Lehigh Valley Transportation Study

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LVTS JOINT TECHNICAL & COORDINATING COMMITTEE SPECIAL MEETING
Wednesday, April 30, 2025, at 9:00 am
DRAFT Virtual Meeting Agenda

Roll Call

Courtesy of the Floor

Minutes

Old Business

1. *INFORMATION/ACTION ITEM*: 2025-2028 Transportation Improvement Program (TIP) Amendment Riverside Drive RAISE Grant
    a. INFORMATION ITEM: Public Comment Period Review (HM)
    b. ACTION ITEM: LVTS Re-Adoption of the Air Quality Conformity Report (BB)
    c. ACTION ITEM: LVTS Adoption of the Air Quality Conformity Resolution (BB)
    d. ACTION ITEM: LVTS Re-Adoption of the 2025-2028 TIP Amendment (BB/JR)

Adjournment

Next LVTS Meetings & Workshops

LVTS Technical Committee Meeting
May 21, 2025, at 9:00 am **Virtual**

LVTS Technical Committee Transportation Alternatives Set Aside Workshop #2
May 21, 2025, at 10:30 am **In-Person**

LVTS Joint Technical and Coordinating Committee Meeting
June 18, 2025, at 9:00 am **Virtual**

LVTS Technical Committee Carbon Reduction Program Workshop #1
June 25, 2025, at 9:00 am **In-Person**

LVTS Technical Committee Carbon Reduction Program Workshop #2
July 16, 2025, at 10:30 am **In-Person**

Meetings will be held virtually, and workshops will be in-person.
Meeting participation information can be found here:
https://www.lvpc.org/transportation-committees.html

The LVPC/LVTS website, www.lvpc.org, may be translated into multiple languages. Publications and other public documents can be made available in non-English languages and alternative formats, if requested.

Riverside Drive Public Comments - January 29, 2025 to February 28, 2025					
#	Date	Name	Muni/Org	Comment	Response
1	29-Jan	Craig Beavers	Palmer Township	I am in full support of the proposed Transportation Improvement Program Amendment for the Riverside Drive Multimodal Revitalization Corridor. This project will positively impact the residents of the City of Allentown, Whitehall Township, and thousands within the Lehigh Valley who travel through this area. Not only will this provide positive vehicular circulation improvements, but it also provides critical connections to our commuter trail network for pedestrians and bicyclists. The project benefits disadvantaged communities and helps promote equitable access to important destinations for employment, education, retail, and recreation. This will implement many key goals and policies of FutureLV: The Regional Plan, Allentown Vision 2030, the 2005 Whitehall Township Comprehensive Plan, and several other critical planning documents.	Thank you for your comment and support of this important regional project.
2	19-Feb	Liz Rosencrans	Delaware and Lehigh National Heritage Corridor	I would like to express concern that the design presented in the amendment shows a trail width of 10 feet. The Delaware and Lehigh National Heritage Corridor would like to advocate for a 12-foot width for the trail section, as previously discussed at public meetings.	The design of the project is still in the planning stage. The Lehigh Valley Transportation Study acknowledges this concern and will plan for futher design coordination with the Delaware and Lehigh National Heritage Corridor.
3	19-Feb	Scott Slingerland	Coalition for Appropriate Transportation	Could you clarify when the second public meeting will be held?	The second public meeting for the Riverside Drive RAISE Grant Amendment will be held during the Lehigh Valley Planning Ccommission's Transportation Committee meeting on Feburary 26 at 5:30 pm.
4	19-Feb	Rick Molchany	Lehigh County	To clarify, the funding for this project is an addition to the regional transportation allocation, and not a reallocation of regional funds, is that correct?	That is correct. This project is new funding that was not available to the region outside of a nationally competitive grant programs.

Air Quality Conformity Analysis Report

Lehigh Valley MPO 2025-2028 Transportation Improvement Program (TIP) Amendment and 2050 Long Range Transportation Plan (LRTP)

National Ambient Air Quality Standards (NAAQS) Addressed:

- 2008 8-Hour Ozone (Nonattainment)
- 2006 24-Hour $PM_{2.5}$ (Maintenance)

Prepared by:

The Lehigh Valley Planning Commission and
Pennsylvania Department of Transportation
for the
Lehigh Valley Transportation Study

Report Date: November 2024

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Attachment B: Detailed Emission Results
Attachment C: Sample MOVES Input Files

Overview

This report provides an analysis of the air quality implications of the Lehigh Valley Transportation Study (LVTS) MPO 2025-2028 Transportation Improvement Program (TIP) and 2050 Long Range Transportation Plan (LRTP). The analysis demonstrates transportation conformity under the 2008 8-hour ozone National Ambient Air Quality Standards (NAAQS) and the 2006 24-hour $PM_{2.5}$ NAAQS. The air quality conformity analysis reflects an assessment of the regionally significant, non-exempt transportation projects included in both the TIP and LRTP. The 2025 TIP has been amended to include the Riverside Drive Raise Grant project. Note that conformity for the LRTP is being reaffirmed as there are no changes to the LRTP from the previous conformity determination.

This document replaces the previously approved conformity demonstration of the TIP and LRTP and ensures that the findings meet all current criteria established by the U.S. Environmental Protection Agency (EPA) for the applicable NAAQS. A new conformity determination has been completed to provide a regional forecast of emissions based on planned air quality significant projects in the updated TIP and the latest available planning assumptions. All air quality significant projects for the LRTP remain the same as previous conformity determinations. The TIP and LRTP projects are listed in **Attachment A**.

Background on Transportation Conformity

Transportation conformity is a way to ensure that federal funding and approval are awarded to transportation activities that are consistent with air quality goals. Under the Clean Air Act (CAA), transportation and air quality modeling procedures must be coordinated to ensure that the TIP and the LRTP are consistent with the area's applicable State Implementation Plan (SIP). The SIP is a federally approved and enforceable plan by which each area identifies how it will attain and/or maintain the health-related primary and welfare-related secondary NAAQS.

In order to receive transportation funding and approvals from the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), state and local transportation agencies must demonstrate that the plans, programs, or projects meet the transportation conformity requirements of the CAA as set forth in the transportation conformity rule. Under the transportation conformity rule, transportation plans are expected to conform to the applicable SIP in nonattainment or maintenance areas. The integration of transportation and air quality planning is intended to ensure that transportation plans, programs, and projects will not:

- Cause or contribute to any new violation of any applicable NAAQS.
- Increase the frequency or severity of any existing violation of any applicable NAAQS.
- Delay timely attainment of any applicable NAAQS, any required interim emissions reductions, or other NAAQS milestones.

The transportation conformity determination includes an assessment of future highway emissions for defined analysis years, including the end year of the LRTP. Emissions are estimated using the latest available planning assumptions and available analytical tools, including EPA's latest approved on-highway mobile sources emissions model, the Motor Vehicle Emission Simulator

(MOVES). The conformity determination provides a tabulation of the analysis results for applicable precursor pollutants, showing that the required conformity test was met for each analysis year.

Report Contents

This document includes a summary of the methodology and data assumptions used for the conformity analysis. As shown in **Exhibit 1**, attachments containing additional detail have been provided with the document. In addition, modeling input and output files have been reviewed by the Environmental Protection Agency (EPA) Region III and the Pennsylvania Department of Environmental Protection (DEP).

EXHIBIT 1: SUMMARY OF ATTACHMENTS

Attachment	Title	Description
A	Project List	Provides a list of regionally significant highway projects for the TIP and LRTP.
B	Detailed Emission Results	Provides a detailed summary of emissions by roadway type.
C	MOVES Sample Run Specification	Provides example MOVES data importer (XML) and run specification (MRS) files.

National Ambient Air Quality Standard Designations

The CAA requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. A nonattainment area is any area that does not meet the primary or secondary NAAQS. Once a nonattainment area meets the standards and additional redesignation requirements in the CAA [Section 107(d)(3)(E)], EPA will designate the area as a maintenance area.

The Lehigh Valley MPO area (includes Lehigh and Northampton counties) is currently designated as a marginal nonattainment area under the 2008 8-hour ozone NAAQS and a maintenance area under the 2006 24-hour $PM_{2.5}$ NAAQS. The region is attaining the current 2012 annual $PM_{2.5}$ NAAQS. Transportation conformity requires nonattainment and maintenance areas to demonstrate that all future transportation projects will not prevent an area from reaching its air quality attainment goals.

Fine Particulate Matter

Fine particulate matter (PM2.5) can be emitted directly into the atmosphere (sources include exhaust and dust from brake and tire wear) or formed in the atmosphere by combinations of precursor pollutants (secondary formation). Sulfates and nitrates are two types of pollutants that contribute to secondary formation. Sulfate emissions are a result of power plant and industry emissions, while nitrate emissions result from automobiles, power plants, and other combustion sources. Scientific studies have shown a significant correlation between exposure to fine particulates and severe health issues such as heart disease, lung disease, and premature death.

The pollutants that could be analyzed in the conformity analysis are: [1] direct PM2.5 emissions (tail pipe emissions, brake and tire wear), [2] re-entrained road dust, and [3] precursors nitrogen oxides (NOX), volatile organic compounds (VOC), sulfur oxides (SOX) and ammonia (NH3). The EPA has ruled that until the EPA or DEP find that other precursor pollutants are significant contributors, and a SIP revision is approved stating such findings, direct PM2.5 emissions and NOX are the only pollutants that must be analyzed for transportation conformity (40 CFR 93.119(f)(8)–(10)).

1997 Annual PM2.5 and 2006 24-hour PM2.5 Standards

The EPA published the 1997 annual PM2.5 NAAQS on July 18, 1997, (62 FR 38652), with an effective date of September 16, 1997. An area is in nonattainment of this standard if the 3-year average of the annual mean PM2.5 concentrations (for designated monitoring sites within an area) exceed 15.0 micrograms per cubic meter (µg/m3). Berks County was designated as a nonattainment area under the 1997 annual PM2.5 NAAQS, effective April 5, 2005 (70 FR 944).

The EPA published the 2006 24-hour PM2.5 NAAQS on October 17, 2006, (71 FR 61144), with an effective date of December 18, 2006. The rulemaking strengthened the 1997 24-hour standard of 65 µg/m3 (62 FR 38652) to 35 µg/m3 and retained the 1997 annual PM2.5 NAAQS of 15 µg/m3. An area is in nonattainment of the 2006 24-hour PM2.5 NAAQS if the 98th percentile of the annual 24-hour concentrations, averaged over three years, is greater than 35 µg/m3. Berks County was designated as attainment under the 2006 24-hour PM2.5 NAAQS, effective December 14, 2009 (74 FR 58688).

A redesignation request and maintenance plan applicable to the 1997 annual PM2.5 NAAQS was approved by EPA and effective December 22, 2014 (79 FR 76251). The maintenance plan includes 2017 and 2025 PM2.5 and NOX mobile vehicle emission budgets (MVEBs) for transportation conformity purposes.

EPA took final action on the "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements" rule on August 24, 2016 (81 FR 58010 effective on October 24, 2016). In that rulemaking, EPA finalized the option that revokes the 1997 primary annual PM2.5 NAAQS in areas that have always been designated as attainment and in maintenance of that NAAQS. After revocation, areas no longer have to expend resources on CAA air quality planning and conformity determination requirements associated with the 1997 annual PM2.5 NAAQS.

2012 Annual PM2.5 Standard

The EPA published the 2012 annual PM2.5 NAAQS on January 15, 2013, (78 FR 3086), with an effective date of March 18, 2013. The EPA revised the annual PM2.5 NAAQS by strengthening the standard from 15 µg/m3 to 12 µg/m3. An area is in nonattainment of this standard if the 3-year average of the annual mean PM2.5 concentrations for designated monitoring sites in an area is greater than 12.0 µg/m3. On December 18, 2014, EPA issued final designations for the standard that were revised on April 7, 2015 (80 FR 18535). Berks County is designated in attainment of the standard.

2024 Annual PM2.5 Standard

On February 7, 2024, EPA strengthened the annual PM2.5 standard at 9.0 µg/m3 to provide increased public health protection, consistent with the available health science. The nonattainment areas have not been designated yet for this new standard.

Ozone

Ozone is formed by chemical reactions occurring under specific atmospheric conditions. Precursor pollutants that contribute to the formation of ozone include VOC and NO_X, both of which are components of vehicle exhaust. VOCs may also be produced through the evaporation of vehicle fuel, as well as by displacement of vapors in the gas tank during refueling. By controlling VOC and NO_X emissions, ozone formation can be mitigated.

2008 8-hour Ozone NAAQS

The EPA published the 2008 8-hour ozone NAAQS on March 27, 2008, (73 FR 16436), with an effective date of May 27, 2008. EPA revised the ozone NAAQS by strengthening the standard to 0.075 ppm. Thus, an area is in nonattainment of the 2008 8-hour ozone NAAQS if the 3-year average of the individual fourth highest air quality monitor readings, averaged over 8 hours throughout the day, exceeds the NAAQS of 0.075 ppm. The Lehigh Valley MPO area was designated as a nonattainment area under the 2008 8-hour ozone NAAQS, effective July 20, 2012 (77 FR 30088). The nonattainment area also includes Carbon County, which demonstrates conformity separately. Effective June 3, 2016, EPA determined that the Lehigh Valley MPO area has attained the 2008 ozone NAAQS by the applicable attainment date. This determination of attainment does not constitute a redesignation to attainment. Redesignations require states to meet a number of additional statutory criteria, including the EPA approval of a state plan demonstrating maintenance of the air quality standard for 10 years after redesignation.

2015 8-hour Ozone NAAQS

In 2015, based on its review of the air quality criteria for ozone and related photochemical oxidants, the EPA revised the primary and secondary NAAQS for ozone to provide requisite protection of public health and welfare, respectively (80 FR 65292). The EPA revised the levels of both standards to 0.070 ppm, and retained their indicators, forms (fourth-highest daily maximum, averaged across three consecutive years) and averaging times (eight hours). On October 16, 2018 (83 FR 52163), EPA established designations to include Lehigh and Northampton Counties as attainment for the 2015 8-hour ozone NAAQS. However, a conformity determination is required as long as 2008 8-hour ozone standard is not revoked by EPA.

Interagency Consultation

As required by the federal transportation conformity rule, the conformity process includes a significant level of cooperative interaction among federal, state, and local agencies. For this air quality conformity analysis, interagency consultation was conducted as required by the Pennsylvania Conformity SIP. This included conference call(s) or meeting(s) of the Pennsylvania Transportation-Air Quality Work Group (including the Pennsylvania Department of Transportation (PennDOT), DEP, EPA, FHWA, FTA and representatives from larger MPOs within the state). A meeting was conducted on February 7, 2024 to review all planning assumptions and to discuss the template and content for transportation conformity analyses.

Analysis Methodology and Data

This transportation conformity analysis was conducted using EPA's MOVES model, which is the official model for estimating emissions from highway vehicles for SIP emission inventories and transportation conformity (75 FR 9411. MOVES3 has been used for this conformity determination and is (in addition to MOVES4) currently considered one of the latest approved model versions for SIP and transportation conformity purposes (88 FR 32167). After September 12, 2025, MOVES4 must be used for conformity determinations.

Planning assumptions are updated following EPA and FHWA joint guidance (EPA420-B-08-901) that clarifies the implementation of the latest planning assumption requirements in 40 CFR 93.110. This analysis utilizes the best available latest traffic, vehicle fleet and environmental data to estimate regional highway emissions.

PennDOT updates many of the key planning assumptions on a triennial basis to support EPA's National Emissions Inventory (NEI) and FHWA's latest planning assumption requirements for transportation conformity. The PennDOT triennial data update is typically used to inform the planning assumptions for the future analysis years used for transportation conformity.

Due to the impacts that COVID has had on the vehicle fleet turnover, PennDOT, in coordination with the Pennsylvania Air Quality Workgroup, has determined that the estimates of the vehicle fleet age for the most recent available data (2020-2022) may not be reflective of future conditions

or longer term trends. Thus, the vehicle age assumption relied on previous planning assumptions used for past conformity analyses.

All other data assumptions for the conformity analysis relied on the latest available planning assumptions or national/local defaults consistent with methods used for past conformity analyses and EPA's technical guidance. This includes information and characteristics related to fuels, inspection maintenance (I/M) program parameters, heavy-truck long duration idling, and environmental data (e.g. temperatures and humidity).

The analysis methodology and data inputs for this analysis were developed through interagency consultation and used available EPA guidance documents that included:

- Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, and Other Purposes, US EPA Office of Transportation and Air Quality, EPA-420-B-20-044, November 2020.

- MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity. US EPA Office of Transportation and Air Quality, EPA-420-B-20-052, November 2020.

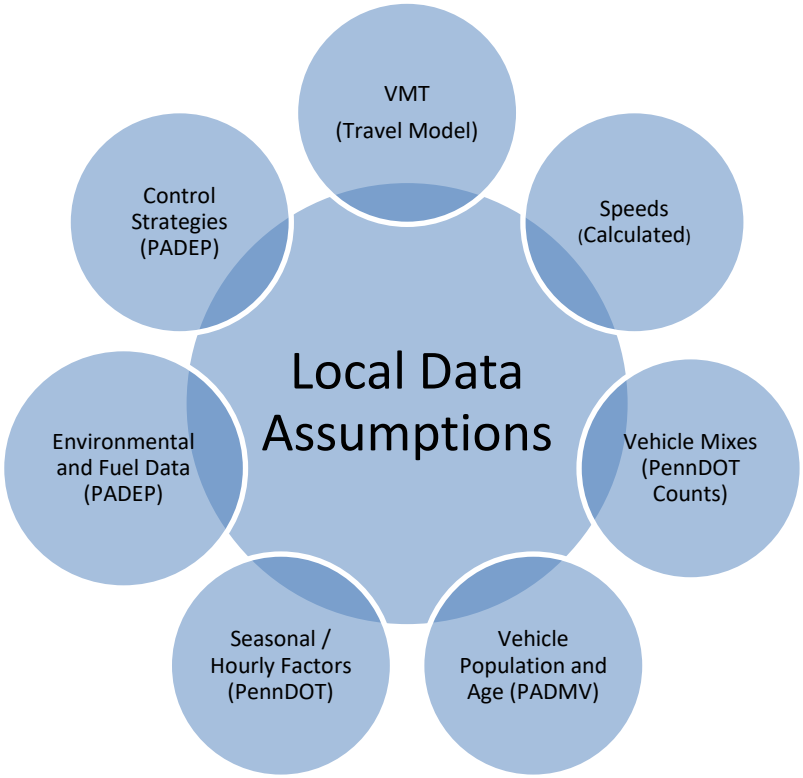
A mix of local and national default (internal to MOVES) data are used in the analysis. As illustrated in **Exhibit 2**, local data has been used for data items that have a significant impact on emissions, including: vehicle miles of travel (VMT), vehicle population, congested speeds, and vehicle type mix, as well as environmental and fuel assumptions. Local data inputs to the analysis process reflect the latest available planning assumptions using information obtained from PennDOT, DEP and other local/national sources.

The methodology used for this analysis is consistent with the methodology used to develop SIP inventories. This includes the use of custom post-processing software (PPSUITE) to calculate hourly speeds and prepare key traffic input files to the MOVES emission model.

PPSUITE consists of a set of programs that perform the following functions:

- Analyzes highway operating conditions.
- Calculates highway speeds.
- Compiles VMT and vehicle type mix data.
- Prepares MOVES runs and processes MOVES outputs.

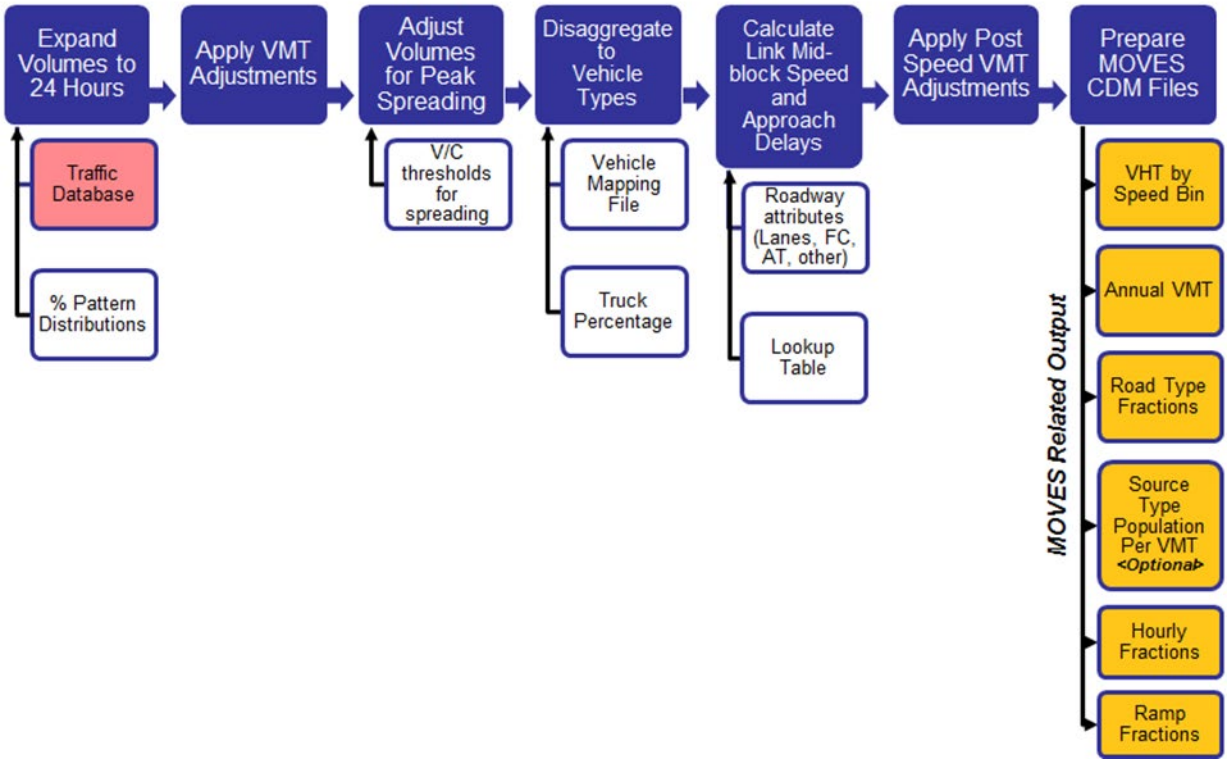
EXHIBIT 2: LOCAL DATA INPUTS USED FOR CONFORMITY RUNS



PPSUITE is a widely used and accepted tool for estimating speeds and processing emissions rates. The PPSUITE tool has been used for developing on-highway mobile source inventories in SIP revisions, control strategy analyses, and conformity analyses in other states. The software was developed to utilize accepted transportation engineering methodologies. The PPSUITE process is integral to producing traffic-related input files to the MOVES emission model. **Exhibit 3** summarizes the key functions of PPSUITE within the emission calculation process. Other MOVES input files are prepared externally to the PPSUITE software, including vehicle population, vehicle age, environmental and fuel input files.

The CENTRAL software is also used in this analysis. CENTRAL is a menu-driven software platform that executes the PPSUITE and MOVES processes in batch mode. The CENTRAL software allows users to execute runs for a variety of input options and integrates custom SQL steps into the process. CENTRAL provides important quality control and assurance steps, including file naming and storage automation.

EXHIBIT 3: EMISSION CALCULATION PROCESS



Key MOVES Input Data

A large number of inputs to MOVES are needed to fully account for the numerous vehicle and environmental parameters that affect emissions. These inputs include traffic flow characteristics, vehicle descriptions, fuel parameters, I/M program parameters and environmental variables. MOVES includes a default national database of meteorology, vehicle fleet, vehicle activity, fuel and emission control program data for every county; EPA, however, cannot certify that the default data is the most current or best available information for any specific area. As a result, local data, where available, is recommended for use when conducting a regional conformity analysis. A mix of local and default data is used for this analysis. These data items are discussed in the following sections.

Travel Demand Model

The roadway data input to emissions calculations for this conformity analysis is based on information from the region's travel demand forecasting model. The travel demand model estimates roadway volumes based on input demographic forecasts and expected changes to the transportation roadway network.

The regional travel demand model follows the basic "four-step" travel demand forecasting process and utilizes the Cube Voyager (TP+) software platform. The model consists of 510 Traffic

Analysis Zones (TAZ's), approximately 9,000 links, and approximately 5,200 nodes. The network contains attributes such as distance, number of lanes, area type, facility type, free flow speed, capacity of the lane, and location of traffic signals.

The model was updated in December of 2023. This update includes preparation of a new socio-economic dataset developed using the Census 2020 data, updates to the external share model and through trip table, updates to trip generation rates, and revisions to model parameters and coefficients to reflect 2022 traffic patterns and conditions. The project team decided to utilize year 2022 traffic conditions due to the significant impact of COVID19 on 2020 traffic patterns. Using the projected traffic volume data from the model, conditions were evaluated for all applicable future analysis years. All significant air quality projects from the TIP and LRTP were coded into the travel demand model. Transit data was also generated as part of the travel demand model. Existing fixed transit routes and their associated attributes (i.e., stops, headways, fares, speeds) are included within a transit subroutine. Ridership estimates generated by this subroutine are fed back into the model stream as part of the overall network processing.

Traffic forecasts were projected based on the socioeconomic and land use data projections developed and adopted by the Lehigh Valley Planning Commission. This data includes total population, households, and employment. **Exhibit 4** summarizes the socioeconomic data for the base year and horizon years of the LRTP. Socioeconomic data for other analysis years were forecasted using interpolation.

EXHIBIT 4: SOCIOECONOMIC GROWTH ASSUMPTIONS TO THE TRAVEL MODEL

County	Year	Population	Household	Total Employment
Lehigh Valley	2025	702,202	277,082	402,086
	2030	719,113	283,771	413,159
	2035	736,023	290,460	424,233
	2045	769,844	303,838	446,380
	2050	786,755	310,527	457,453

The travel model network and assigned traffic volumes are processed by PPSUITE to prepare the traffic inputs needed to run the MOVES emission model. The following information is extracted from the model for emission calculations:

- Lanes
- Roadway capacity
- Distance
- Daily traffic volume
- Type of area abutting the roadway (e.g., urban, suburban, rural, etc.)
- Type of roadway facility (e.g., interstate, arterial, collector, local, etc.)

Other Supporting Traffic Data

Other traffic data is used to adjust and disaggregate traffic volumes. Key sources used in these processes include the following:

- *Highway Performance Monitoring System (HPMS VMT)*: According to EPA guidance, baseline inventory VMT computed from the regional travel model must be adjusted to be consistent with HPMS VMT totals. The VMT contained in the HPMS reports are considered to represent average annual daily traffic (AADT), an average of all days in the year, including weekends and holidays. Adjustment factors are calculated and used to adjust locally modeled roadway data VMT to be consistent with the reported HPMS totals and are applied to all county and facility group combinations within the region. These adjustments are important to account for local roadway VMT not represented within the regional travel demand model.

- *Seasonal Factors*: The traffic volumes estimated from the regional travel demand model are adjusted to summer or average monthly conditions (as needed for annual processing), using seasonal adjustment factors prepared by PennDOT's BPR in their annual traffic data report published on the BPR website (https://www.penndot.pa.gov/ProjectAndPrograms/Planning/TrafficInformation/Pages/default.aspx). The seasonal factors are also used to develop MOVES daily and monthly VMT fraction files, allowing MOVES to determine the portion of annual VMT that occurs in each month of the year.

- *Hourly Patterns*: Speeds and emissions vary considerably depending on the time of day. In order to produce accurate emission estimates, it is important to estimate the pattern by which roadway volume varies by breaking the data down into hourly increments. Pattern data is in the form of a percentage of the daily volumes for each hour. Distributions are provided for all the counties within the region and by each facility type grouping. The hourly pattern data has been developed from 24-hour vehicle count data compiled by PennDOT's BPR, using the process identified in PennDOT's annual traffic data report. The same factors are also used to develop the MOVES hourly fraction file.

Vehicle Class

MOVES produces emission rates for thirteen MOVES vehicle source input types. VMT, however, is input to MOVES by six HPMS vehicle groups (note that passenger cars and light trucks are grouped for input to MOVES3.1). **Exhibit 5** summarizes the distinction between each classification scheme.

EXHIBIT 5: MOVES SOURCE TYPES AND HPMS VEHICLE GROUPS

SOURCE TYPES		HPMS Class Groups	
11	Motorcycle	10	Motorcycle
21	Passenger Car	25	Passenger Car
31	Passenger Truck	25	Passenger/Light Truck
32	Light Commercial Truck	40	Buses
41	Other Buses	50	Single Unit Trucks
42	Transit Bus	60	Combination Trucks
43	School bus		
51	Refuse Truck		
52	Single Unit Short-haul Truck		
53	Single Unit Long-haul Truck		
54	Motor Home		
61	Combination Short-haul Truck		
62	Combination Long-haul Truck		

The emissions estimation process includes a method to disaggregate the traffic volumes to the thirteen source types and then to recombine the estimates to the five HPMS vehicle classes. Vehicle type pattern data is used by PPSUITE to distribute the hourly roadway segment volumes among the thirteen MOVES source types. Similar to the 24-hour pattern data, this data contains percentage splits to each source type for every hour of the day. The vehicle type pattern data is developed from several sources of information:

- PennDOT truck percentages from the RMS database.
- Hourly distributions for trucks and total traffic compiled by PennDOT's BPR.
- School bus registration data from PennDOT's Bureau of Motor Vehicles Registration Database.

Vehicle type percentages are also input into the capacity analysis section of PPSUITE to adjust the speeds in response to truck volume. Larger trucks take up more roadway space compared to an equal number of cars and light trucks, which is accounted for in the speed estimation process by adjusting capacity using information from the Transportation Research Board's fifth edition of the *Highway Capacity Manual* (http://hcm.trb.org/).

Vehicle Ages

Vehicle age distributions are input to MOVES for each of the thirteen source types. These distributions reflect the percentage of the vehicle fleet falling under each vehicle model year (MY), to a maximum age of 31 years. The vehicle age distributions were prepared from the most recently available registration download from PennDOT's Bureau of Motor Vehicles Registration Database. Due to data limitations, information for light duty vehicles, other buses and motor home (including source types 11, 21, 31, 32, 41 and 54) was used as local data for MOVES inputs, while heavy-duty vehicles (including source types 42, 43, 51, 52, 53, 61, and 62) used the internal MOVES national default age distribution data. The registration data download is based on MOBILE6.2 vehicle categories. The data was converted to source types using the EPA convertor spreadsheets provided with the MOVES emission model.

Vehicle Population

The vehicle population information, including the number and age of vehicles, impacts forecasted start and evaporative emissions within MOVES. Similar to vehicle ages, MOVES requires vehicle populations for each of the thirteen source type categories. County vehicle registration data was used to estimate vehicle population for light-duty vehicles, transit buses, and school buses. Other heavy-duty vehicle population values were based on VMT for each source type using the vehicle mix and pattern data discussed previously. PPSUITE automatically applies MOVES default ratios of VMT and source type population (e.g., the number of miles per vehicle by source type) to the local VMT estimates to produce vehicle population.

For the preparation of source type population for other required conformity analysis years, base values were adjusted using forecast population and household data for the area. Growth rates were limited so as to not exceed the Lehigh Valley VMT growth assumptions.

Meteorology Data

Average monthly minimum temperatures, maximum temperatures, and humidity values are consistent with the regional State Implementation Plan (SIP) modeling conducted by DEP. The data was obtained from AccuWeather, Inc. (www.accuweather.com). The 10-year (2010-2020) average minimum and maximum monthly temperature and relative humidity values were obtained for each of the 10 airport locations in Pennsylvania.

Fuel Parameters

The MOVES3 default data assumptions have been reviewed and determined adequate to be used as inputs to the MOVES emissions modeling. Key assumptions include:

- 10.0 RVP used for summer months.
- 100% market share of 10% ethanol throughout the year for analysis years 2025, 2035 and 2045 (based on MOVES3 defaults).

I/M Program Parameters

The inspection maintenance (I/M) program inputs to the MOVES model are based on current programs within each county (all PA I/M programs are based on county boundaries). All analysis years include Pennsylvania's statewide I/M program. The default I/M program parameters included in MOVES were examined for each county and necessary changes were made to the default parameters to match the 2021 I/M program performance.

In order to assure that emission controls are working properly, vehicle inspection and maintenance (I/M) programs have been adopted in some nonattainment areas. These programs have the added benefit of improving the fuel efficiency of vehicles. The Pennsylvania inspection and maintenance (I/M) program was upgraded and expanded throughout the state with a phase-in period starting in September 2003 and fully implemented by June 2004.

The I/M program requirements vary by region (five regions) and include on-board diagnostics (OBD) technology that uses the vehicle's computer for model years 1996 and newer to identify potential engine and exhaust system problems that could affect emissions. The program, named PAOBDII, is implemented by region as follows:

- Philadelphia Region - Bucks, Chester, Delaware, Montgomery and Philadelphia Counties
- [Includes tailpipe exhaust testing using ASM2015 or equipment for pre-1996 vehicles up to 25 years old]
- Pittsburgh Region - Allegheny, Beaver, Washington and Westmoreland Counties.
- [Includes tailpipe exhaust testing using PA 97 equipment for pre-1996 vehicles up to 25 years old]
- South Central and Lehigh Valley Region - Berks, Cumberland, Dauphin, Lancaster, Lebanon, Lehigh, Northampton and York Counties.
- [Includes gas cap and visual inspection only for 1975 through 1995 model years]
- North Region - Blair, Cambria, Centre, Erie, Lackawanna, Luzerne, Lycoming, and Mercer Counties.
- [Gas cap and visual inspection only – No OBD]
- Other 42 Counties – Includes the remaining 42 counties not included above.
- [Visual inspection only – No OBD]

Other Vehicle Technology and Control Strategy Data

<u>Federal Programs</u>

Current federal vehicle emissions control and fuel programs are incorporated into the MOVES3 software. The MOVES3 model includes the National Program standards covering light duty vehicles through model year 2026, heavy duty greenhouse gas standards for model year 2014-2018 vehicles, and the Tier 3 vehicle standards. Modifications of default emission rates are required to reflect the early implementation of the National Low Emission Vehicle (NLEV) program in Pennsylvania. To reflect these impacts, EPA has released instructions and input files that can

be used to model these impacts. The NLEV input database was created for Pennsylvania per EPA's instructions and was used for this inventory.

MOVES3 also incorporates the following new federal emission standard rules:

- Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2 (HD GHG2) Rule: MOVES3 accounts for the HD GHG2 rule published in 2016. The rule set stricter fuel economy standards for HD vehicles which reduce CO2 emissions, but also impact other pollutants through changes in glider sales, hoteling activity, vehicle mass and road load coefficients.
- Safe Affordable Fuel Efficient (SAFE) Vehicles Rule: MOVES3 also accounts for the March 2020 SAFE standards for light-duty vehicles. These standards were less stringent than the preceding fuel economy standards, and thus increased fuel consumption and CO2 emissions.

State Programs

The Pennsylvania Clean Vehicles (PCV) Program, adopted in 1998, incorporated the California Low Emission Vehicle Regulations (CA LEV) by reference. The PCV Program allowed automakers to comply with the NLEV program as an alternative to this Pennsylvania program until MY2006. Beginning with MY2008, all "new" passenger cars and light-duty trucks with a gross vehicle weight rating (GVWR) of 8,500 pounds or less sold/leased and titled in Pennsylvania must be certified by the California Air Resources Board (CARB) or be certified for sale in all 50 states. For this program, a "new" vehicle is a qualified vehicle with an odometer reading less than 7,500 miles. DEP and PennDOT both work with the public, including manufacturers, vehicle dealers and consumers, to ensure that vehicles sold and purchased in Pennsylvania or vehicles purchased from other states by Pennsylvania residents comply with the requirements of the PCV Program, in order to be titled in Pennsylvania. Additionally, PennDOT ensures that paperwork for title and registration includes proof of CARB- or 50-state emission certification or that the vehicle owner qualifies for an exemption to the requirements, as listed on PennDOT's MV-9 form and in the PCV Program regulation. When necessary, information from PennDOT's title and registration process may be used to audit vehicle title transactions to determine program compliance.

The impacts of this program are modeled for all analysis years beyond 2008 using the same instructions and tools downloaded for the early NLEV analysis. EPA provided input files to reflect state programs similar to the CAL LEV program. Modifications to those files were made to reflect a 2008 program start date for Pennsylvania.

Analysis Process Details

The previous sections have summarized the input data used for computing speeds and emission rates for this conformity analysis. This section explains how PPSUITE and MOVES use that input data to produce emission estimates. **Exhibit 6** provides a more detailed overview of the PPSUITE analysis procedure using the available traffic data information described in the previous sections.

VMT Preparation

Producing an emissions inventory with PPSUITE requires a process of disaggregation and aggregation. Data is available and used on a very detailed scale – individual roadway segments for each of the 24 hours of the day. This data needs to be processed individually to determine the distribution of vehicle hours of travel (VHT) by speed and then aggregated by vehicle class to determine the input VMT to the MOVES emission model. Key steps in the preparation of VMT include:

- *Assemble VMT* - The regional travel demand model contains the roadway segments, distances and travel volumes needed to estimate VMT. PPSUITE processes each segment by simply multiplying the assigned travel volume by the distance to obtain VMT.
- *Apply Seasonal Adjustments* – PPSUITE adjusts the traffic volumes to the appropriate analysis season. These traffic volumes are assembled by PPSUITE and extrapolated over the course of a year to produce the annual VMT file input to MOVES.
- *Disaggregate to Hours* - After seasonal adjustments are applied, the traffic volumes are distributed to each hour of the day. This allows for more accurate speed calculations (effects of congested hours) and allows PPSUITE to prepare the hourly VMT and speeds for input to MOVES.
- *Peak Spreading* - After distributing the daily volumes to each hour of the day, PPSUITE identifies hours that are unreasonably congested. For those hours, PPSUITE then spreads a portion of the volume to other hours within the same peak period, thereby approximating the "peak spreading" that normally occurs in such over-capacity conditions. This process also helps prevent hours with unreasonably congested speeds from disproportionately impacting emission calculations.
- *Disaggregation to Vehicle Types* - EPA requires VMT estimates to be prepared by the six HPMS vehicle groups, reflecting specific local characteristics. As described in the previous section, the hourly volumes are disaggregated into thirteen MOVES source types based on data from PennDOT, in combination with MOVES defaults. The thirteen MOVES source types are then recombined into five HPMS vehicle classes.
- *Apply HPMS VMT Adjustments* - Volumes must also be adjusted to account for differences with the HPMS VMT totals, as described in previous sections. VMT adjustment factors are provided as inputs to PPSUITE and are applied to each of the roadway segment volumes. VMT adjustment factors are also applied to runs for future years.

Speed Estimation

Emissions for many pollutants (including VOC and NO_X) vary significantly with travel speed. VOC emissions generally decrease as speed increases, while NO_X emissions decrease at low speeds and increases at higher speeds, as illustrated in **Exhibit 7**. Because emissions are so sensitive to speed changes, EPA recommends special attention be given to developing reasonable and consistent speed estimates. EPA also recommends that VMT be disaggregated into subsets that have roughly equal speeds, with separate emission factors for each subset. At a minimum, speeds should be estimated separately by road type.

The computational framework used for this analysis meets and exceeds the recommendation above relating to speed estimates. Speeds are individually calculated for each roadway segment and hour. Rather than accumulating the roadway segments into a particular road type and calculating an average speed, each individual link hourly speed is represented in the MOVES vehicle hours of travel (VHT) by a speed bin file. This MOVES input file allows the specification of a distribution of hourly speeds. For example, if 5% of a county's arterial VHT operates at 5 mph during the AM peak hour and the remaining 95% operates at 65 mph, this can be represented in the MOVES speed input file. For the roadway vehicle emissions calculations, speed distributions are input to MOVES by road type and source type for each hour of the day.

To calculate speeds, PPSUITE first obtains initial capacities (i.e., how much volume the roadway can serve before heavy congestion) and free-flow speeds (speeds assuming no congestion) from a speed/capacity lookup table. As described previously, this data contains default roadway information indexed by the area and facility type codes. For areas with known characteristics, values can be directly coded to the database and the speed/capacity default values can be overridden. For most areas where known information is unavailable, the speed/capacity lookup tables provide valuable default information regarding speeds, capacities, signal characteristics, and other capacity adjustment information used for calculating congested delays and speeds. The result of this process is an estimated average travel time for each hour of the day for each highway segment. The average travel time multiplied by traffic volume produces vehicle hours of travel (VHT).

EXHIBIT 6: PPSUITE SPEED/EMISSION ESTIMATION PROCEDURE

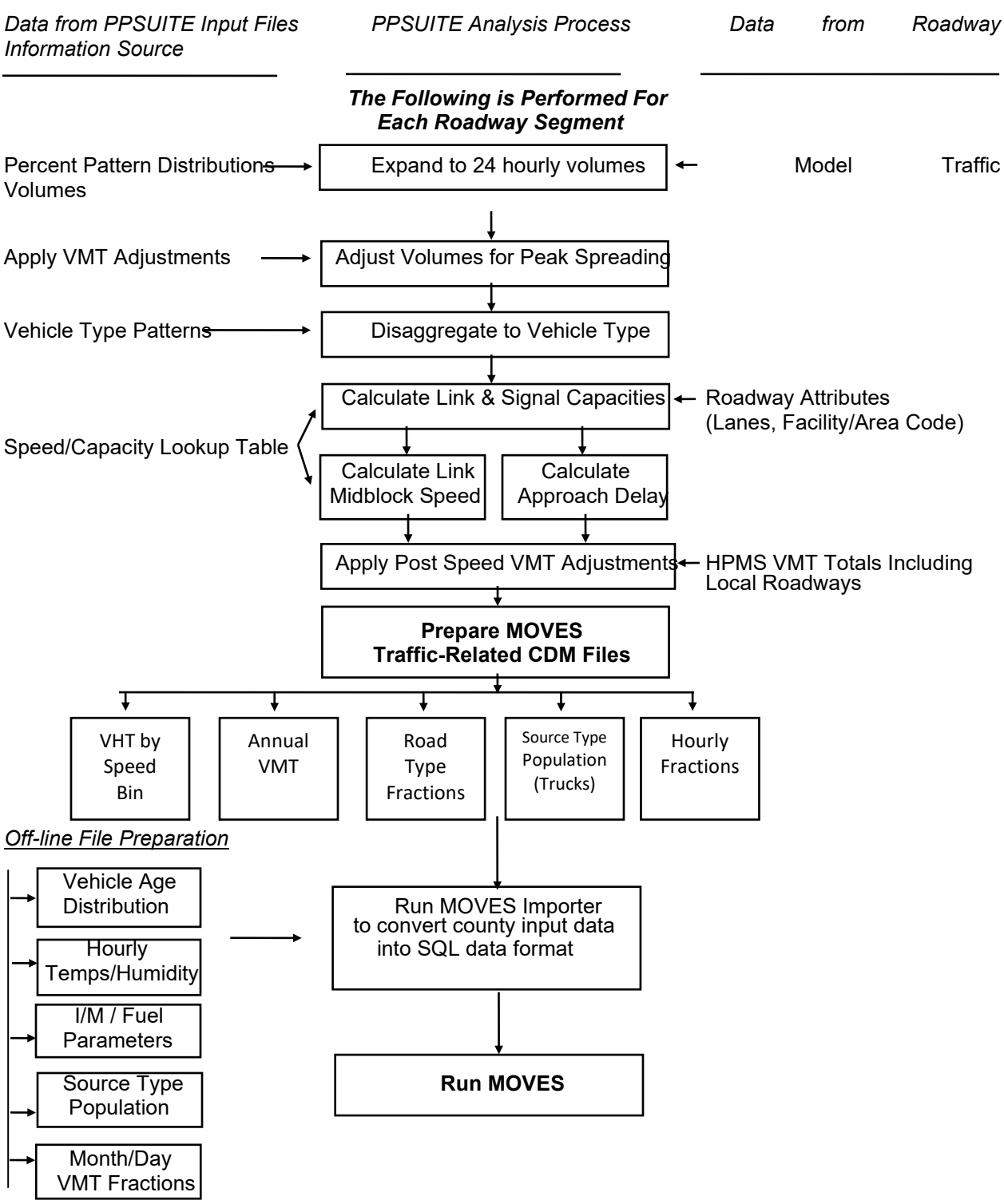
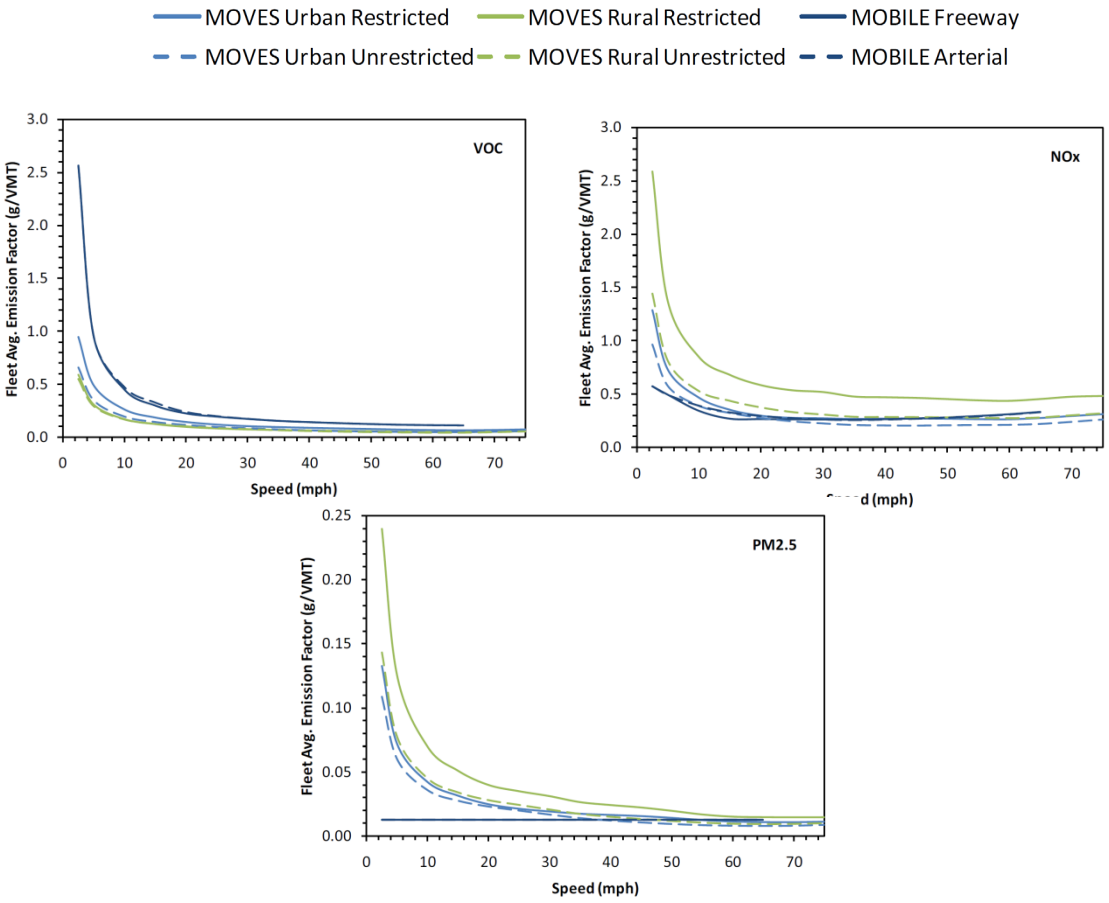


EXHIBIT 7: EMISSION FACTOR VS. SPEED VARIANCES (VOC, NO_X, AND $PM_{2.5}$)



Source: Figure 3 from Implications of the MOVES2010 Model on Mobile Source Emission Estimates, Air & Waste Management Association, July 2010.

Developing the MOVES Traffic Input Files

The PPSUITE software is responsible for producing the following MOVES input files during any analysis run:

- VMT by HPMS vehicle class.
- VHT by speed bin.
- Road type distributions.
- Hourly VMT fractions.

These files are text formatted files with a *.csv extension. The files are provided as inputs within the MOVES County Data Manager (CDM) and are described below:

- *VMT Input File*: VMT is the primary traffic input affecting emission results. The roadway segment distances, and traffic volumes are used to prepare estimates of VMT. PPSUITE performs these calculations and outputs the MOVES annual VMT input file to the County Data Manager (CDM). The annual VMT is computed by multiplying travel model roadway adjusted VMT by 365 days (366 days in a leap year).
- *VHT by Speed Bin File*: As described in the previous section, the PPSUITE software prepares the MOVES VHT by speed bin file, which summarizes the distribution of speeds across all links into each of the 16 MOVES speed bins for each hour of the day by road type. This robust process is consistent with the methods and recommendations provided in EPA's technical guidance and ensures that MOVES emission rates are used to the fullest extent.
- *Road Type Distributions*: Within MOVES, typical drive cycles and associated operating conditions vary by roadway type. MOVES defines five different roadway types as follows:

  1 Off-Network.
  2 Rural Restricted Access.
  3 Rural Unrestricted Access.
  4 Urban Restricted Access.
  5 Urban Unrestricted Access.

  For this analysis, the MOVES road type distribution file is automatically generated by PPSUITE using defined equivalencies. The off-network road type includes emissions from vehicle starts, extended idling, and evaporative emissions. Off-network activity in MOVES is primarily determined by the Source Type Population input.

MOVES Runs

After computing speeds and aggregating VMT and VHT, PPSUITE prepares traffic-related inputs needed to run EPA's MOVES software. Additional required MOVES inputs are prepared externally from the processing software and include temperatures, I/M program parameters, fuel characteristics, vehicle fleet age distributions, and source type population. The MOVES' county data importer is run in batch mode. This program converts all data files into the MYSQL format used by the MOVES model. At that point, a MOVES run specification file (*.mrs) is created which specifies options and key data locations for the run. The MOVES run is then executed in batch mode. A summary of key MOVES run specification settings is shown in **Exhibit 8**. MOVES can be executed using either an inventory or rate-based approach. For this analysis, MOVES is applied using the *inventory-based* approach. Using this approach, actual VMT and population are provided as inputs to the model; MOVES is responsible for producing the total emissions for the region.

EXHIBIT 8: MOVES RUN SPECIFICATION FILE PARAMETER SETTINGS

Parameter	Setting
MOVES Version	MOVES3.1
MOVES Default Database Version	movesdb20221007
Scale	COUNTY
Analysis Mode	Inventory
Time Span	**Annual Runs:** Single MOVES run with 12-month inputs including all days and hours **July Weekday Runs:** July month, Weekday, 24 hours
Time Aggregation	Hour
Geographic Selection	County [FIPS]
Vehicle Selection	All source types Gasoline, Diesel, CNG, E85
Road Type	All road types including off-network
Pollutants and Processes	All $PM_{2.5}$ categories, NO_X, VOC
Database selection	Early NLEV database PA-Specific CAL LEV program database
General Output	Units: Emission = grams; Distance = miles; Time = hours; Energy = Million BTU
Output Emissions	Time = Hour or Month, Emissions by Process ID, Source Type and Road Type

Conformity Analysis Results

Transportation conformity analyses of the current TIP and LRTP have been completed for the Lehigh Valley MPO area. The analyses were performed according to the requirements of the Federal transportation conformity rule at 40 CFR Part 93, Subpart A. The analyses utilized the methodologies, assumptions and data as presented in previous sections. Interagency consultation has been used to determine applicable emission models, analysis years and emission tests.

Emission Tests

There are currently no approved SIP MVEBs for the Lehigh Valley MPO area under 2008 8-hour ozone NAAQS. However, the Lehigh Valley MPO area has MVEBs approved by EPA under the 1997 8-hour ozone NAAQS using MOVES (79 FR 28435). The approved MVEBs are used in this analysis for the ozone conformity test. The ozone conformity analysis has been conducted to evaluate emissions in comparison to the applicable ozone MVEBs summarized in **Exhibit 9**.

EXHIBIT 9: 8-HOUR OZONE MOTOR VEHICLE EMISSION BUDGETS

County / Pollutant	2009 Budget (tons/day)	2018 Budget (tons/day)
VOC	20.65	12.43
NO_X	39.18	20.41

On April 13, 2015, EPA approved the Commonwealth of Pennsylvania's request to redesignate the Lehigh Valley MPO area to attainment for the 2006 24-hour $PM_{2.5}$ NAAQS. The MVEBs provided in the maintenance plans for the county are summarized in **Exhibit 10**. The MVEBs are specified as annual values in tons/year; and as a result, the conformity analyses are conducted for annual conditions.

EXHIBIT 10: ANNUAL $PM_{2.5}$ MOTOR VEHICLE EMISSION BUDGETS

.

County / Pollutant	2017 Budget (tons/year)	2025 Budget (tons/year)
$PM_{2.5}$	297	234
NO_X	8,081	5,303

Analysis Years

Section 93.119(g) of the Federal Transportation Conformity Regulations requires that emissions analyses be conducted for specific analysis years as follows:

- A near-term year, one to five years in the future.
- The last year of the LRTP's forecast period, horizon year 2050.
- All established MVEB years.
- Attainment year of the standard if within timeframe of TIP and LRTP.
- An intermediate year or years such that if there are two years in which analysis is performed, the two analysis years are no more than ten years apart.

All analysis years were determined through the interagency consultation process. **Exhibit 11** provides the analysis years used for this conformity analysis.

EXHIBIT 11: TRANSPORTATION CONFORMITY ANALYSIS YEARS

Analysis Year	Description
2025	Budget Year
2030	Interim Year
2035	Interim Year
2045	Interim Year
2050	Horizon Year of LRTP

Components of the $PM_{2.5}$ Regional Emissions Analysis

$PM_{2.5}$ can be the result of either direct or indirect emissions. Direct transportation emissions can be the result of brake or tire-wear, particulates in exhaust emissions, or dust raised by on-road vehicles or construction equipment. Possible indirect transportation related emissions of $PM_{2.5}$ include: NH_3, NO_X, SO_X, and VOC. The EPA has ruled that regional analysis of direct $PM_{2.5}$ emissions must include both exhaust and brake/tire-wear emissions. EPA's current regulations specify that road dust should be included in the regional analysis of direct $PM_{2.5}$ emissions only if the EPA or the state air agency have found it to be a significant contributor to the region's nonattainment. Neither the EPA nor the state air agency has determined road dust to be a significant contributor in the nonattainment area for this conformity determination.

Until a SIP revision is approved proving that NO_X is insignificant, EPA's current regulations state that indirect $PM_{2.5}$ emissions must be analyzed for NO_X. Conversely, VOC, SO_X and NH_3 must be analyzed only if the state(s) or the EPA determines one or more of these pollutants significant. Therefore, NO_X is the only indirect $PM_{2.5}$ component analyzed for the nonattainment area in this conformity determination.

Regionally Significant Highway Projects

For the purposes of the conformity analysis, model highway networks are created for each analysis year. For the horizon years, regionally significant projects from the TIP and LRTP were coded onto the networks. Detailed assessments were only performed for those new projects which may have a significant effect on emissions in accordance with 40 CFR Parts 51 and 93. Only those projects which would increase capacity or significantly impact vehicular speeds were considered. Projects such as bridge replacements and roadway restoration projects, which constitute the majority of the TIP and LRTP list, have been excluded from consideration since they are considered exempt under 40 CFR 93.126-127. A list of highway projects is shown in **Attachment A**.

Analysis Results

An emissions analysis has been completed for 2008 8-hour ozone and 2006 24-hour $PM_{2.5}$ NAAQS. The results of the analysis are summarized in the tables below. Forecast years have been estimated using the procedures and assumptions provide in this conformity report. A detailed emission summary is also provided in **Attachment B**. Example MOVES importer (XML) and run specification (MRS) files are provided in **Attachment C**.

2008 Ozone NAAQS

Exhibit 12 summarizes the Lehigh Valley MPO area ozone emission results for a summer weekday in each analysis year. The analysis year emission results are compared to the emission budgets in **Exhibit 9**. All years are lower than the applicable conformity budgets established in the regional maintenance plan for the 1997 ozone NAAQS.

EXHIBIT 12: OZONE EMISSION ANALYSIS RESULTS AND CONFORMITY TEST
(Summer Weekday)

Pollutant	*2018 BUDGET (tons/day)*	*2025 (tons/day)*	*2030 (tons/day)*	*2035 (tons/day)*	*2045 (tons/day)*	*2050 (tons/day)*
VOC	***12.43***	*4.43*	*3.56*	*3.15*	*2.68*	*2.48*
NO_X	***20.41***	*8.90*	*6.44*	*5.68*	*5.84*	*6.16*
Conformity Result		**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

2006 24-hour NAAQS

Exhibit 13 summarizes the 24-hour $PM_{2.5}$ and NO_X emissions for annual conditions. The emissions are compared against the available 2017 and 2025 SIP MVEBs listed in **Exhibit 10**. The results illustrate that projected emissions are below the applicable MVEBs.

Exhibit 13: $PM_{2.5}$ Emission Analysis Results and Conformity Test
(Annual Analysis Runs)

Pollutant	*2025 (tons/year)*	*2030 (tons/year)*	*2035 (tons/year)*	*2045 (tons/year)*	*2050 (tons/year)*
$PM_{2.5}$	109	88	79	75	75
NO_X	2,721	1,952	1,713	1,737	1,822
MVEB - $PM_{2.5}$	***234***	***234***	***234***	***234***	***234***
MVEB - NO_X	***5,303***	***5,303***	***5,303***	***5,303***	***5,303***
Conformity Result	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

Conformity Determination

Financial Constraint

The planning regulations, Sections 450.324(f)(11) and 450.326(j), requires the transportation plan and TIP to be financially constrained while the existing transportation system is being adequately operated and maintained. Only projects for which construction and operating funds are reasonably expected to be available are included. The Lehigh Valley MPO, in conjunction with PennDOT, FHWA and FTA, has developed an estimate of the cost to maintain and operate existing roads, bridges and transit systems in the Lehigh Valley MPO area and have compared the cost with the estimated revenues and maintenance needs of the new roads over the same period. The TIP and LRTP have been determined to be financially constrained.

Public Participation

The TIP and LRTP have undergone the public participation requirements as well as the comment and response requirements according to the procedures established in compliance with 23 CFR part 450, LVTS Public Participation Plan and Pennsylvania's Conformity SIP. The draft document was made available for a 30-day public review and comment period starting May 1st and included a public meeting.

Public Participation

The conformity rule requires that the TIP and LRTP conform to the applicable SIP(s) and be adopted by the MPO/RPO before any federal agency may approve, accept, or fund projects. Conformity is determined by applying criteria outlined in the transportation conformity regulations to the analysis.

The TIP and LRTP for the Lehigh Valley MPO are found to conform to the applicable air quality SIP(s) or EPA conformity requirements. This finding of conformity positively reflects on the efforts of the Lehigh Valley MPO and its partners in meeting the regional air quality goals, while maintaining and building an effective transportation system.

Resources

MOVES Model

Modeling Page within EPA's Office of Mobile Sources Website contains a downloadable model, MOVES users guide and other information. See (https://www.epa.gov/moves)

Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, and Other Purposes, US EPA Office of Transportation and Air Quality, EPA-420-B-20-044, November 2020.

MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity. US EPA Office of Transportation and Air Quality, EPA-420-B-20-052, November 2020.

Traffic Engineering

Highway Capacity Manual, sixth edition (HCM2016), Transportation Research Board, presents current knowledge and techniques for analyzing the transportation system.

Traffic Data Collection and Factor Development Report, 2022 Data, Pennsylvania Department of Transportation, Bureau of Planning and Research.

Highway Vehicle Emissions Analysis Glossary

AADT: Average Annual Daily Traffic, average of ALL days.

CAA: Clean Air Act as amended.

CARB: California Air Resources Board.

CFR: Code of Federal Regulations.

County Data Manager (CDM): User interface developed to simplify importing specific local data for a single county or a user-defined custom domain without requiring direct interaction with the underlying MySQL/MariaDB database in the MOVES emission model.

DEP: Pennsylvania Department of Environmental Protection

Emission rate or factor: Expresses the amount of pollution emitted per unit of activity. For highway vehicles, this is usually expressed in grams of pollutant emitted per mile driven.

EPA: Environmental Protection Agency

FC: Functional code. Applied to road segments to identify their type (freeway, local, etc.).

FHWA: Federal Highway Administration.

FR: Federal Register.

FTA: Federal Transit Administration.

Growth factor: Factor used to convert volumes to future years.

HPMS: Highway Performance Monitoring System.

I/M: Vehicle emissions inspection/maintenance programs are required in certain areas of the country. The programs ensure that vehicle emission controls are in good working order throughout the life of the vehicle. The programs require vehicles to be tested for emissions. Most vehicles that do not pass must be repaired.

LRTP: Long Range Transportation Plan

MOVES: Motor Vehicle Emission Simulator. The latest model EPA has developed to estimate emissions from highway vehicles.

MVEB: motor vehicle emissions budget.

NAAQS: National Ambient Air Quality Standard

NTD: National Transit Database

Pattern data: Extrapolations of traffic patterns (such as how traffic volume on road segment types varies by time of day, or what kinds of vehicles tend to use a road segment type) from segments with observed data to similar segments.

PPSUITE: Post-Processor for Air Quality. A set of programs that estimate speeds and prepares MOVES inputs and processes MOVES outputs.

Road Type: Functional code, applied in data management to road segments to identify their type (rural/urban highways, rural/urban arterials, etc.).

RMS: Roadway Management System.

Source Type: One of thirteen vehicle types used in MOVES modeling.

SIP: State Implementation Plan

TAZ: Traffic Analysis Zone System

TIP: Transportation Improvement Program

VHT: Vehicle hours traveled.

VMT: Vehicle miles traveled. In modeling terms, it is the simulated traffic volumes multiplied by link length.

ATTACHMENT A

Project List

The following FFY2025–2028 Transportation Improvement Program (TIP) and 2050 Long Range Transportation Plan (LRTP) air quality significant highway projects are included in this analysis. Project descriptions have been included with the associated TIP and LRTP documentation.

AIR QUALITY SIGNIFICANT PROJECTS BY ANALYSIS YEAR

MPMS #	AQ Significant Project Name
2025-2028 Highway-Bridge TIP Projects	
92780 (Interstate)	I-78 Reconstruction – Berks County Line to SR 100
109318 (Interstate)	I-78 WB - Easton Rd to SR 33 Truck Climbing Lane
57433	Lehigh & Race Street Intersection
11981	Linden Street
96432	SR 309 & Tilghman Interchange Reconfiguration
99697	7th Street Multimodal Corridor
120952	SR 248/Airport Road Intersection Improvements
110169	State Route 29 / Cedar Crest Boulevard Signal Upgrades
110170	MacArthur Road Signal Upgrade
110174	Mauch Chunk Road Signal Upgrade
109971	Route 145 Safety Improvements
102160	State Route 309/Center Valley Parkway Interchange
110076	Jordan Creek Bridge Replacement
110183	SR 29 Shimersville Hill Safety Improvements
117606	SR 22/ SR 191 Interchange Improvements
117509	Freemansburg Ave (SR 2018) Safety Improvements
116936	SR 191 Lower Nazareth Intersection Improvements
120976	Linden Steet Two-Way Conversion
118070	Riverside Drive Raise Grant
2025-2028 Transit TIP Projects	
106530	LANTA Enhanced Bus / BRT

2050 LRTP Projects (Incorporates PennDOT 12-Year Program) **No Changes from Past Conformity Determination**
AQ Significant Project Name
Emmaus Avenue Adaptive Signal Upgrades
Hanover Avenue Adaptive Signal Upgrades at 7 Intersections - North Albert to North Wahneta Streets
State Route 512/Mill Street Intersection Improvements
Union Boulevard/Tilghman Street Adaptive Signal Upgrades at 27 Intersections
American Parkway intersections improvement at Hamilton, Linden & Gordon Streets
State Route 145/South Pike Avenue Betterment Project
Fullerton Avenue (State Route 1015) Betterment Project
State Route 145/7th Street Betterment Project
State Route 33 Betterment Project
State Route 378 Betterment Project
State Route 378 Betterment Project
State Route 248 Betterment Project
State Route 145 (MacArthur Road) Betterment Project, from Newburg Road to 7th Street
State Route 145 (MacArthur Road) Betterment Project, from Center Street to Clearview Road
US Route 22 Betterment Project
State Route 33 North/South Betterment Project
State Route 611 Betterment Project
State Route 248 Betterment Project
State Route 100 Betterment Project
State Route 412 Hellertown Corridor Improvements
State Route 145 (South 4th Street/Pike Avenue) Corridor Improvements
Adaptive Signal Updates
State Route 2002 (Emmaus Avenue) Signal Improvements
State Route 1009 (Schoenersville Road) Corridor Improvements
Lehigh Street and Union Street Intersection and Corridor Improvements
Hamilton Street/Hanover Avenue Corridor Study and Construction
State Route 512 Adaptive Signal Upgrade
State Route 222 (Jaindl Highway) at Krocks Road Intersection Improvements
State Route 29 (Cedar Crest Boulevard) Intersection Improvements.
Weaversville Road Curve Improvements
State Route 1002 (Tilghman Street) Improvements
Nestle Way/Grim Road Corridor and State Route 3012 (Schantz Road) Intersection Improvements
Old Route 22 & State Route 863 Intersection Widening
State Route 222 (Jaindl Highway/Hamilton Boulevard/Hamilton Street) Signal Improvements

State Route 222 (Jaindl Highway), Grim Road and Cetronia Road Intersection Improvements
State Route 100 and Industrial Boulevard Intersection Improvements
Bath Adaptive Traffic Signals
Advanced Signal Coordination System along State Route 512
Road Auxiliary Turn Lanes at Intersection of Vera Cruz Road and Pike Avenue
Downtown Easton Signal Improvements
State Route 1002 (Tilghman Street) Signal Improvements
Uhler Road/Sullivan Trail Intersection Improvement
Center Street One Way to Two Way Conversion
State Route 2020 (William Penn Highway) and State Route 33 Interchange
US Route 22 Widening from Mauch Chunk Road & Route 145
Jefferson Street Road Diet/Roundabout
State Route 309 Northbound Realignment
State Route 222 (Hamilton Boulevard) Breinigsville Road/Newtown Road Roundabout
State Route 2004 (Susquehanna Street/Seidersville Road), State Route 2002 (Emmaus Avenue/Broadway) Roundabout
Mauch Chunk Road/Elizabeth Avenue Roundabout
College Heights Boulevard Traffic Calming and Roundabout
State Route 248 (Lehigh Drive) and State Route 946 (Mountain View Drive) Intersection
State Routes 946 and 248 Intersection Improvements
State Route 512 (Market Street) Improvements, Bangor Borough
Male Road Bridge
Coffeetown Road Bridge Replacement
Water Street Culvert
Canal Park Bridge
Airport Road Corridor Phase 1 Infrastructure Implementation Line Item
Broad Street Traffic Signal Upgrades
State Route 378 (Wyandotte Street) Corridor Improvements
State Route 512 Slate Belt Corridor Improvements Study and Improvements
State Route 33 and Interstate 78 Interchange Reconstruction
State Route 1006 (Walbert Avenue) Betterment Project
17th Street Corridor Traffic Signal Modernization
Americans with Disabilities Act Traffic Signalization in Bath Borough

ATTACHMENT B

Detailed Emission Results

Ozone Analysis

Lehigh Valley Ozone Daily Emission Summary

2025 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Summer Daily VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lehigh	Off-Network	N/A	N/A	1.5	0.81
	Rural Restricted	1,026,027	48.4	0.1	0.41
	Rural UnRestricted	1,778,058	31.5	0.1	0.64
	Urban Restricted	3,924,560	33.6	0.3	1.64
	Urban UnRestricted	5,041,565	23.8	0.5	1.89
	Subtotal	*11,770,209*		*2.46*	*5.38*
Northampton	Off-Network	N/A	N/A	1.4	0.67
	Rural Restricted	0	N/A	0.0	0.00
	Rural UnRestricted	1,626,513	39.5	0.1	0.51
	Urban Restricted	3,488,236	45.2	0.2	1.21
	Urban UnRestricted	3,228,113	25.9	0.3	1.13
	Subtotal	*8,342,862*		*1.98*	*3.52*
Off-Model Project Emission Benefits				0.00	0.00
Region Total		**20,113,071**		**4.43**	**8.90**
			(Kg/Day)	**4,023**	**8,077**

Lehigh Valley Ozone Daily Emission Summary

2025 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Summer Daily VMT	Emissions (Tons/Day)	
			VOC	NOx
Lehigh	Motorcycle	69,862	0.2	0.05
	Passenger Car	5,951,958	0.8	0.32
	Passenger Truck	3,808,592	1.0	0.99
	Light Commercial Truck	967,855	0.3	0.44
	Intercity Bus	1,690	0.0	0.01
	Transit Bus	19,554	0.0	0.09
	School Bus	8,774	0.0	0.03
	Refuse Truck	5,611	0.0	0.02
	Single Unit Short-haul Truck	267,808	0.1	0.41
	Single Unit Long-haul Truck	37,964	0.0	0.05
	Motor Home	39,081	0.0	0.10
	Combination Short-haul Truck	251,968	0.0	1.09
	Combination Long-haul Truck	339,492	0.1	1.78
	Subtotal	*11,770,209*	*2.46*	*5.38*
Northampton	Motorcycle	49,689	0.1	0.03
	Passenger Car	4,236,769	0.7	0.25
	Passenger Truck	2,711,071	0.8	0.73
	Light Commercial Truck	688,948	0.2	0.32
	Intercity Bus	737	0.0	0.00
	Transit Bus	8,170	0.0	0.04
	School Bus	5,617	0.0	0.02
	Refuse Truck	3,795	0.0	0.01
	Single Unit Short-haul Truck	182,503	0.0	0.25
	Single Unit Long-haul Truck	25,887	0.0	0.03
	Motor Home	26,634	0.0	0.07
	Combination Short-haul Truck	171,771	0.0	0.67
	Combination Long-haul Truck	231,270	0.0	1.10
	Subtotal	*8,342,862*	*1.98*	*3.52*
Off-Model Project Emission Benefits			0.00	0.00
Region Total		**20,113,071**	**4.43**	**8.90**
		(Kg/Day)	**4,023**	**8,077**

Lehigh Valley Ozone Daily Emission Summary

2025 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lehigh	Running Exhaust	0.50	4.81
	Start Exhaust	0.35	0.48
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.21	0.00
	Evap Fuel Vapor Venting	0.53	0.00
	Evap Fuel Leaks	0.83	0.00
	Crankcase Running Exhaust	0.03	0.04
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.01	0.06
	Auxiliary Power Exhaust	0.00	0.00
	Subtotal	*2.46*	*5.38*
Northampton	Running Exhaust	0.32	3.04
	Start Exhaust	0.32	0.42
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.19	0.00
	Evap Fuel Vapor Venting	0.46	0.00
	Evap Fuel Leaks	0.67	0.00
	Crankcase Running Exhaust	0.02	0.02
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.04
	Auxiliary Power Exhaust	0.00	0.00
	Subtotal	*1.98*	*3.52*
Off-Model Project Emission Benefits		0.00	0.00
Region Total		**4.43**	**8.90**
	(Kg/Day)	**4,023**	**8,077**

Lehigh Valley Ozone Daily Emission Summary

2030 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Summer Daily VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lehigh	Off-Network	N/A	N/A	1.2	0.64
	Rural Restricted	1,080,308	46.3	0.0	0.29
	Rural UnRestricted	1,821,028	30.5	0.1	0.45
	Urban Restricted	4,073,828	33.1	0.2	1.16
	Urban UnRestricted	5,243,579	23.4	0.4	1.40
	Subtotal	*12,218,743*		*1.97*	*3.94*
Northampton	Off-Network	N/A	N/A	1.1	0.52
	Rural Restricted	0	N/A	0.0	0.00
	Rural UnRestricted	1,669,571	39.3	0.1	0.35
	Urban Restricted	3,608,654	44.1	0.2	0.82
	Urban UnRestricted	3,303,870	25.2	0.2	0.81
	Subtotal	*8,582,095*		*1.59*	*2.50*
Off-Model Project Emission Benefits				0.00	0.00
Region Total		**20,800,839**		**3.56**	**6.44**
			(Kg/Day)	**3,230**	**5,839**

Lehigh Valley Ozone Daily Emission Summary

2030 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Summer Daily VMT	Emissions (Tons/Day)	
			VOC	NOx
Lehigh	Motorcycle	72,490	0.2	0.05
	Passenger Car	6,176,074	0.6	0.18
	Passenger Truck	3,952,005	0.8	0.43
	Light Commercial Truck	1,004,279	0.2	0.20
	Intercity Bus	1,747	0.0	0.01
	Transit Bus	20,401	0.0	0.07
	School Bus	9,155	0.0	0.02
	Refuse Truck	5,824	0.0	0.02
	Single Unit Short-haul Truck	279,522	0.0	0.36
	Single Unit Long-haul Truck	39,519	0.0	0.04
	Motor Home	40,730	0.0	0.08
	Combination Short-haul Truck	261,304	0.0	0.99
	Combination Long-haul Truck	355,693	0.0	1.50
	Subtotal	*12,218,743*	*1.97*	*3.94*
Northampton	Motorcycle	51,098	0.1	0.03
	Passenger Car	4,356,978	0.5	0.14
	Passenger Truck	2,787,987	0.7	0.33
	Light Commercial Truck	708,522	0.2	0.15
	Intercity Bus	742	0.0	0.00
	Transit Bus	8,445	0.0	0.03
	School Bus	5,800	0.0	0.01
	Refuse Truck	3,939	0.0	0.01
	Single Unit Short-haul Truck	188,482	0.0	0.22
	Single Unit Long-haul Truck	26,620	0.0	0.03
	Motor Home	27,466	0.0	0.05
	Combination Short-haul Truck	176,273	0.0	0.60
	Combination Long-haul Truck	239,743	0.0	0.90
	Subtotal	*8,582,095*	*1.59*	*2.50*
Off-Model Project Emission Benefits			0.00	0.00
Region Total		**20,800,839 (Kg/Day)**	**3.56 3,230**	**6.44 5,839**

Lehigh Valley Ozone Daily Emission Summary

2030 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lehigh	Running Exhaust	0.31	3.50
	Start Exhaust	0.25	0.35
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.13	0.00
	Evap Fuel Vapor Venting	0.40	0.00
	Evap Fuel Leaks	0.84	0.00
	Crankcase Running Exhaust	0.02	0.04
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.04
	Auxiliary Power Exhaust	0.00	0.01
	Subtotal	*1.97*	*3.94*
Northampton	Running Exhaust	0.20	2.13
	Start Exhaust	0.23	0.31
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.12	0.00
	Evap Fuel Vapor Venting	0.35	0.00
	Evap Fuel Leaks	0.68	0.00
	Crankcase Running Exhaust	0.01	0.02
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.03
	Auxiliary Power Exhaust	0.00	0.00
	Subtotal	*1.59*	*2.50*
Off-Model Project Emission Benefits		0.00	0.00
Region Total	**(Kg/Day)**	**3.56 3,230**	**6.44 5,839**

Lehigh Valley Ozone Daily Emission Summary

2035 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Summer Daily VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lehigh	Off-Network	N/A	N/A	1.1	0.57
	Rural Restricted	1,129,613	45.4	0.0	0.25
	Rural UnRestricted	1,914,513	29.8	0.1	0.41
	Urban Restricted	4,212,387	32.4	0.2	1.02
	Urban UnRestricted	5,446,844	22.9	0.3	1.27
	Subtotal	*12,703,357*		*1.74*	*3.52*
Northampton	Off-Network	N/A	N/A	1.0	0.46
	Rural Restricted	0	N/A	0.0	0.00
	Rural UnRestricted	1,740,908	38.8	0.1	0.30
	Urban Restricted	3,714,405	43.4	0.1	0.69
	Urban UnRestricted	3,428,266	25.3	0.2	0.72
	Subtotal	*8,883,578*		*1.41*	*2.17*
Off-Model Project Emission Benefits				0.00	0.00
Region Total		**21,586,935**		**3.15**	**5.68**
			(Kg/Day)	**2,856**	**5,154**

Lehigh Valley Ozone Daily Emission Summary

2035 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Summer Daily VMT	Emissions (Tons/Day)	
			VOC	NOx
Lehigh	Motorcycle	75,315	0.2	0.05
	Passenger Car	6,417,338	0.5	0.12
	Passenger Truck	4,106,386	0.7	0.25
	Light Commercial Truck	1,043,509	0.2	0.09
	Intercity Bus	1,854	0.0	0.01
	Transit Bus	21,320	0.0	0.06
	School Bus	9,580	0.0	0.02
	Refuse Truck	6,111	0.0	0.02
	Single Unit Short-haul Truck	292,566	0.0	0.36
	Single Unit Long-haul Truck	41,218	0.0	0.04
	Motor Home	42,616	0.0	0.07
	Combination Short-haul Truck	272,717	0.0	1.00
	Combination Long-haul Truck	372,828	0.0	1.42
	Subtotal	*12,703,357*	*1.74*	*3.52*
Northampton	Motorcycle	52,860	0.1	0.03
	Passenger Car	4,507,632	0.5	0.10
	Passenger Truck	2,884,419	0.6	0.20
	Light Commercial Truck	733,007	0.2	0.07
	Intercity Bus	782	0.0	0.00
	Transit Bus	8,784	0.0	0.02
	School Bus	6,050	0.0	0.01
	Refuse Truck	4,077	0.0	0.01
	Single Unit Short-haul Truck	196,399	0.0	0.22
	Single Unit Long-haul Truck	27,666	0.0	0.02
	Motor Home	28,606	0.0	0.04
	Combination Short-haul Truck	183,030	0.0	0.59
	Combination Long-haul Truck	250,268	0.0	0.84
	Subtotal	*8,883,578*	*1.41*	*2.17*
Off-Model Project Emission Benefits			0.00	0.00
Region Total		**21,586,935**	**3.15**	**5.68**
		(Kg/Day)	**2,856**	**5,154**

Lehigh Valley Ozone Daily Emission Summary

2035 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lehigh	Running Exhaust	0.25	3.13
	Start Exhaust	0.20	0.30
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.10	0.00
	Evap Fuel Vapor Venting	0.33	0.00
	Evap Fuel Leaks	0.84	0.00
	Crankcase Running Exhaust	0.02	0.04
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.03
	Auxiliary Power Exhaust	0.00	0.01
	Subtotal	*1.74*	*3.52*
Northampton	Running Exhaust	0.16	1.86
	Start Exhaust	0.18	0.26
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.09	0.00
	Evap Fuel Vapor Venting	0.29	0.00
	Evap Fuel Leaks	0.67	0.00
	Crankcase Running Exhaust	0.01	0.02
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.02
	Auxiliary Power Exhaust	0.00	0.00
	Subtotal	*1.41*	*2.17*
Off-Model Project Emission Benefits		0.00	0.00
Region Total		**3.15**	**5.68**
	(Kg/Day)	**2,856**	**5,154**

Lehigh Valley Ozone Daily Emission Summary

2045 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Summer Daily VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lehigh	Off-Network	N/A	N/A	0.8	0.57
	Rural Restricted	1,232,645	42.6	0.0	0.25
	Rural UnRestricted	2,039,248	28.2	0.1	0.43
	Urban Restricted	4,508,123	32.2	0.2	1.00
	Urban UnRestricted	5,917,987	21.3	0.3	1.38
	Subtotal	*13,698,003*		*1.49*	*3.63*
Northampton	Off-Network	N/A	N/A	0.8	0.45
	Rural Restricted	0	N/A	0.0	0.00
	Rural UnRestricted	1,816,957	38.3	0.1	0.30
	Urban Restricted	3,951,012	40.2	0.1	0.70
	Urban UnRestricted	3,768,053	24.2	0.2	0.76
	Subtotal	*9,536,022*		*1.19*	*2.21*
Off-Model Project Emission Benefits				0.00	-0.01
Region Total		**23,234,025**		**2.68**	**5.84**
			(Kg/Day)	**2,429**	**5,294**

Lehigh Valley Ozone Daily Emission Summary
2045 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Summer Daily VMT	Emissions (Tons/Day)	
			VOC	NOx
Lehigh	Motorcycle	81,112	0.2	0.05
	Passenger Car	6,912,384	0.5	0.09
	Passenger Truck	4,423,156	0.5	0.18
	Light Commercial Truck	1,124,021	0.1	0.06
	Intercity Bus	2,092	0.0	0.01
	Transit Bus	23,204	0.0	0.07
	School Bus	10,434	0.0	0.02
	Refuse Truck	6,618	0.0	0.02
	Single Unit Short-haul Truck	319,165	0.0	0.40
	Single Unit Long-haul Truck	45,069	0.0	0.05
	Motor Home	46,465	0.0	0.06
	Combination Short-haul Truck	298,090	0.0	1.10
	Combination Long-haul Truck	406,193	0.0	1.53
	Subtotal	*13,698,003*	*1.49*	*3.63*
Northampton	Motorcycle	56,676	0.1	0.04
	Passenger Car	4,834,096	0.4	0.08
	Passenger Truck	3,093,302	0.4	0.14
	Light Commercial Truck	786,093	0.1	0.05
	Intercity Bus	863	0.0	0.00
	Transit Bus	9,541	0.0	0.03
	School Bus	6,553	0.0	0.01
	Refuse Truck	4,436	0.0	0.01
	Single Unit Short-haul Truck	213,100	0.0	0.24
	Single Unit Long-haul Truck	30,086	0.0	0.03
	Motor Home	31,022	0.0	0.03
	Combination Short-haul Truck	199,064	0.0	0.65
	Combination Long-haul Truck	271,188	0.0	0.90
	Subtotal	*9,536,022*	*1.19*	*2.21*
Off-Model Project Emission Benefits			0.00	-0.01
Region Total		**23,234,025**	**2.68**	**5.84**
		(Kg/Day)	**2,429**	**5,294**

Lehigh Valley Ozone Daily Emission Summary
2045 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lehigh	Running Exhaust	0.23	3.26
	Start Exhaust	0.16	0.28
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.07	0.00
	Evap Fuel Vapor Venting	0.24	0.00
	Evap Fuel Leaks	0.76	0.00
	Crankcase Running Exhaust	0.02	0.05
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.03
	Auxiliary Power Exhaust	0.00	0.01
	Subtotal	*1.49*	*3.63*
Northampton	Running Exhaust	0.15	1.92
	Start Exhaust	0.14	0.24
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.06	0.00
	Evap Fuel Vapor Venting	0.21	0.00
	Evap Fuel Leaks	0.61	0.00
	Crankcase Running Exhaust	0.01	0.03
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.02
	Auxiliary Power Exhaust	0.00	0.01
	Subtotal	*1.19*	*2.21*
Off-Model Project Emission Benefits		0.00	-0.01
Region Total		**2.68**	**5.84**
	(Kg/Day)	**2,429**	**5,294**

Lehigh Valley Ozone Daily Emission Summary

2050 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Summer Daily VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lehigh	Off-Network	N/A	N/A	0.8	0.58
	Rural Restricted	1,290,922	41.1	0.0	0.27
	Rural UnRestricted	1,952,031	27.1	0.1	0.43
	Urban Restricted	4,639,542	31.7	0.2	1.06
	Urban UnRestricted	6,270,001	21.2	0.3	1.49
	Subtotal	*14,152,496*		*1.38*	*3.83*
Northampton	Off-Network	N/A	N/A	0.7	0.46
	Rural Restricted	0	N/A	0.0	0.00
	Rural UnRestricted	1,888,105	38.0	0.1	0.32
	Urban Restricted	4,064,357	39.9	0.1	0.74
	Urban UnRestricted	3,904,275	23.5	0.2	0.82
	Subtotal	*9,856,737*		*1.10*	*2.33*
Off-Model Project Emission Benefits				0.00	0.00
Region Total		**24,009,233**		**2.48**	**6.16**
			(Kg/Day)	**2,252**	**5,593**

Lehigh Valley Ozone Daily Emission Summary

2050 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lehigh	Running Exhaust	0.24	3.45
	Start Exhaust	0.16	0.29
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.07	0.00
	Evap Fuel Vapor Venting	0.24	0.00
	Evap Fuel Leaks	0.65	0.00
	Crankcase Running Exhaust	0.02	0.05
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.03
	Auxiliary Power Exhaust	0.00	0.01
	Subtotal	*1.38*	*3.83*
Northampton	Running Exhaust	0.15	2.03
	Start Exhaust	0.14	0.25
	Brakewear	0.00	0.00
	Tirewear	0.00	0.00
	Evap Permeation	0.06	0.00
	Evap Fuel Vapor Venting	0.20	0.00
	Evap Fuel Leaks	0.53	0.00
	Crankcase Running Exhaust	0.01	0.03
	Crankcase Start Exhaust	0.00	0.00
	Crankcase Extended Idle Exhaust	0.00	0.00
	Extended Idle Exhaust	0.00	0.02
	Auxiliary Power Exhaust	0.00	0.01
	Subtotal	*1.10*	*2.33*
Off-Model Project Emission Benefits		0.00	0.00
Region Total		**2.48**	**6.16**
	(Kg/Day)	**2,252**	**5,593**

Lehigh Valley Ozone Daily Emission Summary

2050 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Summer Daily VMT	Emissions (Tons/Day)	
			VOC	NOx
Lehigh	Motorcycle	83,744	0.2	0.05
	Passenger Car	6,746,160	0.5	0.09
	Passenger Truck	4,896,560	0.4	0.17
	Light Commercial Truck	1,222,351	0.1	0.06
	Intercity Bus	2,210	0.0	0.01
	Transit Bus	24,072	0.0	0.08
	School Bus	10,832	0.0	0.02
	Refuse Truck	7,022	0.0	0.02
	Single Unit Short-haul Truck	322,262	0.0	0.42
	Single Unit Long-haul Truck	45,164	0.0	0.05
	Motor Home	59,599	0.0	0.07
	Combination Short-haul Truck	299,042	0.0	1.13
	Combination Long-haul Truck	433,477	0.0	1.67
	Subtotal	*14,152,496*	*1.38*	*3.83*
Northampton	Motorcycle	58,545	0.2	0.04
	Passenger Car	4,719,981	0.4	0.08
	Passenger Truck	3,425,906	0.3	0.14
	Light Commercial Truck	855,248	0.1	0.04
	Intercity Bus	923	0.0	0.00
	Transit Bus	9,903	0.0	0.03
	School Bus	6,816	0.0	0.01
	Refuse Truck	4,653	0.0	0.01
	Single Unit Short-haul Truck	215,361	0.0	0.25
	Single Unit Long-haul Truck	30,165	0.0	0.03
	Motor Home	39,821	0.0	0.04
	Combination Short-haul Truck	199,849	0.0	0.67
	Combination Long-haul Truck	289,567	0.0	0.99
	Subtotal	*9,856,737*	*1.10*	*2.33*
Off-Model Project Emission Benefits			0.00	0.00
Region Total		**24,009,233 (Kg/Day)**	**2.48 2,252**	**6.16 5,593**

Annual $PM_{2.5}$ Analysis

Lehigh Valley PM2.5 Annual Emission Summary

2025 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	$PM_{2.5}$
Lehigh	Off-Network	N/A	N/A	276.98	10.77
	Rural Restricted	274,239,980	54.5	115.96	3.21
	Rural UnRestricted	538,089,238	35.2	197.66	8.36
	Urban Restricted	1,048,951,044	46.9	407.32	12.66
	Urban UnRestricted	1,512,066,003	27.5	567.93	27.37
	Subtotal	*3,373,346,266*		*1,565.85*	*62.37*
Northampton	Off-Network	N/A	N/A	234.52	9.55
	Rural Restricted	0	N/A	0.00	0.00
	Rural UnRestricted	502,786,968	40.3	169.67	7.08
	Urban Restricted	1,064,539,409	51.1	383.29	11.91
	Urban UnRestricted	997,698,452	27.3	367.92	17.82
	Subtotal	*2,565,024,829*		*1,155.40*	*46.36*
Off-Model Project Emission Benefits				-0.21	-0.01
Region Total		**5,938,371,095**	**(Kg/Year)**	**2,721.04** **2,468,488**	**108.72** **98,630**

Lehigh Valley PM2.5 Annual Emission Summary

2025 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	$PM_{2.5}$
Lehigh	Motorcycle	20,050,841	15.41	0.49
	Passenger Car	1,708,371,020	114.04	14.67
	Passenger Truck	1,093,167,410	295.38	16.41
	Light Commercial Truck	277,800,380	126.63	5.80
	Intercity Bus	376,490	1.85	0.05
	Transit Bus	5,473,996	25.81	0.48
	School Bus	2,456,340	8.05	0.30
	Refuse Truck	1,579,683	6.04	0.12
	Single Unit Short-haul Truck	75,534,536	111.66	2.84
	Single Unit Long-haul Truck	10,705,580	13.81	0.36
	Motor Home	11,021,136	30.52	1.13
	Combination Short-haul Truck	71,050,922	308.42	6.51
	Combination Long-haul Truck	95,757,933	508.22	13.22
	Subtotal	*3,373,346,266*	*1,565.85*	*62.37*
Northampton	Motorcycle	15,279,459	11.92	0.37
	Passenger Car	1,302,735,500	94.05	11.23
	Passenger Truck	833,608,900	234.93	12.64
	Light Commercial Truck	211,840,210	99.80	4.43
	Intercity Bus	198,882	0.96	0.02
	Transit Bus	2,507,331	11.50	0.21
	School Bus	1,723,670	5.59	0.20
	Refuse Truck	1,169,642	4.27	0.08
	Single Unit Short-haul Truck	56,053,587	79.63	2.02
	Single Unit Long-haul Truck	7,942,197	9.80	0.26
	Motor Home	8,181,699	21.97	0.81
	Combination Short-haul Truck	52,713,729	218.72	4.63
	Combination Long-haul Truck	71,070,024	362.27	9.46
	Subtotal	*2,565,024,829*	*1,155.40*	*46.36*
Off-Model Project Emission Benefits			-0.21	-0.01
Region Total		**5,938,371,095** **(Kg/Year)**	**2,721.04** **2,468,488**	**108.72** **98,630**

Lehigh Valley PM2.5 Annual Emission Summary

2025 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Year)	
		NOx	$PM_{2.5}$
Lehigh	Running Exhaust	1,364.96	28.84
	Start Exhaust	172.50	8.49
	Brakewear	0.00	15.19
	Tirewear	0.00	5.86
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	10.62	3.60
	Crankcase Start Exhaust	0.01	0.07
	Crankcase Extended Idle Exhaust	0.13	0.10
	Extended Idle Exhaust	16.52	0.20
	Auxiliary Power Exhaust	1.11	0.02
	Subtotal	*1,565.85*	*62.37*
Northampton	Running Exhaust	978.60	20.97
	Start Exhaust	156.04	7.79
	Brakewear	0.00	10.34
	Tirewear	0.00	4.37
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	7.43	2.58
	Crankcase Start Exhaust	0.01	0.07
	Crankcase Extended Idle Exhaust	0.10	0.07
	Extended Idle Exhaust	12.38	0.15
	Auxiliary Power Exhaust	0.83	0.01
	Subtotal	*1,155.40*	*46.36*
Off-Model Project Emission Benefits		-0.21	-0.01
Region Total		**2,721.04**	**108.72**
	(Kg/Year)	**2,468,488**	**98,630**

Lehigh Valley PM2.5 Annual Emission Summary

2030 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	$PM_{2.5}$
Lehigh	Off-Network	N/A	N/A	226.08	10.31
	Rural Restricted	288,770,294	54.4	77.01	2.20
	Rural UnRestricted	551,099,676	34.5	139.10	6.46
	Urban Restricted	1,088,797,798	46.0	273.43	9.09
	Urban UnRestricted	1,573,056,355	27.3	415.96	22.18
	Subtotal	*3,501,724,123*		*1,131.57*	*50.24*
Northampton	Off-Network	N/A	N/A	189.86	9.34
	Rural Restricted	0	N/A	0.00	0.00
	Rural UnRestricted	516,117,854	40.1	116.02	5.37
	Urban Restricted	1,101,277,318	50.7	249.75	8.46
	Urban UnRestricted	1,021,091,248	26.8	264.90	14.33
	Subtotal	*2,638,486,419*		*820.53*	*37.50*
Off-Model Project Emission Benefits				-0.57	-0.02
Region Total		**6,140,210,543**		**1,951.53**	**87.71**
			(Kg/Year)	**1,770,399**	**79,570**

Lehigh Valley PM2.5 Annual Emission Summary

2030 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	$PM_{2.5}$
Lehigh	Motorcycle	20,804,126	15.84	0.51
	Passenger Car	1,772,668,280	71.22	15.09
	Passenger Truck	1,134,311,760	135.03	14.04
	Light Commercial Truck	288,250,020	58.79	4.32
	Intercity Bus	383,755	1.43	0.03
	Transit Bus	5,712,353	18.17	0.26
	School Bus	2,563,457	5.79	0.15
	Refuse Truck	1,632,694	5.15	0.06
	Single Unit Short-haul Truck	78,815,111	95.33	1.89
	Single Unit Long-haul Truck	11,140,310	11.82	0.25
	Motor Home	11,487,202	22.34	0.77
	Combination Short-haul Truck	73,695,346	274.25	4.72
	Combination Long-haul Truck	100,259,709	416.41	8.15
	Subtotal	*3,501,724,123*	*1,131.57*	*50.24*
Northampton	Motorcycle	15,712,077	12.13	0.38
	Passenger Car	1,339,643,200	60.93	11.56
	Passenger Truck	857,223,800	110.39	10.91
	Light Commercial Truck	217,849,700	47.13	3.33
	Intercity Bus	200,856	0.73	0.01
	Transit Bus	2,591,177	8.04	0.11
	School Bus	1,779,496	4.06	0.10
	Refuse Truck	1,199,159	3.59	0.04
	Single Unit Short-haul Truck	57,887,342	66.94	1.31
	Single Unit Long-haul Truck	8,189,172	8.26	0.18
	Motor Home	8,436,049	15.77	0.54
	Combination Short-haul Truck	54,114,975	191.33	3.30
	Combination Long-haul Truck	73,659,418	291.23	5.73
	Subtotal	*2,638,486,419*	*820.53*	*37.50*
Off-Model Project Emission Benefits			-0.57	-0.02
Region Total		**6,140,210,543 (Kg/Year)**	**1,951.53 1,770,399**	**87.71 79,570**

Lehigh Valley PM2.5 Annual Emission Summary

2030 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Year)	
		NOx	$PM_{2.5}$
Lehigh	Running Exhaust	971.75	16.89
	Start Exhaust	134.95	9.11
	Brakewear	0.00	16.10
	Tirewear	0.00	6.09
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	11.06	1.81
	Crankcase Start Exhaust	0.00	0.07
	Crankcase Extended Idle Exhaust	0.11	0.06
	Extended Idle Exhaust	11.90	0.09
	Auxiliary Power Exhaust	1.79	0.01
	Subtotal	*1,131.57*	*50.24*
Northampton	Running Exhaust	680.67	12.21
	Start Exhaust	121.93	8.42
	Brakewear	0.00	10.89
	Tirewear	0.00	4.51
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	7.63	1.28
	Crankcase Start Exhaust	0.00	0.07
	Crankcase Extended Idle Exhaust	0.08	0.05
	Extended Idle Exhaust	8.87	0.07
	Auxiliary Power Exhaust	1.34	0.01
	Subtotal	*820.53*	*37.50*
Off-Model Project Emission Benefits		-0.57	-0.02
Region Total	**(Kg/Year)**	**1,951.53 1,770,399**	**87.71 79,570**

Lehigh Valley PM2.5 Annual Emission Summary

2035 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	$PM_{2.5}$
Lehigh	Off-Network	N/A	N/A	207.10	9.74
	Rural Restricted	301,941,302	54.3	63.59	1.76
	Rural UnRestricted	579,553,827	33.6	125.85	5.87
	Urban Restricted	1,125,875,488	44.9	230.55	7.64
	Urban UnRestricted	1,633,990,336	27.0	373.86	20.26
	Subtotal	*3,641,360,953*		*1,000.96*	*45.27*
Northampton	Off-Network	N/A	N/A	173.42	8.93
	Rural Restricted	0	N/A	0.00	0.00
	Rural UnRestricted	538,166,239	39.7	101.44	4.76
	Urban Restricted	1,133,535,643	50.5	203.50	6.94
	Urban UnRestricted	1,059,536,726	26.8	234.70	12.98
	Subtotal	*2,731,238,609*		*713.06*	*33.62*
Off-Model Project Emission Benefits				-1.03	-0.03
Region Total		**6,372,599,563**	**(Kg/Year)**	**1,712.99** **1,553,999**	**78.85** **71,536**

Lehigh Valley PM2.5 Annual Emission Summary

2035 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	$PM_{2.5}$
Lehigh	Motorcycle	21,619,351	16.29	0.53
	Passenger Car	1,842,276,692	54.99	14.82
	Passenger Truck	1,178,853,590	84.18	13.01
	Light Commercial Truck	299,568,410	28.66	3.54
	Intercity Bus	404,263	1.29	0.02
	Transit Bus	5,976,466	16.24	0.17
	School Bus	2,685,455	5.08	0.09
	Refuse Truck	1,718,545	5.19	0.05
	Single Unit Short-haul Truck	82,520,165	95.42	1.75
	Single Unit Long-haul Truck	11,633,486	11.72	0.23
	Motor Home	12,020,111	18.74	0.69
	Combination Short-haul Truck	76,948,147	273.78	4.26
	Combination Long-haul Truck	105,136,273	389.38	6.11
	Subtotal	*3,641,360,953*	*1,000.96*	*45.27*
Northampton	Motorcycle	16,253,889	12.41	0.39
	Passenger Car	1,385,990,700	48.33	11.21
	Passenger Truck	886,891,000	70.85	10.13
	Light Commercial Truck	225,382,350	23.82	2.75
	Intercity Bus	206,746	0.64	0.01
	Transit Bus	2,698,236	7.11	0.07
	School Bus	1,858,323	3.58	0.06
	Refuse Truck	1,249,548	3.55	0.03
	Single Unit Short-haul Truck	60,315,682	66.07	1.20
	Single Unit Long-haul Truck	8,512,742	8.06	0.15
	Motor Home	8,785,676	12.96	0.48
	Combination Short-haul Truck	56,241,633	188.19	2.93
	Combination Long-haul Truck	76,852,085	267.49	4.21
	Subtotal	*2,731,238,609*	*713.06*	*33.62*
Off-Model Project Emission Benefits			-1.03	-0.03
Region Total		**6,372,599,563 (Kg/Year)**	**1,712.99** **1,553,999**	**78.85** **71,536**

Lehigh Valley PM2.5 Annual Emission Summary

2035 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Year)	
		NOx	$PM_{2.5}$
Lehigh	Running Exhaust	858.73	11.30
	Start Exhaust	118.87	9.05
	Brakewear	0.00	17.18
	Tirewear	0.00	6.36
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	11.65	1.22
	Crankcase Start Exhaust	0.00	0.07
	Crankcase Extended Idle Exhaust	0.10	0.04
	Extended Idle Exhaust	9.38	0.04
	Auxiliary Power Exhaust	2.22	0.01
	Subtotal	*1,000.96*	*45.27*
Northampton	Running Exhaust	589.30	8.12
	Start Exhaust	107.17	8.39
	Brakewear	0.00	11.44
	Tirewear	0.00	4.68
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	7.92	0.86
	Crankcase Start Exhaust	0.00	0.07
	Crankcase Extended Idle Exhaust	0.07	0.03
	Extended Idle Exhaust	6.96	0.03
	Auxiliary Power Exhaust	1.64	0.01
	Subtotal	*713.06*	*33.62*
Off-Model Project Emission Benefits		-1.03	-0.03
Region Total		**1,712.99**	**78.85**
	(Kg/Year)	**1,553,999**	**71,536**

Lehigh Valley PM2.5 Annual Emission Summary

2045 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	$PM_{2.5}$
Lehigh	Off-Network	N/A	N/A	206.19	7.26
	Rural Restricted	329,454,362	53.3	61.67	1.64
	Rural UnRestricted	617,722,478	31.9	130.33	5.90
	Urban Restricted	1,204,909,342	43.8	222.87	7.23
	Urban UnRestricted	1,775,396,224	25.7	398.17	21.13
	Subtotal	*3,927,482,406*		*1,019.23*	*43.17*
Northampton	Off-Network	N/A	N/A	172.94	6.69
	Rural Restricted	0	N/A	0.00	0.00
	Rural UnRestricted	561,648,270	39.1	100.26	4.57
	Urban Restricted	1,205,743,606	49.0	196.84	6.61
	Urban UnRestricted	1,164,729,865	25.8	248.75	13.60
	Subtotal	*2,932,121,741*		*718.79*	*31.48*
Off-Model Project Emission Benefits				-1.28	-0.04
Region Total		**6,859,604,147**		**1,736.74**	**74.60**
			(Kg/Year)	**1,575,545**	**67,678**

Lehigh Valley PM2.5 Annual Emission Summary

2045 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	$PM_{2.5}$
Lehigh	Motorcycle	23,288,525	17.47	0.58
	Passenger Car	1,984,823,596	45.13	14.35
	Passenger Truck	1,270,065,630	62.17	11.68
	Light Commercial Truck	322,751,770	19.35	3.18
	Intercity Bus	458,131	1.38	0.02
	Transit Bus	6,518,399	17.41	0.16
	School Bus	2,930,932	5.30	0.08
	Refuse Truck	1,883,456	5.75	0.05
	Single Unit Short-haul Truck	90,090,545	105.92	1.95
	Single Unit Long-haul Truck	12,725,702	13.05	0.25
	Motor Home	13,115,304	14.80	0.42
	Combination Short-haul Truck	84,159,316	298.19	4.40
	Combination Long-haul Truck	114,671,100	413.30	6.05
	Subtotal	*3,927,482,406*	*1,019.23*	*43.17*
Northampton	Motorcycle	17,429,382	13.18	0.42
	Passenger Car	1,486,506,900	41.14	10.62
	Passenger Truck	951,204,400	54.05	8.91
	Light Commercial Truck	241,727,220	16.74	2.42
	Intercity Bus	231,144	0.68	0.01
	Transit Bus	2,930,684	7.62	0.07
	School Bus	2,012,935	3.74	0.05
	Refuse Truck	1,359,046	3.92	0.04
	Single Unit Short-haul Truck	65,476,446	72.96	1.33
	Single Unit Long-haul Truck	9,237,360	8.92	0.17
	Motor Home	9,533,426	10.04	0.28
	Combination Short-haul Truck	61,135,819	203.68	3.01
	Combination Long-haul Truck	83,336,980	282.12	4.14
	Subtotal	*2,932,121,741*	*718.79*	*31.48*
Off-Model Project Emission Benefits			-1.28	-0.04
Region Total		**6,859,604,147 (Kg/Year)**	**1,736.74 1,575,545**	**74.60 67,678**

Lehigh Valley PM2.5 Annual Emission Summary

2045 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Year)	
		NOx	$PM_{2.5}$
Lehigh	Running Exhaust	880.66	8.66
	Start Exhaust	114.45	6.76
	Brakewear	0.00	19.65
	Tirewear	0.00	6.92
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	12.83	1.05
	Crankcase Start Exhaust	0.00	0.05
	Crankcase Extended Idle Exhaust	0.10	0.04
	Extended Idle Exhaust	8.59	0.03
	Auxiliary Power Exhaust	2.59	0.00
	Subtotal	*1,019.23*	*43.17*
Northampton	Running Exhaust	598.47	6.18
	Start Exhaust	103.35	6.29
	Brakewear	0.00	13.08
	Tirewear	0.00	5.09
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	8.68	0.74
	Crankcase Start Exhaust	0.00	0.05
	Crankcase Extended Idle Exhaust	0.07	0.03
	Extended Idle Exhaust	6.32	0.02
	Auxiliary Power Exhaust	1.91	0.00
	Subtotal	*718.79*	*31.48*
Off-Model Project Emission Benefits		-1.28	-0.04
Region Total	**(Kg/Year)**	**1,736.74 1,575,545**	**74.60 67,678**

Lehigh Valley PM2.5 Annual Emission Summary

2050 FFY25 TIP and 2050 LRTP Conformity (By Road Type)

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	$PM_{2.5}$
Lehigh	Off-Network	N/A	N/A	213.30	6.31
	Rural Restricted	344,977,872	53.3	64.37	1.68
	Rural UnRestricted	590,949,193	31.2	128.95	5.67
	Urban Restricted	1,240,011,172	43.5	233.11	7.38
	Urban UnRestricted	1,882,295,218	25.8	427.87	22.26
	Subtotal	*4,058,233,454*		*1,067.59*	*43.29*
Northampton	Off-Network	N/A	N/A	179.10	5.83
	Rural Restricted	0	N/A	0.00	0.00
	Rural UnRestricted	583,707,582	38.7	106.32	4.74
	Urban Restricted	1,240,313,135	49.1	204.30	6.70
	Urban UnRestricted	1,206,854,578	25.2	265.16	14.21
	Subtotal	*3,030,875,295*		*754.88*	*31.49*
Off-Model Project Emission Benefits				-0.35	-0.01
Region Total		**7,089,108,749**	**(Kg/Year)**	**1,822.12** **1,653,004**	**74.77** **67,828**

Lehigh Valley PM2.5 Annual Emission Summary

2050 FFY25 TIP and 2050 LRTP Conformity (By Source Type)

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	$PM_{2.5}$
Lehigh	Motorcycle	24,046,909	17.99	0.60
	Passenger Car	1,937,272,688	46.55	14.10
	Passenger Truck	1,406,127,720	59.59	11.48
	Light Commercial Truck	351,018,460	18.85	3.13
	Intercity Bus	488,843	1.49	0.02
	Transit Bus	6,766,111	18.84	0.18
	School Bus	3,044,673	5.66	0.08
	Refuse Truck	1,983,479	6.22	0.06
	Single Unit Short-haul Truck	91,015,113	109.95	2.03
	Single Unit Long-haul Truck	12,753,730	13.41	0.26
	Motor Home	16,833,617	18.57	0.52
	Combination Short-haul Truck	84,479,102	303.19	4.40
	Combination Long-haul Truck	122,403,010	447.29	6.44
	Subtotal	*4,058,233,454*	*1,067.59*	*43.29*
Northampton	Motorcycle	18,004,506	13.58	0.44
	Passenger Car	1,451,474,800	42.87	10.53
	Passenger Truck	1,053,524,500	52.51	8.62
	Light Commercial Truck	263,003,320	16.49	2.36
	Intercity Bus	242,334	0.72	0.01
	Transit Bus	3,045,750	8.29	0.08
	School Bus	2,096,327	4.02	0.05
	Refuse Truck	1,433,040	4.25	0.04
	Single Unit Short-haul Truck	66,158,479	76.02	1.39
	Single Unit Long-haul Truck	9,277,143	9.22	0.17
	Motor Home	12,236,848	12.63	0.35
	Combination Short-haul Truck	61,390,018	207.87	3.02
	Combination Long-haul Truck	88,988,230	306.42	4.42
	Subtotal	*3,030,875,295*	*754.88*	*31.49*
Off-Model Project Emission Benefits			-0.35	-0.01
Region Total		**7,089,108,749** **(Kg/Year)**	**1,822.12** **1,653,004**	**74.77** **67,828**

Lehigh Valley PM2.5 Annual Emission Summary

2050 FFY25 TIP and 2050 LRTP Conformity (By Emission Process)

County	Emission Process	Emissions (Tons/Year)	
		NOx	$PM_{2.5}$
Lehigh	Running Exhaust	924.24	8.42
	Start Exhaust	117.82	5.83
	Brakewear	0.00	20.67
	Tirewear	0.00	7.19
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	13.57	1.07
	Crankcase Start Exhaust	0.00	0.05
	Crankcase Extended Idle Exhaust	0.10	0.04
	Extended Idle Exhaust	9.06	0.03
	Auxiliary Power Exhaust	2.79	0.00
	Subtotal	*1,067.59*	*43.29*
Northampton	Running Exhaust	629.93	6.00
	Start Exhaust	106.97	5.45
	Brakewear	0.00	13.89
	Tirewear	0.00	5.29
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	9.21	0.76
	Crankcase Start Exhaust	0.00	0.04
	Crankcase Extended Idle Exhaust	0.07	0.03
	Extended Idle Exhaust	6.65	0.02
	Auxiliary Power Exhaust	2.05	0.00
	Subtotal	*754.88*	*31.49*
Off-Model Project Emission Benefits		-0.35	-0.01
Region Total		**1,822.12**	**74.77**
	(Kg/Year)	**1,653,004**	**67,828**

ATTACHMENT C

Sample MOVES Data Importer (XML) Input Files and Run Specification (MRS) Input Files

(Sample for 2025 July Weekday and Annual Runs)

MOVES County Data Manager Importer File – July Weekday Run (MOVESIMPORTER.XML)

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MOVES Run Specification File – July Weekday Run (MOVESRUN.MRS)

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Scenario: OZO Lehigh 2025 Jul WkDay

2025 Build, Inv, Ozone

Emission Inventory with Local data]]></description>
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    </savedata>

    <donotexecute>

    </donotexecute>

    <generatordatabase shouldsave="false" servername="" databasename="" description=""/>
        <donotperformfinalaggregation selected="false"/>
    <lookuptableflags scenarioid="" truncateoutput="false" truncateactivity="false"/>
</runspec>
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MOVES County Data Manager Importer File – Annual Run (MOVESIMPORTER.XML)

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      <beginhour id="1"/>
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      <aggregateBy key="Hour"/>
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         <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
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         <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="54" sourcetypename="Motor Home"/>
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Unit Long-haul Truck"/>
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Truck"/>
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Unit Short-haul Truck"/>
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Truck"/>
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Bus"/>
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        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="42" sourcetypename="Transit Bus"/>
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    </offroadvehicleselections>
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          <roadtype roadtypeid="3" roadtypename="Rural Unrestricted Access" modelCombination="M1"/>
          <roadtype roadtypeid="4" roadtypename="Urban Restricted Access" modelCombination="M1"/>
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      </agedistribution>

      <avgspeeddistribution>
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      </avgspeeddistribution>

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          </parts>
      </zonemonthhour>

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            </parts>
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</moves>
```

MOVES Run Specification File – Annual Run (MOVESRUN.MRS)

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Scenario: P25 Lehigh 2025 Year WkEnd_WkDay

2025 Build Inv PM 2.5 NOx and VOC

Emission Inventory with Local data]]></description>
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<month id="7"/>
<month id="8"/>
<month id="9"/>
<month id="10"/>
<month id="11"/>
<month id="12"/>
<day id="2"/>
<day id="5"/>
<beginhour id="1"/>
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<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
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<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
<onroadvehicleselection fueltypeid="9" fueltypedesc="Electricity" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
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Lehigh Valley Transportation Study

RICHARD MOLCHANY
Chair, Coordinating Committee

BRENDAN COTTER
Chair, Technical Committee

BECKY A. BRADLEY, AICP
Secretary,
Coordinating Committee +
Technical Committee

Planning for the Future of Lehigh and Northampton Counties at 615 Waterfront Drive, Suite 201, Allentown, PA 18102 ■ (610) 264-4544 ■ lvpc@lvpc.org ■ www.lvpc.org

RESOLUTION 4-30-2025-A

OF THE JOINT TECHNICAL AND COORDINATING COMMITTEES OF LEHIGH VALLEY TRANSPORTATION STUDY

to certify conformity of an amendment to the 2025 – 2028 Transportation Improvement Program (TIP) to include the Riverside Drive RAISE Grant (MPMS#118070) in accordance with the Clean Air Act Amendments of 1990

WHEREAS, the Congress of the United States enacted the Clean Air Act Amendments of 1990 which was signed into law and became effective on November 15, 1990, hereafter referred to as "the CAAA"; and

WHEREAS, the United States Environmental Protection Agency (EPA), under the authority of the CAAA, has defined the geographic boundaries for areas that have been found to be in non-attainment with the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide and particulate matter; and

WHEREAS, the EPA issued the Final Rule on Transportation Conformity on November 24, 1993 for transportation plans and programs and projects: and

WHEREAS, the EPA amended the Final conformity Rule various times between 1996 and the present; and

WHEREAS, effective July 20, 2012, the Lehigh Valley Transportation Study Metropolitan Planning Organization (LVTS) area has been designated as an ozone nonattainment area under EPA's 2008 eight-hour ozone standard; and

WHEREAS, effective December 14, 2009, the LVTS area has been designated by EPA as a nonattainment area under the 2006 PM 2.5 24-hour NAAQS; and

WHEREAS, effective April 13, 2015, the LVTS area has be redesignated as an attainment area under the 2006 PM 2.5 24-hour NAAQS with an approved Maintenance State Implementation Plan that includes motor vehicle emission budgets; and

WHEREAS, the transportation plans and programs are required to conform to the purposes of the State Implementation Plan and Sections 174 and 176 (c and d) of the CAAA (42 U.S.C. 7504, 7506 (c and d); and

WHEREAS, the LVTS is responsible for the development of transportation plans and programs in the two-county Metropolitan Planning Organization region including Lehigh and Northampton counties in accordance with Section 134 of Title 23, which requires coordination and public participation with the State DOT; and

WHEREAS, the Lehigh Valley Planning Commission, in partnership with the Pennsylvania Department of Transportation (PennDOT), City of Allentown, Whitehall Township and Lehigh County, applied for and received a US Department of Transportation RAISE Grant for the planning and construction of a complete street extension of Riverside Drive and closure of a gap in the Delaware and Lehigh National Heritage Corridor Trail, a designated Commuter Corridor, in *FutureLV: The Regional Plan*, a long-range transportation plan; and

WHEREAS, the Riverside Drive project was determined, in consultation with PennDOT and the Federal Highway Administration, to be air quality significant; and

WHEREAS, the LVTS has consulted with the Intergovernmental Coordination Group in regards to the proposed Riverside Drive RAISE Grant Project; and

WHEREAS, the LVTS also opened a 30-day public review and comment period in regards to the Riverside Drive RAISE Grant Project; and

WHEREAS, the final conformity rule (and subsequent amendments) requires the LVTS Policy Board determines that the transportation plans and programs conform within the CAAA requirements by meeting the criteria described in the final guidelines.

JOINT ACTION BY THE LVTS TECHNICAL AND COORDINATING COMMITTEES

NOW, THEREFORE BE IT RESOLVED THAT the Lehigh Valley Technical Committee has found that the air quality conformity analysis and report 2025 – 2028 TIP contributes to the achievement and maintenance of the NAAQS and is consistent with the final conformity rule issued on November 24, 1993, and subsequent amendments.

FURTHER BE IT RESOLVED THAT the Lehigh Valley MPO Technical Committee recommends adoption by the LVTS Coordinating Committee of the proposed 2025 – 2028 TIP amendment to include the Riverside Drive RAISE Grant Project (MPMS#118070).

NOW, THEREFORE BE IT RESOLVED THAT the Lehigh Valley MPO Coordinating Committee has found that the 2025 – 2028 TIP contributes to the achievement and maintenance of the NAAQS and is consistent with the final conformity rule issued on November 24, 1993, and subsequent amendments.

FURTHER BE IT RESOLVED THAT the Lehigh Valley MPO Coordinating Committee recommends adoption as forwarded by the LVTS Technical Committee of the proposed 2025 – 2028 TIP amendment to include the Riverside Drive RAISE Grant Project (MPMS#118070).

SIGNATURE PAGE

I hereby certify that this Resolution was adopted by the Lehigh Valley Transportation Study Technical and Coordinating Committees at its joint meeting on April 30, 2025.

Lehigh Valley Transportation Study Technical Committee:

_____
Ryan Meyer, Vice Chair

ATTEST:

_____
Becky A. Bradley, AICP
LVPC Executive Director and LVTS Secretary

Lehigh Valley Transportation Study Coordinating Committee:

_____
Richard Molchany, Chair

ATTEST:

_____
Becky A. Bradley, AICP
LVPC Executive Director and LVTS Secretary

LVTS Metropolitan Planning Organization

FISCAL CONSTRAINT TABLE

FFY 2025-2028 TIP Highway Element

PMC Request/Administrative Action Request

MPO Tech Meeting: January 15, 2025 | **MPO Coord Meeting: January 15, 2025**

Amendment				**Fund Type**		**FFY 2025**			**FFY 2026**			**FFY 2027**			**FFY 2028**			**FFYs 2029-2032 and Beyond**			**Total**	**Remarks**
Project Title	**MPMS**	**Phase**	**Amts**	**Fed.**	**Sta.**	**Fed. ($)**	**State ($)**	**Loc/Oth ($)**	**Fed. ($)**	**State ($)**	**Loc/Oth ($)**	**Fed. ($)**	**State ($)**	**Loc/Oth ($)**	**Fed. ($)**	**State ($)**	**Loc/Oth ($)**	**Fed. ($)**	**State ($)**	**Loc/Oth ($)**		
Riverside Drive RAISE Grant	118070	FD	Before	RAISE		0															0.00	Add RAISE grant funded project to TIP. Match is ROW contribution.
/ RSD			Adjust	RAISE		650,000															650,000.00	
Lehigh County			After	RAISE		650,000															650,000.00	
Riverside Drive RAISE Grant	118070	UTL	Before	RAISE					0												0.00	Add RAISE grant funded project to TIP. Match is ROW contribution.
/ RSD			Adjust	RAISE					500,000												500,000.00	
Lehigh County			After	RAISE					500,000												500,000.00	
Riverside Drive RAISE Grant	118070	ROW	Before	RAISE		0															0.00	Add RAISE grant funded project to TIP. Match is ROW contribution.
/ RSD			Adjust	RAISE		1,000,000															1,000,000.00	
Lehigh County			After	RAISE		1,000,000															1,000,000.00	
Riverside Drive RAISE Grant	118070	CON	Before	RAISE					0												0.00	Add RAISE grant funded project to TIP. Match is ROW contribution.
/ RSD			Adjust	RAISE					17,208,854												17,208,854.00	
Lehigh County			After	RAISE					17,208,854												17,208,854.00	
Before FFY Totals						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	Actions do not affect the project delivery schedules or air quality conformity.
FFY Adjustment Totals						1,650,000	0	0	17,708,854	0	0	0	0	0	0	0	0	0	0	0	19,358,854.00	
After FFY Totals						1,650,000	0	0	17,708,854	0	0	0	0	0	0	0	0	0	0	0	19,358,854.00	

NOTES:

Lehigh Valley Transportation Study

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PROPOSED AMENDMENT TO THE 2025-2028 TRANSPORTATION IMPROVEMENT PROGRAM TO ADD RIVERSIDE DRIVE PROJECT

A request to amend the 2025-2028 Transportation Improvement Program (TIP) has been forwarded for the consideration of the Lehigh Valley Transportation Study (LVTS) by the Pennsylvania Department of Transportation (PennDOT) in partnership with the Lehigh Valley Planning Commission (LVPC).

This project is bringing additional funding to the region from the US Department of Transportation RAISE Grant Program. The project is extending Riverside Drive, a complete street, southward from Hamilton Street to Union Street in the City of Allentown, and northward from Furnace Street to East Wood Street in the City of Allentown and Township of Whitehall. A gravel multi-use trail will continue from East Wood Street to Lehigh Avenue in the Township of Whitehall.

The amendment was available for public comment from January 29 to February 28, 2025.

The request is summarized below, and details can be found in the corresponding financial chart.

AMENDMENT

Riverside Drive RAISE Grant (MPMS#118070) – Increase of $19,358,854.

Project Sponsors: Pennsylvania Department of Transportation (PennDOT) in partnership with the Lehigh Valley Planning Commission.

Adding the RAISE Grant funded project to the Transportation Improvement Program. The funding match is a land contribution to the public right of way.

Funding Sources:

- $650,000 RAISE Grant is being added to the Final Design Phase in Federal Fiscal Year 2025
- $500,000 RAISE Grant is being added to the Utility Relocation Phase in Federal Fiscal Year 2026
- $1,000,000 RAISE Grant is being added to the Right of Way Phase in Federal Fiscal Year 2025
- $17,208,854 RAISE Grant is being added to the Construction Phase in Federal Fiscal Year 2026

Questions should be directed to the requestors:

PennDOT: Jen Ruth, jeruth@pa.gov
LVPC: Becky Bradley bbradley@lvpc.org