TRAVEL DEMAND MODELING

Since 1997, the Berks County Planning Commission has been using a computerized Travel Demand Forecasting Model (the model). The model estimates roadway volumes based on inputs including demographic forecasts and expected changes to the transportation roadway network. Outputs from the model are then used as inputs to the U. S. Environmental Protection Agency's (USEPA) 5th generation Motor Vehicle Emissions Simulator (MOVES5) air quality model. As an area with air quality concerns addressed by the 1990 Clean Air Act Amendments, Berks County must use these tools to ensure that future roadway projects do not further degrade air quality.

The travel demand model follows the basic "four-step" travel demand forecasting process and uses the Cube BASE (TP+) software platform. The model consists of 673 Traffic Analysis Zones (TAZ's), approximately 16,000 links, and approximately 9,000 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. TAZ attributes include household population, households, employment, school enrollments, and economic information.

The regional travel model was updated and validated in 2015 and again in early 2025. The updates included enhancing the network and zone structure and validating the model to a 2023 base year. 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, and 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 by Berks County Planning Commission. This data includes total population, households, and employment. The travel model network and assigned traffic volumes are further processed to prepare the traffic inputs needed to run the MOVES5 emission model. The results from the MOVES5 emission model are used to ensure that planned roadway projects help the area attain air quality goals.

Air Quality Conformity

The Clean Air Act Amendments of 1990 (CAAA) mandate improvements in the nation's air quality. The CAAA directs the U.S. Environmental Protection Agency (EPA) to implement regulations that will provide for reductions in pollutant emissions. The Berks County area was originally designated under the CAAA as a moderate non-attainment area for ground level ozone. Ozone is a secondary pollutant, which means that it is not emitted directly into the atmosphere but, rather, is created by the reaction of several pollutants in the presence of sunlight. Oxides of Nitrogen (NOx) and Volatile Organic Compounds (VOC's) are the two precursor pollutants that take part in that reaction. Ground level ozone is an eye and lung irritant that has been shown to cause difficulties in the elderly, very young, and those with weakened respiratory systems.

1997 and 2008 8–hour Ozone NAAQS

The EPA published the 1997 8-hour ozone National Ambient Air Quality Standards (NAAQS) on July 18, 1997, (62 FR 38856), with an effective date of September 16, 1997. An area was in nonattainment of the 1997 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, exceeded the NAAQS of 0.08 parts per million (ppm). On May 21, 2013, the EPA published a rule revoking the 1997 8-hour ozone NAAQS, for the purposes of transportation conformity, effective one year after the effective date of the 2008 8-hour ozone NAAQS area designations (77 FR 30160). As of July 20, 2013, Berks County no longer needs to demonstrate conformity to the 1997 8-hour ozone NAAQS. However, future PA State Implementation Plan (SIP) revisions must address EPA's anti-backsliding requirements.

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. Berks County was designated as a marginal nonattainment area under the 2008 8-hour ozone NAAQS, effective July 20, 2012 (77 FR 30088).

2015 8-hour Ozone NAAQS

In October 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).

Under the Clean Air Act, the EPA administrator is required to make all attainment designations within two years after a final rule revising the NAAQS is published. However, the deadline for EPA to issue designations for the 2015 NAAQS for ozone passed on October 1, 2017. Once designations are final, transportation conformity would be required within 12 months for any areas designated nonattainment under the standard.

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). PM2.5, otherwise known as 'fine particulates', come from a variety of sources such as tire wear and brake dust. These particles are absorbed directly into the blood stream through the lungs and can cause a variety of health problems.

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/m^3 and retained the 1997 annual PM2.5 NAAQS of 15 µg/m^3. 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 motor vehicle emission budgets (MVEBs) for transportation conformity purposes.

Since the last conformity determination was completed, 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 must expend resources on CAA air quality planning and conformity determination requirements associated with the 1997 annual PM2.5 NAAQS.

2012 Annual PM2.5 and 2006 24–hour PM2.5 Standards

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 and, as such, no longer must perform emission testing for fine particulates.

ANALYSIS RESULTS

Transportation conformity analyses of the TIP and LRTP has been completed for Berks County. The analyses were performed according to the requirements of the Federal transportation conformity rule at 40 CFR Part 93, Subpart A. The analyses used 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 Motor Vehicle Emissions Budgets (MVEBs) for Berks County under 2008 8-hour ozone NAAQS. However, the County has an approved SIP revision establishing MVEBs under the 1997 8-hour ozone NAAQS. The MVEBs were originally approved on January 14, 2008 (73 FR 2162) and subsequently revised on March 31, 2014 (79 FR 17875). As required, the latest revised budgets are used 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		
VOC	13.1	7.5
NOX	29.0	14.9

Analysis Years

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

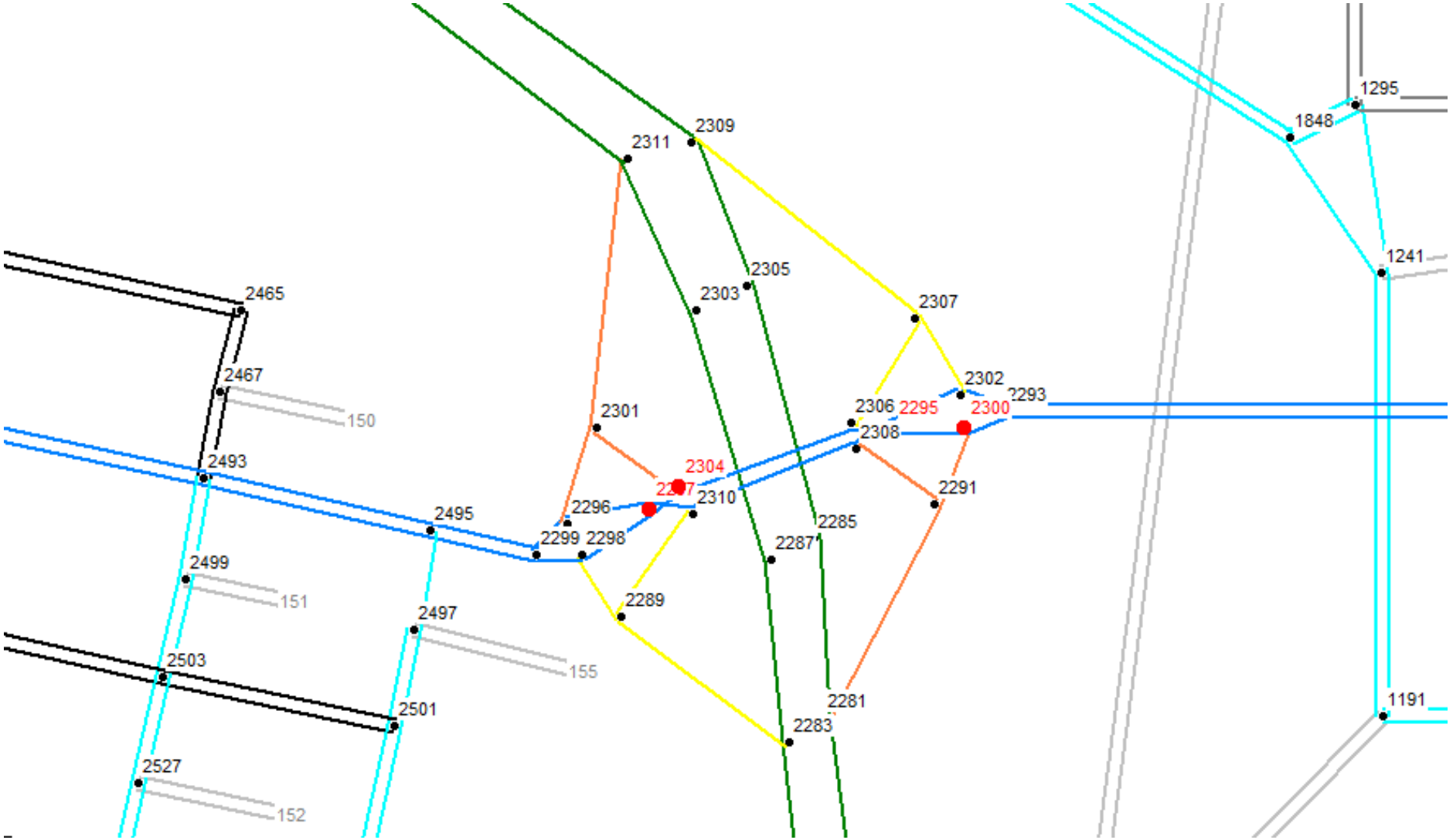
- A near-term year, one to five years in the future.
- The MPO's horizon year for long range planning.
- All established MVEB years (if in the future).
- Attainment year of the standard if within timeframe of the conformity analysis.
- An intermediate year or years such that if there are two years in 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 10 provides the analysis years used for this conformity analysis.

Analysis Year	Description
2030	Near Term (TIP) Year
2040	Interim Year
2050	LRTP Horizon Year

Regionally Significant Highway Projects

For the purposes of conformity analysis, model highway networks are created for each analysis year. Regionally significant projects from the TIP 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 most of the TIP, 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.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Analysis Results

An emissions analysis has been completed for the 2008 8-hour ozone NAAQS. **Exhibit 11** summarizes the Berks County ozone emission results for a summer weekday in each analysis year. All years are lower than the applicable conformity budgets established in the regional maintenance plan for the 1997 ozone NAAQS. A detailed emission summary is also provided in **Attachment B**. Example MOVES importer (XML) and run specification (MRS) files are provided in **Attachment C.**

THE FOLLOWING TABLE: OZONE EMISSION ANALYSIS RESULTS AND CONFORMITY TEST (SUMMER WEEKDAY)

Pollutant	2018 MVEB (tons/day)	2030 (tons/day)	2040 (tons/day)	2050 (tons/day)
VOC	7.5	2.01	1.45	1.38
NOX	14.9	3.40	1.99	2.04
Conformity Result	n/a	PASS	PASS	PASS

CONFORMITY DETERMINATION

Financial Constraint

The planning regulations, Sections 450.324(f)(11) and 450.326(j), require the TIP and LRTP to be financially constrained while the existing transportation system is being adequately operated and maintained. Only projects for which construction and operating funds that are reasonably expected to be available are included. The RATS 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 Berks County and has compared the cost with the estimated revenues and maintenance needs of the new roads over the same period. The TIP and LRTP has been determined to be financially constrained.

Public Participation

The TIP and LRTP will address the public participation requirements as well as the comment and response requirements according to the procedures established in compliance with 23 CFR Part 450, RATS Public Participation Plan, and Pennsylvania's Conformity SIP. The draft documents will be made available for a 30-day public review and comment period.

Conformity Statement

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 RATS MPO TIP and LRTP 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 RATS MPO and its partners in meeting the regional air quality goals, while maintaining and building an effective transportation system.