

7. Conformity Analysis

7.1 Overview

The Dover/Kent County MPO is a federally-designated Metropolitan Planning Organization. As such, the organization is required through federal regulations to show that the Metropolitan Transportation Plan conforms to the requirements of the 1990 Clean Air Act Amendments (CAAA). These air quality standards, called emissions budgets, set standards that the MPO must abide by for specific milestone years. Emissions contribute to air pollution. If the emissions generated from the projects in the transportation plan are equal to or less than these emissions budgets, then the transportation plan conforms to the State Implementation Plan (SIP).

In an attempt to reduce emissions nationwide, the CAAA developed a rating system for metropolitan area non-compliance with federal air quality standards, with levels of non-compliance ranging from “marginal” to “extreme.” The Dover/Kent County MPO region, as part of the Philadelphia-Wilmington-Trenton non-attainment area, was classified as severe. The CAAA of 1990 required severe non-attainment areas, or areas that did not meet national air quality standards, to develop a plan to show how they would achieve the National Ambient Air Quality Standard (NAAQS) for ozone by 2005. A rate-of-progress plan showing emission reductions of 3 percent per year between 1996 and 2005 was required to ensure that proper strategies were being employed to decrease emissions.

Effective June 15, 2004, the United States Environmental Protection Agency (EPA) finalized ground-level ozone designations under the new eight-hour ozone NAAQS. These standards replaced the one-hour ozone NAAQS.

Kent County, part of the Philadelphia-Wilmington-Trenton non-attainment area, is classified as moderate under the eight-hour standard. For Kent County, the eight-hour ozone non-attainment area boundary is the same as the one-hour non-attainment area boundary. Based on this designation, transportation conformity must be based on the existing one-hour attainment budget for all applicable analysis years until the new eight-hour ozone SIPs are implemented. Attainment of the new federal zone standards was required by 2010, which becomes a new milestone year for the conformity analysis.

The emissions targeted for the Dover/Kent County MPO region are the two major ozone contributors, volatile organic compounds (VOCs) and nitrogen oxide (NO_x). While naturally-produced ozone in the upper atmosphere protects life on earth by filtering out radiation from the sun, ozone at the ground level is a noxious pollutant. Ground-level ozone is the major component of smog and can damage lung tissue, worsen respiratory diseases, increase chances of pulmonary diseases, and make people more susceptible to respiratory infections. Automobile emissions are one of the major contributors to ozone formation. Both VOCs and NO_x are the result of combustion within a vehicle engine. VOCs and NO_x at the ground level form ozone in the presence of sunlight.

This chapter demonstrates the transportation conformity of the 2040 Metropolitan Transportation Plan to the eight-hour NAAQS.

7.2 Methodology

The air quality analysis conducted for the 2040 RTP uses a series of computer-based modeling techniques which are described below. These methodologies are consistent with techniques that the Dover/Kent County MPO and DelDOT have used to conduct previously required air quality analyses and to assist DNREC with various SIP documents. They are similar to methods other state and regional agencies use to prepare air quality analysis.

7.2.1 Travel Demand Modeling

A travel demand model for Kent County is maintained by DelDOT. The model uses a variety of data about the roadway network, travel patterns, and automobile ownership, as well as demographic information such as population and employment sites. The model follows the traditional four-step modeling approach that includes trip generation, trip distribution, mode split, and assignment. The model is run in the CUBE Voyager software package (Version 6.0.2).

The modeling process developed for the MTP uses a 2012 base year network validated against DelDOT traffic counts. Model networks were developed for 10-year intervals, 2020, 2030, and 2040 for Kent County. 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 10-year intervals.

Exhibit 7.1: Included Projects

| Project Phasing | | | Year of Completion | Road Classification | Conformity Status | Regionally Significant? | Rationale | |
|----------------------------|--------------------|-------|---|---------------------|-------------------|-------------------------|-----------|-----------------------------|
| Capital Projects - Highway | Committed Projects | score | Highway Projects | | | | | |
| | | 27.1 | South Governors Ave Reconstruction Webbs Lane to Water Street | 2011 | Arterial | Exempt | | No capacity increase |
| | | 26.4 | Complete the SR 1 Little Heaven Grade Separated Intersection | 2015 | Arterials | Exempt | | Intersection Reconstruction |
| | | 23.2 | Complete the SR 1 and SR 9 Grade Separated Intersection at DAFB | 2010 | Arterials | Exempt | | |
| | | 23.2 | Complete the SR 1 / Thompsonville Road Grade Separated Intersection (K 19) | 2014 | Arterials | Exempt | | |
| | | 23.2 | Complete the SR 1 South Frederica Grade Separated Intersection (Cedar Neck Road K 120) | 2015 | Arterials | Exempt | | |
| | | 23.2 | Complete the SR 1, North Frederica Grade Separated Intersection | 2012 | Arterials | Exempt | | |
| | | 27.15 | Complete the SR 1/NE Front St. Grade Separated Intersection | 2020 | Arterial | Exempt | | |
| | | 29.0 | Upgrade Barratts Chapel Road from SR 1 to Kersey Rd to include adequately wide travel lanes and shoulders and include bicycle, pedestrian and transit facilities as appropriate | 2020 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | 29.0 | Improve Carter Road from Sunnyside Road to Wheatley's Pond Road (DE 300) to include adequately wide travel lanes and shoulders and pedestrian and bicycle facilities | 2020 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | 28.3 | Upgrade Duck Creek Parkway from Bassett Street to Main Street in north Smyrna to include adequate travel lanes, shoulders, curbs, drainage, and bicycle and pedestrian improvements | 2020 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | 28.3 | Construct the West Dover Connector | 2020 | Minor Arterial | Non-exempt | | Regionally Significant |

| Project Phasing | | | Year of Completion | Road Classification | Conformity Status | Regionally Significant? | Rationale |
|-----------------------|------|---|--------------------|---------------------|-------------------|-------------------------|----------------------------|
| Included New Projects | 25.1 | Realign Wyoming Mill Road with the Village of Westover entrance and signalize | 2012 | Major Collector | Exempt | | Realignment |
| | 28.3 | Construct the Clarence Street Extension | 2020 | Local | Non-exempt | | Not Regionally Significant |
| | 29.0 | Complete gateway improvements on Forest St, including a roundabout at the intersection of Loockerman Street and Forest Street | 2016 | Minor Arterial | Exempt | | Intersection Improvements |
| | 37.0 | DE 8: Construct recommendations from the DE 8 Concept and Operations Study | 2030 | Minor Arterial | | | |
| | 37.0 | - D8: Intersection Improvements: Left turn phasing at 4 intersections | 2030 | Minor Arterial | Exempt | | Intersection Improvements |
| | 37.0 | - D8 : Intersection Improvements: Access to the new High School site (Carey Farm), Calvary Church site | 2030 | Minor Arterial | Exempt | | Intersection Improvements |
| | 37.0 | - D8 : Intersection Improvements: Mifflin Road right turn and realignment of Brandywine Apts entrance | 2030 | Minor Arterial | Exempt | | Intersection Improvements |
| | 37.0 | - D8: N/S Connector Road: Chestnut Hill Road to Rt 8 | 2030 | Major Collector | Non-exempt | | Not Regionally Significant |
| | 37.0 | - D8: N/S Connector Road: Rt 8 to Hazletville Rd | 2030 | Major Collector | Non-exempt | | Not Regionally Significant |
| | 37.0 | - D8 : N/S Connector Road: Connection above Road to Artis Drive | 2030 | Major Collector | Non-exempt | | Not Regionally Significant |
| | 37.0 | - D8 : Install Bicycle and pedestrian Improvements including bike lanes, designated, controlled crossings with ped signals and an alternative shared use path | 2030 | Minor Arterial | Exempt | | Shoulders, Bike/Ped |
| | 37.0 | - D8 : Connector Road behind Greentree Shopping Center between Independence Blvd and Kenton Road | 2030 | Local | Non-exempt | | Not Regionally Significant |
| | 37.0 | - D8: Realign intersection of Artis Drive with DE 8 | 2030 | Local | Exempt | | Intersection Improvements |

| Project Phasing | | | Year of Completion | Road Classification | Conformity Status | Regionally Significant? | Rationale |
|-----------------|--|---|--------------------|---------------------|-------------------|-------------------------|----------------------------|
| | | - D8: Interconnections to enhance Rt 8 Corridor Capacity Independence south of Rt 8 to Mifflin Road, Dove View to Modern Maturity, Heatherfields/Fox Hall West & Cranberry Run, | 2030 | Exempt | Exempt | | Intersection Improvements |
| | | - D8 : Connector Road south of Gateway West to Commerce Way | 2030 | Local | | | Below Arterial |
| | | NDS: Implement the recommendations of the Concept Plan for US 13 and 113 in Dover | 2030 | Minor Arterial | | | |
| | | - NDS: Construct a collector road between the Scarborough Rd. and US 13 to the East of Dover Mall and Dover Downs, to Leipsic Road (NDS is North Dover Study) | 2030 | Major Collector | Non-exempt | | Not Regionally Significant |
| | | - NDS: Construct a collector between above and US 13 adjacent to Best Buy | 2030 | Major Collector | Non-exempt | | Not Regionally Significant |
| | | - NDS: Realign Exit 104 toll plaza and access roads to accommodate above | 2030 | Other Freeway | Exempt | | Intersection Improvements |
| | | - NDS: Realign Leipsic Road and connect to US 13 at Jefferic Blvd. and to the Barry Van Lines site | 2030 | Major Collector | Exempt | | Roadway Redesign |
| | | - NDS: Construct Crawford Carroll Rd extension from behind Lowes to College Rd east of DSU | 2030 | Major Collector | Non-exempt | | Not Regionally Significant |
| | | - NDS: Construct a local road between above and US 13 across from a realigned Dover Mall North entrance | 2030 | Major Collector | Exempt | | Below Arterial |
| | | Upgrade Kenton Road from DE 8 to Chestnut Grove Road in Dover with shoulders, sidewalks, bike and transit facilities and closed drainage | 2030 | Minor Arterial | Exempt | | Shoulders, Bike/Ped |
| | | Intersection Improvements to South State Street at SR 10 (Lebanon Road) | 2020 | Minor Arterial | Exempt | | Intersection Improvements |
| | | Intersection Improvements to South State Street: Sorghum Mill Rd. to SR 10 (Lebanon Road) | 2020 | Minor Arterial | Exempt | | Intersection Improvements |
| | | South State St. Intersection Improvements various intersections (8 total) between US 13 and SR 1 | 2020 | Minor Arterial | Exempt | | Intersection Improvements |

| Project Phasing | | | Year of Completion | Road Classification | Conformity Status | Regionally Significant? | Rationale |
|-----------------|------|---|--------------------|---------------------|-------------------|-------------------------|----------------------------|
| 32.4 | 32.4 | Upgrade West Street from New Burton Road (Queen Street) to North Street in Dover to include adequate travel lanes, shoulders, curbs, drainage, and bicycle and pedestrian improvements | 2020 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | Construct pedestrian improvements on US 13 from Duck Creek to the north Smyrna SR 1 interchange | 2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | Upgrade Front Street corridor from Rehoboth Blvd to SR 1, Milford to include adequate travel lanes, shoulders, curbs, drainage, bicycle and pedestrian improvements and intersection improvements | 2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | Construct /fill gaps in pedestrian improvements on US 13 in Smyrna | 2030 | Minor Arterial | Exempt | | Shoulders, Bike/Ped |
| | | Upgrade corridor of DE 14 from DE 15 to Church Street and from Washington Street to SR 1 with adequate lane width, shoulders, sidewalks and transit facilities | 2030 | Minor Arterial | Exempt | | Shoulders, Bike/Ped |
| | | Complete upgrade of DE 300 from railroad tracks to US 13 to include sidewalks, bicycle and transit facilities and intersection improvements at Carter Rd/DE 6 area | 2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | Upgrade Irish Hill Road from SR 1 to US 13 to include adequate travel lanes, shoulders, and bicycle and pedestrian improvements | 2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | Upgrade College Road from Salisbury to Kenton Road to include turn lanes where needed, shoulders, sidewalks or multi-use path, curbing and closed drainage | 2030 | Minor Arterial | Exempt | | Shoulders, Bike/Ped |
| | | Construct a connector road from White Oak Road to DE 8 | 2015 | Major Collector | Non-exempt | | Not Regionally Significant |
| | | Upgrade Sunnyside Road from DE 300 to US 13 in Smyrna to include adequate travel lanes, shoulders, curbs, drainage, and bicycle and pedestrian improvements | >2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |

| Project Phasing | | | | | | | |
|---------------------------------|-------------------------|---|--------------------|---------------------|-------------------|-------------------------|----------------------------|
| | | | Year of Completion | Road Classification | Conformity Status | Regionally Significant? | Rationale |
| Capital Projects - New Projects | 29.1 | Construct/fill gaps in pedestrian facilities on US 113 between Court Street and Lafferty Lane | >2030 | Minor Arterial | Exempt | | Shoulders, Bike/Ped |
| | 28.5 | Upgrade N. Main Street in Smyrna to include adequate travel lanes, shoulders, curbs, drainage, and bicycle and pedestrian improvements | >2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | 28.5 | Upgrade Joe Goldsborough Road from Duck Creek Road to US 13 to include adequate travel lanes, shoulders and bicycle and pedestrian facilities | >2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | 28.5 | Upgrade Paddock Road from US 13 to SR 1 to include adequate travel lanes, shoulders and bicycle and pedestrian facilities | >2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | 27.3 | Upgrade Messina Hill Road to improve safety and include adequate travel lanes, shoulders and bicycle and pedestrian facilities | >2030 | Major Collector | Exempt | | Shoulders, Bike/Ped |
| | | | | | | | |
| Capital Projects - Transit | Transit Projects | | | | | | |
| | | Expand fixed-route bus service | 2010 | | Non-exempt | | Regionally Significant |
| | | Expand paratransit service | 2020 | | Non-exempt | | Not Regionally Significant |
| | | Create/operate the Smyrna Shuttle | 2020 | | Non-exempt | | Not Regionally Significant |
| | | Delaware Air Park - DRBA - Runway Extension | 2020 | | Exempt | | No New Emissions |
| | | Implement recommendations of Civil Air Terminals Studies | 2020 | | Exempt | | Categorically |
| | | Construct the Dover Transit Center at Water and West Streets | 2020 | | Exempt | | No New Emissions |

The network horizon years used in the model were selected in accordance with EPA regulations.

7.2.2 Emissions Factor Model

The second major software used in this air quality analysis was MOVES 2010b (Motor Vehicle Emissions Simulator), a program developed by the EPA to calculate mobile source emission rates for each one-mile-per-hour increment up to 65 miles per hour. The factors determined the emission rates for various vehicle classifications at different speeds. Factors were needed for each of these increments because speed is a critical element in determining the total amount of emissions.

The overall structure of the MOVES program is defined by the EPA. DNREC uses this model to predict the level of emissions. The input file for the modeling process reflects air quality strategies anticipated according to the SIP and its amendments.

7.2.3 Mobile Source Emissions

The estimates of emissions for Kent County are generated jointly by DelDOT and DNREC. The post-processor takes data produced by the CUBE model output and adjusts it for input into the mobile emissions model. This process links the speeds and volumes generated by the travel demand model with emission factors from MOVES. Once emissions for each segment are calculated, they are summed to identify the countywide totals presented below.

The vehicle miles traveled and emissions data for Kent County were adjusted to be compatible with data contained in the SIP. The adjustments represent factors to account for seasonal traffic variations and to align the travel demand estimates with DelDOT's HPMS traffic level reporting system.

7.3 Mobile Source Emissions Data

Both NO_x and VOC emissions were tested in Kent County for 2020, 2030, and 2040 against the MOVES eight-hour ozone standard attainment plan budgets. These amounts mirror the budgets set in the latest revision to the Kent County rate of progress plan approved by the EPA. **Exhibit 7.2** summarizes this information.

Exhibit 7.2: Emissions Data

| Year | Average Daily VMT | VOC (Tons/Day) | Budget (Tons/Day) | | NOx (Tons/Day) | Budget (Tons/Day) |
|------|-------------------|----------------|-------------------|--|----------------|-------------------|
| 2012 | 4,649,336 | 2.97 | 3.95 | | 7.56 | 9.04 |
| 2020 | 5,563,018 | 1.77 | | | 3.89 | |
| 2030 | 6,370,097 | 1.40 | | | 3.05 | |
| 2040 | 7,810,082 | 1.54 | | | 3.55 | |

Source: DelDOT Planning

Notes:

VMT = Vehicle Miles Traveled

VOC and NOx data based on tons per day emitted during a weekday, and an average of 3 summer months

7.4 Conclusions

The Dover/Kent County MPO Metropolitan Transportation Plan meets the conformity criteria established by the EPA and the Federal Highway Administration (FHWA). According to the analysis, the plan contributes required emissions reductions for 2020, 2030 and 2040 in comparison to the 2009 budgets established for VOCs and NOx. The modeled VOC and the NOx emission levels are below the established budgets. In addition, both the VOC and the NOx levels are projected to decrease significantly over the next 25 years.