



Air Quality Conformity Determination

For the New Castle County, Delaware Portion of the
PA-NJ-MD-DE 8-hour Ozone &
PA-NJ-DE Fine Particulate Matter (PM_{2.5})
Nonattainment Areas

FY2015–2018 Transportation Improvement Program
And 2040 Regional Transportation Plan

March 2014



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Introduction

This report demonstrates transportation conformity of the Wilmington Area Planning Council's (WILMAPCO) Fiscal Year (FY) 2015-2018 Transportation Improvement Program (TIP) and 2040 Regional Transportation Plan (RTP) for the New Castle County, Delaware portion of the PA-NJ-MD-DE 8-hour ozone and PA-NJ-DE fine particulate matter (PM_{2.5}) nonattainment areas.

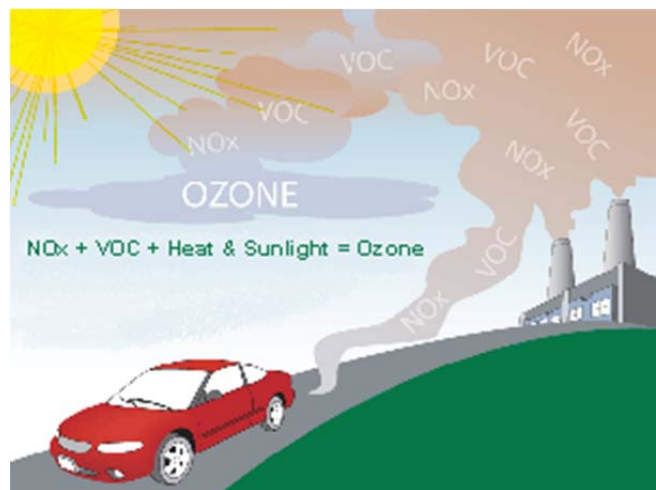
WILMAPCO is the Metropolitan Planning Organization (MPO) for New Castle County, Delaware and Cecil County, Maryland. It is designated by the governors of both states to plan for, coordinate, and program the many transportation investments in the region. Under federal law and regulation, all plans and programs that involve federal funds or are of regional significance must be reviewed and approved through WILMAPCO.

WILMAPCO is responsible for developing a Transportation Improvement Program (TIP) and a regional long-range transportation plan (RTP) in cooperation with the Maryland Department of Transportation (MDOT), the Delaware Department of Transportation (DelDOT) and affected transit operators. In accordance with federal planning requirements, a collaborative process has been developed wherein state, county and local governments and transportation providers are partners in the planning and programming process.

As the Federally-designated MPO for New Castle County, Delaware and Cecil County, Maryland, WILMAPCO is required by law to demonstrate that the RTP and TIP conform to the transportation emission budgets set forth in the Statewide Implementation Plan (SIP) for each state. If emissions generated from the projects programmed in the TIP and RTP are equal to or less than the emission budgets in the SIPs, then conformity has been demonstrated.

8-hour Ozone Background

Ozone is an odorless, colorless, gas and is created by a reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. While ozone in the stratosphere forms a protective layer, shielding the earth from the sun's harmful rays, ground level ozone is a key contributor to smog. Motor vehicle exhaust, industrial emissions, gasoline vapors, chemical solvents, and natural sources all contribute to NO_x and VOC emissions. Since ozone is formed in the presence of heat and sunlight, it is considered a summertime pollutant.



Ozone exposure is detrimental to public health. Ozone can irritate lung airways and cause inflammation similar to sunburn. Other symptoms include wheezing, coughing, and pain when taking a deep breath and breathing difficulties during exercise or outdoor activities. People with respiratory problems, children and the elderly are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high. Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses such as pneumonia and bronchitis.

In addition to adverse health effects, ground-level ozone also interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather. Furthermore, ozone damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas.

8-Hour Ozone National Ambient Air Quality Standards

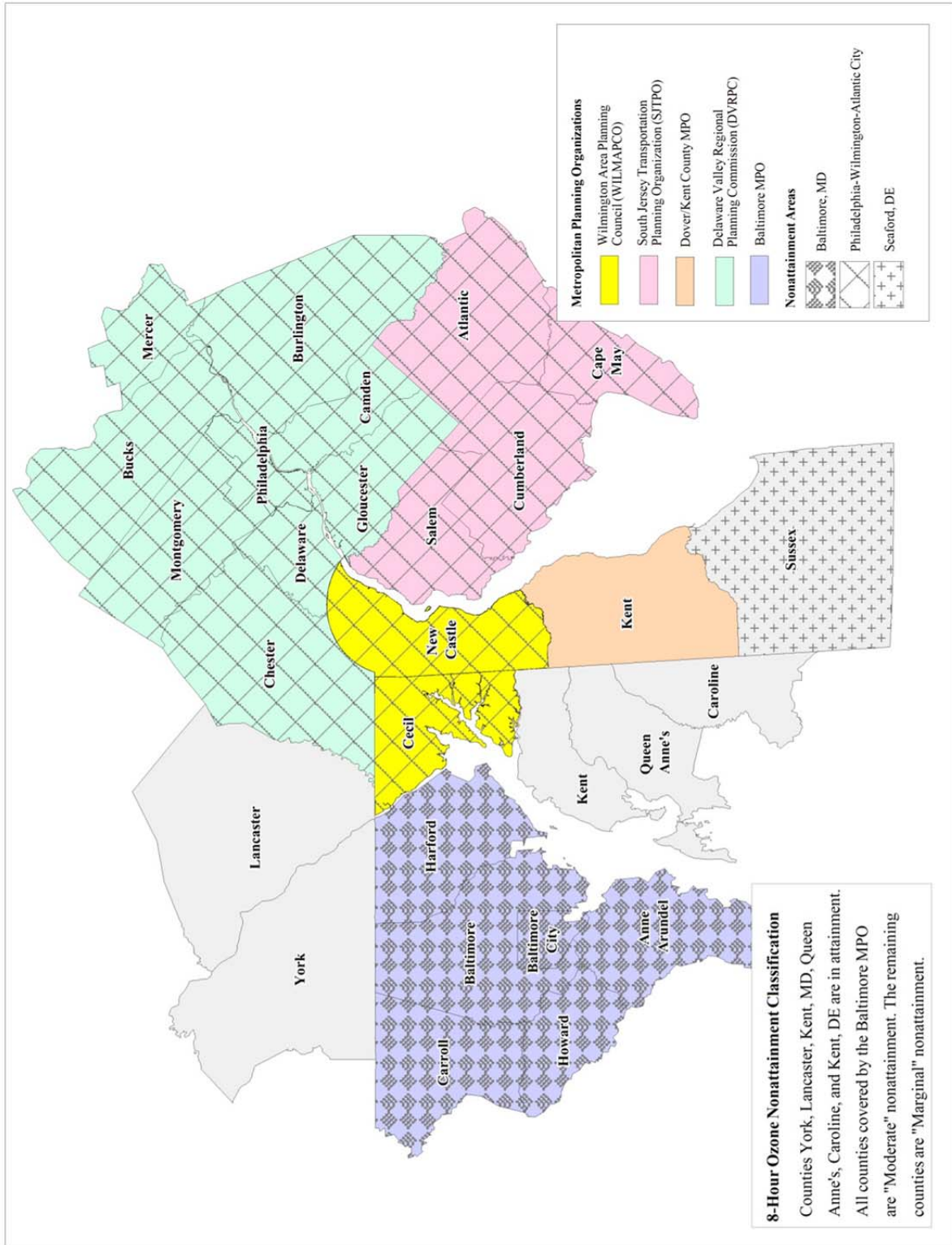
On May 21, 2012, EPA issued a final rule via the Federal Register (77 FR 30088) establishing initial air quality designations for the 2008 primary and secondary NAAQS for ozone. The 2008 standard is set at an 8-hour average concentration of 0.075 ppm and retains the same general form and averaging time as the 0.080 ppm NAAQS set in 1997. The effective date of the 2008 ozone standard designations was July 20, 2012.

Areas across the United States that have failed to meet the standards outlined above have been designated as nonattainment areas and, as a result, are subject to transportation conformity. Transportation conformity requires nonattainment and maintenance areas to demonstrate that all future transportation projects will not hinder the area from reaching and maintaining its attainment goals. In particular, the projects will not:

- *Cause or contribute to new air quality violations*
- *Worsen existing violations*
- *Delay timely attainment of the relevant NAAQS*

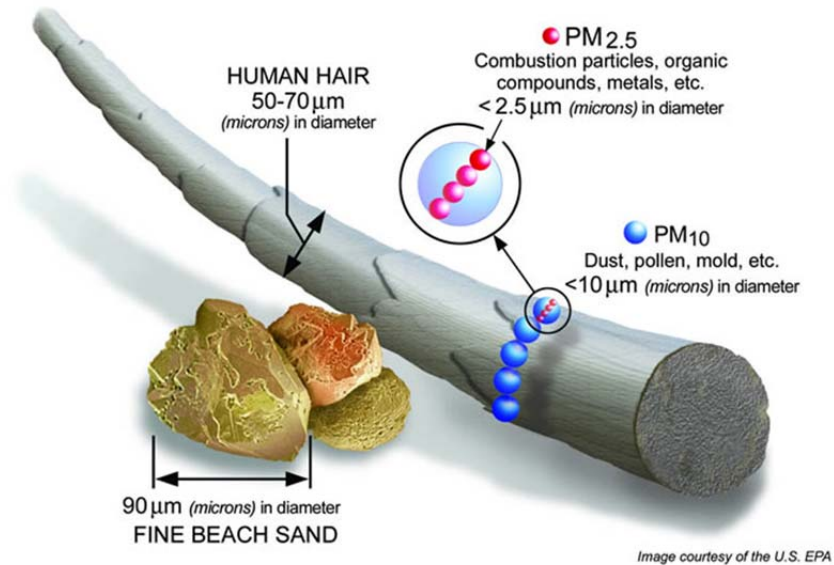
The PA-NJ-MD-DE area is classified as a marginal nonattainment area, resulting in an attainment date of December 31, 2015. It is made up of 16 counties spanning the states of Pennsylvania, New Jersey, Maryland and Delaware. The counties of Sussex and Kent, Delaware will no longer be included in the PA-NJ-MD-DE nonattainment area under the 2008 standard. Figure 1 illustrates the nonattainment areas.

Figure 1: Regional Ozone Nonattainment Areas



PM2.5 Background

Fine particulate matter (PM2.5 hereafter) is a mixture of microscopic solids and liquid droplets suspended in the air, where the size of the particles is less than 2.5 μm (or about one-thirtieth the diameter of a human hair). Fine particles can be emitted directly (such as smoke from a fire, or as a component of automobile exhaust) or be formed indirectly in the air from power plant, industrial and mobile source emissions of gases such as sulfur dioxide and nitrogen oxides.



The health effects associated with exposure to fine particles are significant. Scientific studies have shown significant associations between elevated fine particle levels and premature death. Effects associated with fine particle exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia. While fine particles are unhealthy for anyone to breathe, people with heart or lung disease, asthmatics, older adults, and children are especially at risk.

PM2.5 National Ambient Air Quality Standards

In July 1997, the EPA issued NAAQS for PM2.5, designed to protect the public from exposure to PM2.5 at levels that may cause health problems. That standard included two elements:

- 1) An annual standard set at 15 $\mu\text{g}/\text{m}^3$, based on a three year average of the annual mean PM2.5 concentrations, and

- 2) A 24-hour standard of $65 \mu\text{g}/\text{m}^3$, based on a three year average of the 98th percentile of 24-hour concentrations.

Areas need to meet both standards to be considered in attainment of PM_{2.5} NAAQS¹.

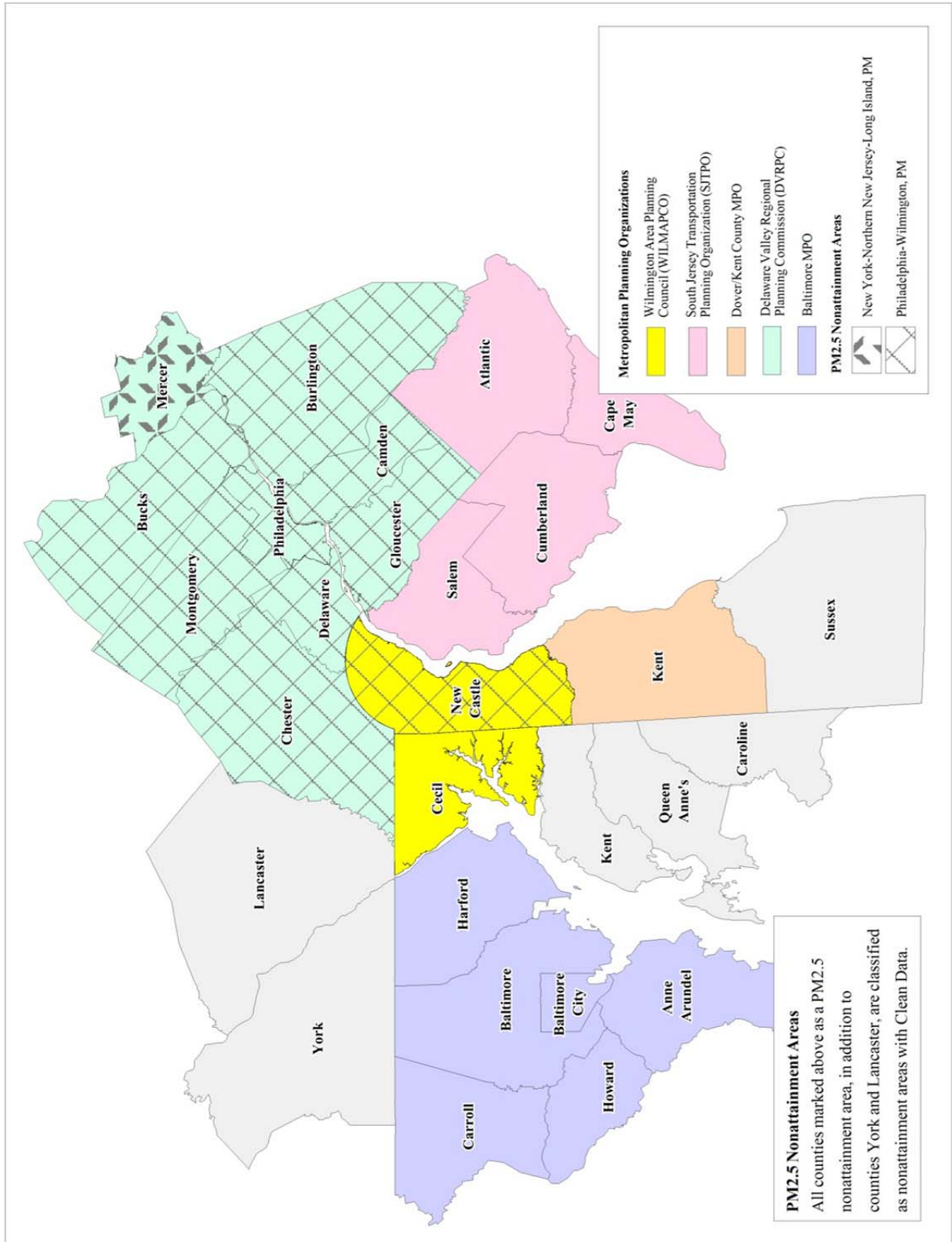
On April 5, 2005, EPA designations under the PM_{2.5} NAAQS became effective, under which the region consisting of New Castle County in Delaware, Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania, and Burlington, Camden and Gloucester counties in New Jersey were collectively designated as a nonattainment area. This region is known as the Philadelphia-Wilmington, PA-NJ-DE PM_{2.5} Nonattainment Area.

In December 2006, the EPA revised the 24-hour standard from $65 \mu\text{g}/\text{m}^3$ to $35 \mu\text{g}/\text{m}^3$. Three years later, in December 2009, the EPA designated the Philadelphia-Wilmington, PA-NJ-DE PM_{2.5} Nonattainment Area in nonattainment for the 24-hour standard. The October 2011 PM_{2.5} SIP's PM_{2.5} emission budget, calculated using the MOVES model, was found adequate for conformity purposes by EPA in December 2013.

Nine counties spanning the states of Pennsylvania, New Jersey and Delaware comprise the PA-NJ-DE PM_{2.5} nonattainment area for the 2006 24-hour standard. Figure 1 illustrates nearby nonattainment areas.

¹ Meeting the PM_{2.5} standards nationwide is estimated to prevent at least 15,000 premature deaths; 75,000 cases of chronic bronchitis; 10,000 hospital admissions for respiratory and cardiovascular disease; hundreds of thousands of occurrences of aggravated asthma; and 3.1 million days when people miss work because they are suffering from symptoms related to particle pollution exposure.

Figure 2: Regional PM2.5 Nonattainment Areas



Status of the 2040 RTP and FY 2015-2018 TIP

As the regional transportation-planning agency for Cecil County, Maryland and New Castle County, Delaware, WILMAPCO is charged with authoring a long-range transportation plan with at least a 20-year planning horizon. The RTP presents recommendations for enhanced transportation efficiency and functionality, including the construction of new facilities, improved connectivity to multiple travel modes, and the enhancement of existing highway, transit, and bicycle/pedestrian facilities. Transportation projects that address challenges faced by the region are identified in this plan and placed in the four-year TIP that corresponds to that project's development timetable.

The 2040 RTP and the Fiscal Year 2015 – 2018 TIP were created by the WILMAPCO staff and member agencies. The RTP was adopted by the WILMAPCO Council in January 2011 and received federal approval in March 2011. The TIP and an amended RTP will be formally adopted, along with this determination, in March 2014.

Interagency Consultation

As required by the federal transportation conformity rule (40 CFR 93.105) the conformity process includes a significant level of cooperative interaction among the federal, state and local agencies. Interagency consultation requirements include coordination with the local county representatives, the MPO and representatives from both state and federal agencies including:

- WILMAPCO
- Maryland Department of the Environment
- Maryland Department of Transportation
- Maryland SHA, MTA and MDTA
- Delaware Transit Corporation
- Delaware Department of Transportation
- Delaware Department of Natural Resources and Environmental Control
- Cecil County
- New Castle County
- FHWA
- EPA
- FTA

As part of the interagency consultation, the Technical Advisory Committee (TAC) and Air Quality Subcommittee (AQS) groups met and collaborated in order to achieve the following goals related to the transportation conformity process:

- Determine planning assumptions

- Develop a definitive list of future year projects to be analyzed
- Develop a format for presenting determination
- Develop and standardize the public participation process

Meeting minutes and notes are available at the following webpages:

- <http://www.wilmapco.org/aqs/>
- <http://www.wilmapco.org/tac/>

Determine Planning Assumptions

Ozone

The emissions resulting from the implementation of regionally significant transportation projects (those which do not qualify as exempt under 40 CFR 93.126 and 127) will be compared to the Delaware Department of Natural Resources and the Environmental Control's (DNREC) Motor Vehicle Emissions Budget (MVEB).

The ozone emissions budgets of record were developed by DNREC using the MOBILE6b model for 2009. The following budgets were used:

- VOC: 9.89 tons/summer day
- NOx: 19.23 tons/summer day

The EPA regulations, as outlined in the Final Transportation Conformity Rule, Section 93.118, require that emissions analyses for the following years:

- Attainment year
- A near-term year, one to five years in the future
- The last year of the RTP's forecast period
- An intermediate year or years such that analyses years are no more than ten years apart.

The following five analysis years were chosen for the ozone analysis:

- 2015 (near-term year and the attainment year)
- 2020 (interim year to keep analysis years less than ten years apart)
- 2030 (interim year to keep analysis years less than ten years apart)
- 2040 (WILMAPCO Plan horizon year)

As discussed above, ozone formation is a direct result of VOC and NOx emissions reacting with each other in the presence of sunlight. The EPA has ruled that both precursor emissions, VOC and NOx, must be included in a regional analysis of 8-hour ozone for transportation conformity.

PM2.5

PM2.5 can result from both direct and indirect sources. Gasoline and diesel on-road vehicles emit both direct PM2.5 and other gases that react in the air to form PM2.5. Transportation-related direct PM2.5 emissions can result from particles in exhaust fumes, from brake and tire wear, from road dust kicked up by vehicles, and from highway and transit construction. Transportation-related indirect PM2.5 emissions can result from one or more of several exhaust components, including nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulfur oxides (SO_x), and ammonia (NH₃).

For the regional analysis of direct PM2.5 emissions, the EPA has ruled that both exhaust and brake/tire wear must be included. However, EPA has ruled that regional emissions analyses for direct PM2.5 should include road dust only if road dust is found to be a significant contributor to PM2.5 by either the EPA Regional Administrator or a state air agency. For this nonattainment area, neither of the EPA Regional Administrators nor any of the three state air agencies have found that road dust is a significant PM2.5 contributor. EPA has also ruled that regional direct PM2.5 analyses need only include fugitive dust from construction of transportation projects if the SIP identifies these emissions as significant contributors to the regional PM2.5 problem. The current submitted PM2.5 SIP has not deemed construction-related dust as a contributor to the regional PM2.5 problem. Thus, the only components of direct PM2.5 emissions to be considered in the nonattainment area are tailpipe exhaust and brake/tire wear.

For the regional analysis of indirect PM2.5 emissions (also called PM2.5 precursors), the EPA has identified four potential transportation-related PM2.5 precursors: NO_x, VOCs, SO_x, and NH₃. The current PM2.5 SIP does not identify any precursors identified other than NO_x as a significant contributor of PM2.5 emissions in New Castle County.

The following PM2.5 pollutants and precursors were tested:

- Direct PM2.5 source: tailpipe exhaust, brake and tire wear
- PM2.5 Precursor: NO_x

The PM2.5 emissions budget of record were developed by DNREC using the MOVES model (described later) for 2012. The following budgets were used:

- Direct PM2.5 2012 budget: 199.0 tons/year (0.545 tons/day)
- Indirect (NO_x) PM2.5 2012 budget: 6,273 tons/year (17.19 tons/day)

EPA regulations require that emissions analysis be conducted for specific analysis years. Section 93.119(g) of the *Final Rule* states that these analysis years must include a near-term year (one to five years in the future), the last year of the long range plan, and an intermediate year or years such that analysis years are no more than 10 years apart. Additionally, the 2015 analysis year meets a conformity requirement to test conformity for the attainment year.

The following five analysis years were chosen for the PM2.5 analysis:

- 2015 (near-term year and the attainment year)
- 2020 (interim year to keep analysis years less than ten years apart)
- 2030 (interim year to keep analysis years less than ten years apart)
- 2040 (WILMAPCO Plan horizon year)

Travel Demand Modeling Methodology

The air quality analysis conducted for the FY 2015-2018 TIP and 2040 RTP used a series of computer-based modeling techniques. These techniques are consistent with methods WILMAPCO and DelDOT have used in conducting air quality analyses required by the CAA amendments, and are similar to those used by other state and regional transportation agencies in preparing air quality analyses. They are also consistent with the modeling procedures WILMAPCO and DelDOT have used assisting in the preparation of various SIP documents with the Delaware Department of Natural Resources and Environmental Control (DNREC).

Travel Demand Modeling

A travel demand model for Delaware, including New Castle County, is maintained by DelDOT. The model applies a variety of data regarding roadway network conditions, vehicular travel patterns, automobile ownership, and the location of population and employment sites. The model follows a five-step process of trip generation, distribution, mode split, assignment, and feedback that is commonly used throughout the transportation planning industry. The model components were processed through the CUBE Voyager software package. The primary products of the model used in the air quality analysis were estimated volumes and average speeds for each segment or “link” of the roadway system.

The modeling process developed for the FY 2015-2018 TIP and the 2040 RTP used a 2012 base year network validated against DelDOT traffic counts for 2011. Model networks were developed for the years 2015, 2020, 2030, and 2040 for New Castle County. The networks include the major capacity improvement projects that are expected to be in place and open to service during these years. The types of projects that are tested include enhanced transit service, highway widening (one lane or more) and/or new construction.

Demographic projections, including employment, households, and population, were developed for each of the analysis years through the WILMAPCO Data & Demographic Subcommittee. These forecasts were recommended by the Technical Advisory Committee (TAC) and were adopted by the WILMAPCO Council in July 2013.

Travel estimates were developed for this conformity analysis using a so-called “five-step travel demand” modeling process. The model follows the traditional five-step modeling approach that includes trip generation, trip distribution, mode split, assignment, and feedback. This type of process is required by Federal air quality conformity regulations, and is a set of planning tools commonly used among MPOs and State DOTs.

The travel demand modeling process uses two sets of primary input data. The first is socio-economic data for Traffic Analysis Zones (TAZ) for the New Castle County MPO region. Since the modeling process maintained for WILMAPCO by the Delaware DOT (Division of Planning) uses a single, integrated model of the Delaware/Maryland portion of the Delmarva Peninsula, WILMAPCO staff have developed a subcommittee process to estimate and manage demographic data for the TAZ in New Castle County. This demographic data generally consists of:

- 1) Population
- 2) Dwelling Units
- 3) Total Employment by Place of Work
- 4) Employment by Job Sector, by Place of Work
- 5) Total Employed Persons (Employment by Place of Residence)
- 6) Average Income
- 7) Income Quartiles
- 8) Average Vehicle Ownership
- 9) Vehicle Ownership Quartiles

For each TAZ, data for each of these items is obtained from the most recent census, updated as needed to the base year of the long range plan. For this conformity analysis, that means data from the 2010 Census was used with other locally obtained information to develop a set of TAZ estimates for 2013. Employment by place of work is not a product of the US Census, but the Demographics and Data Subcommittee used a series of local and state data sources to develop and achieve consensus on TAZ-based employment locations. The MPO subcommittee also developed demographic forecasts for each TAZ, for the horizon years of 2020, 2030, and 2040. Other years needed for the plan were obtained through interpolation.

The second primary travel model input is the so-called “travel network” representation of New Castle County roadways and streets. The network file stores the following data for each street segment:

- 1) Functional Class (or road type)
- 2) Number of Lanes
- 3) Lane Capacity
- 4) Posted Speed
- 5) Operating Speed
- 6) Average Peak Period Capacity (Lanes X Lane Capacity)

The current set of DelDOT/MPO travel demand models is typical of advanced TAZ-based travel models in use in the United States. DelDOT staff (with assistance from an engineering consulting firm) estimated these models using data from the 1997 – 2005 Delaware Travel Monitoring Survey (DTMS). The current TAZ-based models are referred to as aggregate demand models because they are applied at an aggregate, zonal level with extensive market segmentation.

As part of this plan update a review and process update of the modeling programs was performed by DelDOT staff, which added the 2005 – 2011 DTMS travel survey data to the modeling process.

The trip generation models include a precursor step, which disaggregates TAZ-based household data using workers per household, persons per household, and vehicles per household data from US Census PUMS, then applies cross classification-based trip generation rates to estimate productions and attractions for each TAZ, for several trip purposes including:

- 1) Home-Based Work (HBW)
- 2) Home-Based Local Shopping (HBLs)
- 3) Home-Based Regional Shopping (HBRs)
- 4) Home-Based Other (HBO)
- 5) Non-Home Based (NHB)
- 6) Journey-to-Work (JTW)
- 7) Journey-at-Work (JAW)
- 8) Trucks

The trip distribution models are standard gravity model formulations using trip length frequencies for each trip purpose, from the 1997 – 2011 DTMS.

The mode choice model used by DelDOT and the MPOs is a nested logic choice format. Non-motorized trips (separate modes for bicycle and walk) are included as an option in certain sets of model runs that are based on tax-parcel TAZ geography. Non-motorized trips are not currently modeled in the TAZ-based regional modeling process used for county-based conformity analyses.

The trip assignment procedures use network capacity-constrained equilibrium methods, which emphasize average weekday peak period congestion levels to allocate roadway volumes and speeds by time period of day. Four peak period times are used: AM, Midday, PM, and Offpeak. The process uses customized speed-flow delay curves representing freeway, arterial, collector, and local speeds separately.

The model process methods, as required by conformity regulations, incorporate full feedback from trip assignment back through trip distribution. The travel model was run in

the CUBE Voyager software package (Version 6.0.2) under license from the vendor, Citilabs.

In summary, the modeling process used a 2012 base year network validated against DelDOT traffic counts for 2011. Model networks were developed for 2015, 2020, 2030, and 2040 for New Castle County and for the Delaware/Maryland peninsula counties. Modeled transportation projects are listed in Table 1. The types of projects tested were corridor improvements, highway widening, and new roadway construction. Each project was added to the network in the year when the improvement was completed. Socioeconomic projects such as population, employment, and household size were developed for the same planning horizon years.

Table 1: Cecil and New Castle Counties' Regionally Significant Projects

<i>ID</i>	<i>Project</i>	<i>County</i>	<i>Model Year</i>
1	MD 213: Frenchtown Road to US 40 (two to four lane divided highway)	Cecil	2030
2	I-95: Susquehanna River to DE Line (add a lane in each direction, plus bridge expansion)	Cecil	2030
3	MD 272: US 40 to Lums Rd. (two to four lane divided highway)	Cecil	2040
4	I-95/SR 222 Interchange (two to four lanes on the SR 222 bridge)	Cecil	2040
5	SR 72, McCoy Road to SR 71 (two to four lanes)	NCC	2020
6	Road A / SR 7 Improvements (new lane in each direction)	NCC	2020
7	US 301: MD State Line to SR 1 & Spur (new four lane expressway, plus two lane spur)	NCC	2020
8	Christina River Bridge (new bridge)	NCC	2020
9	SR 1: Tybouts Corner to SR 273 (four to six lanes)	NCC	2020
10	SR 299, SR 1 to Catherine Street* (widening)	NCC	2020
11	Tyler McConnell Bridge, SR141: Montchanin Road to Alapocas Road (bridge expansion)	NCC	2030
12	SR 141/I-95 Interchange (expansion)	NCC	2030
13	US 40/SR 896 (grade separated intersection)	NCC	2030
14	Elkton Road, Maryland State Line to Casho Mill Road* (widening)	NCC	2030
15	SR 1: C & D Canal to Tybouts Corner* (widening)	NCC	2030
16	SR 4 (Christina Parkway): SR 2 to SR 896* (widening)	NCC	2030

**Redefined or resurrected projects – new to this analysis*

Emission Factor Estimate

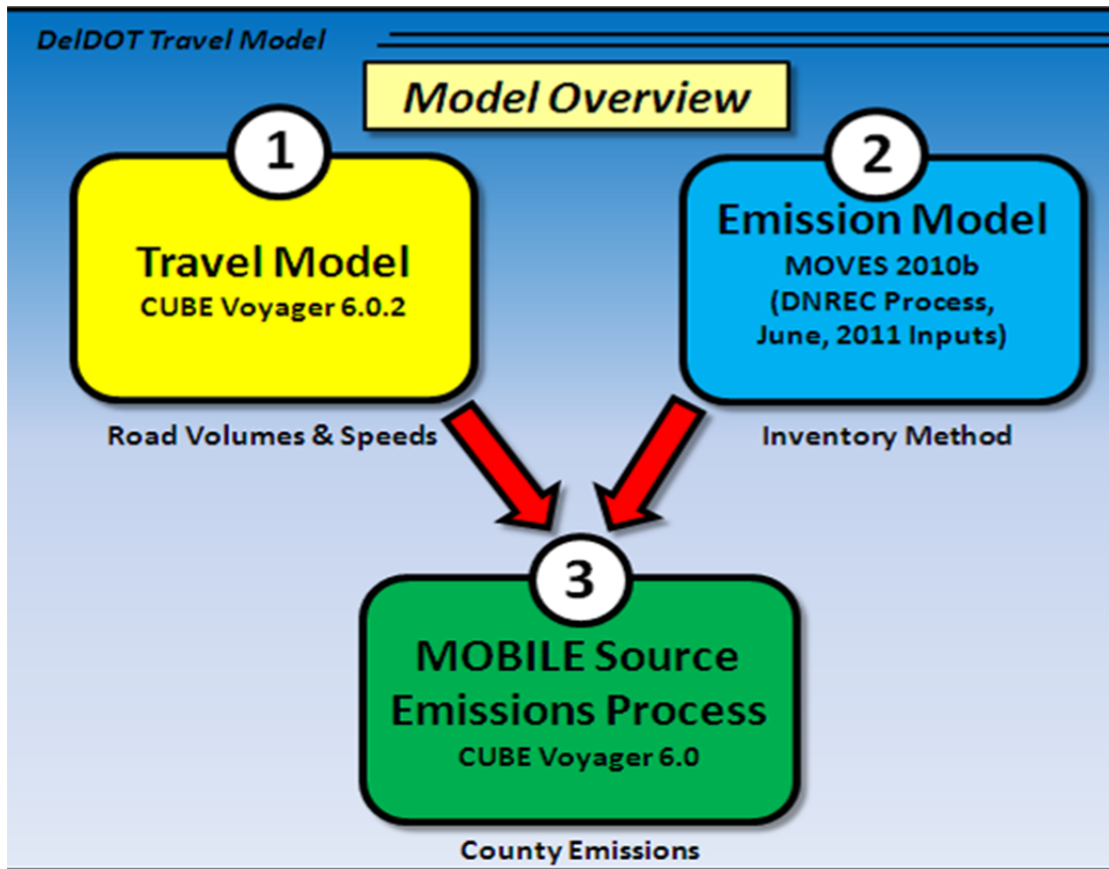
EPA's Office of Transportation and Air Quality (OTAQ) developed the **MO**tor **V**ehicle **E**mission **S**imulator (MOVES). Initial draft versions of the software were released in 2009. This is the required modeling software used in regional or countywide air quality analyses including transportation conformity analyses. The software replaces the previous EPA tool which was called MOBILE6.2. The MOVES software is required for use in conformity analyses after March 2013.

MOVES estimates emissions for mobile sources covering a broad range of mobile source pollutants and allows multiple scale analysis. The MOVES software produces estimates of emissions from cars, trucks and motorcycles.

Figure 3 presents an overview of the process used to generate travel model and emissions model data for this conformity analysis. The travel model software, CUBE Voyager, was arranged by DelDOT staff with consultant assistance to include the DNREC spreadsheet “MOVES inventory method” process for estimating mobile source emissions in New Castle County. Essentially, DNREC staff developed an Excel-based application of the MOVES inventory method for estimating mobile source emissions. That process was incorporated, step-by-step, into the CUBE Voyager software so that conformity analysis process is based directly on the DNREC application of the MOVES inventory method. A series of quality-control checks was performed by DelDOT and the consulting firm staff ensuring the CUBE-model generated emissions data accurately replicated the DNREC spreadsheet method.

Travel model link volumes are summed to countywide totals. Adjustment factors are then used to account for seasonal traffic variations and alignment of Delaware-based Vehicle Miles Traveled (VMT) estimates with the federally-required Highway Performance Management System (HPMS). HPMS data are used to standardize the Delaware specific VMT data as required by the EPA so that direct comparisons can be made among different years and modeling scenarios.

Figure 3: Overview of Travel Model – Emission Model Process for Conformity



Mobile Source Emissions Estimates

The estimates of emissions for New Castle County are generated jointly by DeIDOT and DNREC. The model post-processor takes data produced by CUBE Voyager model output for New Castle County and adjusts it for input into the MOVES mobile emissions process noted above. This process links the estimated roadway speeds and volumes generated by the travel demand model with emission trends derived from MOVES. The product of this process is countywide emission estimates presented in this document.

The VMT and emissions data for New Castle County were adjusted to be compatible with the data contained in the current SIPs. The adjustments represent factors to account for seasonal traffic variations and to align the travel demand estimates with DeIDOT's and the HPMS traffic level reporting system. These data were used to standardize the Delaware specific VMT data as required by the EPA so that direct comparisons can be made among different years and modeling scenarios.

Analysis Results

The results of the motor vehicle emissions budget tests are presented below in Tables 2 and 3 and 4. Table 2 presents the results of the budget tests for ozone emissions. Tables 3 and 4 present the results of the baseline and budget tests for PM2.5 emissions. All baselines and budget tests pass, demonstrating conformity.

Table 2: Ozone (VOC & NOx) Emissions Test Results – MVEB Test (tons/summer day)

VOC (tpsd)	<i>Modeled years</i>			
	2015	2020	2030	2040
Emissions	6.50	4.76	3.89	3.95
2009 Budget	9.89	9.89	9.89	9.89
Result	Pass	Pass	Pass	Pass

NOx (tpsd)	<i>Modeled years</i>			
	2015	2020	2030	2040
Emissions	15.19	9.57	7.17	7.39
2009 Budget	19.23	19.23	19.23	19.23
Result	Pass	Pass	Pass	Pass

Table 3: Annual PM2.5 Emissions Test Results – MVEB Test (tons/day)

Direct PM2.5 (tpy)	<i>Modeled years</i>			
	2015	2020	2030	2040
Emissions	175.9	131.5	115.3	121.4
2012 Budget	199.0	199.0	199.0	199.0
Result	Pass	Pass	Pass	Pass

Indirect (NOx) PM2.5 (tpy)	<i>Modeled years</i>			
	2015	2020	2030	2040
Emissions	5,519	3,511	2,646	2,719
2012 Budget	6,273	6,273	6,273	6,273
Result	Pass	Pass	Pass	Pass

Table 4: Daily PM2.5 Emissions Test Results – MVEB Test (tons/day)

Direct PM2.5 (tpd)	<i>Modeled years</i>			
	2015	2020	2030	2040
Emissions	0.482	0.360	0.316	0.332
2012 Budget	0.545	0.545	0.545	0.545
Result	Pass	Pass	Pass	Pass

Indirect (NOx) PM2.5 (tpd)	<i>Modeled years</i>			
	2015	2020	2030	2040
Emissions	15.12	9.62	7.25	7.45
2012 Budget	17.19	17.19	17.19	17.19
Result	Pass	Pass	Pass	Pass

2040 RTP and FY 2015-2018 TIP Conformity Determination

Financial Constraint

The planning regulations, Sections 450.322(b) (11) and 450.324(e) require the transportation plan 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. WILMAPCO has developed an estimate of the cost to maintain and operate existing roads and bridges in the MPO area and has compared that with the estimated revenues and maintenance needs of the new roads. WILMAPCO has found that the projected revenues are sufficient to cover the costs; therefore, satisfying the financial constraint requirement.

Public Participation

This conformity document has undergone the public participation requirements set forth in the Final Conformity Rule, and Final Statewide / Metropolitan Planning Rule. The draft document was made available for public review and comment beginning on January 13, 2014 and ending March 4, 2014. The public review and comment period was announced using the following outlets:

- Notices in the Delaware News Journal and Cecil Whig
- WILMAPCO website (www.wilmapco.org)
- WILMAPCO E-NEWS (monthly electronic newsletter)
- WILMAPCO Transporter (quarterly newsletter)
- TIP Public Workshop on February 24, 2014 from 4 PM to 7 PM at WILMAPCO

The documentation of the observed 30-day public comment period can be found in Appendix G of the TIP.

Appendices

Appendix A

Conformity Question Checklist

Table A-1: Conformity Questions Matrix

SECTION OF 40 CFR PART 93	CRITERIA	YES / NO	COMMENTS
<i>GENERAL CRITERIA APPLICABLE TO BOTH PLAN AND TIP</i>			
93.11	Are the conformity determinations based upon the latest planning assumptions ?	Yes	The conformity determination uses the most recent available information including recent demographics and vehicle registration.
	(a) Is the conformity determination, with respect to all other applicable criteria in §§93.111 - 93.119, based upon the most recent planning assumptions in force at the time of the conformity determination?	Yes	Population, housing and land use data inputs for the Travel Demand Model were updated in July 2013. Vehicle fleet data for 2013 was utilized in the conformity determination.
	(b) Are the assumptions derived from the estimates of current and future population, employment, travel, and congestion most recently developed by the MPO or other designated agency? Is the conformity determination based upon the latest assumptions about current and future background concentrations?	Yes	Transportation demand end emissions modeling assumptions are developed by the DE Dept of Transportation in conjunction with WILMAPCO and other local, state and federal representatives as part of the consultation process. Standard procedures for projecting future demographics are outlined in the Plan.
	(c) Are any changes in the transit operating policies (including fares and service levels) and assumed transit ridership discussed in the determination? (d) The conformity determination must include reasonable assumptions about transit service and increases in transit fares and road and bridge tolls over time.	Yes	Reasonable assumptions have been made with regard to transit fares and operating policies (fare and service levels). No changes to transit fare policy are anticipated for the duration of the Plan. Changes to service levels for fixed route service in New Castle County are not anticipated for the duration of the plan. It is reasonable to assume they will remain constant. Road and bridge tolls are not expected to increase over the life of the Plan.

SECTION OF 40 CFR PART 93	CRITERIA	YES / NO	COMMENTS
	(f) Key assumptions shall be specified and included in the draft documents and supporting materials used for the interagency and public consultation required by §93.105.	Yes	Key planning assumptions are included and explained in the conformity determination document and agreed upon by all participating parties through the interagency consultation process. The conformity document has been made available for public review for the required 30 day period.
93.111	Is the conformity determination based upon the latest emissions model?	Yes	EPA's latest emission model, MOVES, was used for this conformity analysis.
	Did the MPO make the conformity determination according to the consultation procedures of the conformity rule or the state's conformity SIP?		WILMAPCO conducted the conformity determination in accordance with the consultation procedures of the conformity rule.
TRANSPORTATION PLAN			
93.106(a) (1)	Are the Horizon Years correct?	Yes	Analysis horizon years included 2015, 2020, 2030 and 2040. These represent the appropriate horizon years for the 8-hour ozone and PM2.5 NAAQS conformity determination.
93.106(a) (2)(i)	Does the plan quantify and document the demographic and employment factors influencing transportation demand?	Yes	Socioeconomic data including population, retail and non retail employment and number of households are included in the body of the conformity document
93.106(a) (2)(ii)	Is the highway and transit system adequately described in terms of the regionally significant additions or modifications to the existing transportation network which the transportation plan envisions to be operational in the horizon years?	Yes	The regional modifications to the highway and transit systems are documented within the conformity determination report and included in the emissions analysis.
93.108	Is the Transportation Plan Fiscally Constrained?	Yes	The transportation plan is in complete agreement with the State's FY 2014 to 2019 Capital Improvement Plan.
93.113(b)	Are TCMs being implemented in a timely manner?	N/A	There are no TCMs included in the Plan.
93.118	For Areas with SIP Budgets: Is the Transportation Plan, TIP or Project consistent with the motor vehicle emissions budget(s) in the applicable SIP?	Yes	Emission totals calculated for each analysis years were tested against the 2009 SIP budgets for ozone and the 2012 PM2.5 budget.

Appendix B

Conformity Results
Detailed VMT and Emissions
By County
By Functional Class
By Analysis Year

Table B-2: Detailed Emission Results

New Castle County Annual PM2.5 and Nox Emission (Tons)

Month	2012			2015			2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
1	314.40	660.79	23.60	242.39	490.53	18.73	164.25	314.09	14.81	117.51	238.81	13.43	115.06	244.84	14.12
2	286.68	610.29	21.19	214.84	449.26	16.64	150.64	289.56	13.16	106.31	218.05	11.83	106.91	225.33	12.51
3	274.02	659.10	21.25	210.47	489.13	16.44	147.74	312.87	12.61	114.47	237.46	11.26	114.43	243.65	11.85
4	251.00	642.67	18.96	191.27	474.69	14.25	137.71	300.82	10.52	110.53	226.06	9.17	111.09	231.93	9.65
5	244.18	641.03	18.72	186.48	474.74	13.87	135.94	301.80	10.02	112.43	227.41	8.61	114.56	233.58	9.06
6	243.46	580.73	16.64	185.83	428.93	12.10	136.61	270.43	8.50	111.60	202.43	7.15	113.13	208.35	7.51
7	255.36	582.23	16.89	194.90	430.08	12.26	143.30	270.83	8.60	116.44	202.61	7.22	117.78	208.61	7.59
8	249.85	619.22	17.59	190.66	457.29	12.81	140.08	288.60	9.02	114.88	216.20	7.59	116.64	222.49	7.98
9	229.64	567.15	16.07	175.59	419.22	11.73	129.04	264.61	8.29	106.84	197.92	7.01	108.89	203.33	7.37
10	238.82	591.02	17.61	183.00	439.10	13.23	132.47	280.24	9.76	108.83	211.72	8.50	110.63	217.12	8.94
11	260.62	620.24	19.82	199.45	460.32	15.32	139.57	294.20	11.72	109.04	223.03	10.46	109.46	228.73	11.00
12	309.54	682.20	23.50	237.18	505.38	18.50	161.58	322.64	14.49	117.83	244.65	13.09	115.91	250.91	13.77
Total	3157.56	7456.67	231.85	2412.06	5513.67	175.88	1718.94	3510.67	131.51	1346.71	2646.37	115.33	1354.48	2718.87	121.35

New Castle County Summer Weekday Ozone & PM2.5 Emission (Tons)

Month	2012			2015			2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
6	8.513	20.562	0.595	6.485	15.179	0.433	4.752	9.564	0.305	3.882	7.163	0.258	3.941	7.380	0.272
7	8.632	19.956	0.584	6.575	14.734	0.425	4.819	9.272	0.298	3.916	6.942	0.252	3.967	7.156	0.266
8	8.463	21.211	0.608	6.445	15.656	0.444	4.720	9.875	0.313	3.870	7.401	0.265	3.935	7.623	0.280
Average	8.536	20.576	0.596	6.502	15.190	0.434	4.764	9.570	0.306	3.889	7.169	0.258	3.948	7.386	0.272

Table B-2: VMT by Vehicle Type

New Castle County Annual VMT by Vehicle Type

HPMSVTypeID	2012 HPMS Annual VMT	2015 HPMS Annual VMT	2020 HPMS Annual VMT	2030 HPMS Annual VMT	2040 HPMS Annual VMT
Motorcycles	38,191,711	39,870,067	42,917,305	46,553,283	49,997,974
Passenger Cars	2,364,918,462	2,468,846,110	2,657,538,099	2,882,686,194	3,095,989,393
Other 2 axle-4 tire vehicles	2,679,177,959	2,796,915,914	3,010,682,023	3,265,748,666	3,507,396,418
Buses	31,990,137	33,395,962	35,948,389	38,993,957	41,879,299
Single Unit Trucks	48,155,389	50,271,604	54,113,824	58,698,377	63,041,739
Combination Trucks	129,644,155	135,341,439	145,685,480	158,028,034	169,721,255
Total	5,292,077,814	5,524,641,095	5,946,885,120	6,450,708,510	6,928,026,078

Table B-3: Vehicle Population

New Castle County Vehicle Population

sourceTypeName	2012 Source Type Population	2015 Source Type Population	2020 Source Type Population	2030 Source Type Population	2040 Source Type Population
Motorcycle	13288	13354	13656	14544	15005
Passenger Car	228892	236569	241930	257661	265816
Passenger Truck	146087	153604	157085	167299	172594
Light Commercial Truck	48112	50545	51690	55051	56793
Intercity Bus	189	191	195	208	215
Transit Bus	567	573	586	624	644
School Bus	988	946	968	1031	1063
Refuse Truck	73	75	77	82	85
Single Unit Short-haul Truck	2948	3059	3128	3332	3437
Single Unit Long-haul Truck	208	216	220	235	242
Motor Home	360	375	383	408	421
Combination Short-haul Truck	1149	1183	1210	1288	1329
Combination Long-haul Truck	865	889	909	968	999

Table B-4: VMT by Functional Classification

New Castle County Average Daily VMT by Functional Classification

Functional Class	2012 HPMS Adjusted VMT	2015 HPMS Adjusted VMT	2020 HPMS Adjusted VMT	2030 HPMS Adjusted VMT	2040 HPMS Adjusted VMT
PA-rural	1,128,921	1,244,752	1,462,055	1,728,853	1,987,597
Minor Arterial-rural	274,518	308,330	327,372	388,254	432,400
Major collector-rural	178,772	197,037	203,285	255,580	295,407
Minor collector-rural	51,930	58,280	64,232	82,744	96,701
Local-rural	222,573	249,788	301,723	367,547	426,525
Interstate-urban	3,366,585	3,484,636	3,694,092	4,004,832	4,297,545
Freeway-urban	617,102	668,366	810,779	909,063	983,058
PA-urban	3,695,617	3,834,270	4,047,848	4,294,331	4,509,825
Minor Arterial-urban	1,460,282	1,513,726	1,578,574	1,670,208	1,726,640
Major collector-urban	1,223,632	1,280,057	1,328,229	1,453,014	1,582,470
Local-urban	2,239,297	2,296,762	2,430,132	2,518,748	2,590,865
Total	14,459,229	15,136,004	16,248,321	17,673,174	18,929,033

Appendix C

Interagency Consultation

For a collection of meeting notes, please visit:

wilmapco.org/aqs

Appendix D

Public Participation Materials

Please visit:

wilmington-air.org/tip

wilmington-air.org/aa
