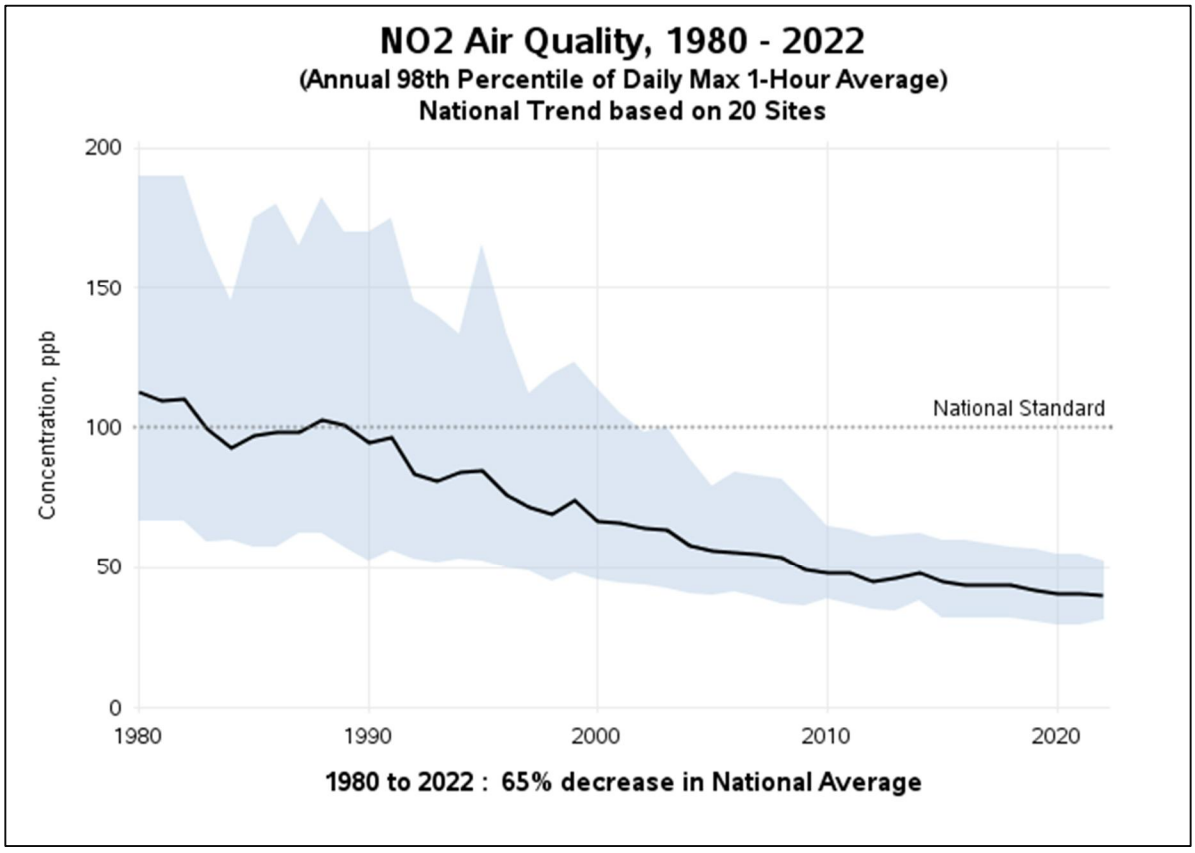
"Breathing air with a high concentration of NO_2 can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO_2.

NO_2 along with other NO_x reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system."

[20] See: https://www.epa.gov/no2-pollution/basic-information-about-no2#What%20is%20NO2

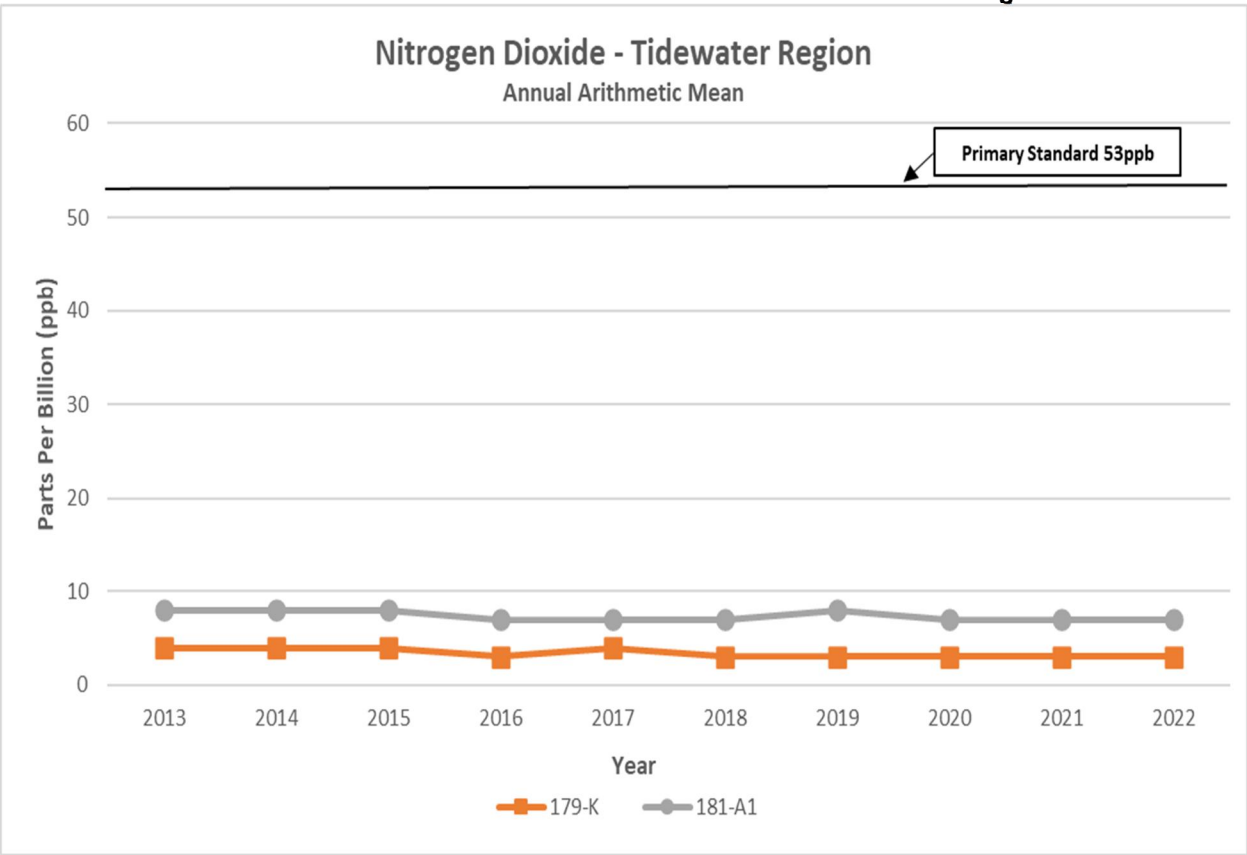
Exhibits 2.3.10 and 2.3.11 present the trend in levels of NO_2 on a national level and for northern Virginia, respectively.

Exhibit 2.3.10: National Trends in NO_2 Concentrations



Source: US EPA website accessed April 10, 2024. See: https://www.epa.gov/air-trends/nitrogen-dioxide-trends

Exhibit 2.3.11: Trends in NO_2 Concentrations in the Tidewater Region



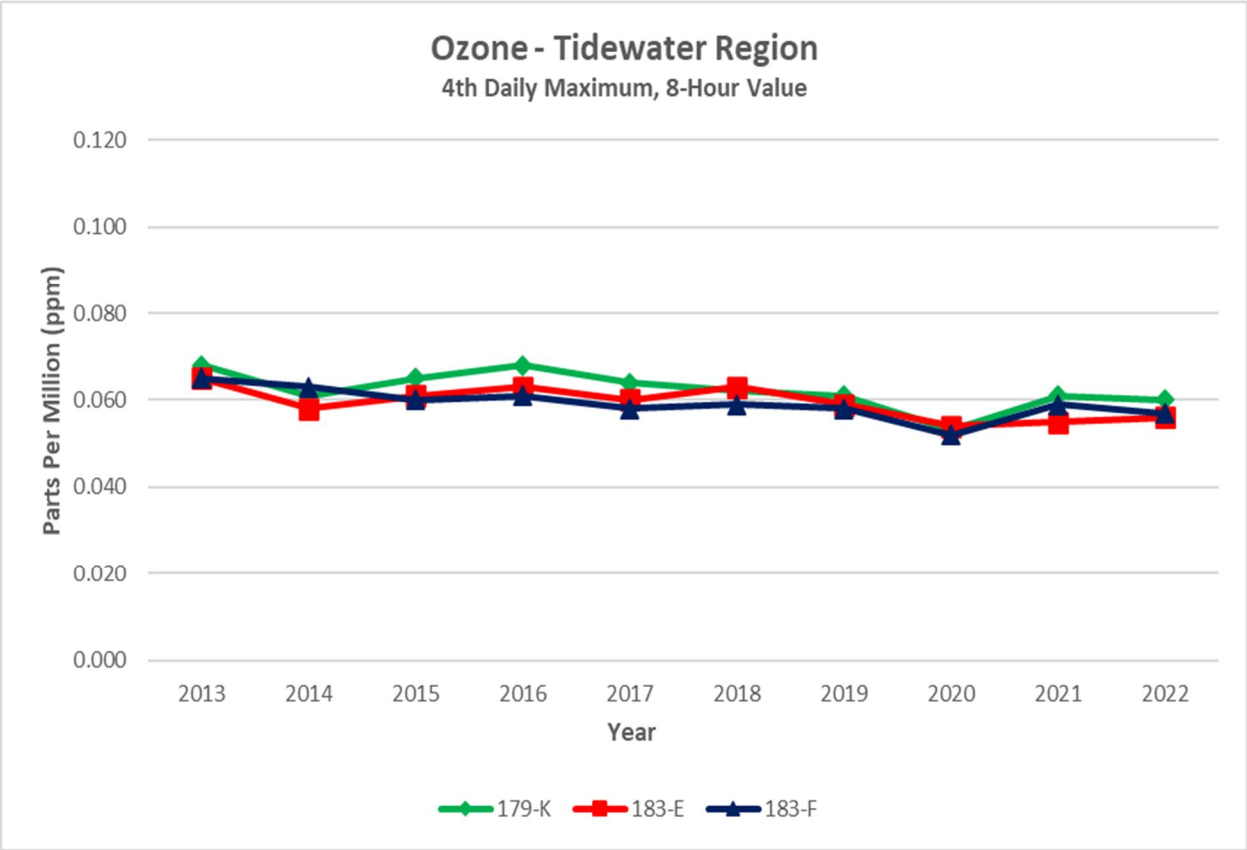
Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report", 2023.
See: https://www.deq.virginia.gov/our-programs/air/reports

2.3.1.4 Ozone

Exhibit 2.3.12 presents the trend in regional ozone levels for the eight-hour standard.

Exhibit 2.3.12: Trend for the Eight-Hour Ozone Standard – Tidewater Region

Current NAAQS: 0.070 ppm



Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2022 Annual Report", 2023. See: https://www.deq.virginia.gov/our-programs/air/reports

2.3.2 Air Toxics

From the VDEQ website:[21]

> *"Toxic air pollutants, also called Hazardous Air Pollutants or air toxics, are known or suspected to cause adverse health or environmental effects.*
>
> *DEQ maintains two air toxics monitoring sites: one in the Richmond area at the MathScience Innovation Center, and one in Hopewell. Among the principal objectives of these stations are assessing trends and emission reduction program effectiveness, assessing and verifying air quality models (e.g., exposure assessments, emission control strategy development, etc.), and as direct input to source-receptor models.*
>
> *At each of these sites, daily measurements are taken for dozens of pollutants, including volatile organic compounds (VOCs), carbonyls and metals, and the Richmond site also measures polyaromatic hydrocarbons (PAHs). The Hopewell site was placed in 2009 as part of a grant to study localized impacts from air toxics. The Richmond site is part of a national network to study air toxics trends. In addition to these sites, DEQ will begin collecting data as part of an air toxics study in Newport News and Norfolk in the summer of 2021.*
>
> *Find more information about these monitors in DEQ's Air Monitoring Network Plan. "*[22]

Mobile source air toxics and trends are addressed in more detail in the next section on project assessment.

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[21] See: *https://www.deq.virginia.gov/our-programs/air/monitoring-assessments/air-monitoring/pollutant-monitoring ,* accessed February 1, 2023

[22] Ibid

3.0 Project Assessment

3.1 Regulatory Requirements

The assessments presented in this section were conducted for purposes of the National Environmental Policy Act of 1969 (NEPA) and, where applicable, to meet transportation conformity rule requirements. FHWA posts guidance for NEPA on its website for project development,[23] and provides guidance specific to air quality (focusing on carbon monoxide) in its 1987 Technical Advisory 6640.8A, "*Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*"[24] FHWA posts separate guidance for mobile source air toxics (MSATs) along with responses to "Frequently Asked Questions" (FAQs) on its air quality webpage.[25]

EPA transportation conformity rule requirements are specified in 40 CFR Parts 51 and 93,[26] which were issued pursuant to requirements in the Clean Air Act (CAA) as amended.[27] Copies of the EPA conformity regulation and associated guidance are available on the EPA website.[28] In general, the rule requires conformity determinations for transportation plans, programs and projects in "*non-attainment 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)).

Corresponding Commonwealth of Virginia requirements for conformity are specified in 9 VAC-5-151, which is also referred to as the state "conformity SIP" or "conformity implementation plan."[29] Note, per the federal transportation conformity regulation, its requirements apply only in the absence of corresponding requirements in the state conformity regulation.[30] The Virginia regulation incorporates by reference most of the requirements in the July 1, 2012 federal rule from 40 CFR 923.101 to 93.129, with the notable exception of 40 CFR 93.105 which addresses consultation. The Virginia regulation provides detailed requirements for consultation that are specific to Virginia but otherwise reflect the consultation requirements in 40 CFR 93.105.

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[23] See: https://www.environment.fhwa.dot.gov/nepa/nepa_projDev.aspx

[24] See: https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

[25] See: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/

[26] *EPA Transportation Conformity Regulation and Guidance*:
- https://www.epa.gov/state-and-local-transportation/current-law-regulations-and-guidance-state-and-local-transportation.

Direct links:
- https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51#subpart-T
- https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#part-93

[27] See: http://www.epa.gov/air/caa/

[28] See: https://www.epa.gov/state-and-local-transportation/transportation-conformity

[29] *Virginia Regulation for Transportation Conformity (9 VAC5-151)*: https://law.lis.virginia.gov/admincode/title9/agency5/chapter151/

[30] 40 CFR 51.390*: "…The federal conformity rules under part 93, subpart A, of this chapter… establish the conformity criteria and procedures necessary to meet the requirements of Clean Air Act section 176(c) until such time as EPA approves the conformity implementation plan revision required by this subpart… The federal conformity regulations contained in part 93, subpart A, of this chapter would continue to apply for the portion of the requirements that the state did not include in its conformity implementation plan and the portion, if any, of the state's conformity provisions that is not approved by EPA."* https://ecfr.federalregister.gov/current/title-40/chapter-I/subchapter-C/part-51.390#51.390

3.2 Application of the VDOT Resource Document

In 2016, the Department created the "VDOT Resource Document" and associated online data repository to facilitate and streamline the preparation of project-level air quality analyses for purposes of NEPA and conformity.[31] Inter-agency consultation was conducted with FHWA Division and Headquarters and other agencies (including EPA) before the Resource Document was finalized. The Resource Document was most recently updated in 2023 to address changes in applicable regulations and guidance.

With regard to this project, the models, methods/protocols and assumptions as specified or referenced in the VDOT Resource Document were applied without change or without substantive change as defined in that document.

3.3 Mobile Source Air Toxics (MSATs) Assessment

FHWA most recently updated its guidance for the assessment of MSATs in the NEPA process for highway projects in 2023.[32] It states that "…*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).*[33] *These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.*" It also specifies three possible categories or tiers of analysis, namely, 1) projects with no meaningful potential MSAT effects, or exempt projects (for which MSAT analyses are not required), 2) projects with low potential MSAT effects (requiring only qualitative analyses), and 3) projects with higher potential MSAT effects (requiring quantitative analyses).

As this project involves a CE, and therefore under FHWA guidance may be categorized as a Tier 1 project for which no meaningful MSAT effects would be expected, neither a qualitative nor a quantitative analysis is needed. In addition, this project has been determined to generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause a meaningful increase in MSAT impacts of the project from that of the no-build alternative.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES3 model forecasts a combined reduction of over 76 percent in the total annual emissions rate for the priority MSAT from 2020 to 2060 while

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[31] See: https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/environmental/

[32] FHWA, "*INFORMATION: Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*," January 18, 2023. See: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/
Note: While the January 2023 FHWA updated guidance was based on modeling using MOVES3, which is reflected in the background information presented here, the current version of the emission model (MOVES4.0.1 at the time of preparation for this analysis) is used for any project-specific modeling.

[33] See: https://www.epa.gov/national-air-toxics-assessment

VMT are projected to increase on a national level by 31 percent (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, January 18, 2023). This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

3.4 Greenhouse Gases (GHGs)

Screening using the criteria specified in the VDOT Resource Document under Protocol 4.7 was conducted to determine the appropriate level of analysis for this project. The project meets the criteria for a Category 1 project with no meaningful GHG effects as it is one that qualifies for a Categorical Exclusion (CE) under 23 CFR 771.116,[34] 23 CFR 771.117[35] or 23 CFR 771.118[36]. As a project with no meaningful GHG effects, no additional analysis is required.

3.5 Carbon Monoxide Assessment

EPA project-level ("hot-spot") transportation conformity requirements for CO do not apply as the project is located in a region that is in attainment of the NAAQS. A project-specific analysis or assessment for CO is also not needed for NEPA per the programmatic approach specified in the VDOT Resource Document (Protocol 4.2.2.2). Based on the overall weight-of-evidence, it may reasonably be concluded that the CO NAAQS will be met given:

- Continued implementation of effective emission control technology, increasingly more stringent motor vehicle emission and fuel quality standards implemented over the past few decades by the Environmental Protection Agency (EPA) that have had the combined effect of substantially reducing CO emission rates nationwide, resulting in long-term downward trends in emissions and near-road ambient concentrations of CO despite increasing vehicle-miles-travelled (VMT)
- Extensive experience in project-specific modeling for CO for a wide variety of project types, configurations and operating conditions in which compliance with the national ambient air quality standards (NAAQS) established by EPA for CO is readily demonstrated given the substantially reduced CO emission rates, and despite the use of multiple worst-case assumptions for emission and dispersion modeling that have a compounding effect such that emissions and near-road ambient concentrations are substantially over-estimated; and
- Extensive experience in programmatic agreements for project-level agreements for CO that established ever-increasing thresholds for such analyses given the substantially reduced emission rates.

[34] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-H/part-771/section-771.116
[35] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-H/part-771/section-771.117
[36] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-H/part-771/section-771.118

3.6 Project Status in the Regional Transportation Plan and Program

Federal conformity requirements at 40 CFR 93.114[37] and 40 CFR 93.115[38] (as incorporated by reference into the Virginia conformity SIP) apply under a federal court decision affecting former maintenance areas nationwide for the 1997 ozone NAAQS.[39] 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 the criteria specified in 40 CFR 93.109(b).[40] As of the date of preparation of this analysis, the project is included in the currently conforming FY 2024-2027 Transportation Improvement Program (TIP) and 2045 Long Range Transportation Plan (LRTP) developed by the designated MPO for the region, HRTPO.[41]

3.7 Construction

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications.*[42]

3.8 VDEQ Requirements

The VDEQ provides general comments for projects by county that in part address mitigation.[43] For the region in which the proposed project is located, their comment is:

> "*…all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions*[44]*; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions*[45]*; and 9 VAC 5-50, Article 1, Fugitive Dust precautions.*[46]"

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37 See: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#93.114
38 See: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#93.115
39 Per a 2/16/2018 court decision (South Coast Air Quality Management District v. EPA), all areas in the country that were in nonattainment or maintenance for the 1997 eight-hour ozone NAAQS before its revocation by EPA in 2015 were again made subject to conformity for that standard. This decision in part affects "orphan areas" (as defined in the ruling), which in Virginia include Fredericksburg, Richmond/Tri-Cities, and Hampton Roads. The court ruling may be viewed at: https://www.cadc.uscourts.gov/internet/opinions.nsf/217B6778AE3EC89C8525823600532AE0/$file/15-1115-1718293.pdf
40 See: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-93#93.109
41 See: https://www.hrtpo.org/101/HRTPO
42 https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/technical-guidance-documents/road-and-bridge-specifications/
43 Spreadsheet entitled: "DEQ SERP Comments rev8b", March 2017
44 See: https://law.lis.virginia.gov/admincode/title9/agency5/chapter130/
45 See: https://law.lis.virginia.gov/admincode/title9/agency5/chapter45/
46 See: https://law.lis.virginia.gov/admincode/title9/agency5/chapter50/

4.0 Consultation

4.1 Public Consultation

Public consultation is generally conducted and documented within the overall NEPA process, and not separately by subject area (including air quality). Please refer to the overall NEPA documentation for a summary of public consultation activities for this project.

4.2 Inter-Agency Consultation

4.2.1 Models, Methods, Assumptions and Protocols Specified in the VDOT Resource Document

All models, methods, assumptions and protocols specified or referenced within the VDOT Resource Document[47] were subjected to inter-agency consultation with FHWA, DEQ and other agencies for purposes of NEPA prior to originally being finalized in 2016. Appendix A of the Resource Document provides a summary of the consultation process and results.

5.0 Conclusions

The proposed improvements were assessed for potential air quality impacts and compliance with applicable air quality regulations and requirements. All models, methods/protocols and assumptions applied in modeling and analyses were made consistent with those provided or specified in the VDOT Resource Document. The assessment indicates that the project would meet all applicable air quality requirements of the National Environmental Policy Act (NEPA) and federal and state transportation conformity regulations. As such, the project will not cause or contribute to a new violation of the NAAQS established by EPA.

[47] See: http://www.virginiadot.org/projects/environmental_air_section.asp

Appendix A: Traffic

U.S. 258 at Route 10 Bypass Intersection Improvements Traffic Operational Analysis Memorandum

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Kimley»Horn

MEMORANDUM

To: Jamie Oliver, Isle of Wight County

From: Devin E. Simpson, P.E.

Kimley-Horn and Associates, Inc.

Date: January 3, 2023

Subject: U.S. 258 at Route 10 Bypass Intersection Improvements Traffic Operational Analysis
Smithfield, VA
UPC #120650

Kimley-Horn was retained to perform a traffic operational analysis for the intersection of U.S. 258 and Route 10 Bypass, in Isle of Wight County, Virginia. Intersection improvements, funded through VDOT's SMART SCALE program, are proposed at this location therefore, the purpose of this analysis is to analyze and validate the operational performance of the proposed improvements.

Project Overview

The project will widen U.S. 258 (Main Street) on both sides of the Route 10 Bypass intersection from a single through lane in each direction to two (2) through lanes in each direction and restore the existing left and right turn lanes at the intersection. The proposed improvements will be consistent with the concept submitted with the SMART SCALE application and consist of roadway widening, curb and gutter improvements, drainage and stormwater management improvements, pedestrian accommodations, and traffic signal and pedestrian signal improvements.

Methodology

Intersection capacity analyses were performed for 2023 Existing, 2037 No Build, and 2037 Build conditions at U.S. 258 and Route 10. The No Build and Build year of 2037 was established consistent with VDOT guidance of +11 years from the advertisement year, which is anticipated to be 2026. The operational analyses were performed consistent with VDOT's *Traffic Operations and Safety Analysis Manual, Version 2.0* (TOSAM 2.0) using *Synchro 11* and its microsimulation companion tool, *SimTraffic*. For the purposes of this analysis, delay, level of service (LOS), and queue lengths were the primary measures of effectiveness.

Data Collection

Existing traffic volumes were based upon previously collected turning movement counts (TMCs) for *The Grange at 10Main Traffic Impact Analysis (December 2022)*. A TMC for the study intersection was collected on Tuesday, May 17, 2022, during the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods. Based on these TMC, the peak hour for the intersection was determined to be 8:00-9:00 AM

and 3:45-4:45 PM. The peak hour volumes from this TMC were grown by a factor of 0.5% to establish Existing 2023 traffic volumes for this analysis.

An annual growth rate of 0.5% was determined based upon historical traffic count data within or near the study intersection obtained from VDOT's online traffic count database. This growth rate was applied annually to the 2023 Existing traffic volumes to develop the 2037 No Build and Build traffic volumes.

Traffic Operational Analysis

Under existing conditions, the study intersection operates at LOS C during both the AM and PM peak hours. All approaches experience a comparable level of delay with varying queues, however all queues are maintained within the existing storage available during both peak periods.

Under 2037 No Build and Build conditions, the study intersection operates at a LOS C and a LOS D during the AM and PM peak hours, respectively. The eastbound and southbound approaches experience the greatest increase in delay. Under these conditions, all queues are maintained within the available storage lengths. **Table 1** illustrates the LOS and delay results, and **Table 2** illustrates the queuing results.

Conclusion

Based on the operational analysis performed for the intersection of U.S. 258 and Route 10 Bypass, the addition of through lanes along U.S. 258 are anticipated to improve traffic operations and queuing through 2037. However, the eastbound left-turn movement maximum queue under Build 2037 conditions is expected to exceed the effective storage length by approximately 20-feet, a distance that is less than one (1) car length. For this reason and due to the back-to-back left-turn lane providing access to Great Spring Road, no turn-lane extension is recommended.

It should be noted that optimization of traffic signal timing was performed for the 2037 Build condition and is recommended upon construction of the intersection improvements to ensure signal timings are attuned to the new traffic patterns.

Table 1 – U.S. 258 and Route 10 Bypass Intersection Operations Results

Scenario	Traffic Control	LOS	Level of Service (LOS)											
			Eastbound U.S. 258 (Main Street)			Westbound U.S. 258 (Main Street)			Northbound Route 10 Bypass			Southbound Route 10 Bypass		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour														
2023 Existing	Signalized	C (27.4)	C (21.6)	C (27.1)	D (35.3)	C (21.8)	C (26.4)	C (23.3)	C (23.7)	C (22.7)	C (21.8)	B (18.8)	C (34.3)	C (29.8)
			C (30.6)			C (25.0)			C (23.1)			C (30.1)		
2037 No Build	Signalized	C (28.3)	C (21.8)	C (27.4)	D (36.9)	C (22.0)	C (26.8)	C (23.5)	C (24.7)	C (23.3)	C (22.3)	B (19.3)	D (36.3)	C (31.0)
			C (31.5)			C (25.3)			C (23.9)			C (31.6)		
2037 Build	Signalized	C (27.5)	C (21.2)	C (24.6)	C (34.2)	C (21.3)	C (24.4)	C (23.2)	C (25.3)	C (23.7)	C (22.7)	B (19.7)	D (37.2)	C (31.6)
			C (29.1)			C (23.5)			C (24.4)			C (32.4)		
PM Peak Hour														
2023 Existing	Signalized	C (32.8)	C (25.9)	C (33.9)	D (43.7)	C (26.5)	C (33.4)	C (28.1)	C (27.9)	C (23.6)	C (22.3)	B (19.1)	D (42.9)	C (32.5)
			D (37.6)			C (30.8)			C (25.3)			D (37.8)		
2037 No Build	Signalized	D (36.8)	C (28.0)	D (36.7)	D (51.4)	C (28.7)	D (36.8)	C (30.2)	C (31.8)	C (24.9)	C (23.5)	C (20.1)	D (50.6)	D (35.1)
			D (42.7)			C (33.6)			C (27.7)			D (43.5)		
2037 Build	Signalized	C (29.6)	C (27.6)	C (34.5)	C (27.3)	C (28.8)	C (32.7)	C (31.2)	C (26.9)	C (21.8)	C (20.5)	B (17.4)	D (38.0)	C (30.7)
			C (30.0)			C (31.4)			C (23.8)			C (34.0)		

Table 2 – U.S. 258 and Route 10 Bypass Queuing Results

Scenario	Maximum Queue Length by Movement (Feet)													
	Eastbound U.S. 258 (Main Street)				Westbound U.S. 258 (Main Street)				Northbound Route 10 Bypass			Southbound Route 10 Bypass		
	LT	TH	TH	RT	LT	TH	TH	RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing & No Build)	120	Cont.		190	250	Cont.		280	270	Cont.	290	150	Cont.	300
Effective Storage Length (Build)		Continuous				Continuous								
AM Peak Hour														
2023 Existing	120	275		190	105	210		40	215	145	55	140	230	65
2037 No Build	120	275		195	150	245		40	240	190	65	140	305	150
2037 Build	120	210	195	180	105	165	120	40	245	210	50	145	260	110
PM Peak Hour														
2023 Existing	130	300		225	240	350		155	260	285	120	150	535	300
2037 No Build	135	325		230	250	445		240	280	435	185	150	695	350
2037 Build	140	265	245	190	200	230	205	75	260	255	55	150	495	285