Wilmington Area Planning Council

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Newark, Delaware 19711
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From Cecil County: 888-808-7088
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MEMORANDUM

To: Members of WILMAPCO's Air Quality Subcommittee (AQS) & Delaware's Transportation Conformity Interagency Consultation Working Group

From: Bill Swiatek, Principal Planner

Date: February 7, 2019

Re: **Air Quality Subcommittee & Delaware's Transportation Conformity Interagency Consultation Working Group**

Date: Thursday, February 14, 2019
Time: 10:00 a.m.
Place: WILMAPCO Conference Room

REMOTE ACCESS
Via Phone: USA Toll-Free 888-557-8511,
Access Code: 5660767#

Via WebEx meeting: wilmapco.webex.com/join/selcock,
Meeting Number: 888-557-8511, Access code: 5660767#

A G E N D A

1. **Acceptance of the notes from the December 20, 2018 meeting**

2. **Amendments to the WILMAPCO FY 2019-2022 TIP – *B. Swiatek***
   The AQS will review a pair of TIP amendments for conformity triggers.

3. **WILMAPCO's 2050 RTP Air Quality Technical Scoring – *B. Swiatek***
   The group will review draft air quality scores for several RTP projects.

4. **WILMAPCO's 2050 RTP/FY 2020-2023 TIP Conformity Determination – *B. Swiatek***
   The group will adopt the draft 2050 RTP conformity determinations (www.wilmapco.org/aq).

5. **D/KC MPO's 2040 MTP/FY 2019-2022 TIP Conformity Determination – *J. Galvin***
   The group will review the draft 2040 MTP conformity determination.

6. **Other**

TECHNICAL ADVISORY COMMITTEE AND
AIR QUALITY SUBCOMMITTEE MEETING
December 20, 2018

A joint meeting of the Technical Advisory Committee (TAC) and Air Quality Subcommittee (AQS) was held on Thursday, December 20, 2018, at WILMAPCO, The Tower at STAR Campus, 100 Discovery Boulevard, Suite 800, Newark, DE 19713.

1. CALL TO ORDER: Mr. Dahlstrom, TAC Chairperson, brought the TAC meeting to order at 10:00 a.m.

2. TAC Members present:
Ian Beam, Maryland Department of Transportation
David Dahlstrom, Maryland Department of Planning
Tony Di Giacomo, Cecil County Land Use and Development Services
Mike Fortner, City of Newark Planning and Development Department
Gwinneth Kaminsky, City of Wilmington Planning and Development
David Mathe, Delaware Division of Small Business, Development, and Tourism
Stephen Miller, Maryland State Highway Administration
Jeanne Minner, Town of Elkton
Brian Mitchell, City of Wilmington Department of Public Works
Molla Sarros, Maryland Department of the Environment (via conference call)
Jolyon Shelton, Delaware Department of Natural Resources and Environmental Control
Catherine Smith, Delaware Transit Corporation
Joshua Thomas, Delaware Department of Transportation

TAC Ex-Officio Members present:
Lindsay Donnellon, U.S. Federal Highway Administration (via conference call)

TAC Members absent:
Delaware Office of State Planning Coordination Delaware River and Bay Authority
Maryland Transit Administration
New Castle County Department of Land Use

TAC Ex-Officio Members absent:
Amtrak
Diamond State Port Corporation
U.S. Environmental Protection Agency
U.S. Federal Transit Administration

AQS Members Present
Kevin Black, FHWA (via conference call)
Tony Di Giacomo, Cecil County Land Use and Development Services
Lindsay Donnellon, U.S. Federal Highway Administration (via conference call)
Jolyon Shelton, DNREC
Catherine Smith, Delaware Transit Corporation
Molla Sarros, Maryland Department of the Environment (via conference call)
Colleen Turner, MDOT (via conference call)

Guests and Invitees:
Benjamin Allen, MDOT SHA
Scott Flanigan, Cecil County Department of Public Works
Kevin Racine, Citizen

Staff:
Dan Blevins, Principal Planner
Janet Butler, Administrative Assistant
Heather Dunigan, Principal Planner
Dave Gula, Principal Planner
Jacob Thompson, Transportation Planner
Tigist Zegeye, Executive Director (via conference call)

Minutes prepared by: Janet Butler

3. MINUTES
Correction to the November 15, 2018 minutes: Ian Beam, MDOT, attended the TAC/AQS meeting via conference call.

ACTION: On motion by Mr. DiGiacomo and seconded by Ms. Kaminsky, the TAC approved the November 15, 2018 minutes with correction.

Motion passed. **(12-20-18 - 01)**

4. Subcommittee Updates - None

5. Public Comments - None

ACTION ITEMS:

6. To recommend amendment of the FY 2019-2022 Transportation Improvement Program (TIP)
Ms. Dunigan said this amendment would fund replacement of the Cecil County Bridge CE-0042, Mechanics Valley Road over CSX Railroad, which is in poor condition and is functionally obsolete, with a new modern bridge on a new alignment that will also improve the intersection of Mechanics Valley Road and Bouchelle Road. The funding is for construction dollars.

ACTION: On motion by Mr. Beam and seconded by Mr. DiGiacomo, the TAC recommended amendment of the FY 2019-2022 TIP to add the Mechanics Valley Road Bridge CE0042 over CSX Replacement Project.

Motion passed. **(12-20-18 - 02)**

7. To recommend release of the Draft 2050 Regional Transportation Plan (RTP) and FY 2020-2023 TIP Air Quality Conformity Determination for Public Comment
Ms. Zegeye said that Cecil County Air Quality Conformity Determination shows that VOC and NOX are well under the budget. The New Castle County document shows that VOC, NOX, and PM2.5 Direct and PM2.5 Indirect are also well under budget. The public comment period will be January 14-March 6, 2019, and the document will be available at the WILMAPCO “Our Town” event, on Thursday, February 7, 2019, from 4:00 to 7:00 p.m. at the STAR Campus Atrium.

Mr. Shelton asked regarding the draft text that was highlighted in yellow in the Cecil County document where the WILMAPCO Council formally adopted the TIP and RTP on March 14, 2019, if this draft text should also be added to the New Castle County document. Ms. Zegeye replied yes the text would be added to the New Castle County document.

ACTION: On motion by Ms. Kaminsky and seconded by Ms. Minner, the TAC recommended release of the Air Quality Conformity Determination for the 2050 RTP and FY2020-2023 TIP for Cecil County and New Castle County.

Motion passed. **(12-20-18 - 03)**

8. To recommend release of the Draft 2050 RTP for Public Comment

Ms. Zegeye distributed the 2050 RTP and TIP Schedule **(Attachment A)**. The update of the 2050 RTP started with the Regional Progress Report and staff completed the Public Opinion Survey. A draft project list and the AQ Conformity Determination document were also developed. Staff is presenting the 2050 RTP to municipalities, counties and civic organizations.

Typically, WILMAPCO staff publicizes the RTP in WILMAPCO's Transporter newsletter and E-News, sends out press releases, participates in radio interviews, and holds the "Our Town" event, during the public comment period.

In addition, the public outreach process for this document includes a Metroquest survey that was conducted with 470 participants that received 353 comments. Staff also held a Virtual Workshop where 125 participants registered, and 75 people attended.

Popup events have been held at the Wilmington Train Station and the Christiana Mall. Popups will also be held at the Perryville Train Station and the Wilmington Public Library. Staff is also expecting to setup popups at either grocery stores or community centers. Staff welcomes TAC and AQS input on any additional areas to hold these presentations and popup events.

The "Our Town" event will be held on Thursday, February 7, 2019, at the STAR Tower Atrium from 4:00 p.m. to 7:00 p.m. Concerning social media outreach on the virtual workshop, we got 155 event responses, 10,900 individuals saw the advertisement, and 49 liked, commented, or shared the RTP information.

Ms. Zegeye distributed maps of Financially Constrained Projects **(Attachment B).** She asked members to provide comments before March 6, 2019. Ms. Sarros asked what was different in the handout other than what was provided in the packet. Ms. Dunigan said the only updates are the maps; however, the projects are the same.

ACTION: On motion by Mr. Fortner and seconded by Ms. Kaminsky, the TAC recommended release of the 2050 RTP for Public Comment.

Motion passed. **(12-20-18 - 04)**

9. To recommend release of the Draft FY 2020-2023 TIP for Public Comment

Ms. Dunigan said proposed new projects are:

- Glasgow Avenue: SR896 – Implements the Glasgow Avenue Study completed last year by WILMAPCO.
- Southbridge Transportation Network – Improves access from the Southbridge Neighborhood to the Wilmington Riverfront.
- SR2/ Harmony Road Intersection – Part of the Churchman's Crossing Corridor project that will improve safety and capacity.
- SR 7 Median Barrier Replacement project – A preservation project.
- SR 896, from US 40 – I-95 Widening – Adds one lane in each direction and improves bike, pedestrian, transit, and multiuse pathways.
- Tyler McConnell Bridge, SR 141: Montchanin Road – Alapocas Road – A four-lane structure over the Brandywine River, which will relieve congestion and improve safety.
- US 40 and SR 7 Intersection – Provides safety and pedestrian improvements.
- I-95 Belvedere Road Interchange – A public/private partnership and Cecil County received a grant for $20 million dollars for this $54-million dollar project.

The Public Comment Period for the TIP matches the RTP comment period. At the Our Town event the FY 2020-2023 TIP and 2050 RTP will be available for review. Ms. Dunigan distributed the Draft WILMAPCO Quick TIP Guide **(Attachment C).** In the TIP Quick Guide, the maps and financial summaries with revised Maryland numbers will be updated prior to the start of the public comment period.

Mr. Shelton suggested that the font on the front page of the Quick TIP Guide should be enlarged so that the public could better understand what WILMAPCO is asking them to do.

ACTION: On motion by Mr. Thomas and seconded by Ms. Minner, the TAC recommended release of the FY 2020-2023 TIP for public comment.

Motion passed. **(12-20-18 - 05)**

10. To recommend endorsement of the 2018 Inter-Regional Report

Mr. Thompson said the last update of the Inter-Regional Report was completed in 2012. The current 2018 Inter-Regional Report utilizes new Census data, as well as the Federal Highway Administration, MPO, County Planning Department, and transit provider data. It includes detailed maps and analysis including recalculated projections through 2045, detailed transit and highway data, and updated transit service feasibility scoring. The report is intended to be a technical tool to guide transportation investments and informed decision making, with cross-border coordination.

The report includes some of the major findings regarding demographics with population and employment change, environmental indicators, traffic volumes, travel speeds, volume to capacity ratios, Level of Service (LOS), commute times, freight and goods movement, portable transit scores, transportation investment areas, and interregional projects. The report concludes with recommendations on page 48.

Some of the key findings are that by 2040 the overall population is projected to increase by 11.8%, while employment is expected to grow by 9.9%. From 2012 to 2045, total traffic and truck volumes are projected to rise by 53% and 55% respectively. In the past decades, travel speeds have decreased in metropolitan areas and increased in rural areas. Congestion is

expected to significantly impede traffic flows throughout the region by 2045, with a 65% increase in the number of roadways reaching or exceeding their carrying capacity.

Mr. DiGiacomo suggested that on page 4, in the "Who is WILMAPCO" section that it include different language that shows that we are embracing completing the plan rather than we are doing it because we are being forced to do it. He suggested on page 8 to add maps; and he suggested on page 9 that the urban areas not be highlighted in green, because green highlighting should indicate rural areas. He added on page 24, Figure 12 and on page 29, Figure 16 shows some of the increased volumes; however, he is unsure where funds are being invested.

Mr. Dahlstrom said on page 44, in figure 27, in the center it says: "fill in the gap", and he was not sure if that is a placeholder. In addition, there is no legend for three corridors. Ms. Zegeye said on page 44, "fill in the gap" refers to the rail gap between Perryville and Newark.

ACTION: On motion by Mr. DiGiacomo and seconded by Ms. Smith, the TAC recommended endorsement of the 2018 Inter-Regional Report.

Motion passed. **(12-20-18 - 06)**

PRESENTATION/DISCUSSION ITEMS:

11. Cecil County Strategic Highway Safety Plan (SHSP)

Mr. Scott Flanigan, Director of Cecil County Public Works, said in each of the last five years 500 deaths and 3,700 serious injuries occurred statewide in Maryland due to motor vehicle crashes. There was an average of 17 deaths and 85 serious injuries in Cecil County. The numbers have increased. In 2017, there were 31 traffic-related fatalities in Cecil County. Maryland. Therefore, Secretary of Transportation Pete Rahn required County – level plans to be developed; and by September 2017 the Cecil County SHSP Committee was formed.

The Statement of Purpose of the Committee is to develop and oversee the implementation of a County-level Strategic Highway Safety Plan to complement the state-level plan with the goal of reducing the frequency and severity of motor vehicle crashes, including those involving bicyclists and pedestrians, which occur on roadways in Cecil County. The following four E's of Highway Safety are included in the plan: 1) Engineering; 2) Enforcement; 3) Education; and 4) Emergency Medical Services.

The timeline for developing the plan includes a Kickoff Meeting (September 17), Monthly SHSP Committee Working Meetings (October 17-April 18), MHSO SHSP Workshop (November 17), Public Meeting (April 18), and Develop Draft SHSP (May 18-August 18). The timeline also includes to present the plan to the Cecil County Executive, coordinate the plan with county fire chiefs and law enforcement officials, and finalize and publish the plan (September 18).

Mr. Flanigan said for decreasing fatalities what is measured is what is improved. Types of measurements include metrics-serious injuries; interim-yearly targets; serious injuries, and non-motorized fatalities.

Seven emphasis areas that are not in priority order include 1) Aggressive driving; 2) Distracted driving; 3) Impaired driving; 4) Occupant protection; 5) Highway infrastructure; 6) Pedestrians and bicyclists; 7) Responder, worker safety, and protection. The plan identified 20 action items, including four in Engineering, eight in Enforcement, and eight in Emergency Medical Services.

The Cecil County SHSP Executive Council provides executive-level leadership; reviews progress; evaluates resource requirements; and provides strategic guidance. Membership includes the County Executive (Co-Chair); Cecil County Sheriff (Co-Chair); Health Officer; Director of Emergency Services; MDOT SHA District Engineer; MSP North East Barrack Commander; and Director of Public Works (Secretary). Meeting frequency is annual.

The purpose of the SHSP Steering Committee is to monitor implementation of the SHSP action items, prepare and present an annual update to the Executive Council and work to publicize the annual update to inform the public and other stakeholders of progress made to date. Membership includes the CCSO Director of Law Enforcement (Co-Chair), Director of Public Works (Co-Chair) and members of the SHSP Functional Area working groups. Meeting frequency is quarterly.

The Cecil County SHSP Functional Area Working Groups implements the SHSP action items and tracks and reports the action item metrics to the steering committee, for inclusion in the annual update to the Executive Council. Membership includes engineering working group members, enforcement working group members, and emergency medical services working group members. Meeting frequency is as needed. The path forward includes implementation (October 18); Executive Council Meeting (May 19); and Initiate the Process to Develop the 2021-2025 Cecil County SHSP.

Mr. Dahlstrom asked if an annual update will be published and can it be shared with WILMAPCO. Mr. Flanigan responded yes, a progress report would be given to the Cecil County Executive and to WILMAPCO.

INFORMATION ITEMS:

12. Staff Report

Ms. Dunigan reported on the following plans and events:

- Please park in the visitor parking spaces here, at the STAR Campus, so that you will not get a ticket.
- The 2050 RTP public outreach is continuing with presentations and popup events through March 2019 to municipalities and community groups. TAC members are welcome to submit any suggestions for additional community groups for 2050 RTP Update presentations or for additional popup locations. Please let Janet Butler know, since she is scheduling them.
- The WILMAPCO “Our Town” event will be held on Thursday, February 7, 2019, at the Atrium of the STAR Campus from 4:00 p.m. to 7:00 p.m. Registration and flyers are available.
- The New Castle County Bicycle Plan meeting that is collaborating with Delaware Greenways was held at the Brandywine Library on December 11, 2018.
- On December 13, 2018, the Town of Elsmere held a 2050 RTP Update meeting. Staff will try to schedule additional town meetings in the New Castle and Hockessin areas. Other locations are welcome.
- Staff attended the City of Newark Sustainability Plan Public Workshop on October 16, 2018.
- On January 22, 2019, WILMAPCO staff will attend a meeting with DVRPC, Penn DOT, and DelDOT regarding East Coast Greenway implementation at the Pennsylvania/Delaware Line. This project includes paving Route 13 in 2020.
- Staff attended the Newark Regional Transportation Center Study Phase I calls/meetings. The project team completed construction on December 11, 2018, including the Access Road

at South College Avenue. The Phase 2 contract was awarded and construction will be in the spring 2019, which includes the main train station building.

- On January 16, 2019, a Maryland Monroe/MLK Stakeholder meeting will be held.
- On January 7, 2019, the 12th Street Alignment Study Public Open House will be held at the Fletcher H. Brown Boys and Girls Club.
- The Concord Pike Master Plan Stakeholder Focus Group Interviews were held on November 15 and 16, 2018. The information will be used to draft concepts for the corridor. A live Wiki Map survey is available on the WILMAPCO website.
- A Southern New Castle County (SNCC) Visioning Workshop will be held in late January 2019. The Next SNCC Advisory Committee meeting will be held on January 17, 2019.
- The Union Street Reconfiguration Project has a spin-off project that is reviewing Pennsylvania Avenue and North Union Street concepts that will be available to the public for review in January 2019.

13. Informational Videos

Mr. Gula announced that Mr. Mark Tudor is retiring from DelDOT. Mr. Gula congratulated Mr. Tudor on his many years of excellent service working with WILMAPCO staff on various projects. Mr. Tudor also expressed his appreciation of working with WILMAPCO and other TAC and AQS members during these years.

OTHER BUSINESS:

ADJOURNMENT:

The meeting adjourned at 11:15 a.m., followed by a networking.

Attachments (3)

WILMAPCO

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TRANSPORTATION IMPROVEMENT PROGRAM AMENDMENT FORM

This form must be completed and all questions must be answered in order to process this request.

Date of Submission: 1/31/19

TIP to be Amended: FY2019-FY2022

Sponsoring Agency: DelDOT

Project Name: Mid County Maintenance Facility Expansion – T201953104

Project Category: Transit Systems

Project Description: DTC needs to expand its Mid-County Bus Maintenance Facility so that transit service in the Middletown, DE area can be increased to meet growing population and transportation needs.

Project Justification: Two maintenance bays of approximately 6,864 sq. ft. will be added allowing four more work spaces for buses. The facility is operating at capacity now; new bays are needed to support the growing fleet.

Funding: Federal $3,385,600 State $846,400 Other $0 Total $4,232,000

Funding	Phase	FY19 SPEND	FY 20 SPEND	FY 21 SPEND	FY 22 SPEND	Total
80% FTA	PE	$0	$300,000	$0	$0	$300,000
80% FTA	CON	$0	$3,932,000	$0	$0	$3,932,000
Total		$0	$4,232,000	$0	$0	$4,232,000

1. Does this project require a new conformity determination? No
(Section 51.400)(C2) "A TIP amendment requires a new conformity determination for the entire TIP before the amendment is approved by the MPO, unless it merely adds or deletes exempt projects listed in (Section 51.460)."

2. Is this project regionally significant? Yes
(Section 450.324)(f)(3) "The TIP shall include…all regionally significant transportation projects for which an FHWA or the FTA approval is required whether or not the projects are to be funded with title 23, U.S.C., or Federal Transit Act funds, e.g., addition of an interchange to the Interstate System with State, local, and/or private funds, demonstration projects not funded under title 23, U.S.C., or the Federal Transit Act, etc."

3. Has this project had the opportunity for public comment? No
(Section 450.326) "… Public involvement procedures consistent with Section 450.316 (b)(1) shall be utilized in amending the TIP, except that these procedures are not required for TIP amendments that only involve projects of the type covered in Section 450.324 (I)."

4. Has this project been found to be financially constrained? Yes
(Section 450.324)(e) "The TIP shall be financially constrained by year and include a financial plan that demonstrates which projects can be implemented using current revenue sources (while the existing transportation system is being adequately operated and maintained. The financial plan shall be developed by the MPO in cooperation with the State and transit operator…"

Please indicate funding sources by agency: DelDOT, FTA

5. Is this project consistent with the WILMAPCO Metropolitan Transportation Plan? Yes
(Section 450.324)(f)(2) "The TIP shall include…only projects that are consistent with the transportation plan."

If not, is there a resolution to amend the Metropolitan Transportation Plan?_____

Please provide any additional pertinent information below:

_____

_____

_____

WILMAPCO

Transportation Improvement Program Submission/Amendment

Description of Public Participation

Project Name: Mid County Maintenance Facility

Which techniques were used to seek public comment (please use additional pages if needed).

_____ Public workshops/meetings

Number of public workshops/meetings: ____

Format:

Location(s):

Number of attendees:

Main issue raised:

Consensus of meeting:

Overall, the public support for the project was (check one):

_____ Strong support, few concerns

____ Some support, but some concerns raised

_____ Mixed, equal support and opposition

_____ Some opposition, many concerns raised

_____ Strong opposition, major problems identified

Unresolved issues identified: _____

_____ Citizen Advisory/Steering Committee

_____ Survey

Number surveyed: _____

Results: _____

_____ Elected officials briefings

_____ Other _____

How was the public notified about the project?

_____ Web page

_____ Legal notice

_____ Videos

_____ Radio/television

_____ Publications

_____ Newsletter/brochure

_____ Flyers

Distribution: _____

_____ Other CTP and MPO Hearings_____

How has the project changed as a result of public comments?

Comment further on the quantity and quality of the public participation:

State of Delaware

Department of Transportation
FY 2019 - FY 2024

Capital Transportation Program

Mid County Maintenance Facility Expansion
Updated - 11/28/18

PROJECT AUTHORIZATION SCHEDULE
IN ($000)

PROJECT NUMBER	PHASE	FUNDING SOURCE	CURRENT ESTIMATE	FY 2019			FY 2020			FY 2021			FY 2022			STATE TOTAL	FEDERAL TOTAL
				STATE	FEDERAL	FUND TYPE	STATE	FEDERAL	FUND TYPE	STATE	FEDERAL	FUND TYPE	STATE	FEDERAL	FUND TYPE		
T201953104	PE	80% FTA	300.0				60.0	240.0	5339							60.0	240.0
T201953104	C	80% FTA	3,932.0				786.4	3,145.6	5339							786.4	3,145.6
Total			**4,232.0**	-	-		**846.4**	**3,385.6**		-	-		-	-		**846.4**	**3,385.6**

5339 - Bus and Bus Facilities Discretionary Program

PROJECT FUNDING SCHEDULE
IN ($000)

PROJECT NUMBER	PHASE	FUNDING SOURCE	BALANCE AS OF July 1, (State Only)	CURRENT ESTIMATE	FY 2019			FY 2020			FY 2021			FY 2022			FY 2023	FY 2024
					STATE	FEDERAL	OTHER	STATE	FEDERAL	OTHER	STATE	FEDERAL	OTHER	STATE	FEDERAL	OTHER	TOTAL	TOTAL
T201953104	PE	80% FTA		300.0				60.0	240.0									
T201953104	C	80% FTA		3,932.0				786.4	3,145.6									
Total			-	**4,232.0**	-	-	-	**846.4**	**3,385.6**	-	-	-	-	-	-	-	-	-

WILMAPCO

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TRANSPORTATION IMPROVEMENT PROGRAM AMENDMENT FORM

This form must be completed and all questions must be answered in order to process this request.

Date of Submission: 1/31/19

TIP to be Amended: FY2019-FY2022

Sponsoring Agency: DelDOT

Project Name: Churchman's Crossing Fairplay Station Parking Expansion – 09-12109

Project Category: Transit Systems

Project Description: This project will include a parking garage to be shared with the office building adjacent to Fairplay Station at Delaware Park.

Project Justification: These improvements will provide a viable alternative for riders who would otherwise travel from this area by car on I-95, helping mitigate congestion along the I-95 corridor. This type of improvement will minimize land impacts and maximize open space.

Funding: Federal $1,001,600 State $250,400 Other $0 Total $1,252,000

Funding	Phase	FY19 SPEND	FY 20 SPEND	FY 21 SPEND	FY 22 SPEND	Total
80% FTA	PE	$0	$652,000	$600,000	$0	$1,252,000
Total		$0	$652,000	$600,000	$0	$1,252,000

1. Does this project require a new conformity determination? No
(Section 51.400)(C2) "A TIP amendment requires a new conformity determination for the entire TIP before the amendment is approved by the MPO, unless it merely adds or deletes exempt projects listed in (Section 51.460)."

2. Is this project regionally significant? Yes
(Section 450.324)(f)(3) "The TIP shall include…all regionally significant transportation projects for which an FHWA or the FTA approval is required whether or not the projects are to be funded with title 23, U.S.C., or Federal Transit Act funds, e.g., addition of an interchange to the Interstate System with State, local, and/or private funds, demonstration projects not funded under title 23, U.S.C., or the Federal Transit Act, etc."

3. Has this project had the opportunity for public comment? No
(Section 450.326) "… Public involvement procedures consistent with Section 450.316 (b)(1) shall be utilized in amending the TIP, except that these procedures are not required for TIP amendments that only involve projects of the type covered in Section 450.324 (I)."

4. Has this project been found to be financially constrained? Yes
(Section 450.324)(e) "The TIP shall be financially constrained by year and include a financial plan that demonstrates which projects can be implemented using current revenue sources (while the existing transportation system is being adequately operated and maintained. The financial plan shall be developed by the MPO in cooperation with the State and transit operator…"

Please indicate funding sources by agency: DelDOT, FTA

5. Is this project consistent with the WILMAPCO Metropolitan Transportation Plan? Yes
(Section 450.324)(f)(2) "The TIP shall include…only projects that are consistent with the transportation plan."

If not, is there a resolution to amend the Metropolitan Transportation Plan?_____

Please provide any additional pertinent information below:

_____

_____

_____

WILMAPCO

Transportation Improvement Program Submission/Amendment

Description of Public Participation

Project Name: Churchman's Crossing Fairplay Station Parking Expansion

Which techniques were used to seek public comment (please use additional pages if needed).

_____ Public workshops/meetings

Number of public workshops/meetings: ____

Format:

Location(s):

Number of attendees:

Main issue raised:

Consensus of meeting:

Overall, the public support for the project was (check one):

_____ Strong support, few concerns

____ Some support, but some concerns raised

_____ Mixed, equal support and opposition

_____ Some opposition, many concerns raised

_____ Strong opposition, major problems identified

Unresolved issues identified: _____

_____ Citizen Advisory/Steering Committee

_____ Survey

Number surveyed: _____

Results: _____

_____ Elected officials briefings

_____ Other _____

How was the public notified about the project?

_____ Web page

_____ Legal notice

_____ Videos

_____ Radio/television

_____ Publications

_____ Newsletter/brochure

_____ Flyers

Distribution: _____

_____ Other CTP and MPO Hearings_____

How has the project changed as a result of public comments?

Comment further on the quantity and quality of the public participation:

Churchman's Crossing Fairplay Station Parking Expansion

Updated - 12/31/18

PROJECT AUTHORIZATION SCHEDULE
IN ($000)

PROJECT NUMBER	PHASE	FUNDING SOURCE	CURRENT ESTIMATE	FY 2019			FY 2020			FY 2021			FY 2022			STATE TOTAL	FEDERAL TOTAL
				STATE	FEDERAL	FUND TYPE	STATE	FEDERAL	FUND TYPE	STATE	FEDERAL	FUND TYPE	STATE	FEDERAL	FUND TYPE		
	PE	80% FTA	1,252.0				250.4	1,001.6	5307							250.4	1,001.6
Total			**1,252.0**	-	-		**250.4**	**1,001.6**		-	-		-	-		**250.4**	**1,001.6**

5307 - Urbanized Area Formula Grant Program

PROJECT FUNDING SCHEDULE
IN ($000)

PROJECT NUMBER	PHASE	FUNDING SOURCE	BALANCE AS OF July 1, (State Only)	CURRENT ESTIMATE	FY 2019			FY 2020			FY 2021			FY 2022			FY 2023	FY 2024
					STATE	FEDERAL	OTHER	STATE	FEDERAL	OTHER	STATE	FEDERAL	OTHER	STATE	FEDERAL	OTHER	TOTAL	TOTAL
	PE	80% FTA		1,252.0				130.4	521.6		120.0	480.0						
Total			-	**1,252.0**	-	-	-	**130.4**	**521.6**	-	**120.0**	**480.0**	-	-	-	-	-	-

AQ OVERALL PRIORITIZATION SYSTEM

3

Project expected to moderately or significantly improve air quality. Project types include:

a. fixed-route bus and train service expansions
b. public transit technology improvements
c. major non-recreational nonmotorized system expansion (not tied to a roadway project which would increase vehicle capacity)
d. diesel engine replacements
e. alternative fueling stations
f. park-and-ride lot expansions
g. carpooling schemes

1

Project expected to slightly improve air quality. Project types include:

a. fixed-route bus and train service replacements
b. minor non-recreational nonmotorized system expansions (not tied to a roadway project which would increase vehicle capacity)
c. major non-recreational nonmotorized system maintenance (not tied to a roadway project which would increase vehicle capacity)

0

Project not expected to impact air quality. Project types include:

a. roadway projects which do not add capacity
b. park-and-ride lot maintenance
c. rail preservation
d. paratransit expansion and maintenance
e. recreational nonmotorized system expansion/maintenance
f. minor non-recreational nonmotorized system maintenance (not tied to a roadway project which would increase vehicle capacity)

-1

Project expected to slightly worsen air quality. Project types include:

a. roadway projects which add capacity but are non-regionally significant, including those with a non-recreational nonmotorized system expansion component

-3

Project expected to moderately or significantly worsen air quality. Project types include:

a. roadway projects which add capacity and are regionally significant, including those with a non-recreational nonmotorized system expansion component

1. **East Coast Greenway: PA line to Claymont Regional Transportation Center**

   Draft AQ Score: +3

   This is a $4.5m project to expand the East Coast Greenway, with a 2022 in service date. Project length is about 1 mile.

2. **East Coast Greenway: New Castle - Churchmans Crossing gaps**

   Draft AQ Score: +3

   This is a $5.9m project to expand the East Coast Greenway, with a 2024 in service date. Project length is about 2.8 miles.

3. **East Coast Greenway: Claymont Station - Northern Delaware Greenway**

   Draft AQ Score: +3

   This is a $14.8m project to expand the East Coast Greenway, with a 2028 in service date. Project length is about 2.5 miles.

4. **East Coast Greenway: Churchmans Crossing - Newark gaps (approx 0.2 mi)**

   Draft AQ Score: +3

   This is a $1m project to expand the East Coast Greenway, with a 2024 in service date. Project length is about 0.2 miles.

5. **Harvey Road and Sconset Road Pedestrian Improvements**

   Draft AQ Score: +1

   This is a Safe Routes to Routes School project to improve an intersection for people walking between the Wilmington Montessori school and the Village of Ardentown. It's an implementation piece of the Ardentown Paths Plan. In service year = 2022.

6. **Augustine Cutoff Pathway**

   Draft AQ Score: +1

   This is a $2.3m bike/ped pathway. In service year = 2022.

7. **Rt 9 Neighborhood Pathway Network**

   Draft AQ Score: +1

   This is a $1.3m bike/ped pathway network to link the suburban communities south of Wilmington. It's an implementation piece of the Route 9 Corridor Master Plan. In service year = 2026.

8. **Newark Mid-block Pedestrian Crossing Improvements**

   Draft AQ Score: +1

   This is a $1.4m project to improve pedestrian crossings in Newark. It's an implementation piece of the Newark Transportation Plan. In service year = 2030.

9. **Newark Pedestrian Improvements**

   Draft AQ Score: +1

   This is a $2.8m project to improve infrastructure for people walking in Newark. It's an implementation piece of the Newark Transportation Plan. In service year = 2030.

10. **DE 896: US 40 to Porter Road, Sidepaths**

    Draft AQ Score: +1

    This is a $4.3m project to add sidepaths along DE 896 between US 40 and Porter Road, just over 1 mile. In service year = 2030.

11. **Support for shared ride services**

    Draft AQ Score: +3

    This is a $7.1m project to support the expansion of shared ride services to reverse the falling carpooling rates. In service year = 2024.

12. **Support for shared ride services**

    Draft AQ Score: +3

    This is a $241m project to support the expansion of shared ride services to reverse the falling carpooling rates. In service year = 2025.

13. **Support for shared ride services**

    Draft AQ Score: +3

    This is a $9.6m project to support the expansion of shared ride services to reverse the falling carpooling rates. In service year = 2040.

14. **US 13, Philadelphia Pike: I-495 - PA Line safety and multimodal improvements**

    Draft AQ Score: +1

    This is a $19.1m management/multimodal project to improve safety and conditions for all road users along US 13 between I-495 and the Pennsylvania state line (about 1 mile). It is an implementation piece of the North Claymont Area Master Plan. In service year = 2040.

15. **Improve pedestrian bridge and connector trail over I-495 pedestrian bridge**

    Draft AQ Score: +1

    This is a $3.6m project to improve the pedestrian bridge and connector trail over the I-495 pedestrian bridge. It is an implementation piece of the North Claymont Area Master Plan. In service year = 2024.

16. **Support for new technologies**

    Draft AQ Score: +3

    This is a $96m project to support the expansion of new technologies, such as electric vehicle and autonomous vehicle infrastructure. In service year = 2024.

17. **Support for new technologies**

    Draft AQ Score: +3

    This is a $172m project to support the expansion of new technologies, such as electric vehicle and autonomous vehicle infrastructure. In service year = 2035.

18. **Support for new technologies**

    Draft AQ Score: +3

    This is a $125m project to support the expansion of new technologies, such as electric vehicle and autonomous vehicle infrastructure. In service year = 2040.

19. **Transit service expansion and frequency enhancements**

    Draft AQ Score: +3

    This is a $72m project to support the expansion of public transit and improve the frequency of existing lines. In service year = 2024.

20. **Transit service expansion and frequency enhancements**

    Draft AQ Score: +3

    This is a $342m project to support the expansion of public transit and improve the frequency of existing lines. In service year = 2030.

21. **Transit service expansion and frequency enhancements**

    Draft AQ Score: +3

    This is a $130m project to support the expansion of public transit and improve the frequency of existing lines. In service year = 2040.

Air Quality Conformity Determination

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

2050 Regional Transportation Plan &
FY 2020–2023 Transportation Improvement Program

January 2019

TEAM DelDOT
Transparent Efficient Accountable Measured

WILMAPCO

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Table of Contents

Introduction

This report demonstrates transportation conformity of the Wilmington Area Planning Council's (WILMAPCO) Amended Fiscal Year (FY) 2020-2023 Transportation Improvement Program (TIP) and Amended 2050 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 (PM2.5) nonattainment areas.

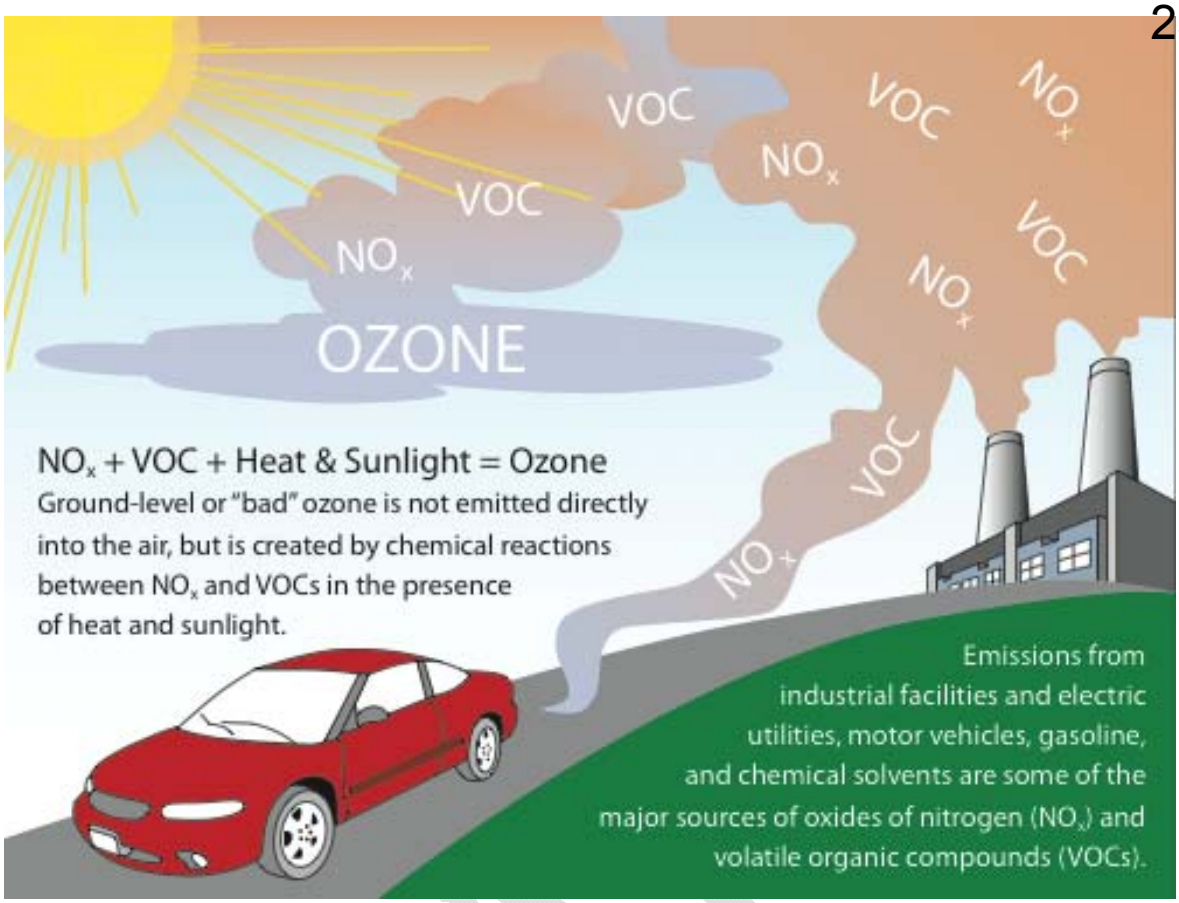
WILMAPCO is the Metropolitan Planning Organization (MPO) for New Castle County, Delaware and Cecil County, Maryland. It is designated by the governors of both states to plan for, coordinate, and program the many transportation investments in the region. Under federal law and regulation, all plans and 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 (NOx) 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 NOx and VOC emissions. Since ozone is formed in the presence of heat and sunlight, it is considered a summertime pollutant.



Source: CleanEnergy.org; adapted from EPA

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 seniors 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. As a result, ground-level ozone negatively impacts both agricultural productivity and ecosystem stability. 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

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, New Castle County no longer needed to demonstrate conformity to the 1997 8-hour ozone NAAQS.

On May 21, 2012, the Environmental Protection Agency (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.

On October 26, 2015, EPA issued 2015 primary and secondary NAAQS for ozone (80 FR 65292). The 2015 standards revised the levels of primary and secondary standards to 0.070 ppm, and retained their indicator (O3), forms (fourth-highest daily maximum, average across three consecutive years), and averaging time (eight hours). New Castle County was classified as a marginal nonattainment area as of September 2018.

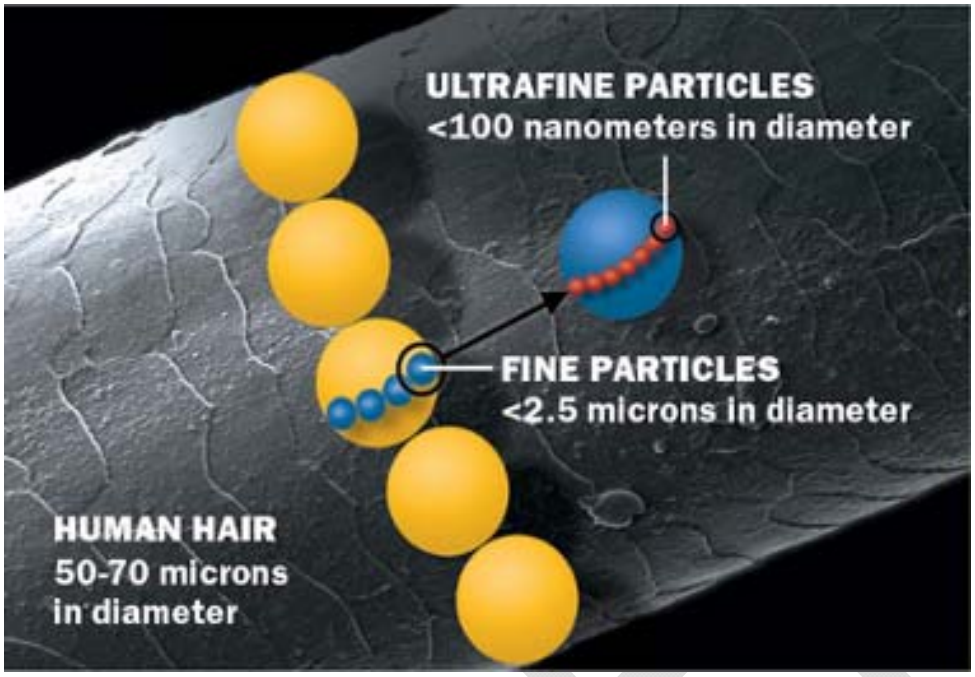
In February 2018, the District of Columbia Court of Appeals ruled that EPA's 2013 revocation of the 1997 Ozone Standard violated the Clean Air Act (*South Coast Air Quality Management District v. EPA*). For New Castle County and other areas, conformity must once again be demonstrated against the 1997 8-hour ozone NAAQS beginning on February 15, 2019.

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*

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.



Source: Tufts University

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 $\mu g/m^3$, based on a three-year average of the annual mean PM2.5 concentrations, and
2) A 24-hour standard of 65 $\mu g/m^3$, based on a three-year average of the 98^{th} percentile of 24-hour concentrations.

Areas need to meet both standards to be considered in attainment of PM2.5 NAAQS[1].

On April 5, 2005, EPA designations under the PM2.5 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 PM2.5 Nonattainment Area.

In December 2006, the EPA revised the 24-hour standard from 65 µg/m^3 to 35 µg/m^3. Three years later, in December 2009, the EPA designated the Philadelphia-Wilmington, PA-NJ-DE PM2.5 Nonattainment Area in nonattainment for the 24-hour standard. The October 2011 PM2.5 SIP's PM2.5 emission budget, calculated using the MOVES model, was found adequate for conformity purposes by EPA in December 2013.

On August 5, 2014, the EPA approved Delaware's request to re-designate to attainment the Delaware portion of the Philadelphia-Wilmington, PA-NJ-DE PM2.5 Nonattainment Area for both the 1997 annual and the 2006 24-hour PM2.5 standards. The EPA simultaneously approved the New Castle County PM2.5 Maintenance Plan, which requires conformity analyses using motor vehicle emission budgets associated with the 1997 annual in the 2006 24-hour PM2.5 standards. The effective date of this final rule was September 4, 2014.

Status of the Amended 2050 RTP and Amended FY 2020-2023 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 2050 RTP and the FY 2020-2023 TIP were created by the WILMAPCO staff and member agencies. [DRAFT TEXT] The RTP and present conformity analysis were adopted by the WILMAPCO Council on March 14, 2019.

[1] Meeting the PM2.5 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.

Interagency Consultation

As required by the federal transportation conformity rule (40 CFR 93.105) the conformity process includes 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:

- Wilmington Area Planning Council (WILMAPCO)
- Maryland Department of the Environment (MDE)
- Maryland Department of Transportation (MDOT)
- Delaware Transit Corporation (DTC)
- Delaware Department of Transportation (DelDOT)
- Delaware Department of Natural Resources and Environmental Control (DNREC)
- Cecil County
- New Castle County
- Federal Highway Administration (FHWA)
- Environmental Protection Agency (EPA)
- Federal Transit Administration (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 webpage:

- http://www.wilmapco.org/aqs/

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 three analysis years were chosen for the ozone analysis:

- 2020 (near-term year and attainment year)
- 2030 (interim year to keep analysis years less than ten years apart)
- 2040 (interim year to keep analysis years less than ten years apart)
- 2050 (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 (NOx), Volatile Organic Compounds (VOCs), Sulfur Oxides (SOx), and ammonia (NH_3).

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: NOx, VOCs, SOx, and NH_3. The current PM2.5 SIP does not identify any precursors identified other than NOx 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: NOx

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 (NOx) 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 Plan, and an intermediate year or years such that analysis years are no more than 10 years apart.

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

- 2020 (near-term year)
- 2030 (interim year to keep analysis years less than ten years apart)
- 2040 (interim year to keep analysis years less than ten years apart)
- 2050 (WILMAPCO Plan horizon year)

Travel Demand Modeling Methodology

The air quality analysis conducted for the FY 2020 - 2023 TIP and 2050 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 2020 - 2023 TIP and 2050 RTP used a 2015 base year network. Model networks were developed for the years 2020, 2030, 2040 and 2050 for New Castle County. Networks included major capacity improvement projects across the WILMAPCO region that are expected to be in place and open to service during these years. The types of projects tested included: roadway upgrades (such as new or improved shoulders), highway widening (one lane or more), and new construction.

Demographic projections, including employment, households, and population, were developed for each of the analysis years through the WILMAPCO Data & Demographic Subcommittee. WILMAPCO provided demographic projections for New Castle County, which were approved by the Delaware Population Consortium in 2017. WILMAPCO provided data for Cecil County was produced by the Maryland Department of Planning in 2015 (employment) and 2017 (population).

Travel estimates were developed for this conformity analysis using a so-called "five-step travel demand" modeling process. The approach 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 was obtained from the most recent census and 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 2015. Employment by place of work is not a product of the US Census, but the WILMAPCO Demographics and Data Subcommittee used a series of local, county, and state-agency 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, 2040, and 2050.

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 Whitman, Requardt and Associates, an engineering consulting firm) estimated these models using data from the 1997 – 2011 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.

DTMS data for 2012 - 2015 has not been analyzed at this time and is therefore not yet a part of the DelDOT/MPO travel model 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 based on analysis of the entire 1997 – 2011 DTMS dataset.

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 6.4.3 of the software dated Oct 6, 2017) under license from the vendor, Citilabs (http://www.citilabs.com/).

Summary

The modeling process for this conformity analysis used a 2015 base year network. Model networks were developed for 2020, 2030, 2040, and 2050 for New Castle County and for the Delaware/Maryland peninsula counties within the DelDOT/MPO "Peninsula Travel Model." 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

Project	County	List	Model Year
I-95/Belvidere Road Interchange (new expressway interchange)	Cecil	Aspiration	2030
I-95: Susquehanna River to DE Line (add a lane in each direction, plus bridge expansion	Cecil	Constrained	2040
I-95/SR 222 Interchange (two to four lanes on the SR 222 bridge)	Cecil	Constrained	2040
MD 222: US 40 to MD 276 (multilane reconstruction)	Cecil	Aspiration	2040
MD 213: Frenchtown Road to US 40 (two to four lane divided highway)	Cecil	Aspiration	2050
MD 272: US 40 to Lums Rd. (two to four lane divided highway)	Cecil	Constrained	2050
US 301: MD State Line to SR 1 (new four lane expressway)	NCC	Constrained	2020
Christina River Bridge (new bridge)	NCC	Constrained	2030
SR 72, McCoy Road to SR 71 (two to four lanes)	NCC	Constrained	2030
Road A / SR 7 Improvements (new lane in each direction)	NCC	Constrained	2030
SR 299, SR 1 to Catherine Street (widening)	NCC	Constrained	2030
Elkton Road, Maryland State Line to Casho Mill Road (widening)	NCC	Constrained	2030
SR 141/I-95 Interchange (expansion)	NCC	Constrained	2030
US 301: Spur (new two lane road)	NCC	Constrained	2030
US 40/SR 896 (grade separated intersection)	NCC	Constrained	2030
SR 896/I-95 Interchange (expansion)	NCC	Constrained	2030
SR 896/Bethel Church Road Interchange (expansion)	NCC	Constrained	2030
US 40 Widening: Salem Church Road to Walther Road	NCC	Constrained	2030
SR 1: Tybouts Corner to SR 273 (four to six lanes)	NCC	Constrained	2030
SR 4 (Christina Parkway): SR 2 to SR 896 (widening entire lengh 2 to 4 lanes)	NCC	Constrained	2030
Boyds Corner Road: Cedar Lane Road to US 13 (two to four lanes)	NCC	Constrained	2030
Center Boulevard extended to Churchmans Road	NCC	Constrained	2030
Eagle Run Road: SR 273 to SR 7 (complete road for thru traffic)	NCC	Constrained	2030
Tyler McConnell Bridge, SR141: Montchanin Road to Alapocas Road (bridge expansion	NCC	Constrained	2040
I-295 Northbound: SR 141 to US 13 (add third lane)	NCC	Constrained	2040
Eagle Run Road to Continental Drive Connector	NCC	Constrained	2040
US 40/SR 7 Grade Separated Intersection	NCC	Constrained	2040
SR 1: Tybouts Corner to Roth Bridge (widening)	NCC	Constrained	2050
SR 896: US 40 to I-95 (widening to six lanes)	NCC	Constrained	2050

Emission Factor Estimate

EPA's Office of Transportation and Air Quality (OTAQ) developed the **MO**tor **V**ehicle **E**mission **S**imulator (MOVES) modeling software. 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. MOVES 2014b has been used for this conformity analysis and it is the latest approved model version for transportation conformity purposes.

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 "MOVES inventory method" for estimating mobile source emissions in New Castle County. 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 were 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 1: Overview of the Travel and Emissions Models for Conformity

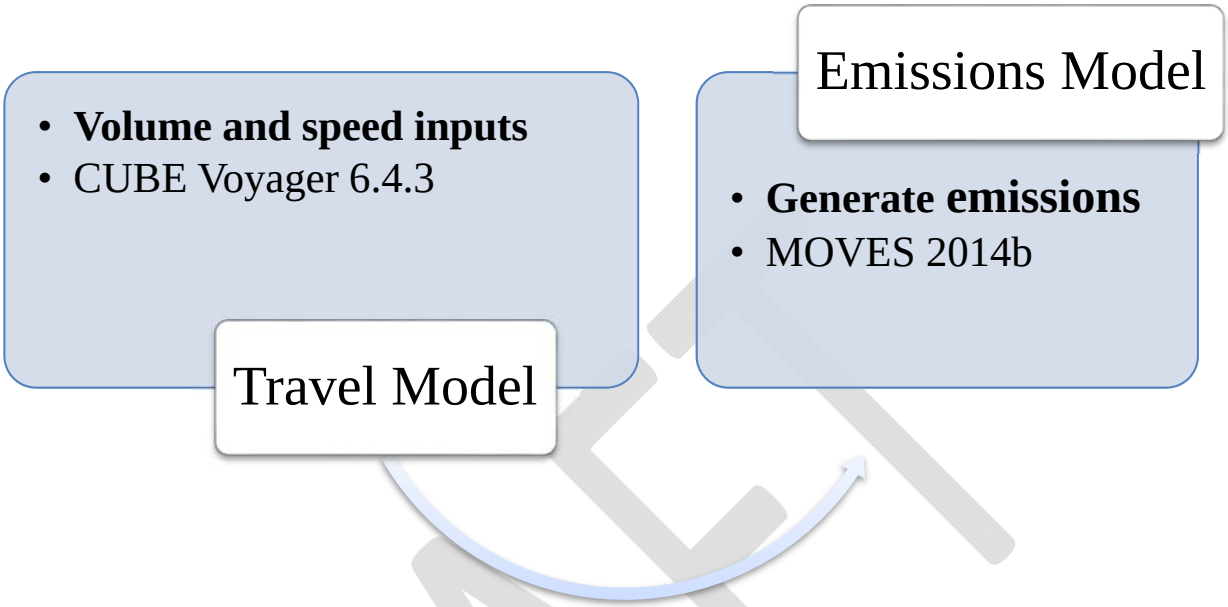
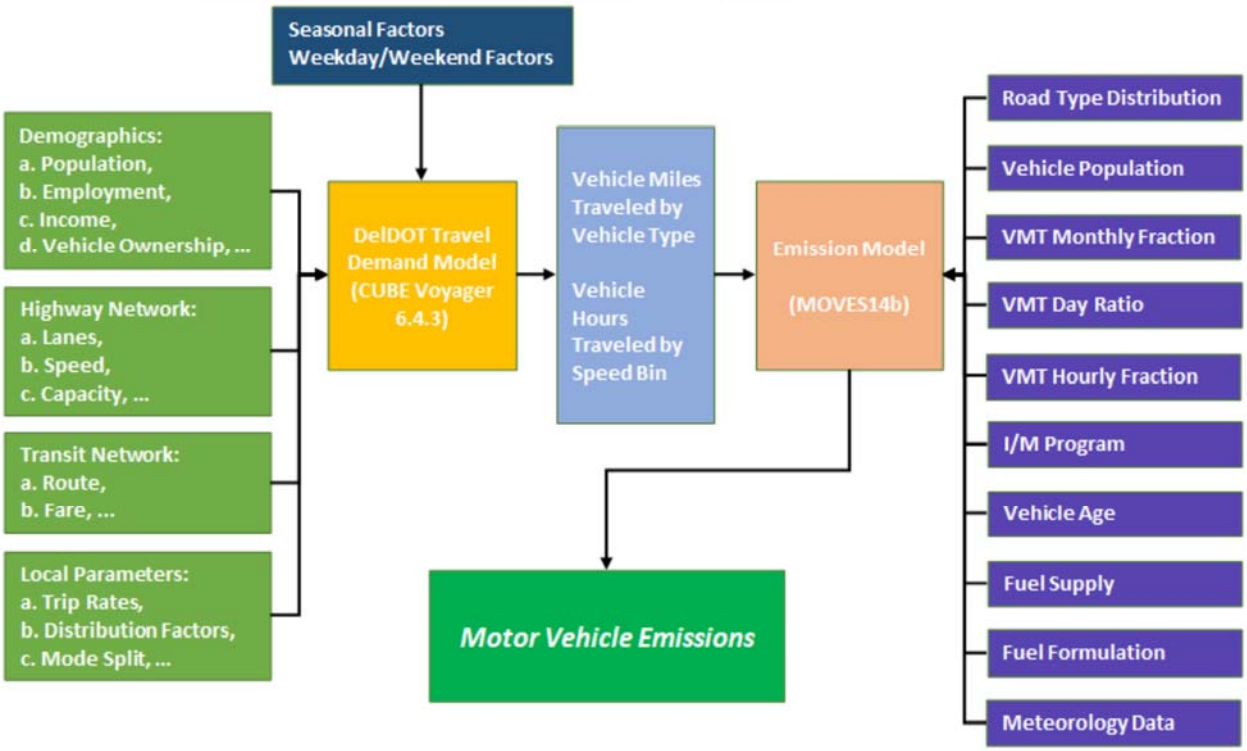


Figure 2: Detail: Travel and Emissions Models for Conformity



Mobile Source Emissions Estimates

The estimates of emissions for New Castle County are generated jointly by DelDOT 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.

VMT data are adjusted to align with data in the SIPs. The adjustments account for seasonal traffic variations and to align the travel demand estimates with DelDOT'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.

Similarly, the vehicle population data is adjusted based on the DMV vehicle registration data.

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, which demonstrates conformity.

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

VOC (tpsd)	2020	2030	2040	2050
Emissions	3.97	2.19	1.64	1.61
2009 Budget	9.89	9.89	9.89	9.89
Result	Pass	Pass	Pass	Pass

NOx (tpsd)	2020	2030	2040	2050
Emissions	7.78	3.31	2.37	2.47
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/year)

Direct PM2.5 (tpy)	2020	2030	2040	2050
Emissions	98.39	61.66	54.14	58.16
2012 Budget	199.0	199.0	199.0	199.0
Result	Pass	Pass	Pass	Pass

Indirect (NOx) PM2.5 (tpy)	2020	2030	2040	2050
Emissions	2,793	1,224	907	946
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)	2020	2030	2040	2050
Emissions	0.270	0.169	0.148	0.159
2012 Budget	0.545	0.545	0.545	0.545
Result	Pass	Pass	Pass	Pass

Indirect (NOx) PM2.5 (tpd)	2020	2030	2040	2050
Emissions	7.65	3.35	2.48	2.59
2012 Budget	17.19	17.19	17.19	17.19
Result	Pass	Pass	Pass	Pass

Description of Input Data

Many inputs to MOVES are needed to fully account for the numerous vehicle and environmental parameters that affect emissions. These include traffic flow characteristics, vehicle descriptions, fuel parameters, inspection/maintenance (I/M) program parameters, and environmental variables. MOVES includes a default national database of meteorology, vehicle fleet, vehicle activity, fuel, and emissions control program data for every county; but EPA cannot certify that the default data is the most current or best available information for any specific area. As a result, local data is recommended for use when completing a regional conformity analysis. Local data sources are used for all inputs that have a significant impact on calculated emission rates. These data items are discussed in the following sections.

Roadway Data

The emission calculation process uses key traffic data from the regional travel demand model to estimate regional Vehicle Miles Traveled (VMT) and speeds. This data includes individual roadway traffic volumes and physical roadway descriptive characteristics including area type, facility type, lanes, distances, capacity, and free-flow speeds. Travel demand model runs are produced for future analysis years and include the impact of regionally significant transportation projects. The model provides a key resource for estimating the impact of population and employment growth on roadway volumes and calculating the diversions due to transportation projects.

VMT was determined for each roadway class/setting by multiplying the length of road by the number of vehicles using the road per day. Additional adjustments to VMT included: seasonal adjustment factors reflecting traffic variation within the spring, summer, fall, and winter months (derived from permanent count station monitoring), and, Highway Performance Monitoring System (HPMS) adjustments used to align annual VMT estimates with HPMS reported totals for the base year.

Speed data was calculated for each highway segment and hour of the day, based on roadway capacity, traffic volume, and other physical roadway features (e.g. traffic signals). Thus, the travel demand model provided VMT according to the speed bins required by the MOVES software, thereby accounting for certain physical highway conditions and congestion caused by traffic volume. A speed bin is essentially an increment of speed range; for example: “VMT for the 30-35 mph range”. For future horizon years, congestion (and thereby speed) can be affected by traffic growth and changes in physical conditions due to planned transportation improvements and other projects assumed to be “in-service” in horizon years.

Vehicle Class Data

Emission rates within MOVES vary significantly by vehicle type. The MOVES model produces emissions and rates by thirteen MOVES vehicle source types. However, VMT is input into MOVES by five HPMS vehicle groups. MOVES14b requires that VMT for any 2-axle, 4-tire vehicle weighting less than 10,000 lbs – regardless of wheelbase length – is entered together. The new HPMSVtypeID 25 (short + long wheelbase light-duty vehicles)

in MOVES2014b replaces both HPMSVtypeID 20 (passenger car) and HPMSVtypeID 30 (other 4-tire trucks) in MOVES2010b.

For this emissions analysis, vehicle type pattern data was developed for New Castle County by functional class based on DelDOT (DMV) vehicle registration report, R45CAM07. The vehicle data included in report R45CAM07 are classified to 16 MOBILE6 categories. They were converted to the 13 MOVES soucetype (vehicle type) using the factors contained in the EPA's tool "VMT-Converter-road-veh16-20100209.xls".

The impact of trucks on traffic flow is accounted for within the travel demand modeling process. A heavy truck weight factor is used by functional class to adjust the rates at which increasing numbers of vehicles (congestion) cause average traveling speeds to drop. This effect generally is due to larger trucks taking up more roadway space than a given number of cars and also tend to have slower average traveling speeds than cars for most functional classes. The final loaded speeds from the travel model (used to define which speed bin a given road segment's VMT is placed in) reflect this truck adjustment.

Vehicle Age

Vehicle age distributions were input to MOVES for the county by the thirteen source types. The age distributions reflect the percentage of vehicles for each model year in the fleet up to 31 years old. The vehicle age distributions were prepared by DNREC DAQ based on information obtained from DMV registration data.

The base year vehicle age distributions for this conformity analysis were based on 2012 DMV registration data. In the late summer of 2012, DNREC DAQ staff transformed DMV raw data for a July 1, 2012 summary of vehicle age data into MOBILE6.2-16 composite vehicle type system using a spreadsheet method. The future year vehicle age distributions were estimated using the EPA's "Age Distribution Projection" tool for MOVES14 based on the base year data.

Vehicle Population Data

Vehicle fleet information such as the number and age of vehicles has an impact on the forecasted start and evaporative emissions within MOVES. The MOVES model requires the number of vehicles (called "vehicle population") to be defined for each of the thirteen source type categories, for each year emissions estimates are needed including future horizon years. This data was prepared and provided by DelDOT's travel demand and air quality modeling consulting firm using a spreadsheet.

For the analysis years 2020, 2030, 2040, and 2050, the vehicle populations were estimated for New Castle County by developing a growth factor based on the projected increase in total countywide vehicles from 2012 to each horizon year. WILMAPCO staff and the Data and Demographics Subcommittee (DDS) use 2010 Census-based data for vehicles per person and vehicles per household (for each traffic analysis zone) to develop TAZ-based estimates of future year vehicles. To generate future year vehicle populations needed for MOVES (for each horizon year), the TAZ based estimates (again, for each horizon year)

were summed and averaged to a countywide growth factor that was then applied to the 2012 age distribution data described above.

Environmental and Fuel Data
Information on environmental, fuel, vehicle technology, and other control strategy assumptions were determined based on a review of MOVES2014b default information by DNREC DAQ.

Fuel Data: DNREC DAQ used the fuel formulation and supply data that has been assigned to New Castle County, Delaware by the EPA in the MOVES model. The EPA obtains data on all fuel shipments from the refineries in the Delaware area and develops the formulations based on these data. Data inputs include fields such as: ethanol content, sulfur content, aromatic content, benzene content, olefin content, Methyl Ter-Butyl Ether (MTBE) volume, Ethyl-tertiary-butyl-ether (ETBE) volume, and Tertiary-amyl-methyl-ether (TAME) volume.

Meteorological Data: Evaporative emissions are influenced significantly by the temperatures of the surrounding air. DNREC used the data from the New Castle County Airport to generate the temperature and humidity values. These values are presented as month-by-month, hourly data sets for New Castle County.

Other Vehicle Technology and Control Strategy Data
The MOVES2010b default I/M data was reviewed and updated by DNREC DAQ for New Castle County. The current I/M program known as the Vehicle Emission Inspection Program (VEIP) was utilized for these analysis runs and is described below.

DE Vehicle Emission Inspection Program: This program tests the following gasoline-powered and diesel-powered vehicles: model year 1968 and newer light duty passenger cars, as well as 1970 and newer light duty trucks up to 8,500 pounds. The test is done biennially and on change of ownership. There is a seven-year grace period for new vehicles. In New Castle County, 1996 and newer light duty vehicles subject to the regulation receive an On-board Diagnostics (OBD) II test. Model year 1968-1980 vehicles subject to the regulation receive an idle test; those of model year 1981-1995 receive a two-speed idle test. In addition, model year 1975-1995 vehicles receive a tank and cap pressure test. Finally, all 1975 and newer light duty vehicles in New Castle County subject to this regulation receive a visual inspection of the catalytic converter. The compliance factors reflect the fail and waiver rates observed in the program, combined with an assumed 96% compliance rate for vehicles showing up for testing.

Federal Programs: Current federal vehicle emissions control and fuel programs are incorporated into the MOVES2014b software. These include the National Program standards covering model year vehicles through 2016. Modifications of default emission rates are required to reflect the implementation of the National Low Emission

Vehicle Program (NLEV) program in Delaware. To reflect these impacts, EPA has released instructions and input files that can be used to model these impacts. This inventory utilized the August 2010 version of the files:

- http://www.epa.gov/oms/models/moves/tools.htm
- https://www.epa.gov/emission-standards-reference-guide/all-epa-emission-standards

State Vehicle Technology Program:
DE Clean Car Program: Under the Delaware Low Emission Vehicle Program, 7 DE Admin Code 1140, which was revised December 2013, Delaware required manufacturers of 2014 model year vehicles to comply with Non-Methane Organic Gas (NMOG) emission requirements and California Low Emission Vehicle (LEV II) phase-in requirements. The regulation also requires manufacturers of 2015 and subsequent model year vehicles to comply with NMOG plus NOx emission requirements, as well as California LEV III phase-in requirements. Zero emission vehicles are currently not required by this regulation. California adopted the Low-Emission Vehicle regulation entitled LEV III (third generation low emission vehicle standards) in March 2012. These amendments create more stringent emission standards for new motor vehicles. These new standards will be phased-in over the 2015-2025 model years.

The impacts of this program were modeled for all analysis years using EPA's guidance document, *Instructions for Using LEV and NLEV Inputs for MOVES14*. EPA provided input files to reflect the CAL LEV III program with the standard phase-in schedules for new emission standards. Modifications to those schedules were done per EPA's instructions, to reflect a later start for the State of Delaware beginning with vehicle model year 2014.

2050 RTP and FY 2020 – FY 2030 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. As shown in the RTP, 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 analysis was made available for public review and comment beginning on January 14, 2019 and ending on March 6, 2019. 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)
- Public Workshop on February 7, 2019 at the Newark STAR Tower Atrium in Newark, Delaware

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
GENERAL CRITERIA APPLICABLE TO BOTH PLAN AND TIP			
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 2017. Extrapolated vehicle fleet data using a 2012 base year 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). Changes to transit policy and tolling may occur during the duration of the Plan. However, these cannot be predicted. Therefore, the model assumes they will remain constant during 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 2020, 2030, 2040 and 2050. 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 house-holds 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 2019 to 2024 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

New Castle County Annual PM2.5 and Nox Emission (Tons) - 2018 Run

Month	2015			2020			2030			2040			2050		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
1	198.62	387.33	12.25	132.43	226.12	8.09	82.50	100.92	4.72	67.44	77.82	4.04	66.91	80.85	4.29
2	179.80	385.20	11.97	119.36	224.29	7.96	74.09	99.10	4.69	60.19	76.15	4.06	59.80	79.32	4.34
3	181.63	391.90	11.52	122.48	228.91	7.87	73.18	102.49	4.80	60.30	76.90	4.17	59.66	80.06	4.46
4	166.88	407.81	11.42	110.99	237.48	8.06	64.47	104.35	5.11	51.37	77.07	4.51	50.76	80.46	4.85
5	173.46	413.81	11.66	117.16	242.06	8.38	67.59	105.85	5.39	52.53	77.51	4.77	51.71	80.95	5.14
6	173.40	384.81	11.09	115.26	223.37	8.09	64.04	95.32	5.29	48.14	68.42	4.72	47.21	71.45	5.10
7	180.91	380.23	11.15	120.07	220.50	8.14	66.39	93.77	5.33	49.72	67.09	4.75	48.68	69.98	5.14
8	176.81	403.93	11.44	117.77	234.63	8.34	65.69	100.36	5.45	49.52	72.19	4.86	48.58	75.41	5.25
9	166.53	385.31	10.93	111.24	224.13	7.95	62.38	96.22	5.18	47.20	69.49	4.62	46.31	72.60	4.99
10	175.86	409.15	11.68	119.49	240.19	8.30	70.01	106.23	5.28	55.33	78.43	4.64	54.53	81.80	4.98
11	178.89	412.53	12.17	119.38	241.68	8.38	70.70	108.34	5.16	58.12	81.07	4.47	57.62	84.44	4.79
12	196.62	426.74	13.18	129.61	249.38	8.84	79.86	110.71	5.25	64.62	84.84	4.53	64.19	88.27	4.82
Total	**2149.41**	**4788.73**	**140.47**	**1435.24**	**2792.75**	**98.39**	**840.92**	**1223.65**	**61.66**	**664.50**	**907.00**	**54.14**	**655.97**	**945.59**	**58.16**

New Castle County Summer Weekday Ozone & PM2.5 Emission (Tons) - 2018 Run

Month	2015			2020			2030			2040			2050		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
6	6.01	13.54	0.40	3.98	7.85	0.29	2.20	3.34	0.19	1.65	2.39	0.17	1.62	2.50	0.19
7	6.06	12.94	0.39	4.00	7.50	0.28	2.20	3.18	0.19	1.64	2.27	0.17	1.61	2.37	0.18
8	5.93	13.75	0.40	3.93	7.98	0.29	2.18	3.40	0.19	1.64	2.44	0.17	1.61	2.55	0.19
Average	**6.00**	**13.41**	**0.39**	**3.97**	**7.78**	**0.29**	**2.19**	**3.31**	**0.19**	**1.64**	**2.37**	**0.17**	**1.61**	**2.47**	**0.19**

Table B-2: VMT by Vehicle Type

New Castle County Annual VMT by Vehicle Type - 2018 Run

HPMSVTypeID	2015 HPMS Annual VMT	2020 HPMS Annual VMT	2030 HPMS Annual VMT	2040 HPMS Annual VMT	2050 HPMS Annual VMT
Motorcycles	41,499,492	44,190,356	48,526,932	52,882,178	58,039,934
Light Duty Vehicles	5,480,965,214	5,836,355,867	6,409,100,813	6,984,311,447	7,665,512,218
Buses	34,760,801	37,014,722	40,647,125	44,295,165	48,615,405
Single Unit Trucks	52,326,123	55,718,996	61,186,924	66,678,391	73,181,734
Combination Trucks	140,872,625	150,006,931	164,727,711	179,511,865	197,020,194
Total	**5,750,424,255**	**6,123,286,872**	**6,724,189,505**	**7,327,679,046**	**8,042,369,485**

New Castle County Vehicle Population - 2018 Run

sourceTypeName	2015 SourceType Population	2020 SourceType Population	2030 SourceType Population	2040 SourceType Population	2050 SourceType Population
Motorcycle	13,354	13792	14406	14661	14636
Passenger Car	236,569	244330	255204	259734	259286
Passenger Truck	153,604	158643	165704	168645	168354
Light Commercial Truck	50,545	52203	54526	55494	55398
Intercity Bus	191	197	206	210	209
Transit Bus	573	592	618	629	628
School Bus	946	977	1021	1039	1037
Refuse Truck	75	78	81	83	83
Single Unit Short-haul Truck	3,059	3159	3300	3358	3353
Single Unit Long-haul Truck	216	223	233	237	236
Motor Home	375	387	404	411	411
Combination Short-haul Truck	1,183	1222	1276	1299	1296
Combination Long-haul Truck	889	918	959	976	974
Total	461,578	476,720	497,938	506,776	505,901

Table B-3: Vehicle Population

New Castle County Average Daily VMT by Functional Classification - 2018 Run

Functional Class	2015 HPMS Adjusted VMT	2020 HPMS Adjusted VMT	2030 HPMS Adjusted VMT	2040 HPMS Adjusted VMT	2050 HPMS Adjusted VMT
freeway-rural	1235119	1287266	1517322	1557677	1802045
PA-rural	259930	261,825	251,532	291,395	323,208
Minor Arterial-rural	386984	418,146	418,455	494,424	524,566
Major collector-rural	264258	284,062	295,415	372,200	423,689
minor collector-rural	86150	96,889	118,367	142,073	155,958
local-rural	178693	186,174	211,439	270,062	298,328
interstate-urban	3700787	3,854,412	4,312,382	4,697,756	5,048,683
freeway-urban	1079488	1,226,033	1,824,772	1,953,709	2,174,781
PA-urban	3952908	4,104,116	3,873,743	4,180,213	4,385,677
Minor Arterial-urban	1634396	1,655,256	1,728,856	1,849,975	1,998,074
Major collector-urban	1154456	1,209,181	1,282,038	1,406,764	1,488,175
minor collector-urban	54942	57,543	44,697	51,298	54,881
local-urban	1766477	2,089,391	2,543,419	2,753,434	3,355,825
Total	15754588	16,730,294	18,422,437	20,020,980	22,033,890

Table B-4: VMT by Functional Classification

Appendix C

Interagency Consultation

For a collection of meeting notes, please visit:

wilmapco.org/aqs

Appendix D

Public Participation Materials

Please visit:

wilmapco.org/rtp

wilmapco.org/tip

wilmapco.org/aq

Air Quality Conformity Analysis for the 1997, 2008, and 2015 8-Hour Ozone NAAQS

For the Cecil County Portion of the
PA-NJ-MD-DE Nonattainment Area

FY2020–2023 Transportation Improvement Program
And 2050 Regional Transportation Plan

Final Draft for Public Review

DRAFT
12.6.18

Prepared for:

WILMAPCO

In Conjunction with
Maryland Department of Transportation
And
Maryland Department of the Environment

Prepared by:

Michael Baker International

January 2019

Air Quality Conformity Analysis

For the 2050 Regional Transportation Plan and the Fiscal Year 2020-2023 Transportation Improvement Program for Cecil County, MD Portion of the PA-NJ-MD-DE 8-Hour Ozone Nonattainment Area

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Introduction

This report demonstrates transportation conformity of the Wilmington Area Planning Council's (WILMAPCO) Fiscal Year (FY) 2020-2023 Transportation Improvement Program (TIP) and 2050 Regional Transportation Plan (RTP) for the Cecil County, Maryland portion of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area under the 1997, 2008, and 2015 8-hour ozone National Ambient Air Quality Standards (NAAQS).

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 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, DE and Cecil County, MD, 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 (NOx) 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 NOx and VOC emissions. Since ozone is formed in the presence of heat and sunlight, it is considered a summertime pollutant.

The health effects of ozone vary. 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 (NAAQS)

1997, 2008 and 2015 NAAQS

The EPA published the 1997 8-hour ozone 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, Cecil County no longer needed to demonstrate conformity to the 1997 8-hour ozone NAAQS.

The EPA published a final rule (77 FR 65488), which became effective on November 28, 2012, approving the attainment demonstration for the 1997 8-hour ozone NAAQS for the Maryland portion of the nonattainment area. The same ruling found adequate the 2009 motor vehicle emission budgets (MVEBs) associated with the attainment demonstration. Since the area was designated as marginal under the 2008 ozone standards, new MVEBs are not required and the previously approved, 2009 MVEBs must be used for conformity purposes.

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. On May 21, 2012, the Environmental Protection Agency (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 PA-NJ-MD-DE area is classified as a marginal nonattainment area under the 2008 ozone NAAQS, resulting in an attainment date of July 20, 2015. The PA-NJ-MD-DE did not attain the standard by the attainment date. However, EPA granted a 1-year extension to July 20, 2016 by meeting the criteria of CAA section 181(a)(5) of compliance with all commitments and requirements in the SIP, and "clean" data in 2014 (81 FR 26697). On November 2, 2017, EPA released a final rule determining that the PA-NJ-MD-DE has attained the 2008 8-hour ozone NAAQS by the July 20, 2016 attainment date with an effective date of December 4, 2017. The determination of attainment if not equivalent to a redesignation and the States in the area must still meet the statutory requirements for redesignation in order to be redesignated to attainment. This determination is also not a clean data determination.

The EPA published the 2015 8-hour ozone NAAQS on October 26, 2015 (80 FR 65291), with an effective date of December 28, 2015. EPA revised the ozone NAAQS by strengthening the standard to 0.070 ppm. Thus, an area is in nonattainment of the 2015 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 0.070 ppm. The PA-NJ-MD-DE area is classified as a marginal nonattainment area under the 2015 8-hour ozone NAAQS, effective August 3, 2018 (83 FR 25776).

In February 2018, the District of Columbia Court of Appeals ruled that EPA's 2013 revocation of the 1997 Ozone Standard violated the Clean Air Act (*South Coast Air Quality Management District v. EPA*). For Cecil County and other areas, conformity must once again be demonstrated against the 1997 8-hour ozone NAAQS beginning on February 15, 2019.

Areas 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 or*
- *Delay timely attainment of the relevant NAAQS.*

PA-NJ-MD-DE 8-Hour Ozone Nonattainment Area

The PA-NJ-MD-DE 8-hour ozone nonattainment area is made up of 16 counties spanning four states. Figure 1 illustrates the entire nonattainment area and the location of the areas covered by WILMAPCO (New Castle and Cecil Counties) for the 1997, 2008, and 2015 ozone standards.

Status of the 2050 RTP & 2020-2023 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 Plan 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 on the four-year Transportation Improvement Program (TIP) that corresponds to that project's development timetable.

The 2050 update of the Regional Transportation Plan and the Fiscal Year 2020 – 2023 TIP were created by the WILMAPCO staff and member agencies. [DRAFT TEXT] The TIP and RTP were formally adopted by the WILMAPCO Council on March 14, 2019.

Figure 1: Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Nonattainment Areas

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:

- Wilmington Area Planning Council (WILMAPCO)
- Maryland Department of the Environment (MDE)
- Maryland Department of Transportation (MDOT)
- Maryland State Highway Administration (SHA), Maryland Transit Administration (MTA), and Maryland Transportation Authority (MDTA) (responsible for the State's toll facilities)
- Delaware Transit Corporation (DTC)
- Delaware Department of Transportation (DelDOT)
- Delaware Department of Natural Resources and Environmental Control (DNREC)
- Cecil County, New Castle County
- Federal Highway Administration (FHWA)
- Environmental Protection Agency (EPA)
- Federal Transit Administration (FTA)

As part of the interagency consultation, members of the Air Quality Subcommittee (AQS) collaborated 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

Please see Appendix D or this website for meeting notes: **http://www.wilmapco.org/aqs/**

Determine Planning Assumptions

8-Hour Ozone Regional Emissions Test

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 2009 Motor Vehicle Emissions Budgets (MVEB), set forth in the document: *Cecil County, Maryland 8-Hour Ozone State Implementation Plan and Base Year Inventory SIP Revision: 07-05*, for conformity purposes. The document was submitted to EPA in June 2007. EPA found the 2009 MVEBs adequate for conformity purposes, effective on November 28, 2012 (77 FR 65488).

Analysis Years

EPA regulations, as outlined in the Final Transportation Conformity Rule, Section 93.118, Criteria and Procedures: Motor Vehicle Emissions Budget, state that the regional emissions analysis may be performed for any years in the timeframe of the conformity determination provided that they:

- Include a near-term year, one to five years in the future;
- Are not more than ten years apart;
- The analysis is performed for the attainment year (if it is in the timeframe of the transportation plan and conformity determination);
- Include the last year of the timeframe of the conformity determination.

The attainment year for the 2008 standard, is 2015, which is not within the timeframe of the transportation plan. The year 2020 was chosen so that the first analysis year is no more than five years beyond the year in which the conformity determination is being made. The year 2020 is also the attainment year for the 2015 standard. The year 2030 was selected as the intermediate year, so that the analysis years are no more than 10 years apart. The last year of the plan is 2050, so that too was selected. This makes the analysis years: 2020, 2030, 2040 and 2050.

Components of the Regional Emissions Analysis

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.

Future Year Projects

The projects listed in Table 3, in the Travel Demand Modeling section of this document, were found to be regionally significant through the interagency consultation process and are analyzed in this conformity determination.

Analysis Results

The results of the motor vehicle emissions budget tests are presented below in Tables 1 and 2. Table 1 presents the results of the budget test for VOC emissions. Table 2 outlines the results of the budget test for NOx emissions. The results show that all analysis years are below the established and approved 2009 MVEB and show a positive conformity determination. The regionally significant projects located in the Cecil County portion of the nonattainment area will not cause or contribute to any new violation of the air quality standard.

Table 1: VOC Emissions Test Results – MVEB Test (tons/day)

	2020	2030	2040	2050
	Modeled	Modeled	Modeled	Modeled
Cecil County Total	***1.45***	***0.89***	***0.74***	***0.75***
2009 Conformity Budget	**2.2**	**2.2**	**2.2**	**2.2**
Conformity Result	**Pass**	**Pass**	**Pass**	**Pass**

Table 2: NOx Emissions Test Results – MVEB Test (tons/day)

	2020	2030	2040	2050
	Modeled	Modeled	Modeled	Modeled
Cecil County Total	***4.67***	***2.77***	***2.51***	***2.60***
2009 Conformity Budget	**7.3**	**7.3**	**7.3**	**7.3**
Conformity Result	**Pass**	**Pass**	**Pass**	**Pass**

Travel Demand Modeling Methodology

A travel demand model has been used to estimate future roadway traffic volumes and diversions related to regionally significant transportation improvement projects. The travel model was originally developed in 2006 and revalidated in 2012 for the upper eastern shore of Maryland including Cecil County.

The Upper Eastern Shore (UES) model uses the TP+ software platform and encompasses Kent, Queen Anne's, and Cecil Counties in Maryland, as well as New Castle County, Delaware. This model is a traditional three-step model incorporating trip generation, trip distribution, and traffic assignment. The regional travel model does not contain a formal mode choice or transit assignment module. The model produces vehicle trips for 477 traffic analysis zones and assigns them to highway networks consisting of key regional roadway segments. The base year model is validated against survey data and traffic counts collected

for the year 2010. A summary of the model components and validation are presented in a final report available from MDOT.

Highway Networks

For the purpose of this conformity analysis, model highway networks are created for each analysis year: 2020, 2030, 2040 and 2050. The networks are comprised of link segments representing freeways, principal arterials, minor arterials, and collectors within the nonattainment region (Figure 2). Links in the network are coded with attributes that portray the facilities' respective capacities and travel speeds. For each horizon year, projects from the RTP and TIP are coded onto the networks by adding links for new construction projects and adjusting the link capacities for projects that add lanes to existing roadways. A list of regionally significant highway projects (as defined in section 93.101 of the Final Transportation Conformity Rule) is shown in Table 3. The primary products of the model used in the air quality analysis are estimated volumes, link distances, free-flow speeds, and link capacities. The impacts of transit on regional vehicle trips are accounted for in the validation count data. Future changes to transit service (as reflected in regionally significant transit projects) can be accounted for using off-model analysis techniques, such as MAQONE.

Figure 2: Cecil County Network Map

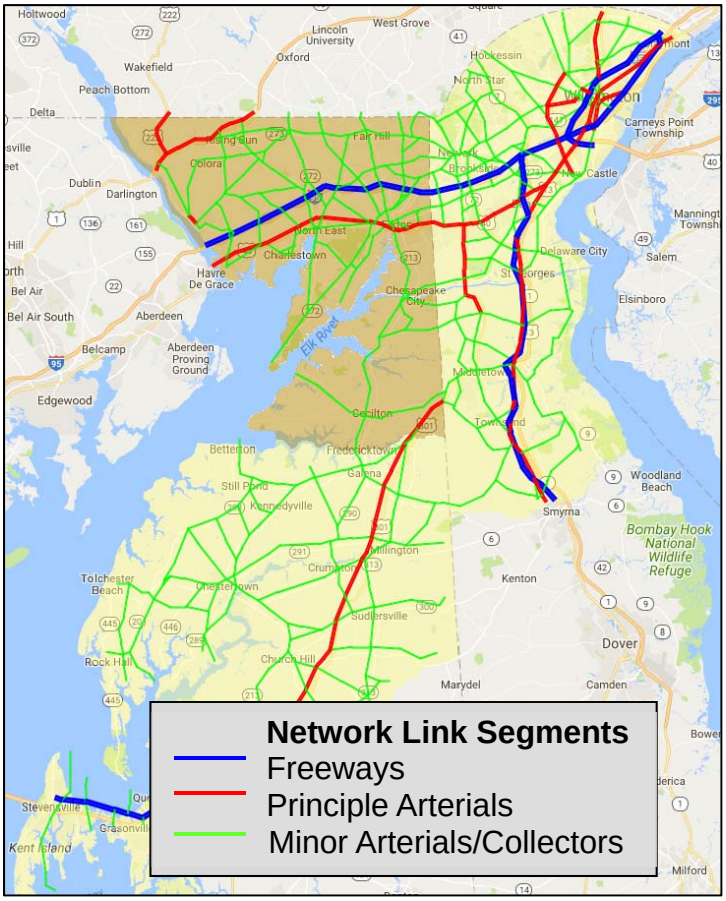


Table 3: WILMAPCO Region's Regionally Significant Highway Projects

No.	Project Name	County	Description	In-service Date
1	MD 213: Frenchtown Road to US 40	CC	Two to four lane divided highway	2050
2	I-95: Susquehanna River to DE Line	CC	Add a lane in each direction, plus bridge expansion	2040
3	MD 272: US 40 to Lums Road	CC	Two to four lane divided highway	2040
4	I-95/SR 222 Interchange	CC	Two to four lanes on the SR 222 bridge	2040
5	MD 222: US 40 to MD 276	CC	Add a lane in each direction	2040
6	I-95 & Belvedere Rd.	CC	Add new interchange with I-95	2030
7	US 301: MD State Line to SR 1	NCC	New four lane expressway	2020
8	Christina River Bridge	NCC	New bridge	2030
9	SR 72, McCoy Road to SR 71	NCC	Two to four lanes	2030
10	Road A / SR 7 Improvements	NCC	New lane in each direction	2030
11	SR 299, SR 1 to Catherine Street	NCC	Add a lane in each direction	2030
12	Elkton Road, Maryland State Line to Casho Mill Road	NCC	Add a lane in each direction	2030
13	SR 141/I-95 Interchange	NCC	Expansion	2030
14	US 301: Spur	NCC	New two lane road	2030
15	US 40/SR 896	NCC	Grade separated intersection	2030
16	SR 1: Tybouts Corner to Roth Bridge	NCC	Widening	2050
17	SR 896/I-95 Interchange	NCC	Expansion	2030
18	SR 896/Bethel Church Rd Interchange	NCC	Expansion	2030
19	US 40 Widening: Salem Church Road to Walther Road	NCC	Widening	2030
20	SR 1: Tybouts Corner to SR 273	NCC	Four to six lanes	2030
21	SR 4 (Christina Pkwy): SR 2 to SR 896	NCC	Widening entire length two to four lanes	2030
22	Tyler McConnell Bridge, SR141: Montchanin Road to Alapocas Road	NCC	Bridge expansion	2040
23	I-295 Improvements EB at SR 141	NCC	Add third lane	2040
24	Boyd's Corner Road Widening	NCC	Add a lane each direction	2030
25	Center Blvd. Extension to Churchmans Rd	NCC	Construct 2 lane Road	2030
26	Eagle Run Road Connection	NCC	Complete Eagle Run Road	2030
27	Eagle Run Rd Extension (I-95 Flyover)	NCC	New 2-lane I-95 Crossover	2040
28	US 40/SR 7 Grade Separation	NCC	Grade separated intersection	2040
29	SR 896 Widening: US 40 to I-95	NCC	Add one lane each direction	2050

Note NCC = New Castle County

CC = Cecil County

Land Use Forecast Methodology

Land use estimates for the base and future year models for Cecil County are developed from existing data sources and county comprehensive plans, as well as through coordination with state and local planning agencies. The land use data for this model is comprised of data describing the population, households, workforce, and employment for the region.

Land use for Cecil County, Maryland and New Castle County, Delaware came directly from the land use demographics used by WILMAPCO. WILMAPCO provided demographic projections for New Castle County, which were approved by the Delaware Population Consortium in 2017. WILMAPCO provided data for Cecil County was produced by the Maryland Department of Planning in 2015 (employment) and 2017 (population). Table 4 summarizes the land use data used for traffic modeling for the analysis years 2020, 2030, 2040, and 2050 for Cecil County.

Table 4: Summary of Land Use Data Used for Modeling Runs

Cecil County						
Year	**Population***	**Households***	**Labor Force***	**Total* Employment**	**Retail* Employment**	**Non-Retail* Employment**
2020	104,460	39,961	51,458	49,706	8,576	41,130
2030	119,497	44,891	56,674	54,591	8,510	46,081
2040	134,975	50,481	63,473	58,364	9,135	49,229
2050	143,197	53,150	66,464	60,135	9,403	50,732

Data Source: WILMAPCO, from the Delaware Population Consortium and Maryland Department of Planning Projections (2015 and 2017)

Estimation Process for Mobile Source Emissions

This conformity analysis uses MOVES2014a model, EPA's state-of-the-art tool for estimating emissions from highway vehicles. Compared to previous tools, MOVES incorporates the latest emissions data, more sophisticated calculation algorithms, increased user flexibility, new software design, and significant new capabilities.

Analysis Methodology

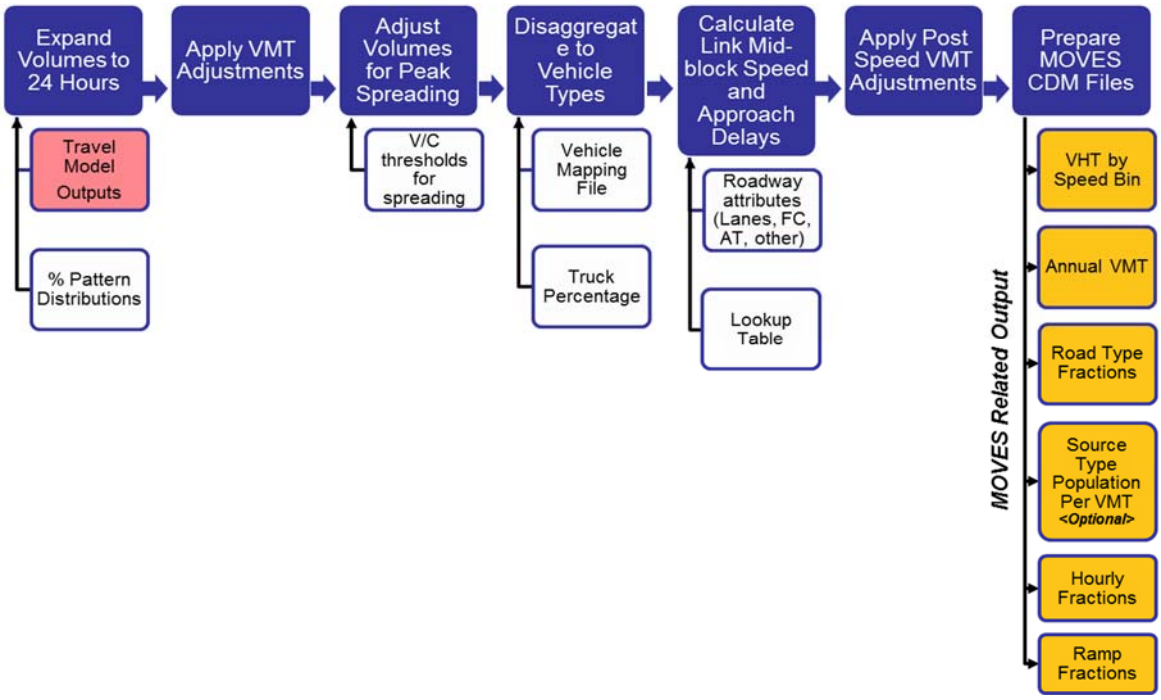
The methodology used to produce the emission data conform to the recommendations provided in EPA's technical guidance. A mix of local data and national default (internal to MOVES2014a) data has been used for the conformity analysis. Local data inputs to the analysis process reflect the latest available planning assumptions using data obtained from the Maryland Department of Environment (MDE), Motor Vehicle Administration (MVA), WILMAPCO, and other local/national sources.

The analysis methodology includes the use of regional travel model outputs (as described above) for 2020, 2030, 2040 and 2050 to estimate the regional Vehicle Miles Traveled (VMT) along with custom post-processing software (PPSUITE) to prepare key input files to the MOVES2014a 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.

The PPSUITE system has been used for previous inventory and conformity submissions in Maryland and in other states including Pennsylvania, Virginia, New Jersey, and New York. The software has gone through a significant revision to ensure consistency with the MOVES emissions model. The PPSUITE process is also integral to producing other key input files to the MOVES emission model. Figure 3 summarizes the key functions of PPSUITE and the traffic-related input files prepared for MOVES.

Figure 3: Summary of Emission Calculation Process



Description of Input Data

Many inputs to MOVES are needed to fully account for the numerous vehicle and environmental parameters that affect emissions. These include traffic flow characteristics, vehicle descriptions, fuel parameters, inspection/maintenance (I/M) program parameters, and environmental variables. MOVES includes a default national database of meteorology, vehicle fleet, vehicle activity, fuel, and emissions control program data for every county; but EPA cannot certify that the default data is the most current or best available information for any specific area. As a result, local data is recommended for use when completing a regional conformity analysis. Local data sources are used for all inputs that have a significant impact on calculated emission rates. These data items are discussed in the following sections.

Roadway Data

The emission calculation process uses key traffic data from the regional travel demand model to estimate regional VMT and speeds. These data include individual roadway traffic volumes and physical roadway descriptive characteristics including area type, facility type, lanes, distances, capacity, and free-flow speeds. Travel demand model runs are produced for future analysis years and include the impact of regionally significant transportation projects. The model provides a key resource for estimating the impact of population and employment growth on roadway volumes and calculating the diversions due to transportation projects.

VMT was determined for each roadway class/setting by multiplying the length of road by the number of vehicles using the road per day. Additional adjustments to VMT included: seasonal adjustments to reflect an average weekday for the summer season and Highway Performance Monitoring System (HPMS) adjustments used to align annual VMT estimates with HPMS reported totals for the base year.

Speed data was calculated for each highway segment and hour of the day, based on roadway capacity, traffic volume, and other physical roadway features (e.g. traffic signals) using the post processing software. Thus, average speeds reflect physical highway conditions and congestion caused by traffic volume. For future conditions, congestion (and thereby speed) is affected by traffic growth and changes in physical conditions due to transportation improvement projects.

Vehicle Class Data

Emission rates within MOVES vary significantly by vehicle type. The MOVES model produces emissions and rates by thirteen MOVES vehicle source types. However, VMT is inputted into MOVES by five HPMS vehicle groups.

For this emissions analysis, vehicle type pattern data was developed for the county by functional class based on State Highway Administration (SHA) classification counts and internal MOVES defaults. As the first step, SHA count data was used to develop percentage splits to the four vehicle groups: Autos, Heavy trucks, Motorcycles and Buses. Then the vehicle groups were expanded to the 13 MOVES source types using MOVES2014a default VMT distributions for Maryland, which were recombined to the HPMS vehicle groups as inputs to MOVES.

Vehicle type pattern data, developed from 2014 SHA TMS database and hourly traffic volumes, is used by PPSUITE to distribute the hourly roadway segment volumes among the thirteen MOVES source types. This data contains percentage splits to each source type for every hour of the day.

The vehicle type percentages are also provided to the capacity analysis section of PPSUITE to adjust the speeds in response to trucks. That is, a given number of larger trucks take up more roadway space than a given number of cars, and this is accounted for in the speed estimation process by adjusting capacity using information from the Highway Capacity Manual.

Vehicle Age

Vehicle age distributions are input to MOVES for the county by the thirteen source types. The distributions reflect the percentage of vehicles in the fleet up to 31 years old. The vehicle age distributions were prepared by MDE based on information obtained from MVA registration data.

The age distributions for light duty vehicles are based on 2014 MVA registration data that included cleaning of duplicate, expired, and non-eligible vehicles (from the emission standpoint such as trailers, farm tractors). The data was transformed into two sets of MOBILE6.2 vehicle types; one conforming to MOBILE6.2-28 vehicle type and the other to MOBILE6.2-16 composite vehicle type system using a SAS-based computer program.

The MOVES model input age distributions were produced utilizing the available EPA MS-Excel-based vehicle registration converter tool. This tool assisted in converting the MOBILE6.2-based data into the MOVES source type categories.

The age distributions for heavy duty trucks (source type 52, 53, 61 and 62) were developed using EPA default age distributions for MOVES2014a for 2020, 2030, 2040 and 2050 (downloaded from https://www3.epa.gov/otaq/models/moves/tools.htm).

Vehicle Population Data

Vehicle fleet information such as the number and age of vehicles has an impact on the forecasted start and evaporative emissions within MOVES. The MOVES model requires the population of vehicles to be separated by the thirteen source type categories. This data was prepared and provided by MDE utilizing another SAS-based computer program similar to the one discussed in the previous vehicle age section. Maryland county vehicle registration data was used to estimate vehicle population for light-duty vehicles, buses, refuse trucks and motor homes for Cecil County. The vehicle population for heavy-duty trucks(source types 52, 53, 61 and 62) were estimated using Cecil county VMT and MOVES2014 default VMT/population ratios for those source types.

For the analysis years 2020, 2030, 2040, and 2050, the vehicle population was forecasted based on projected household and population growth obtained from state and MPO sources. The growth rate methodology included:

- Choosing the highest growth rate between population, households, and VMT growth.
- Default VMT/Population ratio for trucks, i.e., truck population growth based on Truck VMT.

Environmental and Fuel Data

Information on environmental, fuel, vehicle technology, and other control strategy assumptions were determined based on a review of MOVES2014 default information by MDE.

Fuel Data: MDE obtains monthly fuel data reports regularly from the Maryland Fuel Laboratory, which is under the jurisdiction of Maryland Fuel Tax Division of the Office of the Comptroller of Maryland. These fuel reports are generated by testing samples collected in the field (gas stations) for the purpose of fuel regulation enforcement. Three sets of fuel data inputs (Fuel Formulation, Fuel Supply, Fuel Usage Fractions tables) required by the MOVES2014a model were developed for Cecil County. The fuel parameters that changed from the MOVES2014a defaults include:

fuelFormulationID	Unique ID used for easy recognition
fuelSubtypeID	Selected per guidance based on ethanol content of gasoline
sulfurLevel	Computed from the local fuel data
rvp	Computed from the local fuel data
ETOHVolume	Computed from the local fuel data
aromaticContent	Computed from the local fuel data
olefinContent	Computed from the local fuel data
benzineContent	Computed from the local fuel data
E200	Computed from the local fuel data
E300	Computed from the local fuel data

Meteorological Data: Evaporative emissions are influenced significantly by the temperatures of the surrounding air. Ozone analysis temperature and humidity values were determined by MDE using the procedures documented in EPA's technical guidance. On a triennial basis, meteorological data including hourly temperature and relative humidity is compiled to be used for periodic emission inventories. The data used for this analysis were updated in 2014. The month-by-month, raw hourly-data sets were obtained from the National Climate Data Center of NOAA. Hourly average temperature and humidity computations were developed from the 24 hourly values for every hour in a given month for the county.

Other Vehicle Technology and Control Strategy Data

The MOVES2014a default I/M data was reviewed and updated by MDE for Cecil County. The current I/M program known as the Vehicle Emission Inspection Program (VEIP) was utilized for these analysis runs and is described below.

MD Vehicle Emission Inspection Program (VEIP): This program tests model year 1977 and newer gasoline powered vehicles weighing up to 26,000 pounds. The test is done biennially, and on change of ownership. There is a two-year grace period for new vehicles. Light duty vehicles model year 1996 and newer, and model year 2008 and newer vehicles weighing up to 14,000 pounds receive the OBD test. All other vehicles receive an idle test with a gas cap pressure test and a visual check for the presence of a catalytic converter. The compliance factors reflect the fail and waiver rates observed in the program, combined with an assumed 96% compliance rate for vehicles showing up for testing. Heavy duty vehicles have an additional factor, reflecting the fraction of vehicles in the weight range covered by the program. This was derived from documentation comparing the MOVES and MOBILE vehicle classes. The significantly higher compliance rate for the gas cap check reflects the much higher retest pass rate for this check.

Federal Programs: Current federal vehicle emissions control and fuel programs are incorporated into the MOVES2014 software. These include the National Program standards covering model year vehicles through 2025, fuel efficiency and greenhouse gas standards for model year 2014 to 2018 medium and heavy-duty vehicles, Tier 3 vehicle and fuel standards beginning with model year 2017. Modifications of default emission rates are required to reflect the early implementation of the National Low Emission Vehicle Program (NLEV) program in Maryland. To reflect these impacts, EPA has released instructions and input files that can be used to model these impacts. This inventory utilized the October 2014 version of the files: (http://www.epa.gov/oms/models/moves/tools.htm).

State Vehicle Technology Program:
MD Clean Car Program: Under the Maryland Clean Cars Act of 2007, Maryland adopted the California Low Emission Vehicle (LEV) program. The program was implemented in 2011 and requires all 2011 model year and newer vehicles (GVWR up to 14,000 lbs.) registered in Maryland to meet California emission standards for both criteria and greenhouse gas pollutants. This program also contains a zero emission vehicles component that requires the manufactures to produce a certain percentage of zero emission vehicles (electric, fuel cell, etc.) for purchase in the state. California has adopted new amendments to the Low-Emission Vehicle regulation entitled LEV III (third generation low emission vehicle standards). These amendments create more stringent emission standards for new motor vehicles. These new standards will be phased-in over the 2015-2025 model years.

The impacts of this program were modeled for all analysis years using EPA's guidance document, *Instructions for Using LEV and NLEV Inputs for MOVES2014, EPA-420-B-14-060a, October 2014*. EPA provided input files to reflect the CAL LEVIII program with the standard phase-in schedules for new emission standards. Modifications to those schedules were done per EPA's instructions, to reflect a later start for the State of Maryland beginning with vehicle model year 2011.

2050 RTP and FY 2020-2023 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. As shown in the 2050 Regional Transportation Plan, 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 analysis was made available for formal public review and comment beginning on January

14, 2019. The public review and comment period was announced using the following outlets:

- Notices in the Delaware News Journal and Cecil Whig Newspapers
- Radio advertisements
- WILMAPCO website (www.wilmapco.org)
- WILMAPCO E-NEWS (monthly electronic newsletter)
- "Our Town" Public Workshop held at the STAR Campus Atrium in Newark on February 7, 2019.

The documentation of the observed 30-day public comment period, comments, and the responses to comments can be found in Appendix E.

Conformity Statement

The conformity rule, as it applies to the Cecil County, MD portion of the PA-NJ-MD-DE 8-hour ozone nonattainment area, requires the RTP and TIP to conform to the motor vehicle emissions budgets established in the SIP. Appendix A contains a matrix, which provides responses to all of EPA's criteria as applicable to this conformity determination.

The results of the conformity analysis for the Cecil County portion of the PA-NJ-MD-DE 1997, 2008, and 2015 8-hour ozone nonattainment area indicate that the projected mobile source emissions are below the EPA-approved motor vehicle emission budgets for the established analysis years of 2020, 2030, 2040 and 2050. Based on the conformity analysis, WILMAPCO, in its capacity as the MPO, has concluded that the implementation of the 2050 RTP and 2020-2023 TIP will not worsen the region's air quality or delay the timely attainment of the National Ambient Air Quality Standards.

References

Transportation Conformity Regulations as of April, 2012, EPA-420-B-12-013; http://www.epa.gov/otaq/stateresources/transconf/conf-regs.htm

FHWA, 23 CFR PART 450 – Planning Assistance and Standards, Subpart C -- Metropolitan Transportation Planning and Programming; http://www.ecfr.gov/

FY 2017-2020 Transportation Improvement Program; Wilmington Area Planning Council; *http://www.wilmapco.org/tip/*

Regional Transportation Plan, 2050 Update; Wilmington Area Planning Council*;* http://www.wilmapco.org/rtp/

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

Policy Guidance on the Use of MOVES2014 for State Implementation Plan Development, Transportation Conformity, and Other Purposes, US EPA Office of Transportation and Air Quality, EPA-420-B-14-008, July 2014.

MOVES2014 and MOVES2014a Technical Guidance: Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity. US EPA Office of Air and Radiation, and Office of Transportation and Air Quality, EPA-420-B-15-093, November 2015.

MOVES2014a User Guide, US EPA Office of Transportation and Air Quality, EPA-420-B-15-095, November 2015.

Highway Capacity Manual 2010, Transportation Research Board, January, 2010.

Traffic Trends System Report Module, 2014 Data, Maryland State Highway Administration.

Appendix A

Conformity Question Checklist

Table A-1: Conformity Questions Matrix

Section	Requirement	Y/N	Response
40 CFR 93.110	Is the conformity determination based on the latest planning assumptions?	Y	See below.
	(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?	Y	The conformity analysis uses the UES travel demand model that is validated (checks the accuracy of the model) to 2010 conditions. Assumptions regarding vehicle mix, hourly patterns, monthly/seasonal factors, and vehicle fleet registration data are based on the latest available (2014) information from the Maryland Department of the environment (MDE) & State Highway Administration (SHA).
	(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?	Y	Land use for Cecil County, Maryland and New Castle County, Delaware came directly from demographics used by WILMAPCO. WILMAPCO provided data for Cecil County was produced by the Maryland Department of Planning in 2015 (employment) and 2017 (population.
	(c) Are any changes in the transit operating policies (including fares and service levels) and assumed transit ridership discussed in the determination?	Y	The impact of transit on regional vehicle trips is accounted for in the validation count data. Any future changes to transit service can be accounted for using off-model or sketch analysis tools, such as MAQONE. However, there are not any regionally significant transit projects in this analysis.
	(d) The conformity determination must include reasonable assumptions about transit service and increases in transit fares and road and bridge tolls over time.	Y	See above regarding transit. Tolls are included in the validated UES travel demand model.
	(e) The conformity determination must use the latest existing information regarding the effectiveness of the TCMs and other implementation plan measures, which have already been implemented.	N/A	There are no TCMs identified in the SIP.

Section	Requirement	Y/N	Response
	(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.	Y	Summary provided in Interagency Consultation Section with supporting documents in Appendix D & E.
40 CFR 93.111	Is the conformity determination based on the latest emissions model?	Y	EPA's latest emissions model, Motor Vehicle Emissions Simulator (MOVES) was used for this conformity determination.
40 CFR 93.112	Did the MPO make the conformity determination according to the consultation procedures of the conformity rule or the state conformity SIP?	Y	Consultation procedures were followed in accordance with the Federal Transportation Conformity Rule. WILMAPCO consulted appropriate agencies and provided a scope of work to the following agencies: MDOT, MDE, DelDOT, DNREC, FHWA, FTA, and EPA.
40 CFR 93.106 (a) (1)	Are the horizon years correct?	Y	The years chosen: 2020, 2030, 2040 and 2050, represent the appropriate horizon years needed for the 8-hour ozone NAAQS conformity determinations.
93.106(a) (2)(i)	Does the plan quantify and document the demographic and employment factors influencing transportation demand?	Y	A summary is provided in the Land Use Forecast Methodology section and the relevant data is summarized in Table 4 of this 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 that the transportation plan envisions to be operational in the horizon years?	Y	A summary of regionally significant projects can be found in the land use section and Table 3 of this document.
93.108	Is the Transportation Plan Fiscally Constrained?	Y	See Financial Constraint Section.
93.113(b)	Are TCMs being implemented in a timely manner?	N/A	There are no TCMs in the SIP.
40 CFR 93.118	Is the Transportation Plan consistent with the motor vehicle emissions budget in the applicable SIP?	Y	The conformity determination was performed using the 2009 motor vehicle emissions budgets contained in the SIP and found adequate by EPA.

Appendix B

Conformity Results

Detailed VMT and Emissions

By County

By Road Type

By Analysis Year

Table B-1: 2020 Emissions Budget Test Results

2020 Analysis				
Road Type	***VMT***	***Speed (mph)***	***VOC (tons/day)***	***NOX (tons/day)***
Off-Network	-	-	1.10	1.98
Rural Restricted Access	1,781,526	63.7	0.14	1.49
Rural Unrestricted Access	1,889,611	39.2	0.16	0.97
Urban Restricted Access	96,131	59.9	0.01	0.07
Urban Unrestricted Access	330,604	20.4	0.04	0.16
Nonattainment Area Total	4,097,872		1.45	4.67
	2009 Budgets (Submitted)		***2.2***	***7.3***
			PASS	**PASS**

Table B-2: 2030 Emissions Budget Test Results

2030 Analysis				
Road Type	***VMT***	***Speed (mph)***	***VOC (tons/day)***	***NOX (tons/day)***
Off-Network	-	-	0.72	1.68
Rural Restricted Access	1,900,467	63.1	0.06	0.60
Rural Unrestricted Access	2,100,127	38.6	0.08	0.39
Urban Restricted Access	102,363	59.9	0.00	0.03
Urban Unrestricted Access	360,113	18.9	0.02	0.06
Nonattainment Area Total	4,463,071		0.89	2.77
	2009 Budgets (Submitted)		***2.2***	***7.3***
			PASS	**PASS**

Table B-3: 2040 Emissions Budget Test Results

2040 Analysis				
Road Type	***VMT***	***Speed (mph)***	***VOC (tons/day)***	***NOX (tons/day)***
Off-Network	-	-	0.60	1.66
Rural Restricted Access	1,995,553	64.5	0.05	0.47
Rural Unrestricted Access	2,327,441	38.5	0.07	0.31
Urban Restricted Access	108,517	60.0	0.00	0.02
Urban Unrestricted Access	386,826	17.9	0.02	0.05
Nonattainment Area Total	4,818,336		0.74	2.51
	2009 Budgets (Submitted)		***2.2***	***7.3***
			PASS	**PASS**

Table B-4: 2050 Emissions Budget Test Results

2050 Analysis				
Road Type	***VMT***	***Speed (mph)***	***VOC (tons/day)***	***NOX (tons/day)***
Off-Network	N/A	N/A	0.61	1.72
Rural Restricted Access	2,075,799	64.4	0.04	0.48
Rural Unrestricted Access	2,472,423	38.2	0.07	0.32
Urban Restricted Access	114,586	60.0	0.00	0.02
Urban Unrestricted Access	405,204	18.0	0.02	0.05
Nonattainment Area Total	5,068,012		0.75	2.60
	2009 Budgets (Submitted)		***2.2*** **PASS**	***7.3*** **PASS**

Appendix C

MOVES Input Files and Parameters For Cecil County, MD

Traffic/Air Quality Data Checklist for Cecil County

Data Item	Inputs Assumptions
MOVES RunSpec	
Emission Model	MOVES2014a (default database: MOVESDB20161117)
Scale/Calulation Type	County Scale Inventory Run
Analysis Years	2020, 2030, 2040, 2050
Analysis Season	July Weekday
Pollutants	VOC, NOx
Fuel Types	Gasoline, Diesel, CNG, Electricity, E-85
Traffic Data	
Highway Network	Cecil Model Networks (2020, 2030, 2040, 2050): Use socio-economic forecast and latest network Inputs updated for 2050 LRTP
Seasonal/Daily Adjustments	Factors to develop MOVES daily and monthly VMT fraction files as inputs. Seasonal adjustment factors developed from 2014 SHA Traffic Trends Report.
County HPMS VMT Adjustments	Apply HPMS Adjustments to ensure Model VMT is consistent with reported HPMS
Mapfile	Use MOVES2014a national defaults VMT distributions for Maryland to dissagregate light duty vehicles/buses/trucks to MOVES 13 source types; consistent with 2014 NEI.
Hourly Patterns	Deveoped based on 2014 SHA Traffic Trends Report
Vehicle Mixes	MOVES VMT required by 5 HPMS vehicle classes. Use 2014 SHA truck count data (TMS database & hourly volumes) to split model traffic volumes into motorcycles, light duty vehicles, buses and trucks, and use MOVES default VMT distributions for the state to divide the four vehicle groups into MOVES 13 source types, which are recombined to the 5 HPMS vehicle classes.
MOVES Inputs	
Annual VMT	Calculated by PPSUITE from Model network / seasonal factors / vehicle mapping
Month VMT Fractions	Calculated based on 2014 seasonal adjustment factors
Day VMT Fractions	Calculated based on 2014 seasonal adjustment factors
Avg. Hourly Speed Distribution	Calculated by PPSUITE (Minimum Speed = 2.5 mph); Based on Model volumes and speed post processing by hour of day.
Road Type Distribution	Calculated by PPSUITE; a RoadType field must be added to the Model network based on FC.
Ramp Fraction	MOVES defaults
Source Type Population	1. Non-trucks: 2014 Inputs provided by MDE --> Adjust/grow to 2020, 2030, 2040, and 2050 by applying growth factors developed from Woods & Poole population/households/employment forecast data and limiting to VMT Growth. For non-trucks: maximum of households & population growth. 2. Heavy duty trucks (source type 52, 53 ,61 & 62): Use Cecil county VMT and MOVES2014 default VMT/Population ratios to estimate truck population.
Vehicle Age Distribution	Use MDE-prepared 2020, 2030, 2040 and 2050 inputs for light duty vehicles and MOVES naitonal default age distribution inputs for trucks (source type 52, 53 ,61 & 62).
Fuel Supply	Provided by MDE
Fuel Formulation	Provided by MDE
Fuel Usage Fraction	Provided by MDE
Temperatures/Humidity	2014 inputs provided by MDE
I/M Parameters	Provided by MDE
Control Programs	
Early NLEV / CALLEVIII	Include EPA provided MOVES2014 override database for early NLEV implementation and MD-specific CALLEVIII program provided by MDE
California ZEV Program	Included (provided by MDE)

Sample Cecil County MOVES Run Specification File Settings for Analysis Year 2020

Sample xml file format – Run 1

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sourcetypename="Passenger Truck"/>
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sourcetypename="Refuse Truck"/>
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sourcetypename="Single Unit Short-haul Truck"/>
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Sample mrs file format – Run 1

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with user's data]]></description>
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<onroadvehicleselection     fueltypeid="3"     fueltypedesc="Compressed     Natural     Gas     (CNG)"     sourcetypeid="21"
sourcetypename="Passenger Car"/>
<onroadvehicleselection     fueltypeid="3"     fueltypedesc="Compressed     Natural     Gas     (CNG)"     sourcetypeid="31"
sourcetypename="Passenger Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="32" sourcetypename="Light
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```

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Truck"/>
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Truck"/>
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Appendix D

Interagency Consultation

Please Visit:

http://www.wilmapco.org/aqs

The WILMAPCO Air Quality Subcommittee has 13 members representing federal, state and local agencies in Delaware and Maryland. The AQS assesses the air quality impacts of transportation projects in WILMAPCO's Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP). Their recommendations help our region attain its air quality goals.

Appendix E

Public Participation Materials

Please Visit:

http://www.wilmapco.org/aq

Air Quality Conformity is a process which ensures federal funding and approval goes to transportation activities that are consistent with our air quality goals. This process applies to both the long range Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP). Known as “non-attainment areas” or “maintenance areas,” respectively, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) jointly determine conformity within these regions which do not meet air quality standards to ensure that federal actions conform to the purpose of the State Implementation Plan (SIP). The US Department of Transportation cannot fund, authorize, or approve federal actions to support projects that do not conform to Clean Air Act requirements governing the current National Ambient Air Quality Standards (NAAQS).

While ozone and fine particulate emissions have and continue to drop dramatically, the WILMAPCO region still does not meet the rigorous federal air quality standards. Both New Castle and Cecil Counties are designated in moderate non-attainment for ozone. New Castle County is considered in maintenance for fine particulate matter (PM2.5). WILMAPCO is responsible for ensuring a plan in place to meet the attainment levels in these counties.

http://www.wilmapco.org/rtp

Every four years, MPOs must update their long-range transportation plan with at least a 20-year planning horizon. This long-range plan must be financially reasonable and conform to air-quality standards. Significantly, no transportation projects in the region may be funded with federal money unless the projects are found in an approved long-range transportation plan. Our long-range plan is called the Regional Transportation Plan, or RTP.

Air Quality Conformity Analysis Report

Dover/Kent County Metropolitan Planning Organization
FY 2019-2022 Transportation Improvement Program (TIP)
and 2040 Metropolitan Transportation Plan (MTP)

Prepared for:

Dover/Kent County Metropolitan Planning Organization

In association with:

Delaware Department of Transportation
Delaware Department of Natural Resources and Environmental Control

Prepared by:

Whitman, Requardt & Associates, LLP
1013 Centre Road, Suite 302
Wilmington, DE 19805

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TABLE OF EXHIBITS

INTRODUCTION

The Dover/Kent County Metropolitan Planning Organization (Dover/Kent MPO) is the federally-designated agency responsible for coordinating transportation planning and programming in Kent County, Delaware, including all of Milford and Smyrna. Plans and programs adopted by the MPO outline how federal transportation funds will be spent and, must comply with federal laws governing clean air and transportation. Dover/Kent MPO is responsible for developing a Transportation Improvement Program (TIP) and a Metropolitan Long-Range Transportation Plan (MTP) in cooperation with 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.

Dover/Kent MPO is required by law to demonstrate that the MTP 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 MTP are equal to or less than the emission budgets in the SIPs, then conformity has been demonstrated.

Kent County is part of the Philadelphia-Wilmington-Trenton non-attainment area, though it was not cited as a non-attainment county. When the standard was first adopted, Kent County was in attainment and the Dover/Kent MPO was not required through federal regulations to show that the FY 2019-2022 TIP complied with the requirements of the 1990 CAA and subsequent amendments. A challenge to the ozone standards released by the EPA was partially upheld, however, and Kent County was designated as “Partial Orphan Nonattainment Area” by EPA through the “Transportation Conformity Guidance for the South Coast II Court Decision” released in November 2018[1]. Based on the Guidance, transportation conformity for the 1997 ozone National Ambient Air Quality Standard (NAAQS) will again apply in orphan areas as of February 16, 2019. The Dover/Kent MPO is now required to comply with the 1997 ozone standard as well.

This report documents the analysis of Air Quality implications of the Dover/Kent MPO 2019-2022 TIP and 2040 MTP. This document demonstrates the transportation conformity of the Dover/Kent MPO’s 2019-2022 TIP and 2040 MTP under the 8-hour ozone and NAAQS. Kent County has never been designated as non-attainment area for PM2.5. The PM2.5 emission analyses are included in this report to demonstrate the PM2.5 emission in Kent County for the Dover/Kent MPO’s 2019-2022 TIP and 2040 MTP.

The methodology and data assumptions used for the conformity analysis are illustrated. Detailed emission results are presented for each analysis year, by summer weekday and by daily and annual average. Modeling input and output files have been reviewed by Delaware Department of Natural Resources and Environmental Control (DNREC).

[1] https://www.epa.gov/sites/production/files/2018-11/documents/420b18050.pdf

NATIONAL AMBIENT AIR QUALITY STANDARD

The Clean Air Act (CAA) requires the Environmental Protection Agency (EPA) to set NAAQS designations 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.

Kent County is part of the Philadelphia-Wilmington-Trenton non-attainment area, though it was not cited as a non-attainment county. When the standard was first adopted, Kent County was in attainment and the Dover/Kent MPO was not required through federal regulations to show that the FY 2019-2022 TIP complied with the requirements of the 1990 CAA and subsequent amendments. A challenge to the ozone standards released by the EPA was partially upheld, however, and the Dover/Kent MPO is now required to comply with the 1997 ozone standard as well.

Ozone Background

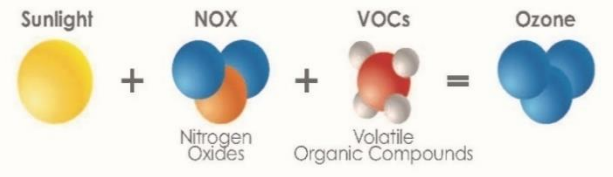
Ozone is an odorless, colorless gas composed of three atoms of oxygen (O3). While ozone in the stratosphere forms a protective layer, shielding the earth from the sun's harmful rays, ground-level ozone is a harmful air pollutant to people's health and the environment, and it is a key contributor to smog.

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 most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers. In addition, people with certain genetic characteristics, and people with reduced intake of certain nutrients, such as Vitamins C and E, are at greater risk from ozone exposure. 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.[2]

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. As a result, ground-level ozone negatively impacts both agricultural productivity and ecosystem stability. Furthermore, ozone damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas.

[2] *Ozone and your health* - https://www3.epa.gov/airnow/ozone-c.pdf

Ground-level ozone is not emitted directly into the air but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline vapors, chemical solvents, and natural sources all contribute to NOx and VOC emissions. Since ozone is formed in the presence of heat and sunlight, it is considered a summertime pollutant.



8-Hour Ozone National Ambient Air Quality Standards

On July 18, 1997, EPA published the 1997 8-hour ozone NAAQS via the Federal Register (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).

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.

On October 26, 2015, EPA issued 2015 primary and secondary NAAQS for ozone via Federal Register 80 FR 65292. The 2015 standards revised the levels of primary and secondary standards to 0.070 ppm, and retained their indicator (O3), forms (fourth-highest daily maximum, average across three consecutive years), and averaging time (eight hours).

Under the CAA, 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.

Kent County is part of the Philadelphia-Wilmington-Trenton non-attainment area under the 1997 8-hour ozone NAAQS, though it was not cited as a non-attainment county. When the standard was first adopted, Kent County was in attainment and the Dover/Kent MPO was not required through federal regulations to show that the FY 2019-2022 TIP complied with the requirements of the 1990 CAA and subsequent amendments. A challenge to the ozone standards released by the EPA was partially upheld, however, and Kent County was designated as “Partial Orphan Nonattainment Area” by EPA through the “Transportation Conformity Guidance for the South Coast II Court Decision” released in November 2018[3]. Based on the Guidance, transportation

[3] https://www.epa.gov/sites/production/files/2018-11/documents/420b18050.pdf

conformity for the 1997 ozone NAAQS will again apply in orphan areas as of February 16, 2019. The Dover/Kent MPO is now required to comply with the 1997 ozone standard as well.

PM2.5 Background

Particulate matter is a mixture of solid particles and liquid droplets found in the air. Particulate matter contains microscopic solids or liquid droplets that are so small that they can be inhaled and cause serious health problems. Particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and some may even get into your bloodstream. PM2.5 refers to the fine particulate matter with diameters that are generally 2.5 micrometers and smaller (or about one-thirtieth the diameter of a human hair).

The health effects associated with exposure to fine particles are significant. Scientific studies have shown that long-term exposures have been associated with problems such as reduced lung function, the development of chronic bronchitis, and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks. While fine particles are unhealthy for anyone to breathe, people with heart or lung disease, asthmatics, older adults, and children are especially at risk.[4]

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 reactions of chemicals such as sulfur dioxide and nitrogen oxides that are emitted pollutants from plants, industries and automobiles.

PM2.5 National Ambient Air Quality Standards

In July 1997, 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 µg/m3, based on a three-year average of the annual mean PM2.5 concentrations, and

2. A 24-hour standard of 65 µg/m3, based on a three-year average of the 98th percentile of 24-hour concentrations.

On October 17, 2006, EPA issued the final rule of 2006 NAAQS for PM2.5 via Federal Register 40 CFR Part 50. The 2006 NAAQS for PM2.5 was effective on December 18, 2006. In the 2006 NAAQS for PM2.5, EPA revised the level of 24-hour PM2.5 standard to 35 micrograms per cubic meter and retained the level of annual PM2.5 standard at 15 micrograms per cubic meter.

To provide requisite protection against health effects associated with long- and short-term PM2.5 exposures, EPA revised the annual PM2.5 standard by lowering the level to 12.0 micrograms per cubic meter and to retain the 24-hour PM2.5 standard at a level of 35 micrograms per cubic meter in the 2012 NAAQS for PM2.5. The EPA issued the final rule of 2012 NAAQS for PM2.5 on January 15, 2013 via Federal Register 40 CFR Parts 50, 51, 52 et al and the final rule was effective on March 18, 2013.

[4] https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

Kent County has never been designated as non-attainment area for PM2.5. There is no PM2.5 conformity budget requirement for Kent County. The PM2.5 emission analysis is conducted and the results are presented to demonstrate the PM2.5 emission in Kent County for the Dover/Kent MPO's 2019-2022 TIP and 2040 MTP.

TRANSPORTATION CONFORMITY

Transportation conformity was first introduced and included in the 1977 CAA to ensure that federal funding and approval go to the transportation activities are consistent with air quality goals. These goals are set in the air quality State Implementation Plan (SIP) in each state. Transportation conformity requirements were made substantially more rigorous in the CAA Amendments of 1990, and the implementation details of the CAA requirements were first issued in the November 24, 1993 through Federal Register. The regulations establish the criteria and procedures for transportation agencies to demonstrate that air pollutant emissions from MTP, TIP, and projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) are consistent with the State's air quality goals in the SIP. The most recent amendment of transportation conformity implementation requirements was issued in April 2012.

The SIP is a federally-approved and enforceable plan by which an area identifies how it will attain and/or maintain the health-related primary and welfare-related secondary NAAQS. Under the CAA, transportation and air quality modeling procedures must be coordinated to ensure that the TIP and the LRTP are consistent with the SIP applicable to Kent County.

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. 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

Status of the Amended Dover/Kent County MPO 2040 MTP and FY 2019-2022 TIP

Dover/Kent MPO is charged with authoring a long-range MTP with at least a 20-year planning horizon and a short-term TIP. The MTP and TIP present 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.

The TIP is one of the products that the federal legislation has continually required a metropolitan planning organization to prepare at least every four years. The purpose of the TIP is to disclose transportation projects for which federal funding will be sought over a four-year period. The TIP should reflect the region’s priorities, represent a consensus among state and regional officials, show a direct relationship to the regional transportation plan, be financially constrained, and conform with federal air quality regulations as they relate to transportation. Finally, the TIP must be subjected to thorough public review during development and prior to adoption.

The Dover Kent MPO FY 2019-2022 TIP deviates from the preceding (FY 2017-2020) TIP from 2017. In the FY 2019-2022 TIP, locations of “state of good repair” activities are summarized as

well. The previously-amended TIP was prepared from DelDOT's FY 2017-2023 Capital Transportation Program (CTP) and influenced by the MPO's 2040 MTP adopted January 4, 2017.

The 2040 MTP is the long-range transportation plan for the Dover/Kent MPO region. The MTP identifies transportation needs, provides strategies to address those needs, guides transportation investment, and provides measurable goals for the region's transportation system through the year 2040. The Plan, which is updated every 4 years, is required of all MPOs, as only projects found in the MTP are eligible for federal funding. The Dover/Kent MPO prepared its initial long-range transportation plan in 1996, and Vision 2040 is the fifth update to the original plan. In 2016, the Dover/Kent MPO sought public input through a number of outreach methods to update the most recent plan for 2017-2040. In January 2017, the Dover/Kent MPO Council adopted the 2017-2040 MTP.

INTERAGENCY CONSULTATION

The federal transportation conformity rule requires that the conformity process include cooperative interaction among federal, state, and local agencies. Interagency consultation for this analysis was conducted, as required by Delaware SIP, through coordination with local county and city representatives, the MPO, and representatives from both state and federal agencies, including:

- Dover/Kent MPO
- Delaware Transit Corporation (DTC)
- Delaware Department of Transportation (DelDOT)
- Delaware Department of Natural Resources and Environmental Control (DNREC)
- City of Dover
- Kent County
- Federal Highway Administration (FHWA)
- Environmental Protection Agency (EPA)
- Federal Transit Administration (FTA)

As part of the interagency consultation, the Technical Advisory Committee (TAC) and Delaware Transportation Conformity Interagency Consultation Working Group 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

DETERMINE PLANNING ASSUMPTIONS

The transportation conformity determination includes an assessment of future highway emissions for defined analysis years. 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), and the most current version of DelDOT's statewide travel demand model.

Ozone

The emission estimates resulted from the implementation of regionally-significant transportation projects that do not qualify as exempt under 40 CFR 93.126 and 127 are compared to DNREC's Motor Vehicle Emissions Budget (MVEB).

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

- VOC: 3.95 tons/summer day
- NOx: 9.04 tons/summer day

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

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

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

- 2020 (near-term year)
- 2030 (interim year to keep analysis years less than ten years apart)
- 2040 (Dover/Kent MPO 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 (NOx), volatile organic compounds (VOCs), sulfur oxides (SOx), and ammonia (NH_3).

For the regional analysis of direct PM2.5 emissions, 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 the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Nonattainment area in which Kent County is included, 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: NOx, VOCs, SOx, and NH_3. The current PM2.5 SIP does not identify any precursors other than NOx as a significant contributor of PM2.5 emissions in Kent County.

The following PM2.5 pollutants and precursors were tested:

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

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.

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

- 2020 (near-term year)
- 2030 (interim year to keep analysis years less than ten years apart)
- 2040 (Dover/Kent MPO Plan horizon year)

ANALYSIS METHODOLOGY AND DATA

Under the CAA, transportation and air quality modeling procedures must be coordinated to ensure that the TIP and the MTP are consistent with the SIP applicable to Kent County. The air quality analysis conducted for the Amended FY 2019-2022 TIP and 2040 MTP used a series of computer-based modeling techniques. These techniques are consistent with methods Dover/Kent MPO 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 Dover/Kent MPO and DelDOT have used assisting in the preparation of various SIP documents with DNREC.

Travel Demand Modeling Methodology

A statewide travel demand model for Delaware, including Kent 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 Amended FY 2019-2022 TIP and this update of the 2040 MTP used a 2015 base year network. Model networks were developed for the years 2020, 2030, and 2040 for Kent County. Networks included major capacity improvement projects that are expected to be in place and open to service during these years. The types of projects tested included roadway upgrades (such as new or improved shoulders), highway widening (one lane or more), and new construction.

Demographic projections, including employment, households, and population, were developed for each of the analysis years through the Wilmington Data & Demographic Subcommittee. These forecasts were approved by the Delaware Population Consortium in 2017.

Travel estimates were developed for this conformity analysis using the five-step travel demand modeling process noted above. 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 (TAZs) for the Dover/Kent MPO region. The modeling process maintained for Dover/Kent MPO by DelDOT's Division of Planning uses a single, integrated model of the Delaware/Maryland portion of the Delmarva Peninsula. The Delaware Population Consortium (DPC) develops demographic data projections for Kent County and the City of Dover. Dover/Kent MPO staff assisted in the analysis of DPC annual distribution projections, developed the smaller TAZ geographies, and allocated the DPC projections. 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, the demographic data for each of these items was obtained from the most recent census and updated as needed to the base year of the long-range plan. The 2010 Census was used with other locally obtained information to develop a set of TAZ estimates for 2015 for this conformity analysis. The employment by place of work is developed through a series of local, county, and state-agency data sources to achieve consensus on TAZ-based employment locations.

The second primary travel model input is the so-called “travel network” representation of Kent County and Dover 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 Whitman, Requardt & Associates, LLP, an engineering consulting firm) estimated these models using data from the 1997 – 2011 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.

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 based on analysis of the entire 1997 – 2011 DTMS dataset.

The mode choice model used by DelDOT and the MPOs is a nested logit choice format. Non-motorized trips (separate modes for bicycling and walking) 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 6.4.3 of the software dated October 6, 2017) under license from the vendor, Citilabs.[5]

The modeling process for this conformity analysis used a 2015 base year network. Model networks were developed for 2020, 2030, and 2040 for Kent County and for the Delaware/Maryland peninsula counties within the DelDOT/MPO "Peninsula Travel Model." For the horizon years, regionally significant projects from the TIP and MTP were coded onto the networks. Detailed assessments were only performed for those projects which may have significant effect on emissions in accordance with Federal Register 40 CFR Parts 51 and 93. The types of projects tested were corridor improvements, highway widening, and new roadway construction. Regionally significant transportation projects in Kent County that were modeled are listed in Exhibit 1. Projects were included in the network based on the in-service date and falling before the model year.

[5] http://www.citilabs.com/

Exhibit 1: Kent County Regionally Significant Projects

Project	*Limit*	*Desciption*	*In Service*
Camden Bypass	Rising Sun Road to South Street	New roadway south side of Camden	2022-2030
Camden Bypass	Old North Road Extended to Route 10	New roadway north-east side of Camden	2022-2030
U.S. 13/Kings Highway	Intersection	Intersection Improvements	2031-2040
Crawford Carroll Road Extension	West Rustic Lane to U.S. 13	Extend existing service road	2022-2030
Saulsbury Road and McKee Road	Scarborough Road To North Street	Expand to 4 lanes	2022-2030
Route 1/N.E. Front Street	Intersection	Grade-separated intersection	2018-2021
U.S. 13 Connector Road	Scarborough Road to Leipsic Road	New collector road east of Dover Mall and Dover Downs	2022-2030
Route 8 Connector	Hazlettville Road to Route 8	New north-south connection near Dover High School	2031-2040
U.S. 13/Dover Mall	Power Center Drive to U.S. 13	Provide a new connector to U.S. 13 across from DSU	2031-2040
Greentree Connector Road	Independence Blvd. to Kenton Road	Provide a new east-west connection	2022-2030
Garrison Oak Connector Road	White Oak Road to Route 8	Provide new road to technology park	2022-2030
Leipsic Road Realignment	U.S. 13 to Jefferic Boulevard	Roadway realignment	2031-2040
Woodleytown Road/Irish Hill Road	Intersection	Intersection realignment	2022-2030
Route 8 Intersections	Various locations	Provide local connections	2031-2040

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 include traffic flow characteristics, vehicle descriptions, fuel parameters, inspection/maintenance (I/M) program parameters, and environmental variables. MOVES includes a default national database of meteorology, vehicle fleet, vehicle activity, fuel, and emissions 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 is recommended for use when completing a regional conformity analysis. Local data sources are used for all inputs that have a significant impact on calculated emission rates. These data items are discussed in the following sections.

Roadway Data

The emission calculation process uses key traffic data from the regional travel demand model to estimate regional Vehicle Miles Traveled (VMT) and speeds. This data includes individual

roadway traffic volumes and physical roadway descriptive characteristics including area type, facility type, lanes, distances, capacity, and free-flow speeds. Travel demand model runs are produced for future analysis years and include the impact of regionally significant transportation projects. The model provides a key resource for estimating the impact of population and employment growth on roadway volumes and calculating the diversions due to transportation projects.

VMT was determined for each roadway class/setting by multiplying the length of road by the number of vehicles using the road per day. Additional adjustments were made to convert the VMT to an average monthly day and summer day (including weekday and weekend), including:

- Seasonal adjustment factors reflecting traffic variation within the spring, summer, fall, and winter months and weekday and weekend derived from permanent count station monitoring[6] in Kent County, and

- Highway Performance Monitoring System (HPMS) adjustments used to align annual VMT estimates with HPMS reported totals for the base year for Kent County[7].

Speed data was calculated for each highway segment and hour of the day, based on roadway capacity, traffic volume, and other physical roadway features (e.g. traffic signals). Thus, the travel demand model provided VMT according to the speed bins required by the MOVES software, thereby accounting for certain physical highway conditions and congestion caused by traffic volume. A speed bin is essentially an increment of speed range; for example: “VMT for the 30-35 mph range.” For future horizon years, congestion (and thereby speed) can be affected by traffic growth and changes in physical conditions due to planned transportation improvements and other projects assumed to be “in-service” in horizon years.

Vehicle Class Data

Emission rates within MOVES vary significantly by vehicle type. The MOVES model produces emissions and rates by thirteen MOVES vehicle source types. However, VMT is input into MOVES by five HPMS vehicle groups. MOVES2014b requires that VMT for any 2-axle, 4-tire vehicle weighing less than 10,000 lbs – regardless of wheelbase length – is entered together. The new HPMSVtypeID 25 (short + long wheelbase light-duty vehicles) in MOVES2014b replaces both HPMSVtypeID 20 (passenger car) and HPMSVtypeID 30 (other 4-tire trucks) in MOVES2010b. Exhibit 2 summarizes the MOVES source type and HPMS vehicle class group definitions.

[6] https://www.deldot.gov/Publications/manuals/traffic_counts/index.shtml
[7] https://www.deldot.gov/information/projects/hpms/2015/DVMT2015.pdf?081116

Exhibit 2 MOVES Source Type and HPMS Vehicle Groups

sourceTypeID	sourceTypeName	HPMSVtypeID	HPMSVtypeName
11	Motorcycle	10	Motorcycles
21	Passenger Car	25	Light Duty Vehicles
31	Passenger Truck		
32	Light Commercial Truck		
41	Intercity Bus	40	Buses
42	Transit Bus		
43	School Bus		
51	Refuse Truck	50	Single Unit Trucks
52	Single Unit Short-haul Truck		
53	Single Unit Long-haul Truck		
54	Motor Home		
61	Combination Short-haul Truck	60	Combination Trucks

For this emissions analysis, vehicle type pattern data was developed for Kent County by functional class based on DelDOT (DMV) vehicle registration data collected on July 1, 2018. The vehicle data from DMV are classified to 16 MOBILE6 categories. They were converted to the 13 MOVES source types (vehicle types) using the factors contained in the EPA's tool "VMT-Converter-road-veh16-20100209.xls"[8].

The impact of trucks on traffic flow is accounted for within the travel demand modeling process. A heavy truck weight factor is used by functional class to adjust the rates at which increasing numbers of vehicles (congestion) cause average traveling speeds to drop. This effect generally is due to larger trucks taking up more roadway space than a given number of cars; they also tend to have slower average traveling speeds than cars for most functional classes. The final loaded speeds from the travel model (used to define which speed bin a given road segment's VMT is placed in) reflect this truck adjustment.

Vehicle Age

Vehicle age distributions were input to MOVES for Kent County by the thirteen source types. The age distributions reflect the percentage of vehicles for each model year in the fleet. The vehicle age distributions were prepared by DNREC based on information obtained from DMV vehicle registration data.

The base year vehicle age distributions for this conformity analysis were based on 2017 DMV vehicle registration data. The future year vehicle age distributions were estimated using the EPA's "Age Distribution Projection" tool for MOVES2014[9] based on the base year data.

[8] https://www.epa.gov/sites/production/files/2016-06/vmt-converter-road-veh16-20100209.xls
[9] https://www.epa.gov/sites/production/files/2016-06/age-distribution-projection-tool-moves2014.xlsm

Vehicle Population Data

Vehicle fleet information such as the number and age of vehicles has an impact on the forecasted start and evaporative emissions within MOVES. The MOVES model requires the number of vehicles (called "vehicle population") to be defined for each of the thirteen source type categories, for each year emissions estimates are needed including future horizon years.

The base year (2017) vehicle population data was prepared and provided by DNREC based on the 2017 DMV vehicle registration data. For the analysis years 2020, 2030, and 2040, the vehicle populations were estimated for Kent County by developing a growth factor based on the projected increase in total countywide vehicles from 2017 to each horizon year.

Fuel Data

The DNREC Division of Air Quality (DAQ) used the fuel formulation and supply data that has been assigned to Kent County by the EPA in the MOVES model. The EPA obtains data on all fuel shipments from the refineries in the Delaware area and develops the formulations based on these data. Data inputs include fields such as ethanol content, sulfur content, aromatic content, benzene content, olefin content, Methyl ter-butyl ether (MTBE) volume, Ethyl-tertiary-butyl-ether (ETBE) volume, and Tertiary-amyl-methyl-ether (TAME) volume.

Meteorological Data

Evaporative emissions are influenced significantly by the temperatures of the surrounding air. DNREC used the 2017 data from the National Centers for Environmental Information from Dover Air Force Base. These values are presented as month-by-month, hourly data sets for Kent County.

Other Vehicle Technology and Control Strategy Data

The MOVES2014b default I/M data was reviewed and updated by DNREC DAQ for Kent County. The current I/M program known as the Vehicle Emission Inspection Program (VEIP) was utilized for these analysis runs and is described below.

DE Vehicle Emission Inspection Program: This program tests the following gasoline-powered and diesel-powered vehicles: model year 1968 and newer light duty passenger cars, as well as 1970 and newer light duty trucks up to 8,500 pounds. The test is done biennially and on change of ownership. There is a seven-year grace period for new vehicles.

In Kent County, 1996 and newer light duty vehicles subject to the regulation receive an On-Board Diagnostics (OBD) II test. Model year 1968-1980 vehicles subject to the regulation receive an idle test; those of model year 1981-1995 receive a two-speed idle test. In addition, model year 1975-1995 vehicles receive a tank and cap pressure test. Finally, all 1975 and newer light duty vehicles in Kent County subject to this regulation receive a visual inspection of the catalytic converter. The compliance factors reflect the fail and waiver rates observed in the program, combined with an assumed 96% compliance rate for vehicles showing up for testing.

Federal Programs*:* Current federal vehicle emissions control and fuel programs are incorporated into the MOVES2014b software. These include the National Program standards covering model year vehicles through 2016. Modifications of default emission rates are required to reflect the

implementation of the National Low Emission Vehicle (NLEV) program in Delaware. To reflect these impacts, EPA has released instructions and input files that can be used to model these impacts. This inventory utilized the August 2010 version of the files[10].

Delaware Clean Car Program*:* Under the Delaware Low Emission Vehicle Program, 7 DE Admin Code 1140[11], which was revised December 2013, Delaware required manufacturers of 2014 model year vehicles to comply with Non-Methane Organic Gas (NMOG) emission requirements and California Low Emission Vehicle (LEV II) phase-in requirements. The regulation also requires manufacturers of 2015 and subsequent model year vehicles to comply with NMOG plus NOx emission requirements, as well as California LEV III phase-in requirements. Zero emission vehicles are currently not required by this regulation. California adopted the Low-Emission Vehicle regulation entitled LEV III (third generation low emission vehicle standards) in March 2012. These amendments create more stringent emission standards for new motor vehicles. These new standards will be phased in over the 2015-2025 model years.

The impacts of this program were modeled for all analysis years using EPA's guidance document, *Instructions for Using LEV and NLEV Inputs for MOVES14*[12]. EPA provided input files to reflect the CAL LEV III program with the standard phase-in schedules for new emission standards. Modifications to those schedules were done per EPA's instructions, to reflect a later start for the State of Delaware beginning with vehicle model year 2014.

Air Quality Analysis Process

As presented above, a modeling process that integrates DelDOT's travel demand model and the EPA's Motor Vehicle Emission Simulator (MOVES) model is applied for estimating emissions in Kent County.

The travel model software, CUBE Voyager, was arranged by DelDOT staff with consultant assistance to include the DNREC "MOVES inventory method" for estimating mobile source emissions in Kent County. 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 were performed by DelDOT and the consulting firm staff ensuring the CUBE-model generated emissions data accurately replicated the DNREC spreadsheet method.

Along with updated socio-economic data and other travel behavior parameters, the regionally significant projects were coded to the network and input into the travel demand model to generate the VMT and speed distribution. Adjustment factors are then used to account for seasonal traffic variations and alignment of Delaware-based VMT estimates with the federally-required Highway Performance Management System (HPMS). The 2015 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.

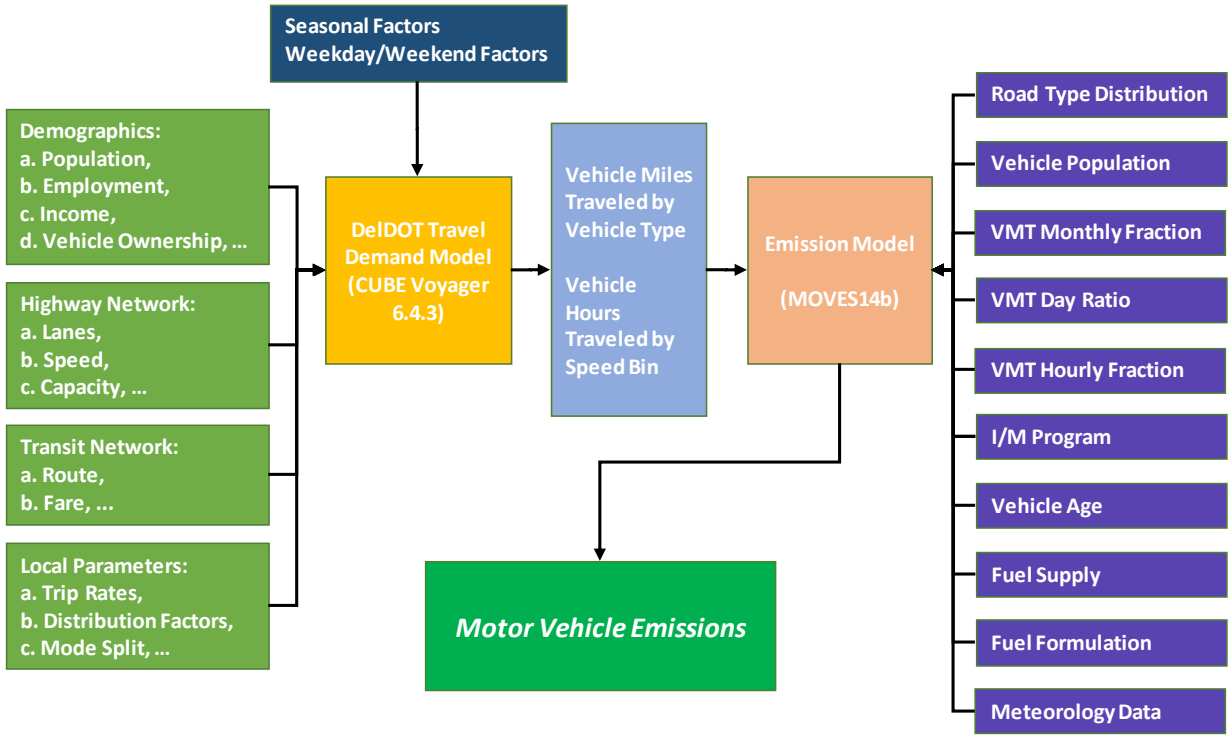
[10] https://www.epa.gov/emission-standards-reference-guide/all-epa-emission-standards
[11] http://regulations.delaware.gov/AdminCode/title7/1000/1100/1140.shtml#TopOfPage
[12] https://www.epa.gov/sites/production/files/2016-06/lev-and-early-nlev-modeling-information-for-moves2014-20141022.zip

The vehicle characteristics data was generated by DNREC based on the 2017 DelDOT DMV vehicle registration data. The fuel formulation and supply data that has been assigned to Kent County by the EPA in the MOVES model was used in this analysis. The 2017 temperature data from the National Centers for Environmental Information from Dover Air Force Base was used for meteorological input.

The estimates of emissions for Kent County are generated jointly by DelDOT and DNREC. The model post-processor takes data produced by CUBE Voyager model output for Kent 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 presented in this document is countywide emission estimates.

Exhibit 3 presents an overview of the process used to generate travel model and emission model data for this conformity analysis.

Exhibit 3: Air Quality Analysis Modeling Process



CONFORMITY ANALYSIS RESULTS

Exhibit 4 and Exhibit 5 present the results of the budget tests for ozone emissions. All baselines and budget tests pass, which demonstrates conformity.

Exhibit 4: VOC Emission Test Results – MVEB Test (tons/summer weekday)

VOC (tpsd)	2020	2030	2040
Emissions	1.66	0.78	0.59
2009 Budget	3.95	3.95	3.95
Result	Pass	Pass	Pass

Exhibit 5: NOx Emission Test Results – MVEB Test (tons/summer weekday)

NOx (tpsd)	2020	2030	2040
Emissions	2.54	0.96	0.71
2009 Budget	9.04	9.04	9.04
Result	Pass	Pass	Pass

Exhibit 6 to Exhibit 9 illustrate the baseline emission results for PM2.5 emissions. Since Kent County has never been in non-attainment for PM2.5, there is no PM2.5 conformity budget requirement for Kent County.

Exhibit 6: Annual Direct PM2.5 Emission Test Results – MVEB Test (tons/year)

Direct PM2.5 (tpy)	2020	2030	2040
Emissions	31.11	17.62	14.96

Exhibit 7: Annual Indirect (NOx) PM2.5 Emission Test Results – MVEB Test (tons/year)

Indirect (Nox) PM2.5 (tpsd)	2020	2030	2040
Emissions	891	351	272

Exhibit 8: Daily Direct PM2.5 Emission Test Results – MVEB Test (tons/day)

Direct PM2.5 (tpy)	2020	2030	2040
Emissions	0.085	0.048	0.041

Exhibit 9: Daily Indirect (NOx) PM2.5 Emission Test Results – MVEB Test (tons/day)

Indirect (Nox) PM2.5 (tpsd)	2020	2030	2040
Emissions	2.44	0.96	0.74

RESOURCES

1. *EPA Motor Vehicle Emission Simulator Model MOVES14b*. https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves

2. *MOVES2014a User Guide*, US EPA Office of Transportation and Air Quality, EPA-420-B-15-095, November. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNCY.pdf

3. Policy Guidance on the Use of MOVES2014 for State Implementation Plan Development, Transportation Conformity, and Other Purposes, US EPA Office of Air and Radiation, EPA-420-B-14-008, July 2014. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100K4EB.txt

4. *LEV and Early NLEV Modeling Information for MOVES2014*. https://www.epa.gov/sites/production/files/2016-06/lev-and-early-nlev-modeling-information-for-moves2014-20141022.zip

5. Age Distribution Projection Tool From MOVES14. https://www.epa.gov/sites/production/files/2016-06/age-distribution-projection-tool-moves2014.xlsm

6. Delaware Low Emission Vehicle Program. http://regulations.delaware.gov/register/october2017/proposed/21%20DE%20Reg%20278%2010-01-17.htm

7. *National Ambient Air Quality Stands for Ozone*, Federal Register/Vol. 80, 206/Monday, October 26, 2015. https://www.gpo.gov/fdsys/pkg/FR-2015-10-26/pdf/2015-26594.pdf

8. National Ambient Air Quality Stands for Particle Pollution. https://www.epa.gov/sites/production/files/2016-04/documents/2012_aqi_factsheet.pdf

9. Dover/Kent County MPO 2040 Metropolitan Transportation Plan. https://doverkentmpo.delaware.gov/files/2015/06/MTP-for-Web-1.pdf

10. Dover/Kent County MPO 2019-2022 Transportation Improvement Plan. https://doverkentmpo.delaware.gov/files/2018/09/FINAL-AMENDED-FY-2019-2022-TIP-COMPLETE-9-12-2018.pdf

AIR QUALITY 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
CH4	Methane
CO2	Carbon Dioxide
CO2Eq	Carbon Dioxide Equivalent. A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "million metric tons of carbon dioxide equivalents (MMTCO2Eq)."
DAQ	Division of Air Quality
DelDOT	Delaware Department of Transportation
DMV	Department of Motor Vehicles
DNREC	Department of Natural Resources and Environmental Control
DPC	Delaware Population Consortium
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
HPMS	Highway Performance Monitoring System
I/M	Vehicle emissions inspection/maintenance programs
LEV	Low Emission Vehicle
LRTP	Long Range Transportation Plan
MMT	Million Metric Tons
MOBILE6b	EPA earlier version motor vehicle emission estimation model
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MVEB	Motor vehicle emissions budget
MTP	Metropolitan Transportation Plan
NAAQS	National Ambient Air Quality Standard
NOx	Oxides of nitrogen
PM2.5	Particulate Matter less than 2.5 microns in diameter
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
SIP	State Implementation Plan
Source Type	One of thirteen vehicle types used in MOVES modeling
TIP	Transportation Improvement Plan
VHT	Vehicle hours traveled
VMT	Vehicle miles traveled
VOC	Volatile organic compound emissions

APPENDICES

Appendix A Conformity Review Check List

Exhibit A 1: Conformity Review List

Regulation (40 CFR Part 93)	Criteria	Yes	No	Comments
§§93.11	Are the conformity determinations based upon the latest planning assumptions?			
(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?			
(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?			
(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.			
(e)	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			
§§93.111	Is the conformity determination based upon the latest emissions model?			
	Did the MPO make the conformity determination according to the consultation procedures of the conformity rule or the state's conformity SIP?			
§§93.106(a)(1)	Are the Horizon Years correct?			
§§93.106(a) (2)(i)	Does the plan quantify and document the demographic and employment factors influencing transportation demand?			

§§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?			
§§93.108	Is the Transportation Plan Fiscally Constrained?			
§§93.113(b)	Are TCMs being implemented in a timely manner			
§§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?			

Regulation (40 CFR Part 93)	Criteria	Yes	No	Comments
§§93.11	Are the conformity determinations based upon the latest planning assumptions?			
(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			
(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			
(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			
(e)	Key assumptions shall be specified and included in the draft documents and supporting materials used for the interagency and public consultation			
§§93.111	Is the conformity determination based upon the latest emissions model?			
	Did the MPO make the conformity determination according to the consultation procedures of the conformity rule or the state's conformity SIP?			
§§93.106(a)(1)	Are the Horizon Years correct?			
§§93.106(a) (2)(i)	Does the plan quantify and document the demographic and employment factors influencing transportation demand?			
§§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			
§§93.108	Is the Transportation Plan Fiscally Constrained?			
§§93.113(b)	Are TCMs being implemented in a timely manner			
§§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?			

Appendix B Detailed Emission Results

Exhibit B 1: Kent County Annual Ozone & PM2.5 Emission (Tons)

Month	2020			2030			2040		
	VOC	NOx	PM2.5	VOC	NOx	PM2.5	VOC	NOx	PM2.5
1	50.2	70.0	2.5	26.0	29.0	1.3	22.0	22.8	1.1
2	43.9	69.2	2.4	22.3	28.0	1.3	18.6	21.8	1.1
3	48.2	75.1	2.5	24.4	30.4	1.4	20.4	23.7	1.1
4	44.6	73.0	2.4	21.9	28.7	1.4	17.5	21.9	1.2
5	47.5	76.3	2.7	23.4	30.0	1.5	18.5	22.8	1.3
6	48.1	73.0	2.6	22.9	27.8	1.5	17.6	20.6	1.3
7	50.7	74.3	2.7	23.9	28.1	1.6	18.3	20.8	1.4
8	49.5	76.9	2.8	23.4	29.3	1.6	18.0	21.8	1.4
9	46.5	72.5	2.5	22.3	27.9	1.5	17.2	22.2	1.4
10	46.1	72.1	2.4	22.3	27.9	1.4	17.6	22.3	1.2
11	46.4	77.8	2.6	23.2	31.1	1.4	19.3	25.5	1.3
12	53.1	81.2	3.0	27.6	33.4	1.6	23.5	26.2	1.3
Total	**574.8**	**891.4**	**31.1**	**283.5**	**351.4**	**17.6**	**228.5**	**272.4**	**15.0**

Exhibit B 2: Kent County Summer Weekday Ozone & PM2.5 Emission (Tons)

Month	2020			2030			2040		
	VOC	NOx	PM2.5	VOC	NOx	PM2.5	VOC	NOx	PM2.5
6	1.65	2.54	0.09	0.78	0.96	0.05	0.59	0.72	0.05
7	1.68	2.50	0.09	0.79	0.94	0.05	0.60	0.70	0.05
8	1.65	2.59	0.09	0.77	0.98	0.06	0.59	0.73	0.05
Average	**1.66**	**2.54**	**0.09**	**0.78**	**0.96**	**0.05**	**0.59**	**0.71**	**0.05**

Exhibit B 3: Kent County Annual Greenhouse Gas Emission (MMT)

Month	2020			2030			2040		
	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4
1	44,314	63.6	2.4	37,048	26.3	2.0	37,087	20.7	2.0
2	45,593	62.9	2.1	38,075	25.5	1.7	38,130	19.8	1.7
3	49,163	68.3	2.3	41,057	27.7	1.9	41,114	21.5	1.8
4	53,511	66.3	1.9	44,624	26.1	1.5	44,705	19.9	1.5
5	58,263	69.3	2.1	48,573	27.2	1.6	48,666	20.7	1.5
6	62,230	66.4	1.9	51,846	25.2	1.4	51,962	18.7	1.3
7	66,958	67.5	2.0	55,778	25.5	1.5	55,909	18.9	1.4
8	65,925	69.9	2.0	54,923	26.6	1.5	55,045	19.8	1.4
9	58,805	65.9	1.9	49,000	25.3	1.4	53,813	20.2	1.4
10	54,169	65.6	1.9	45,155	25.3	1.4	49,558	20.3	1.4
11	53,298	70.7	2.2	44,477	28.3	1.8	48,760	23.2	1.8
12	52,758	73.8	2.7	44,082	30.4	2.2	44,139	23.9	2.2
Total	**664,987**	**810.4**	**25.3**	**554,638**	**319.5**	**19.9**	**568,887**	**247.6**	**19.4**

Exhibit B 4: Kent County Summer Weekday Greenhouse Gas Emission (MMT)

Month	2020			2030			2040		
	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4
6	2,171	2.31	0.07	1,810	0.88	0.05	1,813	0.65	0.05
7	2,260	2.27	0.07	1,884	0.86	0.05	1,887	0.63	0.05
8	2,226	2.35	0.07	1,856	0.89	0.05	1,859	0.66	0.05
Average	**2,219**	**2.31**	**0.07**	**1,850**	**0.88**	**0.05**	**1,853**	**0.65**	**0.05**

Exhibit B 5: Kent County Annual Road Type Ozone & PM2.5 Emission (Tons)

Road Type	2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
Off-Network	454.8	258.0	4.4	228.3	122.5	2.3	180.5	102.6	1.3
Rural Restricted Access	10.3	61.0	2.3	5.1	24.1	1.3	4.5	18.9	1.1
Rural Unrestricted Access	34.2	180.5	7.5	15.1	63.0	4.1	13.5	47.4	3.7
Urban Restricted Access	15.8	97.6	3.4	7.5	37.8	1.8	5.9	27.4	1.4
Urban Unrestricted Access	59.7	294.3	13.6	27.6	104.0	8.1	24.2	76.1	7.4
Total	**574.8**	**891.4**	**31.1**	**283.5**	**351.4**	**17.6**	**228.5**	**272.4**	**15.0**

Exhibit B 6: Kent County Summer Weekday Road Type Ozone & PM2.5 Emission (Tons)

Road Type	2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
Off-Network	1.25	0.67	0.01	0.59	0.28	0.00	0.43	0.22	0.00
Rural Restricted Access	0.03	0.17	0.01	0.02	0.07	0.00	0.01	0.05	0.00
Rural Unrestricted Access	0.11	0.52	0.02	0.05	0.18	0.01	0.04	0.13	0.01
Urban Restricted Access	0.06	0.29	0.01	0.03	0.11	0.01	0.02	0.08	0.00
Urban Unrestricted Access	0.21	0.89	0.04	0.10	0.32	0.03	0.08	0.23	0.02
Total	**1.66**	**2.54**	**0.09**	**0.78**	**0.96**	**0.05**	**0.59**	**0.71**	**0.05**

Exhibit B 7: Kent County Annual Road Type Greenhouse Gas Emission (MMT)

Road Type	2020			2030			2040		
	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4
Off-Network	33,364	234.6	16.9	28,935	111.4	13.0	28,669	93.3	12.7
Rural Restricted Access	57,551	55.4	0.8	50,861	21.9	0.7	55,161	17.2	0.7
Rural Unrestricted Access	181,322	164.1	2.4	146,449	57.2	1.9	153,075	43.1	1.9
Urban Restricted Access	88,529	88.8	1.3	74,688	34.4	1.0	74,482	24.9	0.9
Urban Unrestricted Access	304,221	267.6	4.0	253,704	94.5	3.3	257,500	69.2	3.3
Total	**664,987**	**810.4**	**25.3**	**554,638**	**319.5**	**19.9**	**568,887**	**247.6**	**19.4**

Exhibit B 8: Kent County Summer Weekday Road Type Greenhouse Gas Emission (MMT)

Road Type	2020			2030			2040		
	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4	CO2Eq	NOx	CH4
Off-Network	70	0.61	0.04	60	0.26	0.03	59	0.20	0.02
Rural Restricted Access	189	0.16	0.00	167	0.06	0.00	174	0.05	0.00
Rural Unrestricted Access	595	0.47	0.01	481	0.16	0.01	489	0.12	0.01
Urban Restricted Access	306	0.27	0.00	258	0.10	0.00	242	0.07	0.00
Urban Unrestricted Access	1,059	0.81	0.01	884	0.29	0.01	890	0.21	0.01
Total	**2,219**	**2.31**	**0.07**	**1,850**	**0.88**	**0.05**	**1,853**	**0.65**	**0.05**

Exhibit B 9: Kent County Annual Source Type Ozone & PM2.5 Emission (Tons)

Source Type	2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
Motorcycle	29.9	11.6	0.4	29.6	12.5	0.4	30.3	14.1	0.4
Passenger Car	195.6	158.7	6.9	106.8	64.7	5.1	85.5	48.9	4.4
Passenger Truck	205.2	250.4	7.0	85.8	78.9	4.9	64.6	47.3	4.1
Light Commercial Truck	116.9	153.8	4.3	48.8	50.0	2.8	37.0	30.6	2.4
Intercity Bus	0.7	12.0	0.5	0.3	5.9	0.2	0.1	2.6	0.1
Transit Bus	0.8	11.7	0.3	0.3	5.3	0.2	0.2	3.4	0.1
School Bus	1.4	12.2	0.6	0.8	7.7	0.3	0.6	6.2	0.2
Refuse Truck	0.1	1.1	0.1	0.0	0.4	0.0	0.0	0.4	0.0
Single Unit Short-haul Truck	8.2	28.9	1.3	3.6	13.0	0.5	3.0	12.2	0.5
Single Unit Long-haul Truck	0.5	2.9	0.1	0.2	1.4	0.1	0.1	1.3	0.1
Motor Home	0.4	0.7	0.0	0.2	0.3	0.0	0.1	0.2	0.0
Combination Short-haul Truck	3.2	66.2	2.7	1.3	30.1	1.1	1.1	28.6	0.9
Combination Long-haul Truck	11.8	181.2	7.0	6.0	81.1	2.2	6.0	76.5	1.7
Total	**574.8**	**891.4**	**31.1**	**283.5**	**351.4**	**17.6**	**228.5**	**272.4**	**15.0**

Exhibit B 10: Kent County Summer Weekday Source Type Ozone & PM2.5 Emission (Tons)

Source Type	2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
Motorcycle	0.09	0.03	0.00	0.09	0.03	0.00	0.09	0.04	0.00
Passenger Car	0.55	0.43	0.02	0.28	0.16	0.02	0.21	0.11	0.01
Passenger Truck	0.60	0.71	0.02	0.24	0.21	0.01	0.17	0.12	0.01
Light Commercial Truck	0.34	0.44	0.01	0.13	0.14	0.01	0.10	0.08	0.01
Intercity Bus	0.00	0.04	0.00	0.00	0.02	0.00	0.00	0.01	0.00
Transit Bus	0.00	0.03	0.00	0.00	0.02	0.00	0.00	0.01	0.00
School Bus	0.00	0.04	0.00	0.00	0.02	0.00	0.00	0.02	0.00
Refuse Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Unit Short-haul Truck	0.03	0.09	0.00	0.01	0.04	0.00	0.01	0.04	0.00
Single Unit Long-haul Truck	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Home	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combination Short-haul Truck	0.01	0.19	0.01	0.00	0.09	0.00	0.00	0.08	0.00
Combination Long-haul Truck	0.04	0.53	0.02	0.02	0.24	0.01	0.02	0.22	0.01
Total	**1.66**	**2.54**	**0.09**	**0.78**	**0.96**	**0.05**	**0.59**	**0.71**	**0.05**

Exhibit B 11: Kent County Annual Source Type Greenhouse Gas Emission (MMT)

Source Type	2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
Motorcycle	5,188	10.5	0.4	5,766	11.4	0.5	6,539	12.9	0.5
Passenger Car	215,748	144.3	5.2	170,272	58.8	3.8	170,090	44.5	3.2
Passenger Truck	220,119	227.6	8.3	172,854	71.8	4.4	172,374	43.0	3.6
Light Commercial Truck	120,131	139.8	5.4	96,804	45.5	3.4	97,712	27.8	2.9
Intercity Bus	2,942	10.9	0.1	3,101	5.4	0.1	3,368	2.4	0.1
Transit Bus	3,133	10.6	0.1	3,367	4.8	0.1	3,900	3.1	0.1
School Bus	5,679	11.1	0.5	6,061	7.0	0.5	6,627	5.7	0.6
Refuse Truck	438	1.0	0.0	467	0.4	0.0	528	0.4	0.0
Single Unit Short-haul Truck	13,691	26.3	1.0	14,375	11.8	1.2	16,224	11.1	1.3
Single Unit Long-haul Truck	1,287	2.7	0.1	1,366	1.2	0.1	1,538	1.2	0.1
Motor Home	235	0.6	0.0	218	0.2	0.0	238	0.2	0.0
Combination Short-haul Truck	29,031	60.1	0.8	30,975	27.4	0.9	34,937	26.0	1.1
Combination Long-haul Truck	47,363	164.7	3.6	49,010	73.7	4.9	54,811	69.5	5.8
Total	**664,987**	**810.4**	**25.3**	**554,638**	**319.5**	**19.9**	**568,887**	**247.6**	**19.4**

Exhibit B 12: Kent County Summer Weekday Source Type Greenhouse Gas Emission (MMT)

Source Type	2020			2030			2040		
	VOC	NOx	PM25	VOC	NOx	PM25	VOC	NOx	PM25
Motorcycle	16.6	0.03	0.00	18	0.03	0.00	20	0.03	0.00
Passenger Car	716.5	0.39	0.01	564	0.14	0.01	550	0.10	0.01
Passenger Truck	732.9	0.65	0.02	575	0.19	0.01	560	0.11	0.01
Light Commercial Truck	399.5	0.40	0.01	322	0.12	0.01	317	0.07	0.01
Intercity Bus	10.0	0.03	0.00	11	0.02	0.00	11	0.01	0.00
Transit Bus	10.7	0.03	0.00	11	0.01	0.00	13	0.01	0.00
School Bus	19.4	0.03	0.00	21	0.02	0.00	22	0.02	0.00
Refuse Truck	1.5	0.00	0.00	2	0.00	0.00	2	0.00	0.00
Single Unit Short-haul Truck	46.7	0.08	0.00	49	0.04	0.00	54	0.03	0.00
Single Unit Long-haul Truck	4.4	0.01	0.00	5	0.00	0.00	5	0.00	0.00
Motor Home	0.8	0.00	0.00	1	0.00	0.00	1	0.00	0.00
Combination Short-haul Truck	98.7	0.18	0.00	105	0.08	0.00	116	0.07	0.00
Combination Long-haul Truck	161.1	0.48	0.01	167	0.21	0.02	182	0.20	0.02
Total	**2,218.7**	**2.31**	**0.07**	**1,850**	**0.88**	**0.05**	**1,853**	**0.65**	**0.05**

Exhibit B 13: Kent County Annual VMT by Vehicle Type

HPMSVTypeID	Kent County HPMS Annual VMT		
	2020	2030	2040
Motorcycles	13,670,298	15,146,703	16,759,976
Light Duty Vehicles	1,805,478,142	2,000,471,502	2,213,541,487
Buses	11,450,513	12,687,180	14,038,490
Single Unit Trucks	17,236,685	19,098,264	21,132,417
Combination Trucks	46,404,682	51,416,431	56,892,789
Total	**1,894,240,320**	**2,098,820,080**	**2,322,365,160**

Exhibit B 14: Kent County Vehicle Population by Vehicle Type

sourceTypeName	Kent County Vehicle Population		
	2020	2030	2040
Motorcycle	6,184	6,591	6,918
Passenger Car	69,592	74,167	77,854
Passenger Truck	54,888	58,497	61,404
Light Commercial Truck	29,124	31,039	32,582
Intercity Bus	33	36	37
Transit Bus	100	107	112
School Bus	729	777	816
Refuse Truck	23	24	25
Single Unit Short-haul Truck	1,937	2,065	2,167
Single Unit Long-haul Truck	142	151	159
Motor Home	212	226	238
Combination Short-haul Truck	375	399	419
Combination Long-haul Truck	264	281	295
Total	**163,603**	**174,360**	**183,027**

Exhibit B 15: Kent County Average Daily VMT by Functional Classification

Functional Class	Kent County HPMS Adjusted VMT		
	2020	2030	2040
Interstate-rural	-	-	-
Freeway-rural	482,231	567,326	649,445
PA-rural	427,617	578,505	651,260
Minor Arterial-rural	293,700	230,048	260,143
Major collector-rural	272,240	301,559	339,795
minor collector-rural	161,257	173,689	195,851
Local-rural	344,868	340,463	369,929
Interstate-urban	-	-	-
Freeway-urban	715,384	803,347	829,194
PA-urban	598,613	591,165	651,567
Minor Arterial-urban	1,101,708	1,202,119	1,365,101
Major collector-urban	410,900	401,006	423,775
Minor collector-urban	66,776	65,946	72,207
Local-urban	300,227	495,019	536,993
Total	**5,175,521**	**5,750,192**	**6,345,260**