Transportation Conformity Demonstration:

Connections 2045 Long-Range Plan and FY 2019 Pennsylvania TIP

MAY 2018

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

The Delaware Valley Regional Planning Commission is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

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DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

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DVRPC is funded through a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

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Glossary of Acronyms and Terms

AQ	Air Quality
CAA	Clean Air Act (as amended)
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DEP	State Department of Environmental Protection
DOT	State Department of Transportation
DRPA	Delaware River Port Authority
DVRPC	Delaware Valley Regional Planning Commission
FHWA	Federal Highway Administration
Final Rule	Current conformity guidance under CAA
FR	*Federal Register*
FTA	Federal Transit Administration
FY	Fiscal Year
Maintenance Area	Area that previously did not meet NAAQS
MOVES	Motor Vehicle Emissions Simulator: the most recent emissions estimation model approved by the US EPA
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standards
NH_3	Ammonia
NJT	New Jersey Transit
Nonattainment Area	Area currently not meeting the NAAQS
NO_x	Nitrogen Oxides
NRS	Not Regionally Significant
PATCO	Port Authority Transit Corporation
PennDOT	Pennsylvania Department of Transportation
Plan	DVRPC's Long-Range Plan
PM	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Coarse Particulate Matter
ppm	Parts per Million
SIP	State Implementation Plan
SEPAT	Southeastern Transportation Authority
SO_x	Sulfur Oxides
TAZ	Traffic Analysis Zone
TCICG	Transportation Conformity Interagency Consultation Group
TCM	Transportation Control Measure
TDM	Travel Demand Model
TIP	Transportation Improvement Program
U.S.C.	U.S. Code
US EPA	U.S. Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds

Executive Summary

Overview

Transportation conformity is the process by which metropolitan planning organizations (MPOs) or departments of transportation (DOTs) demonstrate that transportation projects included in a region's Long-Range Plan (Plan) or Transportation Improvement Program (TIP) do not cause new air quality violations, worsen existing violations, or delay timely attainment of the National Ambient Air Quality Standards (NAAQS). The transportation conformity process is required in areas that have been designated by the U.S. Environmental Protection Agency (US EPA) as not having met one or more of the NAAQS. These areas are called nonattainment areas if they currently do not meet air quality standards, or maintenance areas if they have previously violated air quality standards but currently meet them and have an approved Clean Air Act (CAA) section 175(a) maintenance plan. The transportation conformity requirements are still applicable for up to 20 years after a nonattainment area is redesignated to ensure that the region continues to meet the NAAQS.

A transportation conformity demonstration is required at least once every four years or when an MPO: (1) adopts a new Plan or TIP; or (2) amends, adds, or deletes a regionally significant, nonexempt project in a Plan or TIP. This conformity demonstration is required due to a new Fiscal Year (FY) 2019 TIP for Pennsylvania. Since there have been no changes to regionally significant and non-exempt projects in New Jersey, a conformity determination in the New Jersey portion of the Delaware Valley Regional Planning Commission (DVRPC) region is not required.

The DVRPC region includes a complex combination of nonattainment and maintenance areas for two of the NAAQS (ozone and fine particulate matter [$PM_{2.5}$]). The region's ozone nonattainment area encompasses the entire nine-county DVRPC region, while the $PM_{2.5}$ maintenance and nonattainment areas encompass various portions of the region. The region is required to demonstrate transportation conformity for each of these standards in each of the appropriate geographic areas covered by the nonattainment and maintenance areas.

Until December 2017, DVRPC was required to demonstrate conformity for the 1971 Carbon Monoxide (CO) Standard. A portion of the city of Philadelphia was under a limited maintenance plan for CO that became effective on December 4, 2007 (72 FR 56911). Since this conformity demonstration is beyond that 10-year maintenance plan period, DVRPC is no longer required to demonstrate conformity for CO[1].

This transportation conformity demonstration shows that the *Connections 2045* Long-Range Plan and FY 2019-2022 Pennsylvania TIP are following, or "conforming to," the State Implementation Plans (SIP) to meet the NAAQS.

This Executive Summary highlights DVRPC's conformity demonstration for:

Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx) meeting the 1997 and 2008 Eight-Hour Ozone NAAQS requirements in:

- the DVRPC portion of the Philadelphia–Wilmington–Atlantic City Ozone Nonattainment Area; and

[1] Transportation Conformity Guidance for Areas reaching the End of the Maintenance Period , EPA-420-B-14-093

Direct $PM_{2.5}$ and precursor NO_x meeting the 1997 Annual, 2006 24-Hour, and 2012 Annual $PM_{2.5}$ NAAQS requirements in:

- the DVRPC portion of the Philadelphia–Wilmington, Pennsylvania–
- New Jersey–Delaware (PA–NJ–DE) Annual $PM_{2.5}$ Maintenance Area;
- the DVRPC portion of the Philadelphia–Wilmington, PA–NJ–DE 24-Hour $PM_{2.5}$ Maintenance Area; and
- the Delaware County, PA Annual $PM_{2.5}$ Nonattainment Area;

This summary serves as an inclusive document that demonstrates the transportation conformity of the DVRPC Plan and Pennsylvania TIP with all applicable SIPs and NAAQS requirements for the above pollutants within the noted areas. The full conformity determination document is available at **www.dvrpc.org/airquality/conformity**.

Analysis Approach

Regional Emissions Analysis of Plan and TIP Projects

The federal Final Conformity Guidance (Final Rule, 40 Code of Federal Regulations [CFR] 93) stipulates that the emissions analysis of transportation plans and programs must model all regionally significant, nonexempt projects. Each project in the Plan and TIPs has an associated alphanumeric air quality (AQ) code to identify which projects are coded into DVRPC's Travel Demand Model (TDM) to be included in the transportation conformity analysis. The code also identifies the first year for which those projects are analyzed. In addition, the AQ code identifies projects that are exempt from conformity analysis.

Pennsylvania has implemented SIPs that contain motor vehicle emissions budgets (MVEBs). The MVEB sets a regional emissions amount that functions as a threshold against which conformity is tested. The federal Final Rule stipulates that each SIP is sovereign and that for a multistate MPO such as DVRPC, conformity applies separately to individual state portions of its planning area. Since there are no changes to regionally significant and non-exempt projects in the FY 2018 TIP for New Jersey or Plan projects in the New Jersey portion of the DVRPC region, DVRPC is not required to demonstrate transportation conformity for projects in the New Jersey portion of the region.

DVRPC will be using the Motor Vehicle Emissions Simulator 2014a (MOVES 2014a) emissions model to demonstrate transportation conformity. MOVES 2014a is the latest US EPA emissions model and includes updates to fuel tables and improved emissions estimates from brake wear from the MOVES 2014 model. MOVES 2014a does not significantly change the criteria pollutant emissions results of MOVES 2014 and therefore is not considered a new model for SIP and transportation conformity purposes

Conformity Test

Pennsylvania has an approved SIP MVEB for the 1997 Eight-Hour Ozone Standard (73 FR 77682). The Final Rule requires that regions with existing MVEBs for a standard of the same pollutant (i.e., 1997 Eight-Hour Ozone and 2008 Eight-Hour Ozone), must utilize the approved budget test to demonstrate conformity for the new standard. Therefore, DVRPC will utilize the 1997 Eight-Hour Ozone MVEBs in Pennsylvania to demonstrate conformity to the 2008 Eight-Hour Ozone Standard.

The region also has approved SIP budgets for the 1997 Annual and 2006 24-Hour $PM_{2.5}$ standards in Pennsylvania (80 FR 27112). The Transportation Conformity Interagency Consultation Group (TCICG)

has determined that since the Pennsylvania $PM_{2.5}$ SIP budgets were developed with individual county emissions inventories, the MVEB portion of the SIP budgets for the 1997 and 2006 $PM_{2.5}$ standards attributed to Delaware County could serve as a SIP budget for the 2012 Annual $PM_{2.5}$ Standard conformity demonstration.

Analysis Years

For this conformity demonstration, the mobile source emissions analysis years are identified in Table 1.

Table 1: Mobile Source Analysis Years

Year	Ozone	$PM_{2.5}$	Note
2020	√	√	2012 $PM_{2.5}$ Std. attainment date and near-term year
2025	√	√	$PM_{2.5}$ SIP budget year
2035	√	√	Year within 10 years of previous analysis
2045	√	√	DVRPC Plan horizon year

Source: DVRPC, 2018.

VOCs and NO_x, which are heat-sensitive ozone precursors, are estimated for a typical summer week workday. To demonstrate conformity for ozone in the Philadelphia–Wilmington–Atlantic City Ozone Nonattainment Area, projected VOC and NO_x emissions in all analysis years must be below the SIP MVEBs for the given analysis years.

To demonstrate conformity for the $PM_{2.5}$ NAAQS, emissions are estimated for direct $PM_{2.5}$ and the $PM_{2.5}$ precursor chemical NO_x. The SIP budgets for $PM_{2.5}$ are expressed in terms of annual emissions; therefore, conformity analyses are conducted for annual $PM_{2.5}$ emissions. In the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Area and the Delaware County $PM_{2.5}$ Nonattainment Area, the analysis years are 2020, 2025, 2035, and 2045.

To demonstrate conformity in Pennsylvania, projected $PM_{2.5}$ emissions in analysis years must not exceed the 2017 (for analysis years before 2025) and 2025 (for analysis years 2025 and later) budgeted emissions in the Pennsylvania portion of the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Area and Delaware County in the Delaware County $PM_{2.5}$ Nonattainment Area.

Findings

The DVRPC Plan and the TIPs are found to be in conformity with the current Pennsylvania SIPs under the CAA. The forecasted emissions levels of VOCs, NO_x, and $PM_{2.5}$ do not exceed the respective budgets established by the state department of environmental protection (state DEP) in accordance with the Final Rule under the current NAAQS governing applicable pollutants.

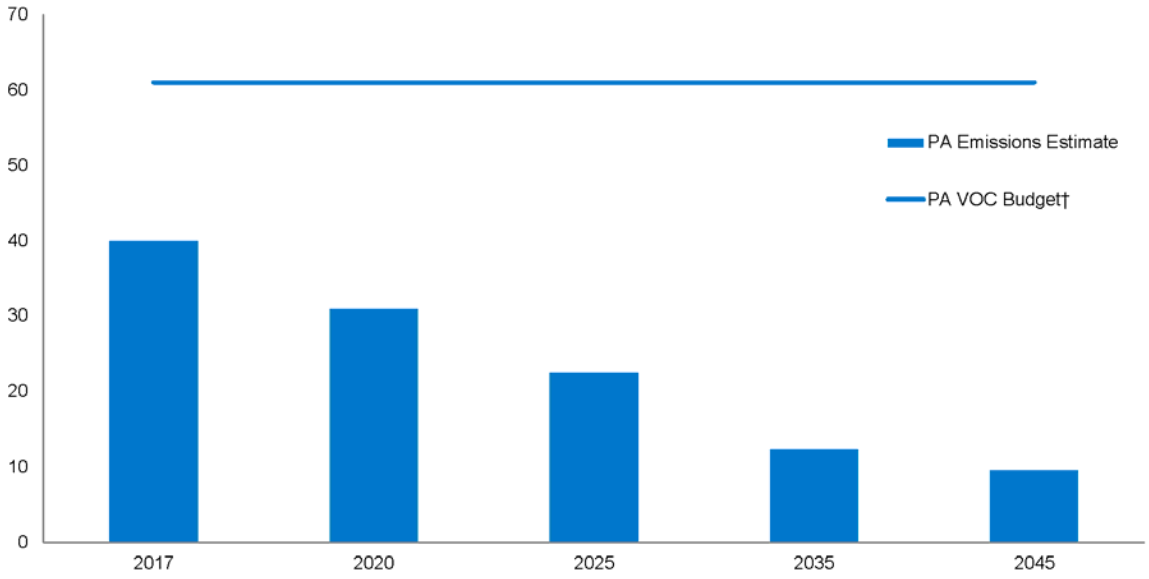
The transportation conformity analysis meets all applicable conformity criteria, including, but not limited to, the following:

- that the Plan and the TIPs are fiscally constrained [40 CFR 93.108];
- that this determination is based on the latest planning assumptions [40 CFR 93.110];
- that this determination is based on the latest emissions estimation model available [40 CFR 93.111];

- that DVRPC has made the determination according to the applicable consultation procedures [40 CFR 93.112];
- that the Plan and the TIPs do not interfere with the timely implementation of transportation control measures (TCMs) [40 CFR 93.113]; and
- that the Plan and the TIPs are consistent with the MVEBs in the applicable SIPs [40 CFR 93.118].

Figures 1 through 6 detail the emissions analysis results for transportation projects included in the Plan and TIP for Pennsylvania. The data for these figures is detailed in Tables 6 and 7, found on pages 24. These estimates of emissions results confirm that the transportation projects in the Plan and TIP conform to the respective SIP and Final Rule conformity requirements.

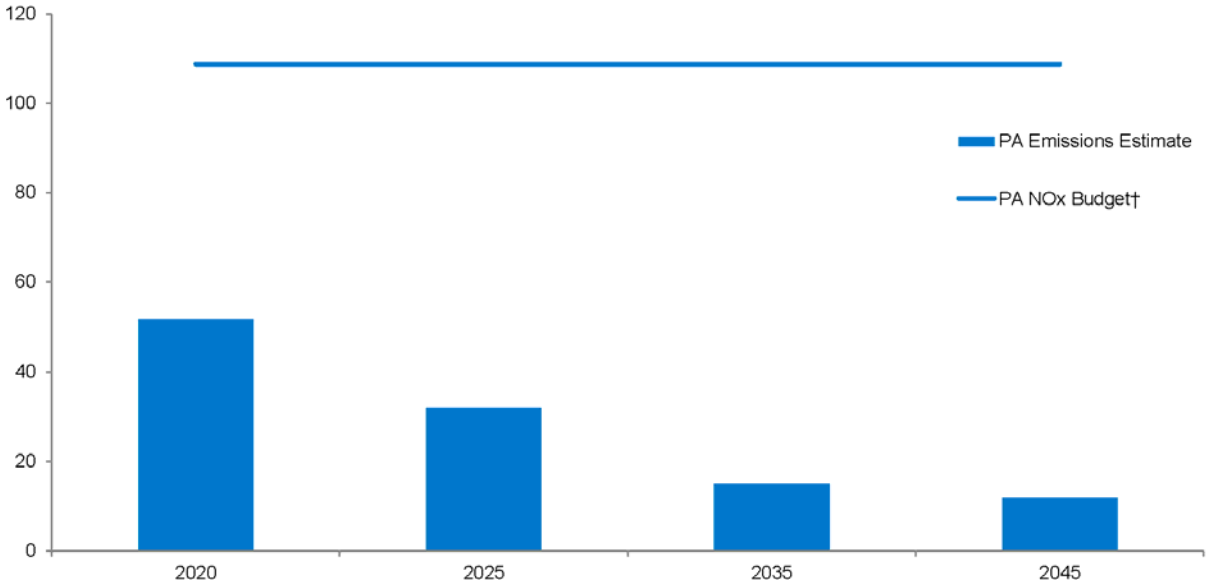
Figure 1: VOCs Emissions Analysis Results (Tons/Day)



Source: DVRPC, 2018.

Note: †The most recent Eight-Hour Ozone SIP MVEBs (2008) will apply to all future analysis years.

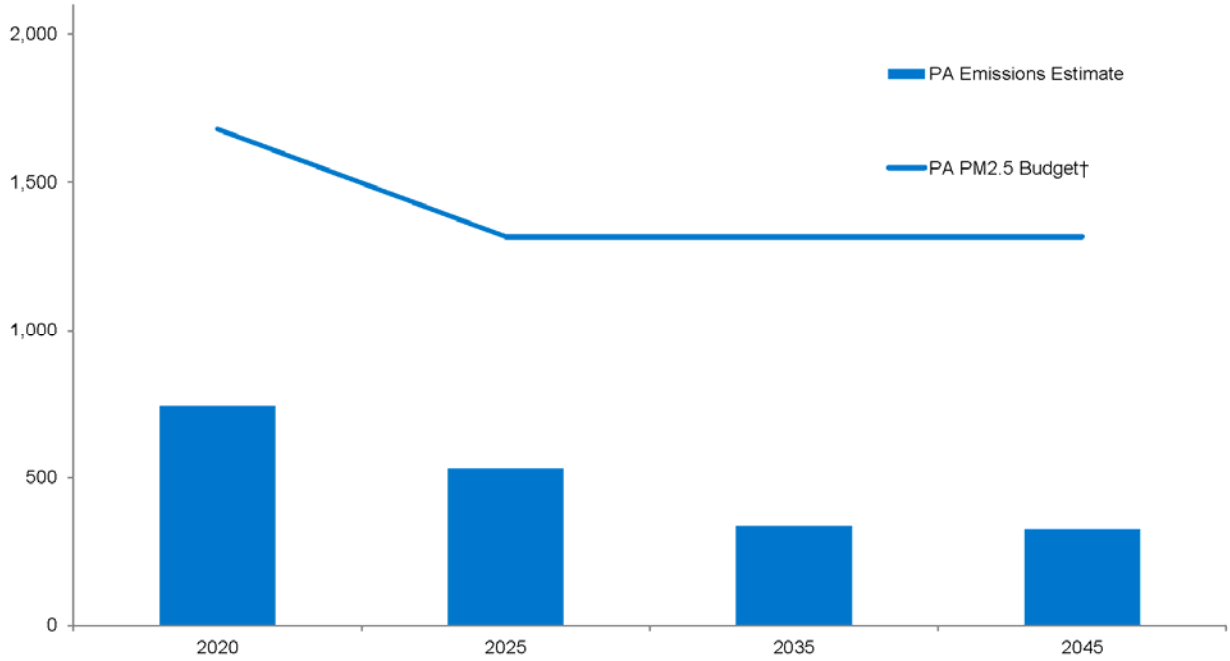
Figure 2: NO_x Emissions Analysis Results (Tons/Day)



Source: DVRPC, 2018.

Note: †The most recent Eight-Hour Ozone SIP MVEBs (2008) will apply to all future analysis years.

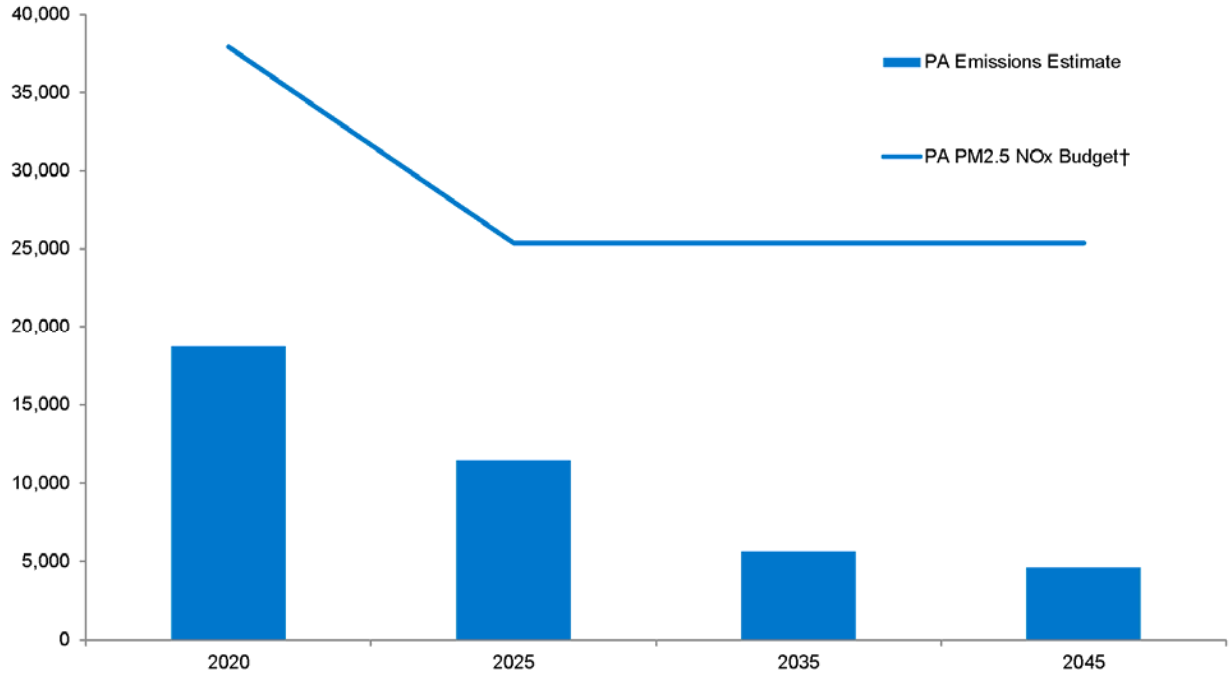
Figure 3: Annual and 24-Hour Direct $PM_{2.5}$ Emissions Analysis Results (Tons/Year)



Source: DVRPC, 2018.

Note: †Associated MVEBs apply to all future analysis years.

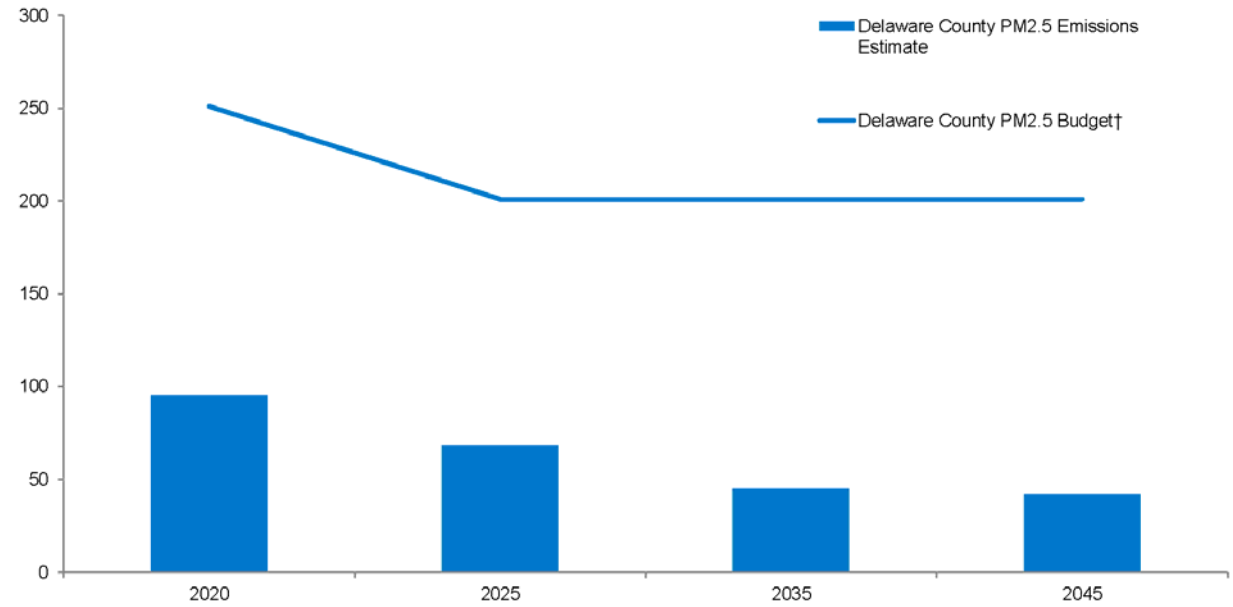
Figure 4: Annual and 24-Hour NO_x Precursor Emissions Analysis Results (Tons/Year)



Source: DVRPC, 2018.

Note: †Associated MVEBs apply to all future analysis years.

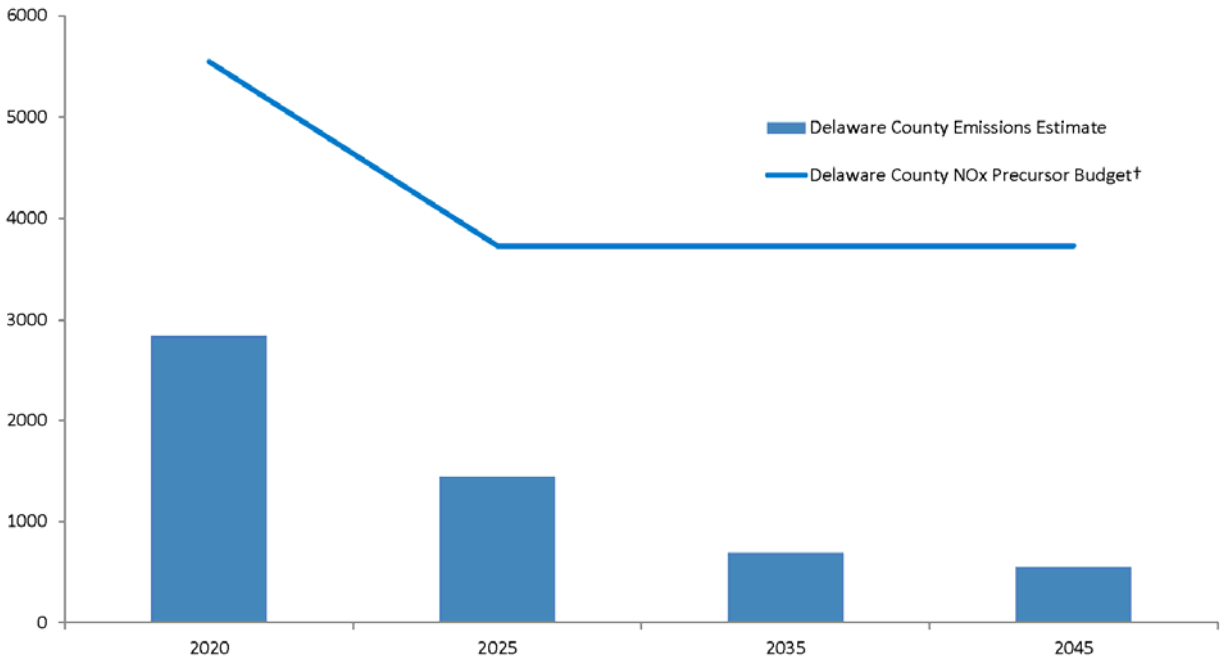
Figure 5: Delaware County Annual Direct $PM_{2.5}$ Emissions Analysis Results (Tons/Year)



Source: DVRPC, 2018.

Note: † Associated MVEBs apply to all future analysis years.

Figure 6: Delaware County Annual NO_x Precursor Emissions Analysis Results (Tons/Year)



Source: DVRPC, 2018.

Note: † Associated MVEBs apply to all future analysis years.

These findings demonstrate transportation conformity of the DVRPC *Connections 2045* Long-Range Plan and FY 2019 Pennsylvania TIP, with the state SIPs and the Final Rule requirements under CAA, including:

- the 1997 and 2008 Eight-Hour Ozone NAAQS in the Philadelphia–Wilmington–Atlantic City Ozone Nonattainment Area;
- the 1997 Annual and 2006 24-Hour $PM_{2.5}$ NAAQS in the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Area; and
- the 2012 Annual $PM_{2.5}$ Delaware County Nonattainment Area.

CHAPTER 1: Introduction

Overview

This report documents the demonstration of transportation conformity for the DVRPC *Connections 2045* Long-Range Plan and the FY 2019 Pennsylvania TIP with the respective SIPs and applicable NAAQS requirements under the CAA, as amended.

This report documents transportation conformity for the following specific pollutants within the stated designation areas. Those pollutants are:

VOCs and NO_x meeting the 1997 and 2008 Eight-Hour Ozone NAAQS requirements in:

- the DVRPC portion of the Philadelphia–Wilmington–Atlantic City Ozone Nonattainment Area; and

Direct $PM_{2.5}$ and precursor NO_x meeting the 1997 Annual, 2006 24-Hour, and 2012 Annual $PM_{2.5}$ NAAQS requirements in:

- the DVRPC portion of the Philadelphia–Wilmington, PA–NJ–DE Annual $PM_{2.5}$ Maintenance Area;
- the DVRPC portion of the Philadelphia–Wilmington, PA–NJ–DE 24-Hour $PM_{2.5}$ Maintenance Area; and
- the Delaware County, PA Annual $PM_{2.5}$ Nonattainment Area.

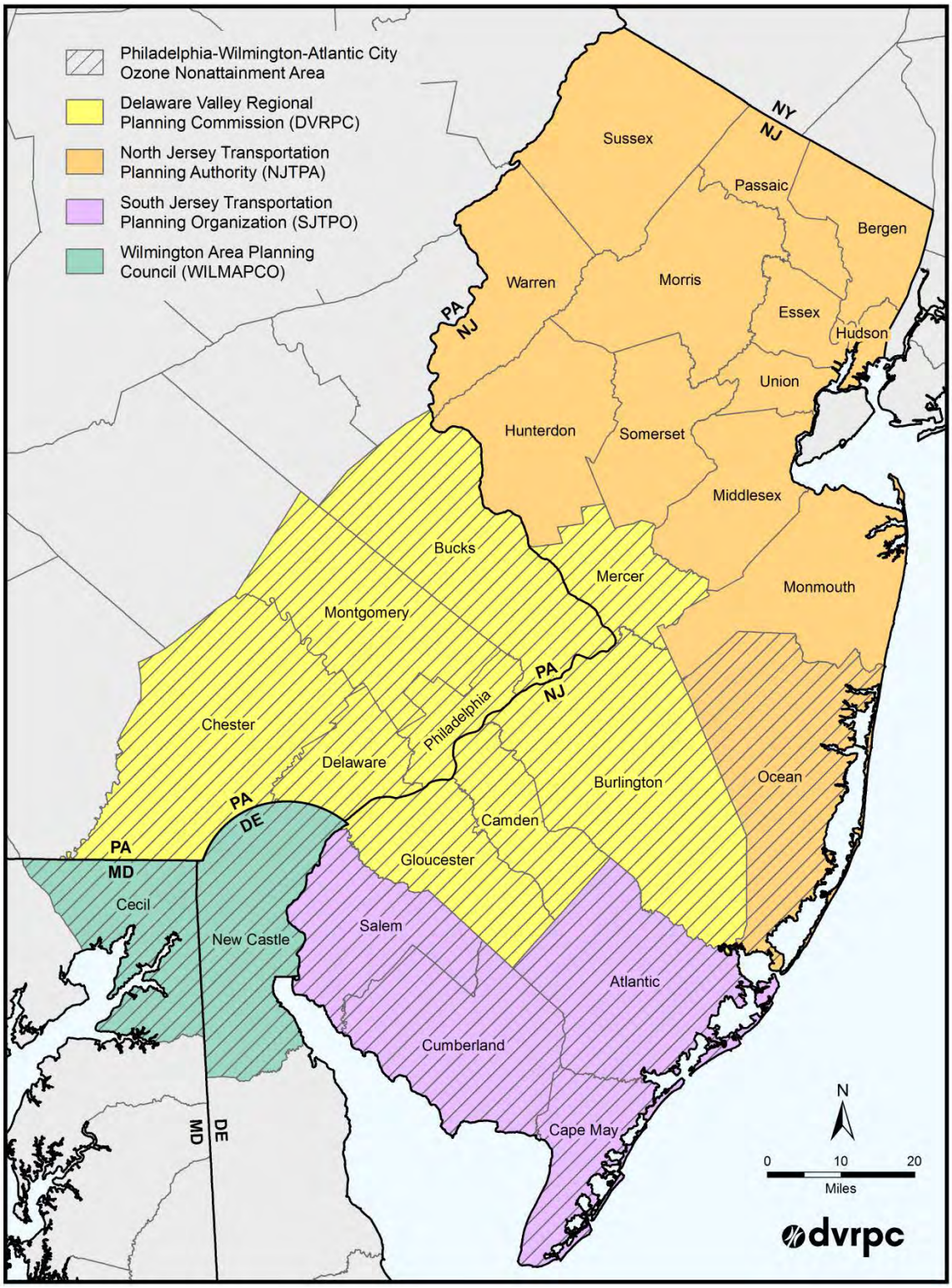
In July 2013, the US EPA revoked the 1997 Ozone standard with the publication of the implementation rule for the 2008 Ozone Standard. In February 2018 the District of Columbia Court of Appeals ruled in the case of *South Coast Air Quality Management District v. EPA* that the implementation of this revocation of the standard violated the Clean Air Act. While the implications of this ruling are being decided, DVRPC is affirming that this conformity finding does also demonstrate transportation conformity to the revoked 1997 Ozone NAAQs, as well as to the 2008 Ozone NAAQs.

On August 24, 2016, the US EPA revoked the 1997 Annual $PM_{2.5}$ Standard. The DVRPC region was in maintenance of this standard and while DVRPC is not required to demonstrate conformity to this standard due to this action, DVRPC is affirming that this conformity finding does also demonstrate transportation conformity to the revoked 1997 $PM_{2.5}$ NAAQs, as well as to the 2006 and 2012 $PM_{2.5}$ NAAQs.

Until December 2017, DVRPC was required to demonstrate conformity for the 1971 CO standard. A portion of the city of Philadelphia was under a limited maintenance plan for CO that became effective on December 4, 2007 (72 FR 56911). Since this conformity demonstration is beyond that 10-year maintenance plan period, DVRPC is no longer required to demonstrate conformity for CO.

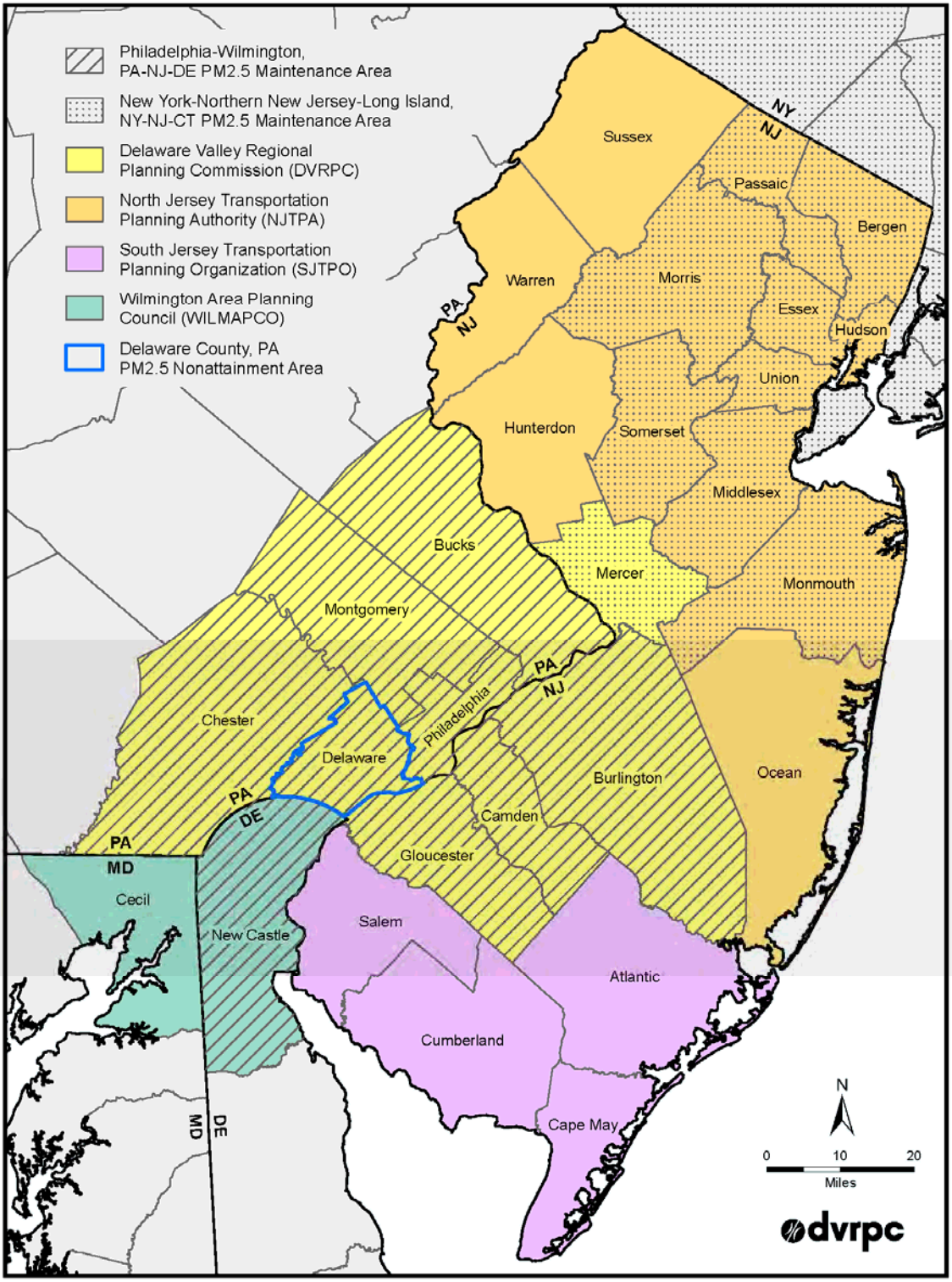
Figures 7 and 8 detail the current ozone and $PM_{2.5}$ nonattainment and maintenance areas that are relevant to the DVRPC region.

Figure 7: Philadelphia–Wilmington–Atlantic City Eight-Hour Ozone Nonattainment Area



Source: DVRPC, 2018.

Figure 8: DVRPC Annual and 24-Hour $PM_{2.5}$ Maintenance and Nonattainment Areas



Source: DVRPC, 2018.

Transportation Conformity

The CAA section 176(c) (42 US Code [U.S.C.] 7506(c)) requires that federally funded highway and transit project activities "conform to" state air quality goals found in SIPs. The procedure that is followed to fulfill this requirement is called "transportation conformity." This process ensures that transportation and air quality agencies are consulting one another to look for strategies to relieve traffic congestion, improve air quality, and provide communities with a safe and efficient transportation system.

The transportation conformity process is required in areas that have been designated by the US EPA as not having met one or more of the NAAQS. These areas are called nonattainment areas if they currently do not meet air quality standards, or maintenance areas if they have previously violated air quality standards but currently meet them and have an approved CAA section 175(a) maintenance plan. A transportation conformity demonstration is required at least once every four years; or when an MPO adopts a new Plan or TIP; or amends, adds, or deletes a regionally significant, nonexempt project in a Plan or TIP. This conformity demonstration is required due to a new FY 2019 Pennsylvania TIP. Since there are no changes to regionally significant and nonexempt projects in the FY 2018 TIP for New Jersey or Plan projects in the New Jersey portion of the DVRPC region, DVRPC is not required to demonstrate transportation conformity for projects in the New Jersey portion of the region.

Transportation conformity is demonstrated when federally funded highway and transit activities are determined not to cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) jointly make conformity determinations within air quality nonattainment and maintenance areas to ensure that federal actions are consistent with corresponding SIPs. The US Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not found to conform to the CAA requirements governing the current NAAQS for transportation conformity.

This conformity demonstration is based on the current Final Rule under the CAA, including 40 CFR Part 93, as revised, and applies to ozone and $PM_{2.5}$. The Final Rule dictates that conformity findings within the DVRPC planning area must be based on the applicable SIP budgets in all target analysis years. The demonstration process estimates emissions that will result from the region's transportation system and determines whether those emissions are within the limits outlined in respective SIPs and other applicable NAAQS requirements.

DVRPC uses the MOVES 2014a emissions model to demonstrate transportation conformity. MOVES 2014a is the latest US EPA emissions model approved for use in demonstrating transportation conformity and includes updates to fuel tables and improved emissions estimates from brake wear compared to the MOVES 2014 model.

NAAQS, Nonattainment, and Maintenance Areas

The CAA, first enacted in 1963 and last amended in 1990, currently mandates the US EPA to set national air quality standards for air pollutants that are considered harmful to public health and the environment. The CAA also requires the agency to periodically review the standards to ensure that they provide adequate health and environmental protection, and to update those standards as necessary. These standards are set at the level required to provide an ample margin of safety to protect public health and welfare.

The US EPA has set NAAQS for several principal air pollutants, which are called criteria pollutants. The NAAQS criteria pollutants include ozone, CO, coarse and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively), sulfur dioxide, NO_x, and lead.

At the state level, the SIP represents the state's roadmap to meet or "attain" air quality goals. Implemented SIPs contain an MVEB. Regional emissions estimates are compared against these budgets to determine progress toward meeting air quality goals. The Final Rule stipulates that each SIP is sovereign and that, for a multistate MPO such as DVRPC, conformity applies separately to individual state portions of its planning area under respective SIPs.

The DVRPC region must demonstrate transportation conformity for ozone and $PM_{2.5}$.

Ozone is a photochemical oxidant and a major component of smog. Ozone is not emitted directly into the air, but is formed through complex chemical reactions between precursor emissions of VOCs and NO_x in the presence of sunlight. Although ozone in the upper atmosphere shields and protects the earth from harmful radiation from the sun, high concentrations of ozone at ground level are a serious health and environmental concern. Even at low levels, ozone can damage lung tissue, reduce lung function, and sensitize the respiratory system to other irritants. Additionally, scientific evidence has indicated that ambient levels of ozone not only affect people with pulmonary conditions, such as asthma, but also normal, healthy adults and children.

In March 2008, the US EPA revised the NAAQS for the Eight-Hour Ozone Standard from 0.08 parts per million (ppm) to 0.075 ppm. Designation of the nonattainment areas for this standard was published in the *Federal Register* (77 FR 30088) on May 21, 2012, and became effective in July 2012. The DVRPC region was classified as a marginal nonattainment area for the 2008 Eight-Hour Ozone Standard, and the implementation guidance for the ozone standard revoked the 1997 Eight-Hour Ozone Standard for transportation conformity purposes in July 2013.

In October 2015, the US EPA strengthened the Eight-Hour Ozone Standard to 0.70 ppm (80 FR 65292). The US EPA is still finalizing the nonattainment area designations for this standard. The DVRPC region is expected to be designated as a nonattainment area for that standard. Until that time the DVRPC region is conforming to the Final Rule Guidance for the 2008 Ozone NAAQS (EPA-420-B12-045).

The ozone standard is based on the three-year average of the annual fourth-highest daily maximum eight-hour ozone concentration monitor value. This value is called the "design value" and, among other factors, helps the US EPA determine which areas are meeting the NAAQS.

Particulate matter (PM) includes both solid particles and liquid droplets found in air. Many man-made and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. These solid and liquid particles come in a wide range of sizes. The coarse particles, less than 10 micrometers (μm) in diameter (PM_{10}), pose a health concern since they can be inhaled into and accumulate in the respiratory system. The fine particles, less than 2.5 μm in diameter ($PM_{2.5}$), are believed to pose even greater health risks. Because of their small size, these fine particles can lodge deep in the lungs. Individuals particularly sensitive to $PM_{2.5}$ exposure include older adults, people with heart and lung disease, and children. Health studies have shown a significant association between exposure to $PM_{2.5}$ and premature mortality.

$PM_{2.5}$ can be emitted directly from combustion engines or chemically formed in the atmosphere when certain gases are present. Direct $PM_{2.5}$ emissions can result from particles in exhaust fumes, from brake and tire wear, from road dust kicked up by vehicles, and from highway and transit construction. Indirect $PM_{2.5}$ emissions can result from one or more of several exhaust components, including VOCs, NO_x, sulfur oxides (SO_x), and ammonia (NH_3).

The $PM_{2.5}$ NAAQS include an annual standard set at 12 µg/m^3 based on a three-year average of the annual mean $PM_{2.5}$ concentrations; and a 24-hour standard of 35 µg/m^3, based on a three-year average of the 98th percentile of 24-hour concentrations. The US EPA adopted this annual $PM_{2.5}$ standard in January 2013 and designated the nonattainment areas for this standard in December 2014.

Areas need to meet both standards (24-hour and annual) to be considered in attainment of the $PM_{2.5}$ NAAQS.

The DVRPC region is part of a complex combination of two $PM_{2.5}$ maintenance areas and a stand-alone county nonattainment area. Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania; and Burlington, Camden, and Gloucester counties in New Jersey; along with New Castle County in Delaware, are collectively designated as the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Area, which covers three states, two MPOs, and nine counties for the 1997 Annual and 2006 24-Hour $PM_{2.5}$ standards. Mercer County is part of another nonattainment area titled the New York–Northern New Jersey–Long Island, NY–NJ–CT $PM_{2.5}$ Maintenance Area, which covers three states, nine MPOs, and 21 counties. Delaware County, Pennsylvania, was designated as a stand-alone nonattainment area in December 2014 for not attaining the 2012 Annual $PM_{2.5}$ NAAQS.

In December 2016, the US EPA published a “clean data determination” for the Delaware County $PM_{2.5}$ Nonattainment Area (81 FR 89868). This determination indicates that the Delaware County has met the 2012 $PM_{2.5}$ Standard by the 2020 Attainment Date. The county will remain a nonattainment area until the Pennsylvania DEP submits, and the US EPA approves, plans to re-designate the area as either an attainment or maintenance area.

CO is a colorless, odorless, but poisonous gas produced by incomplete combustion of carbon compounds in fuels. When CO enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Health threats are most serious for those who suffer from cardiovascular disease. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks.

In 1996, the DVRPC planning area met the CO standard and attained the CO NAAQS. Following the attainment status, portions of four counties in the region were designated as separate CO maintenance areas. The Philadelphia–Camden CO Maintenance Area comprised the cities of Camden and Philadelphia. Portions of Burlington (City of Burlington) and Mercer (City of Trenton) counties were also part of individual CO maintenance areas within the region.

In December 2007, the US EPA approved the second 10-year limited maintenance plan SIP for Philadelphia (72 FR 56911). Since this conformity demonstration is beyond the second 10-year maintenance plan for CO, DVRPC is no longer required to demonstrate regional transportation conformity for CO in Philadelphia.

The attainment status for each of the criteria pollutants can be viewed at: **www.epa.gov/green-book**. Detailed information on the attainment status for each region can be viewed at: **www.epa.gov/air-quality-implementation-plans/approved-air-quality-implementation-plans**.

CHAPTER 2: Conformity Demonstration Overview

DVRPC Plan and TIPs

The CAA requires that, in nonattainment or maintenance areas, all regionally significant and nonexempt projects included in a Plan or TIP meet the conformity requirements established in the Final Rule. Therefore, DVRPC must identify these projects in the Plan and TIPs and conduct a conformity determination on those projects in order to demonstrate that the projects included in the Plan and TIPs do not worsen air quality or inhibit the region's progress toward meeting the NAAQS.

The FY 2019 Pennsylvania TIP is a staged, multiyear, intermodal program of transportation projects covering the five Pennsylvania counties in the DVRPC planning area. The DVRPC TIPs are consistent with the Plan and are developed, pursuant to 23 CFR Part 450, to meet the federal requirement of being financially constrained to a funding level that is available to the region, as established in the financial guidance provided by the respective states. All TIP projects have been reviewed and approved by DVRPC's TCICG for appropriate AQ code and analysis year.

The *Connections 2045* Long-Range Plan, adopted in October 2017, provides a broad planning framework for the region. The transportation component of the Plan articulates a vision and a comprehensive long-range transportation blueprint for the DVRPC planning area. The *Connections 2045* Plan includes over $65 billion from traditional sources for regional transportation improvements. The Plan is fiscally constrained and focuses transportation funding on rebuilding the region's transportation infrastructure, but it also includes new major regional transportation projects to achieve its goals and objectives. The Plan also advances and supports the region's land use plans and policies and proposes strategies to carry out those policies.

The Plan's financial component reflects actual federal authorization levels. Projected costs for future Plan projects have been adjusted to account for inflation and to reflect the year of expenditure, as required by the FHWA/FTA Final Rule on Statewide and Metropolitan Transportation Planning and Programming.[2] All Plan projects have also been reviewed and approved by the TCICG for appropriate AQ code and analysis year.

Project Category

There are three categories of projects in the Plan and TIP:

- **Regionally Significant Project:** a nonexempt highway or transit project on a facility that, regardless of its length, serves regional needs and is normally included in the regional travel simulation model;
- **Exempt Project:** a project listed in Table 2 or Table 3 of the Final Rule (40 CFR 93) that primarily enhances safety or aesthetics, maintains mass transit, continues current levels of ridesharing, or builds bicycle and pedestrian facilities; and
- **Not Regionally Significant Project/Nonexempt:** a nonexempt highway or transit project on a facility that does not serve regional needs or is not normally included in the regional travel simulation model and does not fit into an exempt project category in Table 2 or Table 3 of the Final Rule (40 CFR 93).

[2] See 23 CFR 450.216(1), 23CFR 450.322(f) (10) (iv), and 23 CFR 450.23(h).

The Final Rule requires that a regional emissions analysis be conducted to demonstrate conformity of the Plan and the TIP and includes all "regionally significant, nonexempt" projects on principal arterials and higher classifications—that is, those that can impact regional air quality. The project set includes all those in the Plan, those in the current TIP, and those that have been introduced in previous TIPs but are not yet completed. Each project is classified by the first year that the project is included in the regional emissions analysis or analysis year. The emissions estimates for a particular analysis year include all of the projects that are expected to be open to traffic by that analysis year.

DVRPC AQ Code

For all Plan and TIP projects, an alphanumeric AQ coding scheme has been developed and is applied by DVRPC for the conformity determination and exempt eligibility identification purposes.

All regionally significant, nonexempt projects are assigned a five-character alphanumeric AQ code that begins with a four-digit analysis year followed by the letter "M" to indicate that it was included in the TDM.

For instance, a Plan or TIP project may have an AQ code of 2020M, in which case the project is identified as a regionally significant, nonexempt project, the emissions estimates of which are (1) included in the 2020 and all subsequent future analysis years and (2) performed using the TDM network analysis technique.

DVRPC has also developed an internal coding scheme to identify each exempt project type based on those defined in the Final Rule. Table 2 shows the exempt project categories in the Final Rule and their corresponding DVRPC AQ codes. In cases in which multiple codes can apply to a project, the most representative code is assigned. The AQ code for each project is shown in the respective Plan and TIP documents.

Projects that have been determined not to be regionally significant as defined in the Final Rule, and do not fit into an exempt category, are labeled as "NRS."

The TCICG has reviewed all projects and concurred on all assigned AQ codes in the Plan and the TIPs.

Table 2: AQ Codes for Projects in the Plan and TIP

	Exempt Project Category†	AQ Code
Safety Projects	Railroad/highway crossing	S1
	Hazard elimination program	S2
	Safer non-federal-aid system roads	S3
	Shoulder improvements	S4
	Increasing sight distance	S5
	Safety improvement program	S6
	Traffic control device and operating assistance other than signalization projects	S7
	Railroad/highway crossing warning devices	S8
	Guardrails, median barriers, crash cushions	S9
	Pavement resurfacing and/or rehabilitation	S10
	Pavement marking demonstration	S11
	Emergency relief (23 U.S.C. 125)	S12
	Fencing	S13
	Skid treatments	S14
	Safety roadside rest areas	S15
	Adding medians	S16
	Truck-climbing lanes outside the urbanized area	S17
	Lighting improvements	S18
	Widening narrow pavements or reconstructing bridges (no additional travel lanes)	S19
	Emergency truck pullovers	S20
Mass Transit Projects	Operating assistance to transit agencies	M1
	Purchase of support vehicles	M2
	Rehabilitation of transit vehicles	M3
	Purchase of office, shop, and operating equipment for existing facilities	M4
	Purchase of operating equipment for vehicles (e.g., radios, fare boxes, lifts, etc.)	M5
	Construction or renovation of power, signal, and communications systems	M6
	Construction of small passenger shelters and information kiosks	M7
	Reconstruction or renovation of transit buildings and structures	M8
	Rehabilitation or reconstruction of track structures, track, and tracked-in existing rights-of-way	M9
	Purchase of new buses and rail cars to replace existing vehicles or for minor expansions of the fleet	M10
	Construction of new bus or rail storage/maintenance facilities categorically excluded in 23 CFR part 771	M11

	Exempt Project Category†	AQ Code
Air Quality Projects	Continuation of ridesharing and vanpooling promotion activities at current levels	A1
	Bicycle and pedestrian facilities	A2
Other Projects	Specific activities that do not involve or lead directly to construction, such as planning and technical studies	X1
	Grants for training and research programs	X2
	Planning activities conducted pursuant to title 23 and 49 U.S.C.	X3
	Federal aid systems revisions	X4
	Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action	X5
	Noise attenuation	X6
	Advance land acquisitions (23 CFR 712 or 23 CFR 771)	X7
	Acquisition of scenic easements	X8
	Plantings, landscaping, etc.	X9
	Sign removal	X10
	Directional and informational signs	X11
	Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities)	X12
	Repair of damage caused by natural disasters, civil unrest, or terrorist acts, except projects involving substantial functional, locational, or capacity changes	X13
No Regional Emissions Analysis Required	Intersection channelization projects	R1
	Intersection signalization projects at individual intersections	R2
	Interchange reconfiguration projects	R3
	Changes in vertical and horizontal alignment	R4
	Truck size and weight inspection stations	R5
	Bus terminals and transfer points	R6
Not Regionally Significant	Projects determined to be “Not Regionally Significant” and do not fit into an exempt category	NRS
Study and Development (New Jersey Only)	Project in the Study and Development Program expected to result in an exempt project	SDX
	Project in the Study and Development Program expected to result in a nonexempt project	SDN

Source: DVRPC, 2018.

Note: † 40 CFR 93 Sections 126 and 127.

Analysis Year

For this conformity demonstration, the mobile source ozone emissions analysis years for VOCs and NO_x in the Philadelphia–Wilmington–Atlantic City Ozone Nonattainment Area are 2020, 2025 (an interim year selected to keep all analysis years no more than 10 years apart), 2035 (a second interim year selected to keep all analysis years no more than 10 years apart), and 2045 (the horizon year of the DVRPC Plan). VOCs and NO_x, which are heat-sensitive ozone precursors, are estimated for a typical summer work weekday. To demonstrate conformity, projected ozone emissions in all analysis years must not exceed the established MVEBs in prior years. For this conformity demonstration, the mobile source emissions analysis years are also identified in Table 3.

Table 3: Mobile Source Analysis Years

Year	Ozone	$PM_{2.5}$	Note
2020	√	√	2012 $PM_{2.5}$ Std. attainment date and near term year
2025	√	√	$PM_{2.5}$ SIP budget year
2035	√	√	Year within 10 years of previous analysis
2045	√	√	DVRPC Plan horizon year

Source: DVRPC, 2018.

In the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Areas and the Delaware County $PM_{2.5}$ Nonattainment Area, the analysis years are 2020 (the attainment date for the 2012 $PM_{2.5}$ Standard for Delaware County and a near-term year within the four-year TIP), 2025 (a SIP budget year), 2035 (an interim year selected to keep all analysis years no more than 10 years apart), and 2045 (the horizon year of the DVRPC Plan).

To demonstrate conformity in Pennsylvania, projected $PM_{2.5}$ emissions in analysis years must not exceed the 2017 (for analysis years before 2025) and 2025 (for analysis years 2025 and later) budgeted emissions in the Pennsylvania portion of the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Areas and Delaware County in the Delaware County $PM_{2.5}$ Nonattainment Area.

Table 4 describes the project sets that are considered in each future-year analysis. All analysis years, projects, and activities identified in Table 4 have been reviewed and approved by the TCICG for the conformity demonstration.

Table 4: Projects Included in the Regional Emissions Analysis

Analysis Year	Project Set
2020 (Attainment date for the 2012 $PM_{2.5}$ Standard and near-term year)	All regionally significant highway and transit facilities, services, and activities currently in place and All regionally significant highway and transit projects that are scheduled to open between 2018 and 2020.
2025 $PM_{2.5}$ budget years and interim year	All regionally significant highway and transit projects in the 2020 model network and Additional highway and transit projects that are scheduled to open between 2021 and 2025.
2035 (Interim year)	All regionally significant highway and transit projects in the 2025 model network and Additional highway and transit projects that are scheduled to open between 2026 and 2035.
2045 (DVRPC Plan Horizon)	All regionally significant highway and transit projects in the 2035 model network and Additional highway and transit projects that are scheduled to open between 2036 and 2040.

Source: DVRPC, 2018.

Emissions Analysis

Once the regionally significant and nonexempt projects in the Plan and TIPs are identified, regional emissions estimates are developed through a series of models that simulate travel demand in the region and then convert those travel characteristics into estimates of emissions of the pollutants of concern.

Plan and TIP projects are coded into the DVRPC TDM (TIM 2.0). The TDM represents the regional transportation network and uses inputs such as population, employment, and land use data to develop estimates for trip length, vehicle miles traveled (VMT), and traffic volumes on the transportation network. The model includes the base transportation network of roads and transit projects that have been constructed, and new networks are built to include projects from the Plan and TIPs according to the projects' analysis years.

Outputs of the TDM are then processed and entered into the emissions estimation model, MOVES 2014a. The MOVES model will then take the TDM outputs, information on meteorology, fuel information, data on vehicle types and vehicle populations, and other critical inputs to develop a projected emissions estimate for a given analysis year and pollutant, which is then compared against SIP MVEBs to demonstrate conformity.

Latest Planning Assumptions

The Final Rule requires that the most current available planning assumptions be used in determining transportation conformity. In addition to the Plan and TIP projects that are included in the conformity analysis, planning assumptions, such as population and employment estimates, transit and toll road policies, and land use assumptions are critical inputs to the TDM. Planning assumptions, as well as the list of Plan and TIP projects, are reviewed and approved by the TCICG before DVRPC begins the regional emissions analysis.

The planning assumptions and project lists used in this demonstration are the latest and most current assumptions available as of January 25, 2018. This date functions as “start of analysis” dates for the conformity determination.

Population and Employment Estimates

The population and employment estimates used in this conformity determination are the latest available at the traffic analysis zone (TAZ) level. Population forecasts were adopted by the DVRPC Board in July 2016, and employment forecasts were adopted in October 2016. These estimates include forecasts for the Plan horizon year of 2045 and can be reviewed in *Regional, County, and Municipal Population Forecasts, 2015–2045* (August 2016, DVRPC publication number ADR022) and *Regional, County, and Municipal Employment Forecasts, 2015–2045* (October 2016, DVRPC publication number ADR023).

Transit and Toll Road Policies

As part of the latest planning assumptions, current transit operations policies and road toll structures are considered. The transit person trips produced by the modal split component of the DVRPC TDM are considered “linked” in the sense that they do not include any transfers that may have occurred either between transit trips or between auto approaches and transit lines. Therefore, the transit assignment procedure accomplishes two major tasks. First, the transit trips are “unlinked” to include transfers; and second, these “unlinked” transit trips are associated with specific transit facilities to produce link, line, and station volumes. These tasks are performed simultaneously within the transit assignment model, which assigns the transit trip matrix to paths built through the transit network, which is not capacity constrained.

All fares entering the transit network are “blended” by operating entity. For each operator, different existing fare types (e.g., cash; token; transfer charge; and daily, weekly, and monthly passes) are blended into a single fare policy based on the percentage of each fare type and use in the 2015 fare structure. Then the future fare for each operator is held constant in current dollars. All current operating plans, ridership, and service levels of transit systems are built into the transit network and incorporated into the future-year networks, as well. Future-year transit networks are also augmented with any new services identified in the corresponding DVRPC Plan and TIPs. Table 5 details all transit operators included in the transit network and their operational assumptions.

Other transportation-related costs, such as automobile operating costs, gasoline costs, parking costs, and road/bridge tolls, are also based on current and available data and are held constant in current dollars into the future analysis years.

Table 5: Transit Operation Assumptions

Transit Companies	Fares	Operating Plan /Service Level
SEPTA City Transit Division	Specified in the transit network by operator and by analysis year; held constant in year 2015 dollars	Specified in the transit networks by operator and by analysis year.
SEPTA Suburban Victory Division		
SEPTA Suburban Frontier Division		
SEPTA Regional Rail Division		
NJ Transit Mercer Division		
NJ Transit Southern Division		
NJ Transit Railroad Division		
PATCO High-Speed Line (DRPA)		
Pottstown Area Rapid Transit		
Krapf's Coaches		

Source: DVRPC, 2018.

Note: DRPA = Delaware River Port Authority; NJ Transit = New Jersey Transit; PATCO = Port Authority Transit Corporation; SEPTA = Southeastern Pennsylvania Transportation Authority.

Travel Demand Simulation

TIM 2.0 has been validated following FHWA guidance and features an expanded geography to improve travel simulation within, through, and across the region. The previous DVRPC TDM only included data on the nine-county DVRPC region. The current model includes detailed transportation network data on the DVRPC region, plus less detailed information on the transportation network in the 16 counties surrounding the DVRPC region. The current DVRPC TDM meets the federal transportation authorization and planning requirements, as well as requirements included in the CAA and the Final Rule.

DVRPC's TDM is a four-step process that ultimately assigns travel patterns among and within TAZs and modes of transportation using the built transportation networks, along with the planned highway and transit networks described by the Plan and the TIPs. Travel patterns and modal splits are then run through a postprocessor in preparation for emissions analysis by MOVES 2014a.

The TCICG has reviewed and approved DVRPC's travel demand modeling process.

Emissions Model

The CAA requires the US EPA to regularly update emissions models. In 2009, the US EPA required that the MOVES model become the official emissions estimation model used for SIP development and transportation conformity determinations. The MOVES family of models estimates on-road mobile emissions based on an operational mode that accounts for different driving patterns and emission profiles from various vehicle types. Beginning in October 2016, MPOs and state DOTs were required to use the MOVES 2014 emissions model to demonstrate transportation conformity; MOVES 2014 has subsequently been updated to the MOVES 2014a emissions model that is used for this conformity determination. For a detailed description of the MOVES model, please visit: **www.epa.gov/otaq/models/moves/index.htm.**

Conformity Tests

The DVRPC region must demonstrate transportation conformity for ozone and $PM_{2.5}$, and governing SIPs are in place for these pollutants in Pennsylvania. DVRPC utilizes the budget test to demonstrate conformity using applicable SIP budgets.

The DVRPC region has been designated as a marginal nonattainment area for the 2008 Ozone Standard. On May 21, 2012, the US EPA published a Final Rule for the implementation of the 2008 Eight-Hour Ozone NAAQS (77 FR 30088). In the same rulemaking, the US EPA revoked the 1997 Eight-Hour Ozone NAAQS for the purposes of transportation conformity, effective July 20, 2013. For this conformity determination, DVRPC is using the 1997 Ozone SIP Budget in Pennsylvania. This budget was approved by the US EPA for conformity purposes in May 2009. All ozone budgets have been established in cooperation with the state DEP using MOBILE 6.2. The regional emissions analysis for ozone was conducted using the MOVES model (version 2014a). Analysis is conducted for ozone emissions for a typical summer work weekday.

The US EPA has an approved maintenance plan for the 1997 Annual and 2006 24-Hour $PM_{2.5}$ standards in the Pennsylvania counties in the DVRPC region (approved by the US EPA in April 2015). These SIPs contain MVEBs for direct $PM_{2.5}$ and precursor NO_x to be used to demonstrate transportation conformity. The county-level $PM_{2.5}$ budget contained in the appendix of the Pennsylvania maintenance plan has been approved to serve as the MVEB for the Delaware County $PM_{2.5}$ Nonattainment Area. All $PM_{2.5}$ MVEBs are expressed in tons of emissions per year for both the Annual and 24-Hour standards.

The US EPA revoked the 1997 $PM_{2.5}$ Annual Standard in August 2016 however DVRPC is demonstrating conformity to this standard in this finding pending guidance on the implementation of the *South Coast Air Quality Management District v. EPA* court ruling.

The US EPA has ruled that exhaust and brake/tire wear must be included in the regional analysis of direct $PM_{2.5}$ emissions but has not ruled that fugitive road dust must be included in this analysis in the DVRPC region. Thus, the only components of direct $PM_{2.5}$ emissions in this DVRPC conformity iteration are tailpipe exhaust and brake/tire wear.

For the indirect $PM_{2.5}$ emissions (also called $PM_{2.5}$ precursors), the US EPA has identified four potential transportation-related $PM_{2.5}$ precursors: VOCs, NO_x, SO_x, and NH_3. NO_x must be included in the $PM_{2.5}$ precursor analysis unless it has been determined that NO_x emissions are not significantly contributing to regional $PM_{2.5}$ formation. The Pennsylvania $PM_{2.5}$ SIP does not demonstrate that any of the identified precursors, aside from NO_x, are contributing to regional $PM_{2.5}$ formation. Thus, the only indirect $PM_{2.5}$ component analyzed in this conformity iteration is NO_x.

Tables 6 and 7 show governing MVEBs to be utilized in this iteration of conformity demonstration. Conformity to the SIP is demonstrated by meeting the Annual and 24-Hour $PM_{2.5}$ SIP budgets which are both expressed as an annual tons/year value.

Table 6: Pennsylvania Ozone Emissions Budgets (Tons/Day)

Pollutant	Budget	VOCs (tons/day)	NO_x (tons/day)
Pennsylvania Subregion	2008 Budget (tons per day)	61.09 (all counties)	108.78 (all counties)

Source: DVRPC, 2018.

Table 7: Pennsylvania $PM_{2.5}$ Emissions Budgets (Tons/Year) †

Pollutant	Budget	Pennsylvania Subregion (tons/year)	Delaware County (tons/year)
Annual and 24-Hour Direct $PM_{2.5}$ ♦	2017 Budget (tons per year)	1,679	251
Annual and 24-Hour Precursor NO_x ♦		37,922	5,544
Annual and 24-Hour Direct $PM_{2.5}$ ♦	2025 Budget (tons per year)	1,316	201
Annual and 24-Hour Precursor NO_x ♦		25,361	3,730

Source: DVRPC, 2018.

Note: †$PM_{2.5}$ budgets are rounded off to the nearest integer in accordance with the SIP.
♦ Both state SIP budgets for Annual and 24-Hour $PM_{2.5}$ are the same value expressed in tons/year.

Travel Demand Simulation Results

Quantitative analyses for this iteration of transportation conformity determination for the DVRPC region began on January 25, 2018. All planning assumptions utilized in this demonstration are the latest and most current as of that date. The TDM analysis includes all regionally significant and nonexempt projects from the *Connections 2045* Long-Range Plan and FY 2019 TIP for Pennsylvania segregated into networks according to the anticipated date that the facilities will be open to traffic.

Results from the TDM, including speed distribution, VMT by vehicle type, road-type distribution, ramp fraction, VMT by day and month, and VMT by hour, were input into the MOVES 2014a emissions analysis model. These input files are provided to the US EPA for review and are available upon request.

For ozone analysis, a second speed distribution is performed before being analyzed by the MOVES 2014a model. The postprocessor applies a factor to the assigned volumes from the TDM that increases the annual average weekday volume to an average July weekday volume (these factors vary by county and functional class). This speed distribution is then organized into a MOVES–formatted input file, and the daily speed distribution is used for ozone emissions analysis to determine VOC and NO_x emissions estimates for a typical summer work weekday.

Emissions Estimate Results

Mobile source emissions estimates are outputs of the MOVES 2014a model. The regional emissions analysis must meet all conformity tests in the Final Rule. Specifically, emissions of VOCs, NO_x, and $PM_{2.5}$ must be less than the MVEBs established by the states.

Tables 8 and 9 present the results of these calculations for the transportation conformity simulation for the critical ozone precursors of VOCs and NO_x. The Final Rule requires that until MVEBs are established for the 2008 Eight-Hour Ozone NAAQS, the approved SIP MVEBs for the 1997 Ozone Standard are to be used to demonstrate conformity.

Table 8: VOCs Emissions Analysis Results (Tons/Day)

		SIP 2008 MVEB†	2020	2025	2035	2045
PA	Emissions from MOVES 2014A	61.09	30.92	22.48	12.37	9.53

Source: DVRPC, 2018.

Note: † The most recent Eight-Hour Ozone SIP MVEBs will apply to all future analysis years. All emissions are rounded off to the nearest hundredth of a ton per day.

Table 9: NO_x Emissions Analysis Results (Tons/Day)

		SIP 2008 MVEB†	2020	2025	2035	2040
PA	Emissions from MOVES 2014	108.78	51.71	31.91	14.96	11.90

Source: DVRPC, 2018.

Note: † The most recent Eight-Hour Ozone SIP MVEBs will apply to all future analysis years. All emissions are rounded off to the nearest hundredth of a ton per day.

Furthermore, DVRPC must make conformity determinations for $PM_{2.5}$ in one nonattainment area and two different maintenance areas. Table 10 provides the $PM_{2.5}$ emissions estimate results for the maintenance areas, and Table 11 provides the emissions estimates and MVEB for the 2012 Delaware County Annual $PM_{2.5}$ Nonattainment Area.

In Pennsylvania, governing SIP MVEBs for the years 2017 and 2025 were approved for both the Annual and 24-Hour $PM_{2.5}$ standards in April 2015. Since the Pennsylvania regional SIP MVEBs were developed by adding county-level inventories and then applying a regional safety margin to the budgets, the TCICG determined that the county-level budget included in the SIP appendix would be appropriate to use as an approved MVEB for the 2012 Delaware County, PA Annual $PM_{2.5}$ Nonattainment Area. The TCICG also approved that a safety margin, comprising Delaware County's VMT–based portion of the regional safety margin included in the SIP, be added to the Delaware County MVEB. In Table 11, DVRPC is demonstrating that the emissions estimates for Delaware County meet the $PM_{2.5}$ SIP MVEBs with and without the safety margin.

Since the $PM_{2.5}$ SIPs provide MVEBs expressed in annual values (tons/year), conformity is demonstrated by comparing emissions estimates against these budgets in those terms.

Table 10: Annual and 24-Hour Direct $PM_{2.5}$ and NO_x Emissions Analysis Results (Tons/Year) for Pennsylvania

		2017	2020	2025	2025	2035	2045
		SIP MVEB†	Estimated Emissions	SIP MVEB†	Estimated Emissions	Estimated Emissions	Estimated Emissions
Direct $PM_{2.5}$	DVRPC—PA*	1,679	741	1,316	531	336	325
$PM_{2.5}$ Precursor (NO_x)	DVRPC—PA*	37,922	18,717	25,361	11,445	5,619	4,610

Source: DVRPC, 2018.

Note: †Associated 2017 and 2025 MVEBs apply to all future analysis years.

Table 11: 2012 Annual Direct $PM_{2.5}$ and NO_x Emissions Analysis Results (Tons/Year) for Delaware County

		2017	2020	2025	2025	2035	2045
		SIP MVEB†		SIP MVEB†			
		w/o safety margin	Estimated Emissions	w/o safety margin	Estimated Emissions	Estimated Emissions	Estimated Emissions
Direct $PM_{2.5}$	Delaware County	251	95	201	68	45	42
		219		175			
$PM_{2.5}$ Precursor (NO_x)	Delaware County	5,544	2,385	3,730	1,441	691	547
		5,040		3,391			

Source: DVRPC, 2018.

Note: †Associated 2017 and 2025 MVEBs apply to all future analysis years.

Meeting the Conformity Criteria

Collectively, these tables show that the estimated emissions of VOCs, NO_x, and $PM_{2.5}$ do not exceed the respective MVEBs included in approved SIPs discussed in the previous sections of this conformity demonstration. Tables 8 through 11 cumulatively demonstrate that the Plan and the TIPs conform to the SIPs with respect to the MVEBs in the corresponding analysis year. The Plan and the TIPs meet all requirements under the governing ozone and $PM_{2.5}$ regulations for all analysis years tested.

The transportation conformity process must also meet all the applicable criteria that are consistent with the requirements for nonattainment areas and maintenance areas under the CAA. Specifically, the finding must show, among other items:

- that the Plan and the TIPs are fiscally constrained [40 CFR 93.108];
- that this determination is based on the latest planning assumptions [40 CFR 93.110];
- that this determination is based on the latest emissions estimation model available [40 CFR 93.111];
- that DVRPC has made the determination according to the applicable consultation procedures [40 CFR 93.112];
- that the Plan and the TIPs do not interfere with the timely implementation of TCMs [40 CFR 93.113]; and
- that the Plan and the TIPs are consistent with the MVEBs in the applicable SIPs [40 CFR 93.118];

All identified conformity evaluation criteria in the Final Rule and subsequent responses from DVRPC are detailed in Table 12.

Table 12: Evaluation of the Conformity Determination Criteria

Corresponding 40 CFR Part 93 Section(s)	Evaluation Criteria	DVRPC Response
§93.106(a)(1)	Are the transportation plan horizon years correct?	Yes. The analysis years of 2020, 2025, 2035, and 2045 correspond to the 2012 Annual $PM_{2.5}$ attainment date (Delaware County), SIP budget years in both states, interim years within a 10-year time frame, and the current DVRPC Plan horizon year.
§93.106(a)(2)(i)	Does the plan quantify and document the demographic and employment factors influencing transportation demand?	Yes. The *Connections 2045* Long-Range Plan does quantify and document demographic and employment factors influencing transportation demand. Future population and employment forecasts were developed with member counties and adopted by the DVRPC Board.
§93.106(a)(2)(ii)	Is the highway and transit system adequately described in terms of regionally significant additions or modifications to the existing transportation network that the transportation plan envisions to be operational in horizon years?	Yes. The regionally significant additions and modifications to the network utilized in this conformity analysis are listed and described. Detailed information regarding each project can be found in the respective Plan and TIP documents.
§93.108	Are the transportation Plan and TIPs fiscally constrained?	Yes. The Plan and the TIP are constrained to reasonably anticipated financial resources as required by federal regulations and are based on year-of-expenditure costs.
§93.109(e) §93.109(f)	Are all budget tests for VOCs, NO_x, and CO satisfied as required by §93.118 and §93.119 for conformity determination?	Yes. $PM_{2.5}$, VOCs, and NO_x MVEBs have been approved by the US EPA. DVRPC performs budget tests to demonstrate the $PM_{2.5}$ and ozone conformity of the Plan and the TIPs. The DVRPC is beyond the second 10-year maintenance plan and is no longer required to demonstrate conformity for CO.

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Corresponding 40 CFR Part 93 Section(s)	Evaluation Criteria	DVRPC's Response
§93.110	Are the conformity determinations based upon the latest planning assumptions?	Yes.
	Is the conformity determination, with respect to all other applicable criteria in §93.111-93.119, based upon the most recent planning assumptions in force at the time that the conformity determination began?	Yes. This conformity determination utilizes the most recent planning assumptions as of January 25, 2018, the start-of-analysis date for this conformity determination for the Pennsylvania Plan and TIP.
	Are the assumptions derived from the estimates of current and future population, employment, travel, and congestion the most recently developed by the MPO or other designated agency? Is the conformity determination based upon the latest assumptions about current and future background concentrations?	Yes. This conformity determination utilizes the most recent demographic and employment data, which were adopted by the DVRPC Board in July and October 2016, respectively. Also, other planning assumptions and travel data are derived from the most current information available to DVRPC.
	Are any changes in the transit operating policies (including fares and service levels) and assumed transit ridership discussed in the determination?	Yes. Applicable transit operating policies and transit ridership are discussed in this document and were verified through the consultation process. (Chapter 2, p. 22).
	The conformity determination must include reasonable assumptions about transit service and increases in transit fares and road and bridge tolls over time.	Key transit and toll assumptions outlined in this document were verified through the consultation process. (Chapter 2, p. 22).
	The conformity determination must use the latest existing information regarding the effectiveness of the TCMs and other implementation plan measures that have already been implemented.	Currently, there are no adopted TCMs in the corresponding SIPs.
	Key assumptions must be specified and included in the draft documents and supporting materials used for the interagency and public consultation, as required by §93.105.	Key assumptions are specified, and other supporting documents are included, in this conformity determination document, which is available to the TCICG and the public.

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Corresponding 40 CFR Part 93 Section(s)	Evaluation Criteria	DVRPC's Response
§93.111	Is the conformity determination based upon the latest emissions model?	Yes. The transportation conformity determination for the Plan and the TIPs is based on MOVES 2014a, the latest available emissions model.
§93.112	Did the MPO make the conformity determination according to the consultation procedures of the Final Rule or the state's conformity SIP?	Yes. Formal interagency consultation meetings with the US EPA, FHWA, FTA, and state environmental and transportation agencies were held according to the consultation procedures consistent with the requirements of all applicable regulations, including §93.105(a) and (e), to consider input assumptions and to review findings regarding transportation conformity. In compliance with 23 CFR 450, a 30-day public comment period and public meeting are scheduled to receive comments regarding the transportation conformity of the Plan and the TIPs under all governing NAAQS.
§93.113(b) §93.113(c)	Are TCMs being implemented in a timely manner?	There are currently no adopted TCMs in the SIPs.
§93.118	For areas with SIP Budgets: is the transportation plan, TIP, or project consistent with the established MVEB(s) in the applicable SIP?	Yes. Projects contained in the TIPs and the Plan result in fewer emissions than the established budgets for all applicable pollutants in each analysis year.
§93.122(a)(1)	Does the conformity analysis include all regionally significant projects?	Yes. The project sets for the Plan and the TIPs include all regionally significant projects.
§93.122(a)(6) §93.122(a)(7)	Are reasonable methods and factors used for the regional emissions analysis consistent with those used to establish the emissions budget in the applicable SIP?	Yes. The ambient temperatures and other factors used in the analysis, including the methods for off-network VMT and speed, have been reviewed by the TCICG and deemed reasonable.
§93.122(b)	Is there a network-based travel model of reasonable methods to estimate traffic speed and delays for the purpose of transportation-related emissions estimates?	Yes. DVRPC uses a network-based model that runs iteratively using the Evans algorithm to obtain convergence on input/output highway and transit travel speed. It is sensitive to travel time, costs, and other factors affecting travel choices.

Source: DVRPC, 2017.

CHAPTER 4: Stakeholder Participation

Interagency Consultation Group Meetings

DVRPC participated in a series of TCICG meetings and correspondence for this iteration of the transportation conformity demonstration of the Plan and the TIP. The TCICG met at the Pennsylvania Air Quality Working Group meeting on January 25, 2018 to assess the transportation conformity process, to advise on the timeline, and to determine the latest planning assumptions utilized. At this meeting, the TCICG determined that TIP and Plan project reviews and coding, as well as the review of the draft conformity documents, would be performed through sharing documents on the Pennsylvania Department of Transportation (PennDOT) Sharepoint site. DVRPC uploaded the *Connections 2045* Long-Range Plan and FY 2019 Pennsylvania TIP project sets and associated AQ codes. The TCICG reviewed these documents, and comments and responses were posted to the Sharepoint site. The conformity document was also posted to the Sharepoint site before it was released for public comment on May 10, 2018.

Additional consultation occurred regularly through email and phone correspondence between TCICG members throughout the conformity determination process. Final decisions on items of discussion were shared with the TCICG on the PennDOT Sharepoint site.

Represented federal, state, and local partners on the TCICG included US EPA Region III offices, FHWA PA Division Office, PA DEP, PennDOT, and SEPTA. The consultant firm of Michael Baker Jr., Inc., also participated in the TCICG process because of its extensive involvement and expertise in the transportation conformity processes in Pennsylvania.

Public Participation

DVRPC opened a mandated 30-day public comment period on May 10, 2018, to receive comments on the draft conformity findings. The announcement for the public comment period for the conformity determination of the Plan and the TIPs appeared in five major newspapers throughout the region during the week of May 7, 2018. Additionally, a media release was sent to local television, radio, and print media.

This draft conformity document was distributed to various libraries throughout the region and made available online at **www.dvrpc.org/airquality/conformity**. A public meeting/information session was held on May 24, 2018, at the DVRPC offices at 190 N. Independence Mall West, in Philadelphia. A webinar of the public information session was recorded and posted at **www.dvrpc.org**. The comment period closed on June 11, 2018, at 5:00 PM.

DVRPC accepted public comments on the Draft Conformity document online at **www.dvrpc.org/airquality/coformity**; by email at **airconformity@dvrpc.org**; by fax at (215) 592-9125; by mail at the address at the end of this document, Attention: TIP/Plan/Conformity Comments; and by submission of a written copy of oral comments made at the public meetings. The DVRPC Board is scheduled to adopt the Conformity findings on June 26, 2018.

No public comments were submitted on the Draft Conformity Document.

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CHAPTER 5: Conclusion

The DVRPC Plan and TIPs are found to be in conformity with the current Pennsylvania SIPs under the CAA. The forecasted emissions levels of VOCs, NO_x, and $PM_{2.5}$ do not exceed the respective budgets established by the states in accordance with the Final Rule under the current NAAQS governing applicable pollutants. The transportation conformity analysis meets all applicable conformity criteria, including, but not limited to, the following:

- that the Plan and the TIPs are fiscally constrained [40 CFR 93.108];
- that this determination is based on the latest planning assumptions [40 CFR 93.110];
- that this determination is based on the latest emissions estimation model available [40 CFR 93.111];
- that DVRPC has made the determination according to the applicable consultation procedures [40 CFR 93.112];
- that the Plan and the TIPs do not interfere with the timely implementation of TCMs [40 CFR 93.113]; and
- that the Plan and the TIPs are consistent with the MVEBs in the applicable SIPs [40 CFR 93.118].

These findings demonstrate transportation conformity of the DVRPC *Connections 2045* Long-Range Plan and FY 2019 TIP for Pennsylvania with the corresponding state SIPs and the Final Rule requirements under CAA, including:

- the 1997 and 2008 Eight-Hour Ozone NAAQS in the Philadelphia-Wilmington-Atlantic City Ozone Nonattainment Area;
- the 1997 Annual and 2006 24-Hour $PM_{2.5}$ NAAQS in the Philadelphia–Wilmington, PA–NJ–DE $PM_{2.5}$ Maintenance Areas; and
- the 2012 Annual $PM_{2.5}$ NAAQS in the Delaware County, PA, $PM_{2.5}$ Nonattainment Area.

Appendix A

Regionally Significant and Nonexempt Projects in the *Connections 2045* Long-Range Plan and FY 2019 TIP for Pennsylvania

FY 2019 Pennsylvania TIP Projects

MPMS Number	Project Title	AQ Analysis Code
Highway		
Bucks County		
12923	Bristol Road Extension	2035M
13549	US 1 (Bridges) Design (Section 03S)	2025M
93444	Route 1 Improvement–South (Section RC1)	2025M
93445	Route 1 Improvement–North (Section RC2)	2035M
110024	District-Wide Roundabout Program–Easton Road at New Britain Road/Sauerman Road	2025M
110309	I-95/US 13/PA 132 Slip Ramp Operation Improvement	2035M
Chester County		
14541	US 1, Baltimore Pike Widening	2025M
87781	US 30, Coatesville Downingtown Bypass (CER–Eastern Section)	2035M
93586	Downingtown Train Station Rehabilitation	2025M
102708	PA 41 at PA 841 Improvements	2025M
102709	PA 41 & SR 926 Improvements	2025M
107553	US 30 & Airport Road Interchange Improvement	2035M
110949	Roundabout Installation at Manor Road and Cedar Knoll/Reeceville Road	2025M
Delaware County		
15477	I-95/322/Conchester Highway. Interchange/Improvements.	2035M
57927	Lansdowne Avenue Corridor Safety Improvements	2025M
69817	US 322, Featherbed Lane to I-95 (Section 102)	2035M
79329	Bridgewater Road Extension	2035M
95429	US 202 and US 1 Loop Road	2025M
104821	I-476 Travel Management	2035M
107652	US 202/US 1 ITS Corridor	2020M
110951	Road Diet Macdade Boulevard Corridor from Fairview to Ashland	2025M
110965	Marshall Road Corridor Safety Improvements	2025M
111021	District-Wide Roundabout Program–Bethal Road at Mill Road	2025M
Montgomery County		
16334	PA 73: Church Road Intersection and Signal Improvements	2025M
16577	Ridge Pike, Butler Pike to Crescent Avenue Reconstruction and Signal Upgrade	2035M
48172	PA 23 Moore to Allendale and Trout Creek Road Bridge	2035M
48174	PA 63, Welsh Rd. Intersection Improvements	2035M
48175	Ridge Pike, PA Turnpike to Butler Pike	2025M
48186	Pottstown Area Signal System Upgrade	2020M
48187	Henderson/Gulph Road Widening Near I-76 Ramps	2035M
57858	Lafayette Street Extension (MG1)	2035M

Montgomery County		
63486	US 202: Johnson Highway to Township Line Road (61S)	2035M
63490	US 202: Township Line Road to Morris Road (61N)	2035M
63491	US 202: Morris Road to Swedesford Road (65S)	2035M
64795	Belmont Road/Rock Hill Road Widening: I-76 Ramps to Rock Hill Road	2035M
74816	Whitemarsh Street Improvements	2020M
77211	PA 309 Connector: Allentown Road to Souderton Pike	2035M
79864	Lafayette Street, Barbados Street to Ford Street Widening	2025M
102273	Second Collegeville Bridge Crossing	2035M
104280	First Avenue Road Diet	2020M
105803	PA 309 Connector: Souderton Pike to PA 309	2035M
106662	I-76 Integrated Corridor Management	2035M
110315	Philmont Avenue/Tomlinson Road/Pine Road Improvements - 6 Point Intersection	2035M
110961	District-Wide Roundabout Program–Old Skippack Road at Schwenksville Road	2025M
111005	Conshohocken Garage (I-76 ICM)	2035M
Philadelphia County		
17697	Island Avenue Signals	2025M
17821	I-95, Shackamaxon Street to Ann Street (GIR)	2035M
47811	Bridge Street Design (Section BSR)(IMP) SR:0095	2035M
47812	I-95: Betsy Ross Interchange (BRI)–Design (IMP)	2035M
47813	I-95: Ann Street to Wheatsheaf Lane (AFC)	2035M
57927	Castor Avenue Corridor Safety Improvements	2025M
57927	University Avenue and I-76 Off Ramp Intersection Safety Improvements	2025M
79685	I-95: Cottman-Princeton Main Line and Ramps (CP2)	2020M
79686	I-95: Columbia Avenue to Ann Street (GR1)	2025M
79826	I-95 Northbound: Columbia–Ann Street N (GR3)	2025M
79827	I-95 Southbound: Columbia–Ann Street N (GR4)	2035M
79828	I-95: Race-Shackamaxon (GR5)	2035M
79903	I-95: Betsy Ross Bridge Ramps Construction (BR0)	2025M
79905	I-95: Betsy Ross Mainline (BR3)	2035M
79910	I-95: Margaret to Kennedy (Section BS2)	2035M
79911	I-95: Allegheny Avenue Interchange Advance Contract (AFI)	2025M
79912	I-95: Allegheny Avenue and Castor Avenue Interchanges Connection (AF2)	2035M
80014	I-95: Utility Relocation & Surface Streets (CP3)	2025M
103555	I-95: Corridor ITS (GR8)	2035M
103557	I-95: Ann St–Wheatsheaf Lane (AF3)	2035M
103559	I-95: Betsy Ross Mainline SB (BR4)	2035M
103562	I-95: Betsy Ross / Adams Ave. Connector (BS4)	2025M
103563	I-95: Bridge Street Ramps (Section BS5)	2035M
105290	Ben Franklin Bridge Eastbound Operational Improvements	2035M
106991	5th Street Signal Improvements	2020M
106992	2nd Street Signal Improvements	2020M
106993	Frankford Avenue Signal Improvements	2020M
106994	Rising Sun Avenue Signal Improvements	2020M
106995	Castor Avenue Signal Improvements	2020M
107198	Safe Spaces for Cyclists: Building a Protected Bicycle Network	2020M
110958	Roundabout Installation at Castor Avenue & Wyoming Avenue	2025M

Transit		
60540	Parking Improvements	2035M
60574	Paoli Transportation Center	2035M
60636	Elwyn to Wawa Rail Restoration	2025M
60655	Levittown Station in Bucks County	2025M
73214	Ardmore Transportation Center	2035M
93586	Downingtown Train Station Rehabilitation	2025M
93588	Exton Station	2035M

Pennsylvania Long-Range Plan Projects

MRP ID	Project Name	AQ Analysis Code
Highway		
20	I-95 and I-476 Ramps	2045M
32	I-476 (PA Turnpike Northeast Extension) Widening	2035M
34	County Line Road Widening	2035M
35	I-95 at PA Turnpike Interconnection	2025M
36	I-95 at Scudders Falls Bridge Widening	2035M
37	US 1 Widening	2035M
40	I-76 (PA Turnpike) Widening	2045M
44	US 1 Baltimore Pike Widening	2025M
48	US 30 Widening Coatesville-Downingtown Bypass	2035M
50	US 322 Widening	2035M
52	I-476 Widening between Mid-County and Lansdale	2020M
54	Henderson Road and South Gulph Road Widening	2035M
55	Lafayette Street Extension	2025M
56	US 202 (Section 600) Widening	2035M
57	PA 309 Connector Road	2035M
65	I-95 North Reconstruction	2035M
66	North Delaware Avenue Extension	2025M
68	Adams Avenue Connector	2025M
96	US 422 Bridge and PA 23 Interchange (River Crossing)	2025M
98	US 422 Mainline Widening (River Crossing)	2045M
101	Bryn Mawr Avenue Extension	2045M
113	I-276 and Lafayette Street/Ridge Avenue Ramp Modifications	2035M
115	I-95/US 322/Highland Avenue Interchange Ramp Modifications	2045M
116	PA 113 Widening	2045M
Highway		
117	Bridgewater Road Extension	2035M
119	Bristol Road Extension	2035M
120	Belmont Ave at I-76 Interchange	2035M
123	US 202 and US 1 Loop Road	2025M
125	Guthriesville Loop Road	2045M
126	G.O. Carlson Boulevard Extension	2045M
130	I-476 Active Traffic Management	2035M
132	I-76 Integrated Corridor Management	2035M
137	US 30/Coatesville-Downingtown Bypass (Eastern)	2035M
158	All Electronic Tolling	2035M
160	Second Collegeville Bridge Crossing	2035M
161	PA 23 and Trout Creek Road Bridge	2035M
163	Ridge Pike Reconstruction	2035M

MRP ID	Project Name	AQ Analysis Code
Transit		
E	Paoli Station	2035M
P	Media-Elwyn Line Rail Extension	2025M
Q	Norristown High Speed Line–King of Prussia Extension	2045M
AF	AMTRAK Keystone Stations	2035M
AG	Exton Station	2035M
AH	Ardmore Station	2035M
AI	Fern Rock Station	2045M
AJ	Levittown Station	2025M
AL	69th Street Transportation Center	2035M
AO	Roosevelt Boulevard Enhanced Bus A	2035M
BS	Regional Rail Parking Expansion	2035M
CB	Noble Station	2035M
CF	Franklin Square Station	2025M

Note: AQ Codes for Long-Range Plan projects indicate when the project is expected to be complete. Phases of these projects are often programmed in the TIP as breakout projects. These phases are analyzed for conformity when the breakout project is expected to open to traffic.

Transportation Conformity Demonstration: *Connections 2045* Long-Range Plan and FY 2019 Pennsylvania TIP

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Geographic Area Covered:

The nine-county DVRPC planning area, which covers the counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania.

Key Words:

Transportation Conformity, Air Quality, National Ambient Air Quality Standards, Ozone, Volatile Organic Compounds (VOCs), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Fine Particulate Matter ($PM_{2.5}$), Nonattainment Area, Maintenance Area, Multijurisdictional Nonattainment Area, *Connections 2045* Long-Range Plan, Transportation Improvement Program (TIP), State Implementation Plan (SIP).

Abstract:

The Delaware Valley Regional Planning Commission (DVRPC) demonstrates transportation conformity of its *Connections 2045* Long-Range Plan and Fiscal Year 2019 Pennsylvania Transportation Improvement Program (TIP). A transportation conformity demonstration is required at least once every four years or when an MPO: (1) adopts a new Plan or TIP; or (2) amends, adds, or deletes a regionally significant, nonexempt project in a Plan or TIP. This conformity finding of the DVRPC Plan and TIPs shows that they meet the National Ambient Air Quality Standards requirements governing ozone and fine particulate matter. This conformity finding reflects all amendments to the Plan and TIP through May 2018.

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