WILMAPCO

2012 Congestion Management System Summary

September 2012

TABLE OF CONTENTS

List of Figures

List of Tables

This page has been intentionally left blank

INTRODUCTION

According to the Federal Highway Administration (FHWA) recently released Moving Ahead for Progress in the 21st Century Act, known as MAP-21 a Congestion Management Process (CMP) is "*Within a metropolitan planning area serving a transportation management area, the transportation planning process under this section shall address congestion management through a process that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under this title and chapter 53 of title 49 through the use of travel demand reduction and operational management strategies.*"

A CMP is required in metropolitan areas with population exceeding 200,000, known as Transportation Management Areas (TMAs). In TMAs designated as ozone or carbon monoxide non-attainment areas (the Wilmington Area is in non-attainment for ozone) the CMP takes on a greater significance. Federal guidelines prohibit projects that increase capacity for single occupant vehicles unless the project comes from a CMP. Federal requirements also state that in all TMAs, the CMP shall be developed and implemented as part of the metropolitan planning process. According to the FHWA, a CMP must perform the following tasks:

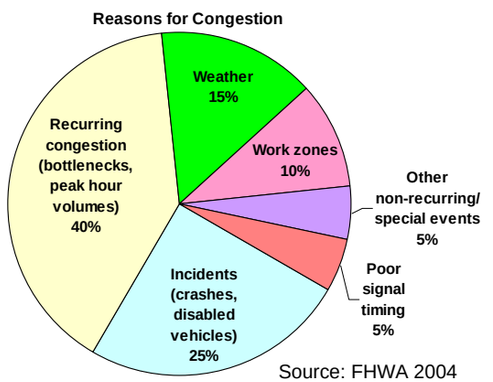
- Measure multi-modal transportation system performance
- Identify the causes of congestion
- Assess alternative actions
- Implement cost-effective actions
- Evaluate the effectiveness of implemented actions

An effective CMP should also include alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs. It should include a data collection and monitoring system, develop a "tool box" of strategies for addressing congestion, performance measures or criteria for identifying when action is needed, and a system for prioritizing which congestion management strategies would be most effective such as:

- Operational and management strategies to improve the performance of the existing transportation facilities to relieve vehicular congestion and maximize safety and mobility for people and goods

- A process that provides for effective management and operation to address congestion management

The main goal of the Wilmington Area Planning Council's (WILMAPCO) Congestion Management System (CMS) report is a "systems" approach to identifying and addressing congestion in our region. With this approach, the existence of congestion in the transportation system can be seen in more of a regional (or national) context and it becomes apparent how slight changes at a specific location can impact the operation of the transportation system as a whole. Another important point that is carried forward in this report is the idea that it is often difficult (or too expensive) to build our way out of congestion. It has been witnessed and discussed locally and referenced in national studies that the "build more lanes" approach to solving congestion often has the undesired effect of actually creating more traffic. This report acknowledges that, in some areas, roadway capacity addition may be the only solution for a severe congestion problem. However, that option will only be examined as a last resort after all other strategies have been exhausted or determined to be unfeasible based on the characteristics of the corridor. These alternative strategies include measures to reduce automobile trips from the network, measures to shift trips to some other mode than the automobile, encouraging more high-occupancy vehicle trips, and measures to manage the existing transportation system.



Source: FHWA 2004

This report has been written with two audiences in mind. First, the document has been designed so that anyone, with or without a transportation planning background, can pick up the report and follow the progression through to the end. We have attempted to make the text clear and the steps logical, and have included numerous appendices including a listing of transportation terms for reference.

The second audience is the planners and planning managers at the Maryland Department of Transportation, the Delaware Department of Transportation, New Castle County, Cecil County, and the Transportation Management Association of Delaware. While this report will serve as the first step in addressing regional congestion, we will rely on project development and land use planners to follow through with this report's recommendations with further study and eventual implementation. To that end, Chapter 5, in particular, has been written in a "corridor summary" format where each corridor's relevant statistics, location, congestion measures, and recommended mitigation measures are summarized on one page for quick and easy reference. The following sections explain in detail the process in which WILMAPCO has developed to address this requirement put forth by SAFETEA-LU.

The WILMAPCO Approach to Congestion

The WILMAPCO 2012 CMS uses a "Summary-Style" approach that has been designed to focus on the core functions of what a CMP is to perform. The goal was to create a more streamlined, data-oriented summary that serves as a resource for use in other Metropolitan Planning Organization (MPO) documents. The report has four key sections:

SECTION 1: *Congestion Performance Measures*—A review annual performance measure data and the determination of the most congested locations based on a regional analysis

SECTION 2: *Intersection Operational Analysis*— Detailed analysis to determine if a deficient intersection is suffering from a signal timing issue or has it truly reached a level of volume in which it requires more physical, on-road improvements

SECTION 3: *Strategy Evaluation*—Identification (by consensus) congested corridors, perform a detailed analysis of each corridor and determine which mitigation strategies are feasible

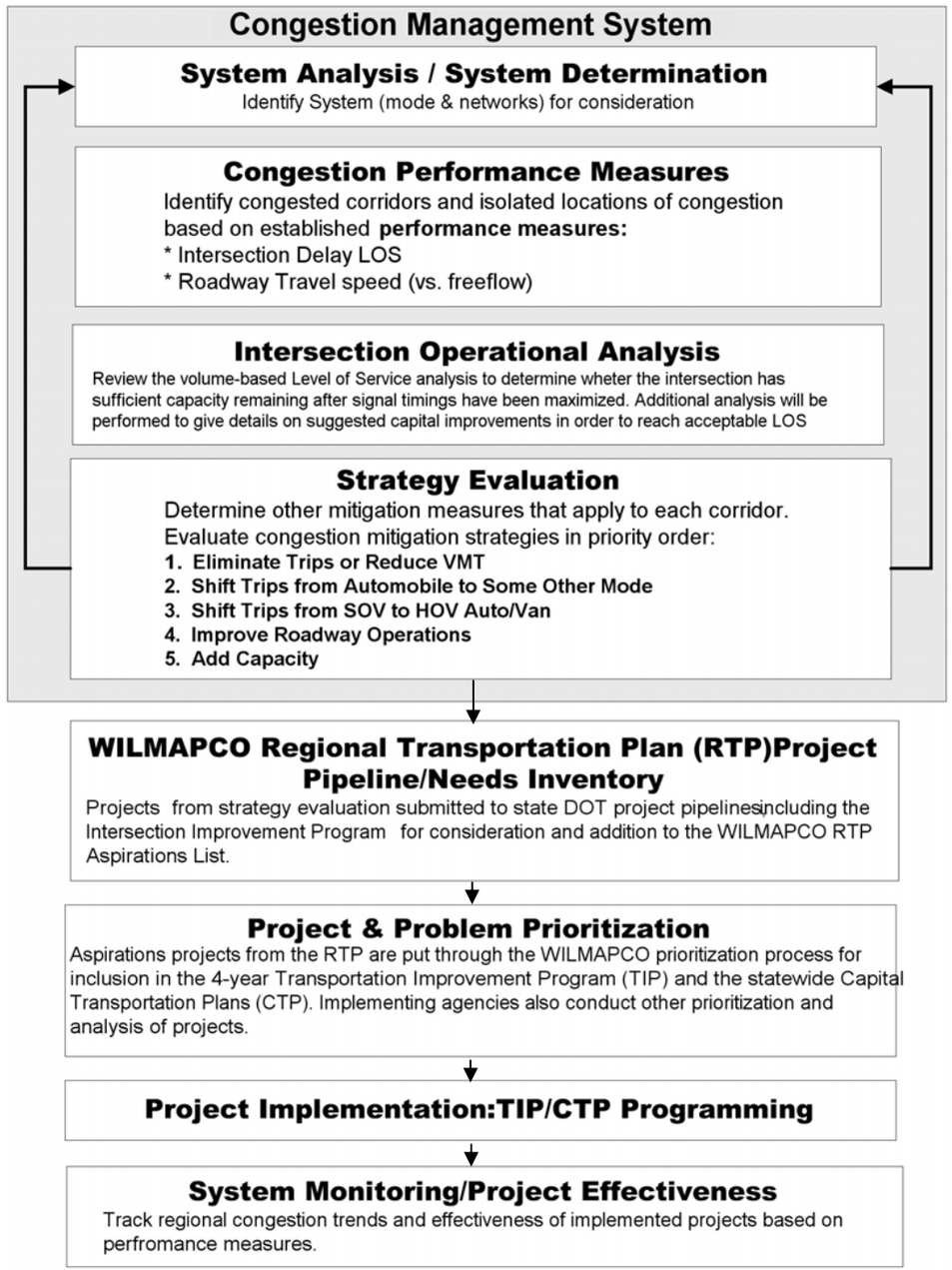
SECTION 4: *System Monitoring*—Track congestion trends and changes to transportation characteristics over time

SECTION 5: *Data Collection & Inventory*—A display of ongoing data collection activities that relate to congestion.

Integration into the Overall WILMAPCO Planning Process

The integration of the CMS into the overall WILMAPCO planning process is shown in Figure 1. The process begins with an evaluation of the overall system performance using the defined congestion performance measures. The outputs of the CMS intersection operation analysis and recommended congestion mitigation measures then flow into the Delaware Department of Transportation (DelDOT) project pipeline and the Maryland State Highway Administration (MDSHA) Highway Needs Inventory where they are included in the "Aspirations List" developed during the WILMAPCO Regional Transportation Plan (RTP) update in March 2011. The aspirations list is an inventory of needed, but not financially feasible projects which were included in the plan but are not part of the constrained project list used for air quality conformity. These aspirations projects are then evaluated by the WILMAPCO project prioritization process and prioritized for input into the RTP. Note—more details on the role of the CMS in the WILMAPCO Project Prioritization Process can be found in Section 3 of this document. After analysis, the projects are programmed into the WILMAPCO Transportation Improvement Program (TIP) along with other agency capital improvement programs for implementation based on funding allowances.

Figure 1: CMS Integration into the Planning Process



SECTION #1: CONGESTION PERFORMANCE MEASURES

Defining the Transportation Network

The first step in defining the CMS system is to determine the transportation network to consider in the analysis. Due to constraints in data collection, the network has been limited to all roadways classified as Minor Arterial or greater according to the FHWA functional classification network. (NOTE– Some Minor arterials in Cecil have been omitted due to data limitations)

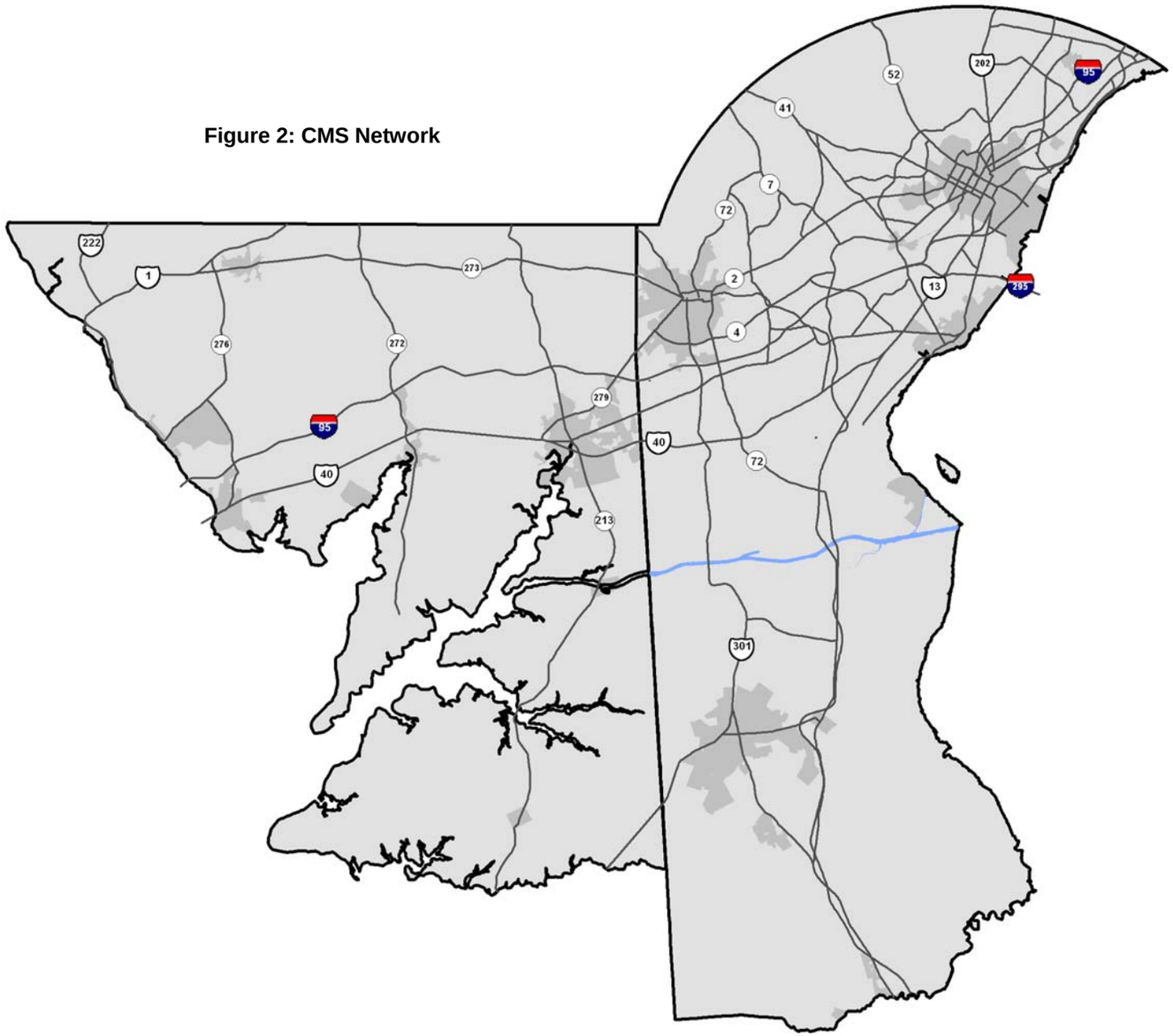
Currently this method captures roughly 17% of all roadway mileage in the WILMAPCO region (including local roads). However these roads carry around 77% of the daily vehicle miles traveled (VMT)*.

Performance Measures

The CMS uses a series of performance measures to evaluate the current congestion level of our most traveled roadway network.

Currently, performance measures used in the congestion identification analysis in this report are limited to roadway congestion due to reliable data constraints.

Figure 2: CMS Network



* Based on 2011 HPMS data.

SECTION #1: CONGESTION PERFORMANCE MEASURES

The CMS uses a series of performance measures to evaluate the current congestion level of our most traveled arterial roadway network. Currently, performance measures used in the congestion identification analysis in this report are limited to roadway congestion due to reliable data constraints. The measures chosen were based on the following criteria:

- Ability to cover (at minimum) the arterial roadway system
- Data is available on a regular basis (i.e. annually, quarterly, etc…)
- Data is from reliable sources

For the 2012 Congestion Management Summary, there are four performance measures being used. Pages 5-9 discuss them in more detail.

Performance Measure #1 Intersection Level of Service (Delay)

According to the 2010 Highway Capacity Manual (HCM) recommends using the measurement of delay when determining a systems-based analysis for signalized intersections. This report uses data from a variety of sources to create a regional "snapshot" of the most current AM and PM levels of service (LOS).

Measure: Current AM and PM Level of Service for signalized intersections, identifying intersections which are functioning at LOS E or F in the morning and evening peak periods. The delay-based intersection LOS results have been taken from a GIS inventory maintained by WILMAPCO which stores all base year LOS that has been developed through a variety of sources, but all use very similar data collection methodologies. All counts are done for a 2-3 hour period, covering the most common peak period for weekday traffic (6-9am or 7-9am) for the AM period and (3-6pm or 4-7pm) in the PM period.

Table 1: Intersection Level of Service (Delay-Based)

LOS	Delay Measure
A	under 10 seconds
B	10-20 seconds
C	20-35 seconds
D	35-55 seconds
E	55-80 seconds
F	over 80 seconds

Data Sources: Numerous sources including:

- New Castle County Traffic Impact Studies (TIS)
- DelDOT Traffic Operational Analysis (TOA)
- US 40, 301, and Churchman's Crossing annual monitoring reports

Performance Measure #2: Travel speed vs. Free flow speed

This measure uses data collected from annual GPS travel time runs throughout the WILMAPCO region. It compares the recorded average travel speeds between pre-determined roadway links during the AM and PM peak periods. Travel time runs are made multiple times during the AM peak (7-9am) and the PM peak (4-6pm).

Measure: Based on a 2-year average (2010 and 2011), this measure uses the 2010 HCM established thresholds for urban streets. It compares the measure speed versus the base free flow speed to the given roadway segment. For purposes of simplification, free flow was assumed to be 5mph over the posted speed limit.

Table 2: Travel Speed Level of Service

LOS	Travel Speed Measure
A	More than 85% of freeflow speed
B	67-85% of freeflow speed
C	50-67% of freeflow speed
D	40-50% of freeflow speed
E	30-40% of freeflow speed
F	Under 30% of freeflow speed

Data Source: University of Delaware Center for Transportation

Figure 3: AM Peak Intersection Level of Service and Travel Speed

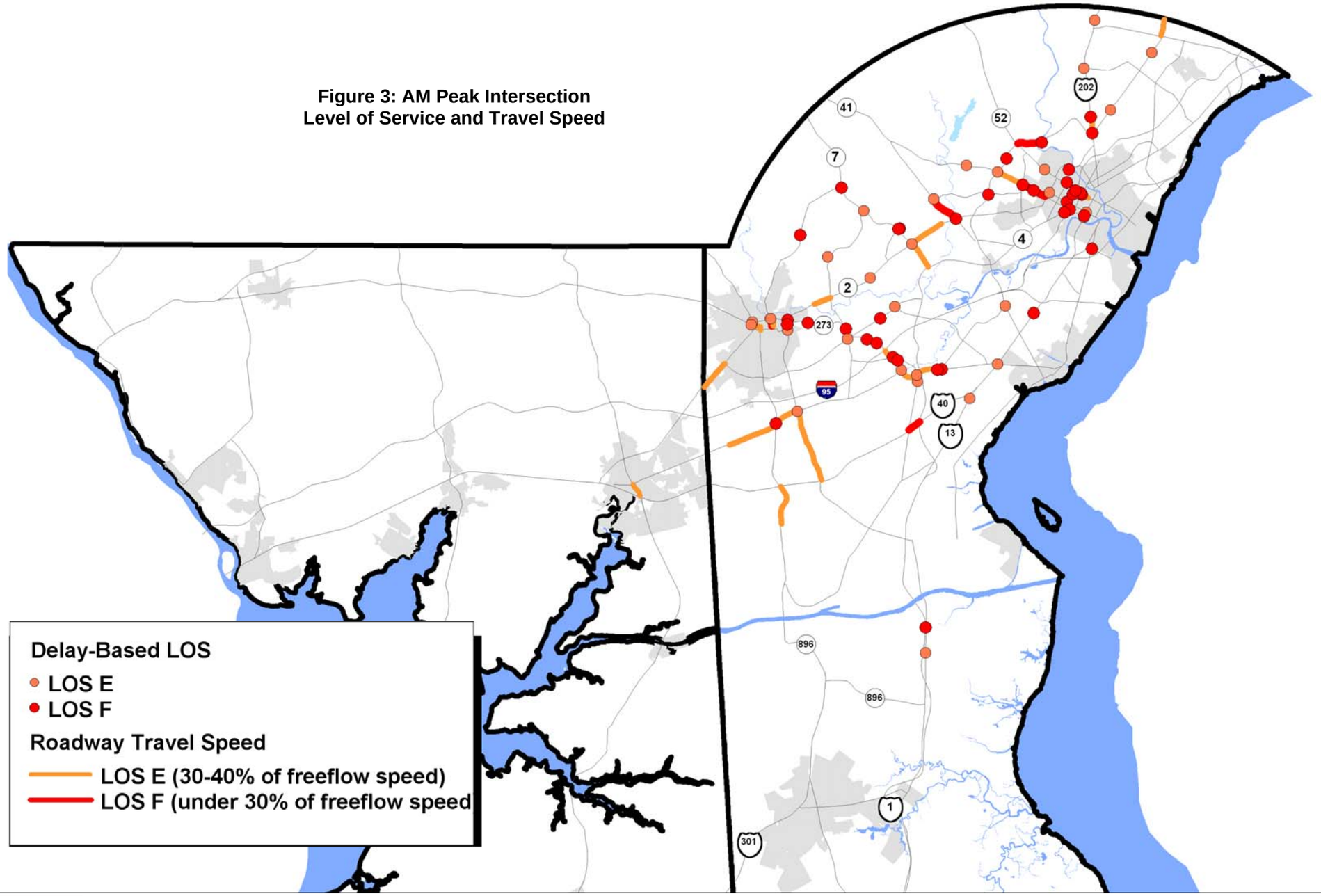
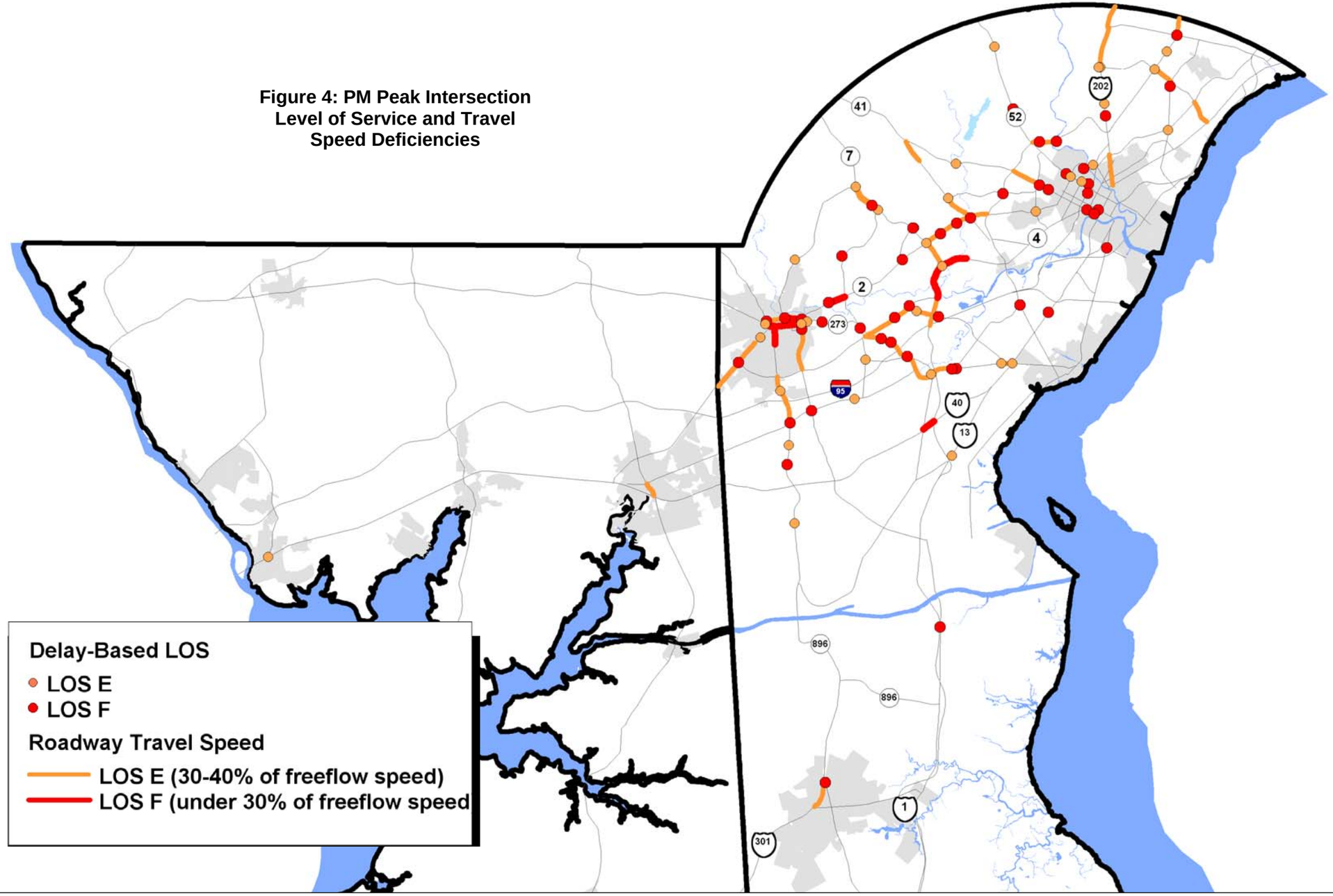


Figure 4: PM Peak Intersection Level of Service and Travel Speed Deficiencies



Performance Measure #3: Crashes

Crashes can dramatically change the performance of a roadway, contributing significantly to travel time delays. Even minor lane-blocking incidents can have significant impacts on traffic if they are not removed quickly.

Measure: Based on a 3-year average (2009-2011), the crash rate per million vehicles entering the intersection is calculated. In order to establish crashes that are associated with each intersection, a "sphere of influence" has been determined around each intersection, which include each turning bay and acceleration lanes downstream from the intersection. Since there is no HCM standard, the analysis will include the intersections (with an average of 15 or more crashes annually) that are in the top 40% of the highest crash rates out the ones studied.

Data Source: Delaware State Police, DelDOT

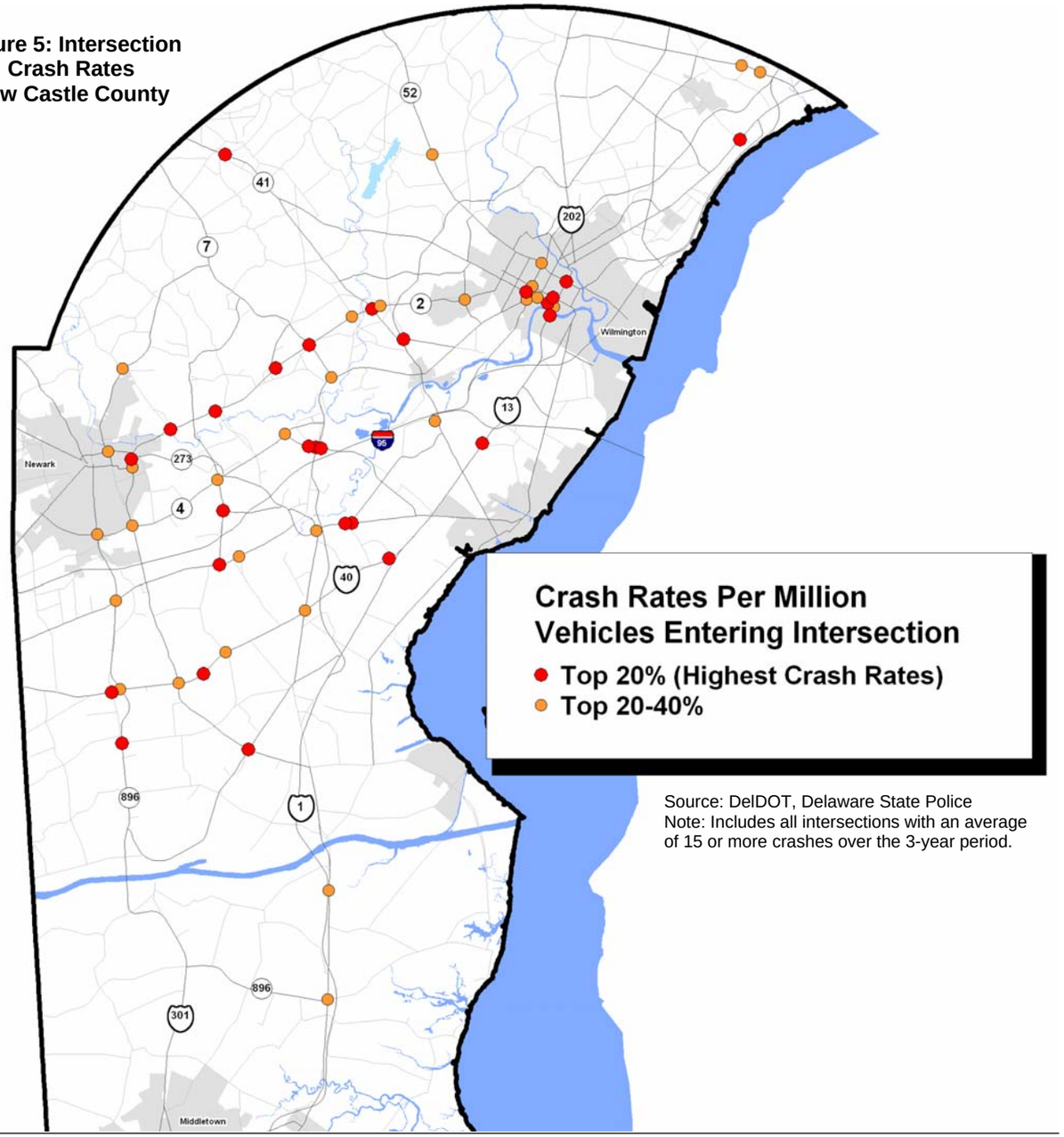
As stated earlier, automobile crashes account for approximately one quarter of congestion delays. Therefore, including locations with experience higher than normal crash rates is a critical component for any congestion performance measurement. Not only do crashes cause issues with delays and secondary incidents, but have proven to be nearly five times as costly to society than typical costs of congestion (i.e. gas, worker productivity, etc…).

A recent study conducted by the American Automobile Association (AAA) found the overall cost of crashes ($299.5 billion) equates to an annual per person cost of $1,522, compared to $590 per person annually for congestion ($97.7 billion overall). In a medium sized MPO like the WILMAPCO region, these crash costs grow to nearly six times that of the cost of congestion.[1]

Using data provided by the Delaware State Police, we have collected all crashes occurring around all signalized intersections through a "sphere of influence" determination around each site, including all turn bays and acceleration/ merge lanes approaching and departing each intersection. A three-year average from 2008-2010 was used to calculate an annual crash rate per million vehicles entering the intersection. **Figure 5** shows the 146 intersections which were analyzed along the CMS network and the ones which scored in top 40% of those sites. According to the analysis, this includes all intersections with a crash rate of more than 1.67 crashes per million vehicles entering intersection. For a complete listing of the crash analysis, please see Appendix D.

1. AAA Report "*Crashes and Congestion: What's the Cost to Society*", November 2011

Figure 5: Intersection Crash Rates New Castle County



Source: DelDOT, Delaware State Police
Note: Includes all intersections with an average of 15 or more crashes over the 3-year period.

Performance Measure #4 Congestion Assessment– Cecil County
The Maryland State Highway Administration (MDSHA) produces an annual county-wide congestion assessment. LOS is calculated using the amount of traffic demand at a given time as compared to the capacity of the roadway. The resulting map is used directly in the CMS report as a performance measure.

Data Source: Maryland State Highway Administration

Figure 6 represents the results of the 2011 Congestion Assessment for Cecil County. According to the MDSHA, the LOS is calculated using the amount of traffic demand at a given time as compared to the capacity of the roadway. Capacity changes due to weaves, intersections, and junctions have been factored into the capacity of a given segment.

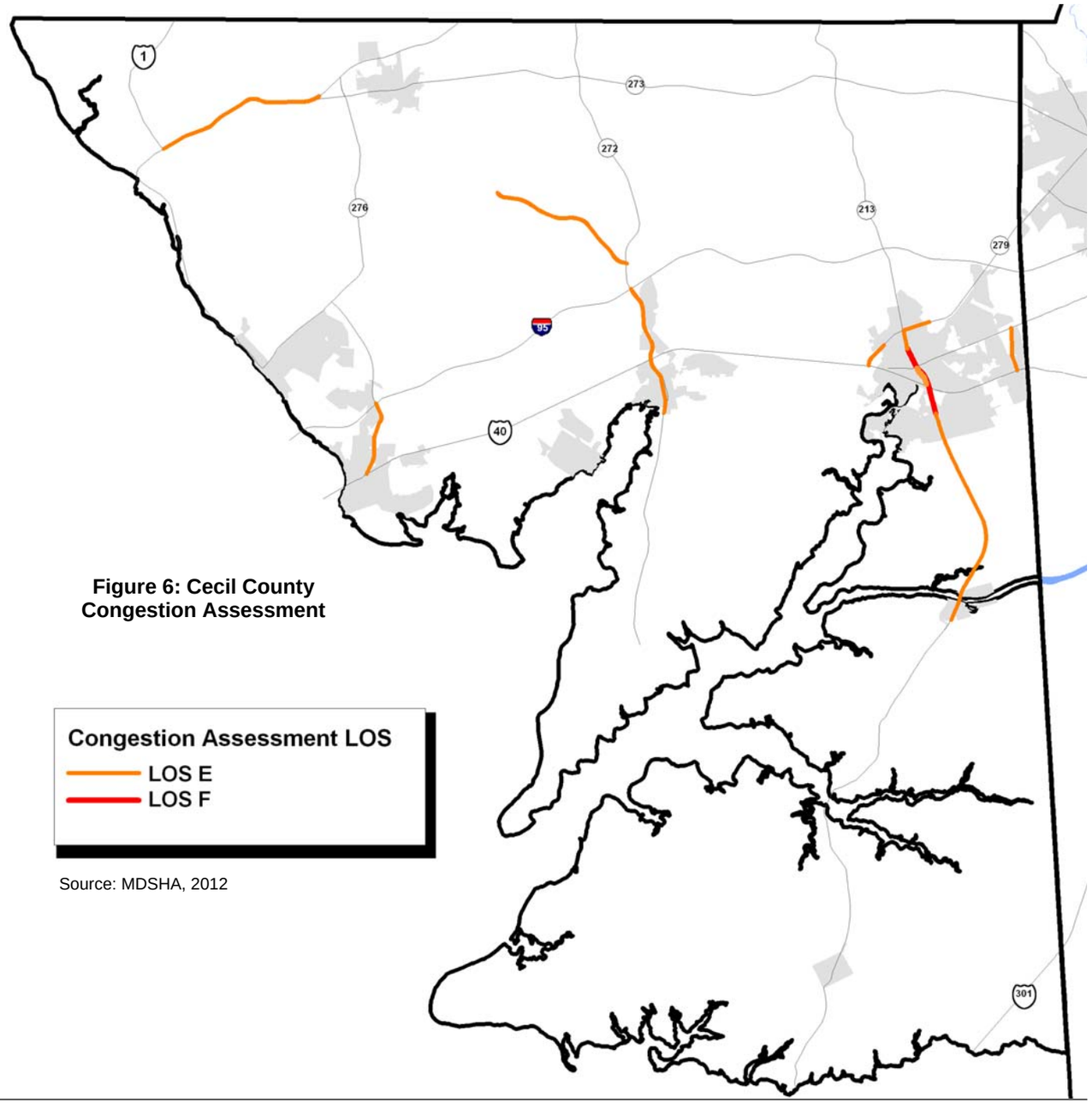


Figure 6: Cecil County Congestion Assessment

Source: MDSHA, 2012

CONGESTED CORRIDOR IDENTIFICATION

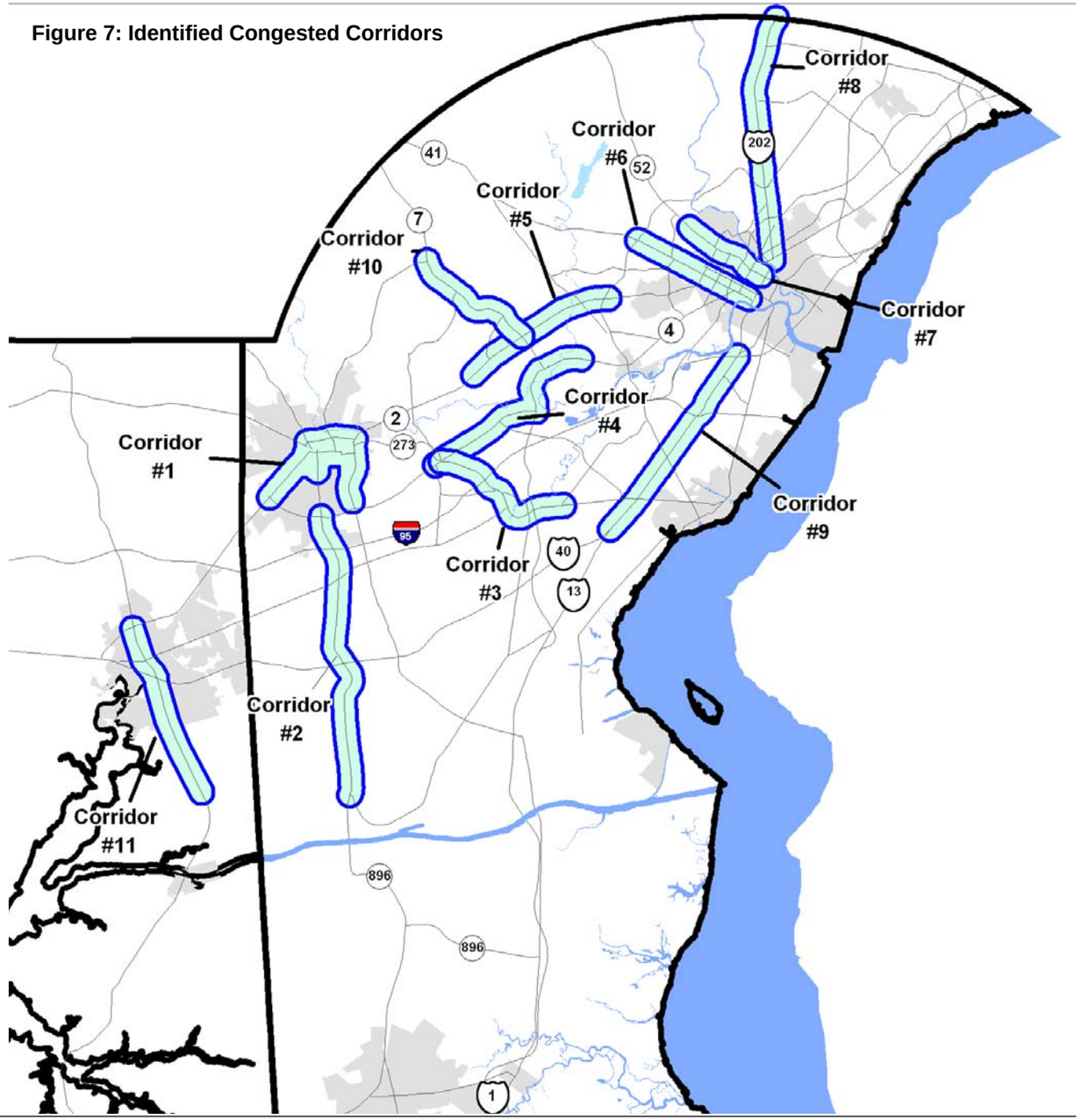
Using the established performance measures, the final step in the CMS process is to delineate congested corridors. By looking over each measure, areas in which repeated deficiencies occurred were identified. With the addition of crash frequencies to the identification process, changes were required in terms of how these data are displayed. Instead of layering each measure on a single map, staff used GIS to analyze each roadway segment and intersection to show which segments and intersections are experiencing multiple performance failures.

Members of the CMS Subcommittee and the Technical Advisory Committee identified these corridors with criteria that analyzed congestion density (number or frequency of adjacent congested segments and/or intersections) and predominant travel patterns.

2012 Identified CMS Corridors

Corridor #1: City of Newark
Corridor #2: SR 896, SR 4 to SR 71
Corridor #3: SR 273, Salem Church Rd. to Churchman's Rd.
Corridor #4: SR 4, Salem Church Rd. to Macarthur Dr.
Corridor #5: SR 2, Kirkwood Highway
Corridor #6: SR 48, Lancaster Pike, Wilmington
Corridor #7: SR 52, Pennsylvania Ave., Wilmington
Corridor #8: US 202, PA line to Wilmington
Corridor #9: US 13, US 40 split to I-495
Corridor #10: SR 7, SR 72 to SR 2
Corridor #11: MD 213, MD 279 to Locust Point Rd.

Figure 7: Identified Congested Corridors



This page has been intentionally left blank

INTERSECTION OPERATIONAL ANALYSIS

To create a process which brings both the planning and operating communities together in developing cohesive solutions for congested corridors, this report has added a feature that not only looks at how intersections are performing through measures of delay, but also by the measurement of vehicle throughput of each intersection. In order to accomplish this, a capacity analysis was done using the Critical Movement Summation (CMS). This method focuses on "raw" intersection capacity, that is, the ability for an intersection to process a given traffic demand with a given lane use configuration and given phase sequence.

Traffic signal phasing is one component of the analysis, but it is important to note that most of the subtleties of traffic signal phasing and operation are not included in the analysis. The analyst can use this simple hands-on approach to get right to the point of an intersection's ability to handle traffic demands. CMS looks at each of the "critical" movements at an intersection. It is a volume-based measure.

The maps to the right show all of the intersections where the volume-based level of service is calculated using the Critical Movement Summation analysis tool, which measures the peak hour traffic volume movements though each leg of the intersection. The LOS breakdown is shown below. More details in Appendix B.

Table 3: Intersection Level of Service (Volume-Based)

Level of Service Critical Movement Summation (CMS)
LOS A Less than 1,000 vehicles/hour
LOS B 1,000 to 1,150 vehicles/hour
LOS C 1,151 to 1,300 vehicles/hour
LOS D 1,301 to 1,450 vehicles/hour
LOS E 1,451 to 1,600 vehicles/hour
LOS F More than 1,600 vehicles/hour

Figure 8: Volume-Based Intersection Level of Service AM Peak

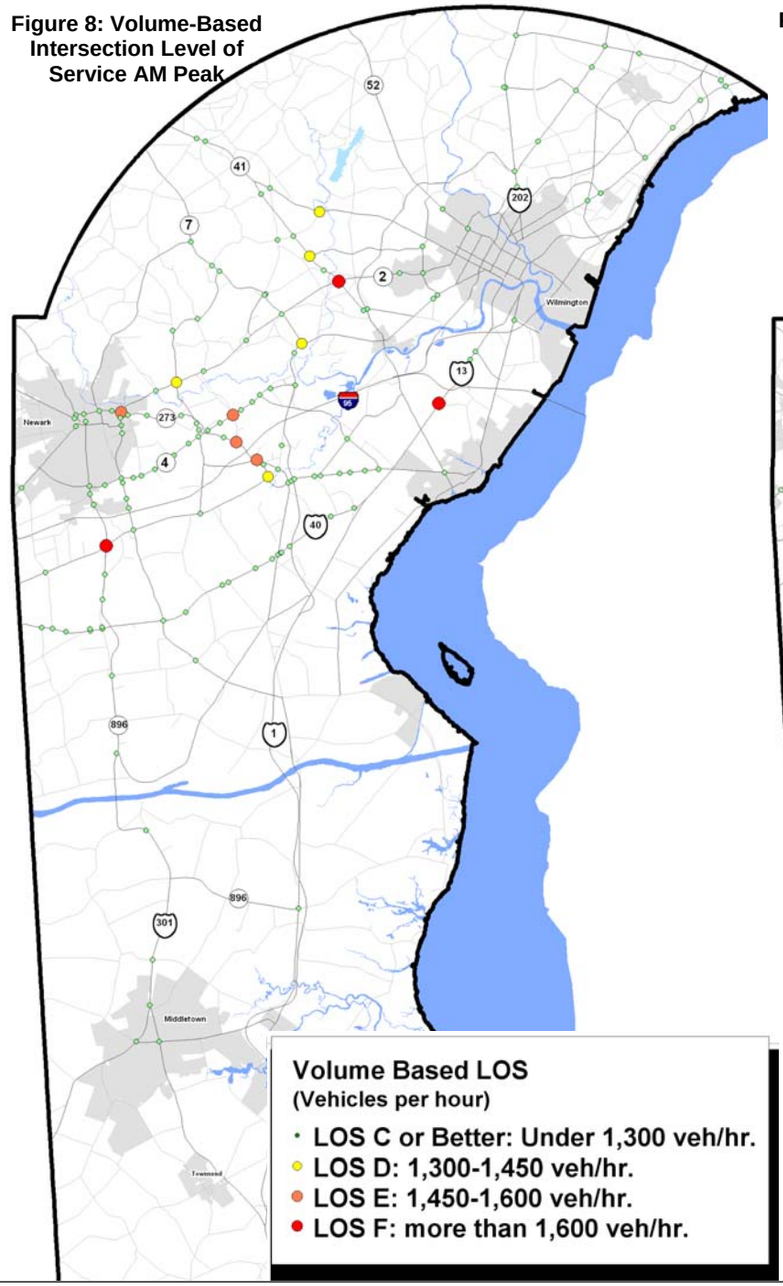
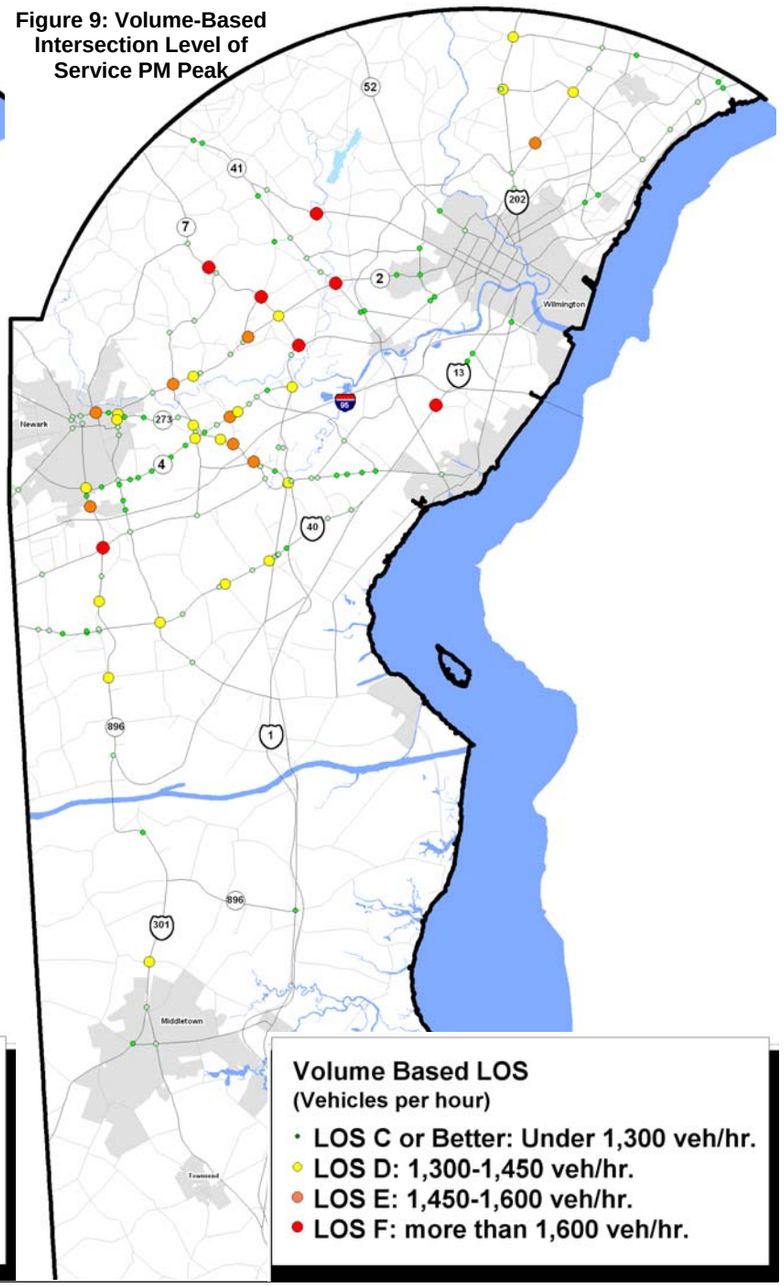


Figure 9: Volume-Based Intersection Level of Service PM Peak



INTERSECTION OPERATIONAL ANALYSIS (cont.)

To take the analysis a little further, each of the intersections determined deficient through the delay-based analysis were studied using the Critical Movement Summation (CMS) methodology which allows us to see which intersections not only have issues with delay, but have capacity problems as well. The purpose of this is to be able to determine whether a deficient intersection is suffering from a signal timing issue or if it has truly reached a level of volume in which it requires capital improvements. This effort will help determine the extent of demand reduction or capital improvements that are needed to provide an acceptable LOS and provide more efficient traffic flows for commuters and bus transit services.

Results of this effort can be used to provide a performance-based analysis to provide a prioritized list of needed improvements into the statewide Transportation Improvement Program listed each year in the Delaware Capital Transportation Program.

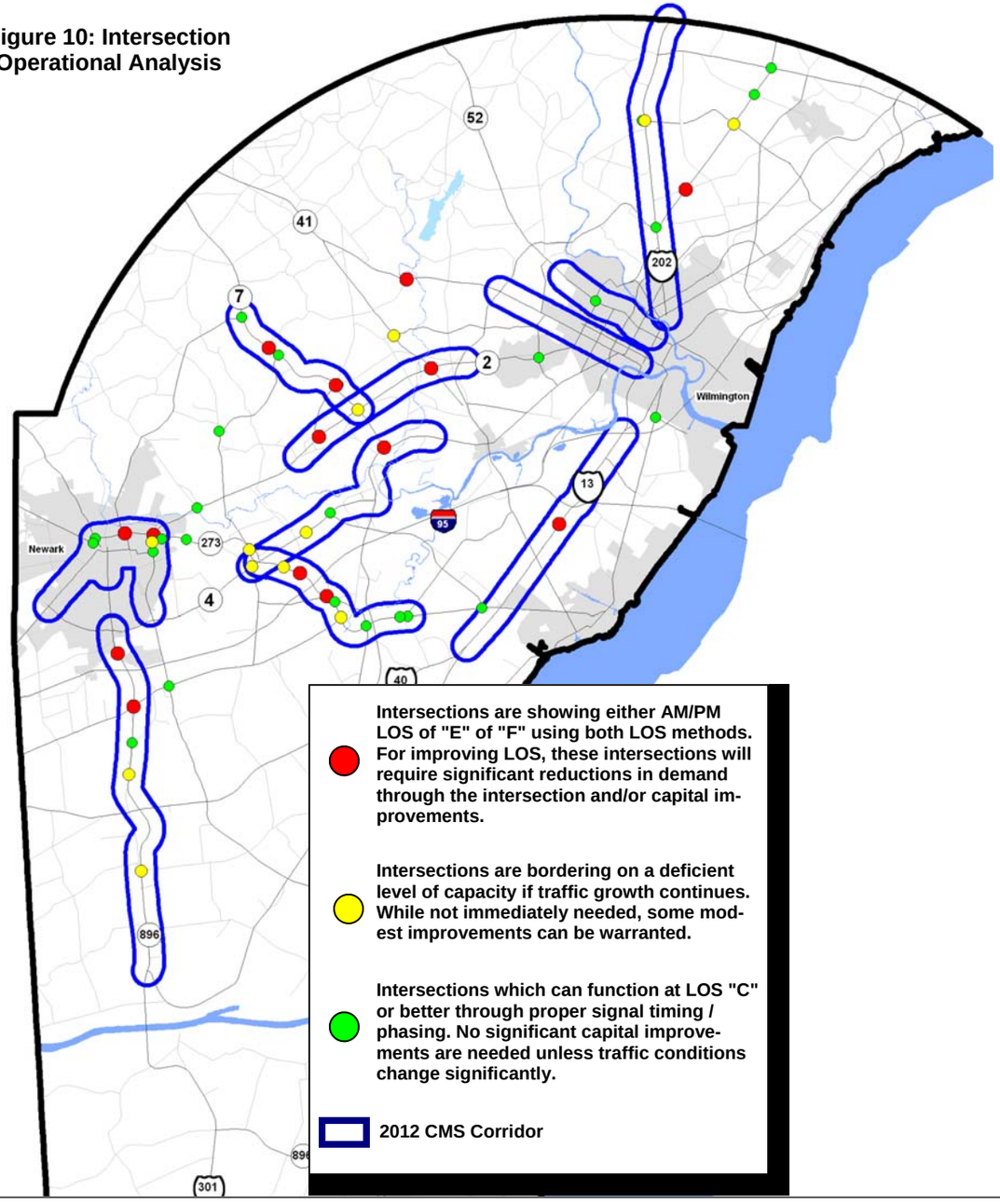
Intersections shown in RED are ones that are showing LOS E of F during the AM or PM peak period. These intersections have issues with capacity and will require strategies that will reduce demand through the intersection or will need capital improvements to improve LOS.

Intersections in YELLOW are bordering on a deficient level of capacity if traffic demand grows. While not immediately needed, some modest improvements can be made to the intersection.

Intersections in GREEN can function at LOS "C" or better through proper signal timing / phasing. No significant capital improvements are needed unless traffic demand increases.

For more specific details on the analysis of these intersections, and for the recommended improvements for priority intersections, please see Appendix C.

Figure 10: Intersection Operational Analysis



INTERSECTION OPERATIONAL ANALYSIS (cont.)

Advanced Traffic Signal Control Improvements: Through coordination with the DelDOT, TMC and WILMAPCO, an effort was made to use the performance measures developed through the corridor identification process to help the operations community to prioritize their efforts to address the corridors which are in need of installing traffic signal improvements, including retiming and/or installing Traffic Responsive Signalization (TRS).

Traffic responsive signalization is a method of signal management that uses advanced technology to adjust timing to meet the needs of the current traffic volume. The signals used in this method optimize signal timing according to traffic volume in each direction. Sensors are used to detect vehicular traffic in a certain direction at a particular point and an algorithm is used to predict when and where the traffic will be. The signal controller utilizes these algorithms to adjust the length of green time to allow the maximum amount of vehicles through the intersection. This method can react to fluctuating traffic volume in order to reduce congestion.

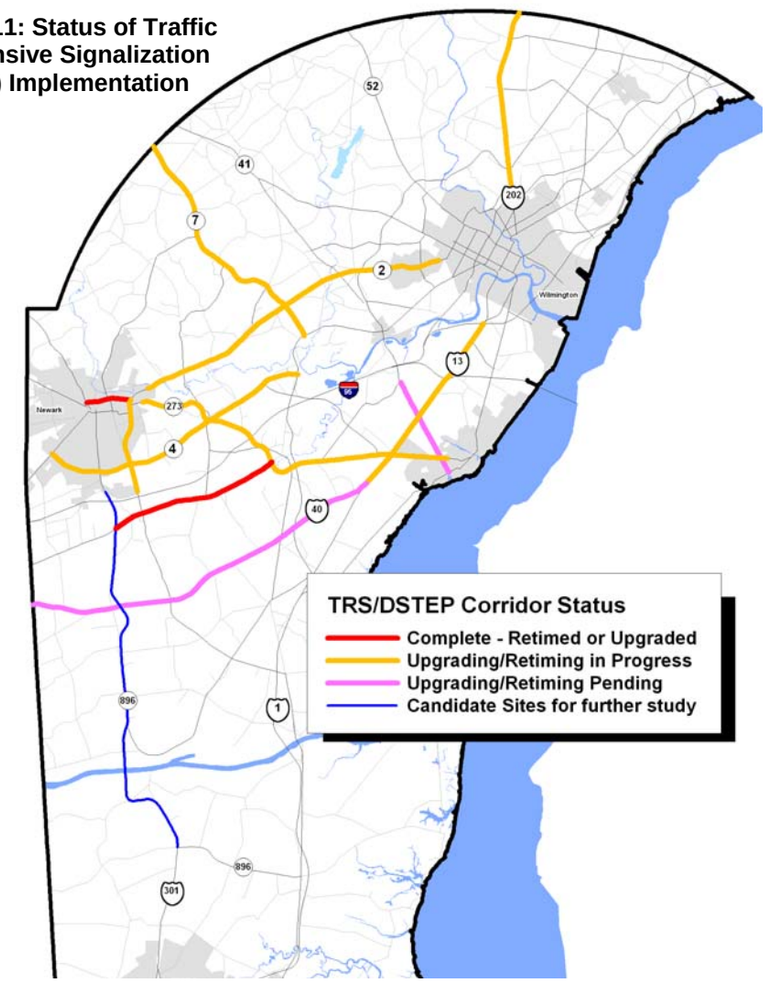
As an aid to the TMC, the University of Delaware Signal Timing Enhancement Partnership (DSTEP) has performed data collection and engineering. DSTEP is a partnership between the Delaware Department of Transportation and the University of Delaware. The partnership has laid out a work plan for the corridors identified, including analyzing the best signal timing sequence along each. Using the resources of the University of Delaware GPS travel time probes, each corridor can then be driven to measure how much improvement was made as a result of each retiming project.

The TMC's corridor work plan correlates very well with the identified 2012 CMS corridors. As a strategy to mitigate congestion, select corridors will be studied for further implementation. For WILMAPCO's complete list of prioritized corridors, please see Appendix D.

Table 4: Status of TRS/DSTEP Corridors

Map ID	Corridor	Length (mi)	TRS/DSTEP	Status	Year Completed
1	US 202	5.1	TRS	In Progress	
2	Cleveland Avenue	1.2	DSTEP	Complete	2010
3	DEL. 896	10.8	?	Candidate Site for 2012	
4	Old Baltimore Pike	4.7	TRS & DSTEP	Complete	
5	DEL. 273, Christiana	9.2	TRS	In Progress	
6	DEL. 2, Kirkwood Hwy.	8.8	DSTEP	In Progress	
7	DEL. 72	2.6	TRS & DSTEP	In Progress	
8	US 40, Pulaski HW	9.9	TRS	Pending	
9	DEL. 4	7.6	TRS	In Progress	
10	US 13	5.4	TRS	In Progress	
11	DEL. 141, Basin Rd.	2.8	DSTEP (?)	Pending	
12	DEL. 7, Limestone Rd.	6.9	TRS	In Progress	
13	US 40, W Pulaski Hwt.	3.6	Telemetry	Telemetry	
14	MD 213	0.5	Telemetry	Telemetry	
15	MD 222	1.3	NIC	NIC	

Figure 11: Status of Traffic Responsive Signalization (TRS) Implementation



SECTION #2: STRATEGY EVALUATION:

Potential strategies to reduce congestion have been assembled in a "toolbox" designed to provide the appropriate solutions for each corridor. Within each of these strategies, specific congestion mitigation measures are outlined and described in detail. This package of solutions to congestion includes measures involving *all* modes of transportation as well as strategies to encourage more sensible land development.

WILMAPCO CMS "TOOLBOX" STRATEGIES:

Strategy #1: Eliminate person trips or reduce VMT during peak hours
Strategy #2: Shift Trips from Automobile to Other Modes
Strategy #3: Shift Trips from SOV to HOV Auto/Van
Strategy #4: Improve Roadway Operations
Strategy #5: Add Capacity

A key component in WILMAPCO's "top-down" approach ensures that solutions which would eliminate or shift auto trips or improve roadway operations are evaluated before adding roadway capacity. While our effort is designed to be corridor-specific, there are several strategies that are being employed region-wide that help address congestion. **Table 5** lists these strategies in detail.

The next several pages will describe in detail the strategy evaluation process for each corridor. Page X contains the expanded illustration of the identified corridors (Fig. X) which were described in Section 1. **Table 6** on page 15 shows the corridor solution matrix with all ten corridors and the congestion mitigation strategies deemed applicable to each. An "X" in the corridor column indicates that the strategy is applicable to the corridor. Listed next to each strategy are the agencies responsible for implementing each project.

Our CMS Subcommittee, comprised of state and county planners that guide the development of this summary, developed the matrix by assigning the congestion mitigation strategies from the toolbox that they felt would be effective along each corridor. Additional weight was given to feedback from the implementing agency of a particular strategy as to whether that strategy was applicable for a
given corridor.

To assist in the above work, the Subcommittee carefully reviewed the corridor profiles on pages 16-26.

Table 5: Area-wide Congestion Mitigation Strategies (Not Corridor Specific)

Strategy #1: Eliminate Person Trips or Reduce VMT	**Growth Management/Activity Centers**
	Land Use Policies/Regulations - Encourage more efficient patterns of commercial or residential development in defined growth areas. Specific land use policies and/or regulations that could significantly decrease both the total number of trips and overall trip lengths, as well as making transit use, bicycling and walking more viable.
	Congestion Pricing
	Parking Fees - Market-based strategy designed to modify mode choice by imposing higher costs for parking private automobiles. Most appropriately applied to parking facilities in urban settings.
	Transportation Demand Management
	Alternate Work Schedule, Telecommuting and Employee Trip Reduction Programs- Encourage employers to consider allowing employees to maintain a flexible schedule – thus allowing the employee the option of commuting during non-peak hours. Organize Groups/employers that offer tax incentives or transit subsidies on a regular basis
Strategy #3 Shift Trips from SOV to HOV	**Transportation System Management**
	Rideshare Matching Services - Provide carpool/vanpool matching and ridesharing information resources and services
	Vanpool/Employer Shuttle Programs - Organize groups of commuters to travel together in a passenger van or employer-provided shuttle on a regular basis.
Strategy #4: Improve Roadway Operation	**Traffic Operational Improvements**
	Incident Management- Detection, Response & Clearance - Utilize traveler radio, travel alert notification (via e-mail, fax, etc.), and general public outreach to enhance incident-related information dissemination.

Table 6: CMS Strategy Mitigation Matrix

Strategy	Implementing Agency	Corridor #1	Corridor #2	Corridor #3	Corridor #4	Corridor #5	Corridor #6	Corridor #7	Corridor #8	Corridor #9	Corridor #10	Corridor #11
estion Pricing												
Road User Fees - Includes area-wide pricing fees, time-of-day/congestion pricing and tolls. Most appropriately applied to freeways and expressways and requires the infrastructure to collect user fees. Complimented by transit/HOV discounts.	**MDOT/DelDOT**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
: Transit Capital Improvements												
Exclusive Right of Way – New Rail Service - Includes heavy rail, commuter rail, and light rail services. Most appropriately applied in a dense context serving a major employment center.	**DTC/MTA**		X			X						
Exclusive Right of Way – New Bus Facilities - Includes Busways, Bus Only Lanes, and Bus Bypass Ramps. Most appropriately applied to freeways and expressways with high existing transit ridership rates.	**DTC/MTA**	X		X	X	X	X	X	X	X	X	X
Fleet Expansion - Expansion of existing rail and/or bus capacity to provide increased service. Includes improvements to the service frequency and service area provided throughout the region.	**DTC/MTA**	X			X	X			X	X		
Improved Intermodal Connections- Improve the efficiency and functionality of intermodal connections where several modes of transportation are physically and operationally integrated.	**DTC/MTA**		X							X	X	
: Transit Operational Improvements												
Traffic Signal Preemption - Improve traffic flow for transit vehicles traveling through signalized intersections.	**DTC/MTA**	X			X	X	X		X	X		
Transit Fare Reductions/Reduced Rate of Fare- Includes system-wide reductions, off-peak discounts and deep discount programs.	**DTC/MTA**	X			X	X	X		X	X		
nced Public Transportation Systems (APTS)												
Intelligent Bus Stops & Transit Information Systems - Increasing ridership by providing real-time vehicle, schedule, and transfer information and improved in-vehicle and station information systems to improve the dissemination of transit-related information to the user.	**DTC/MTA**	X			X	X	X		X	X		
e and Pedestrian Modes												
Improved/Expanded Bicycle Network and Facilities - Includes on-road facilities, pathways, and greenways. Providing safe and secure places for bicyclists to store their bicycles at key locations including Park and Ride/Park and Pool Facilities.	**MDOT/ DelDOT/ Municipalities**	X				X	X	X	X	X		
Improved/Expanded Pedestrian Network Facilites- Includes sidewalks, overpasses/tunnels, greenways and walkways.	**MDDOT/ DelDOT/ Municipalities**	X				X	X	X	X	X		
rage High Occupancy Vehicle (HOV) Use												
Add HOV Lanes- Most appropriate use on freeways and expressways.	**DelDOT/MDOT**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HOV Toll Savings- Preferential pricing to multi-occupant vehicles. Needs infrastructure to administer toll collection.	**DelDOT/MDOT**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Development of Park and Pool/Park-n-Ride Facilities & Capital Improvements - Modify or expand current capacity of Park and Ride/Park and Pool Lots.	**DelDOT/MDOT**		X		X					X	X	X
portation System Management												
Parking Management - Preferential parking is a low-cost incentive that can be used to encourage the utilization of alternative commute modes, such as carpooling and vanpooling.	**Municipalities/ Private Businesses**	X					X	X	X			X
: Operational Improvements												
Intersection Geometric/Channelization/Turn Restriction Improvements - Improvements to intersection geometrics to improve overall efficiency, and operation and improvements that provide physical separation or delineation of conflicting traffic movements. Also includes turn restrictions to reduce conflicts and increase overall intersection performance.	**DelDOT/MDOT**	X	X	X	X	X	X	X	X	X	X	X
Intersection Signalization Improvements - Improving signal operations through re-timing signal phases, adding signal actuation, etc.	**DelDOT/MDOT**	X	X	X	X	X	X	X	X	X	X	X
Coordinated Intersection Signals (ITS) - Improve traffic signal progression along identified corridors.	**DelDOT/MDOT**											
Incident Management- Detection, Response & Clearance - Utilize traveler radio, travel alert notification (via e-mail, fax, etc.), and general public outreach to enhance incident-related information dissemination.	**DelDOT/MDOT**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
al/Freeway Operations and Management												
Elimination of Bottlenecks - Eliminating high-traffic areas where one or more travel lane(s) are removed.	**DelDOT/MDOT**											
Ramp Metering - Metering vehicular access to a freeway during peak periods to optimize the operational capacity of the freeway.	**DelDOT/MDOT**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
s Management												
Access Control / Roadway Frontage- Reduction or elimination of "side friction", especially from driveways via traffic engineering, regulatory techniques, and purchase of property rights. Includes Auxiliary roadways which provide a separated lane or lanes for access to abutting land uses along freeways or arterials.	**DelDOT/MDOT**		X	X	X	X			X	X		X
Access Management - Reduction of centerline and "side friction", via traffic engineering and regulatory techniques.	**DelDOT/MDOT**		X	X	X	X			X	X		X
on of General Purpose Lanes												
Arterial/Freeway Lanes - Increasing the capacity of congested arterials through additional travel lanes.	**DelDOT/MDOT**											
Interchanges - Addition of Interchanges for capacity, operational or safety improvements.	**DelDOT/MDOT**		X						X			
Relief Routes- The addition of a roadway designed to carry through traffic around an area of significant congestion.	**DelDOT/MDOT**			X	X	X						

CMS Corridor #1, Newark: Profile

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	9,530 - 39,735	2010
Type of Facility(ies)	Minor Arterial, Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	57.0%	2010
Average Transit Peak Headway (AM/PM)	39 minutes / 48 minutes	2008
Number of Park and Rides and % Usage	1; 0%	2010
Daily Truck % at Select Locations # (Shown on map in green)	3.3%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	1.46	2010
Gross Employment Density (per acre)	3.67	2010
Percent within an EJ*** Area	0.0%	2000
Percent within a TJ**** Area	8.2%	2000
Major Activity Center	City of Newark	

Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	613 (4.6% increase)	2010
Gross Employment Change (2005-2010)	-3699 (-10% decrease)	2010
AADT Change (2005-2010)	2005 - 22,830 2010 - 20,161 (11.7% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-23.37 PM-17.54mph 2011: AM-21.66 PM-15.88mph (AM-7.3% decrease, PM-9.4% decrease)	2011

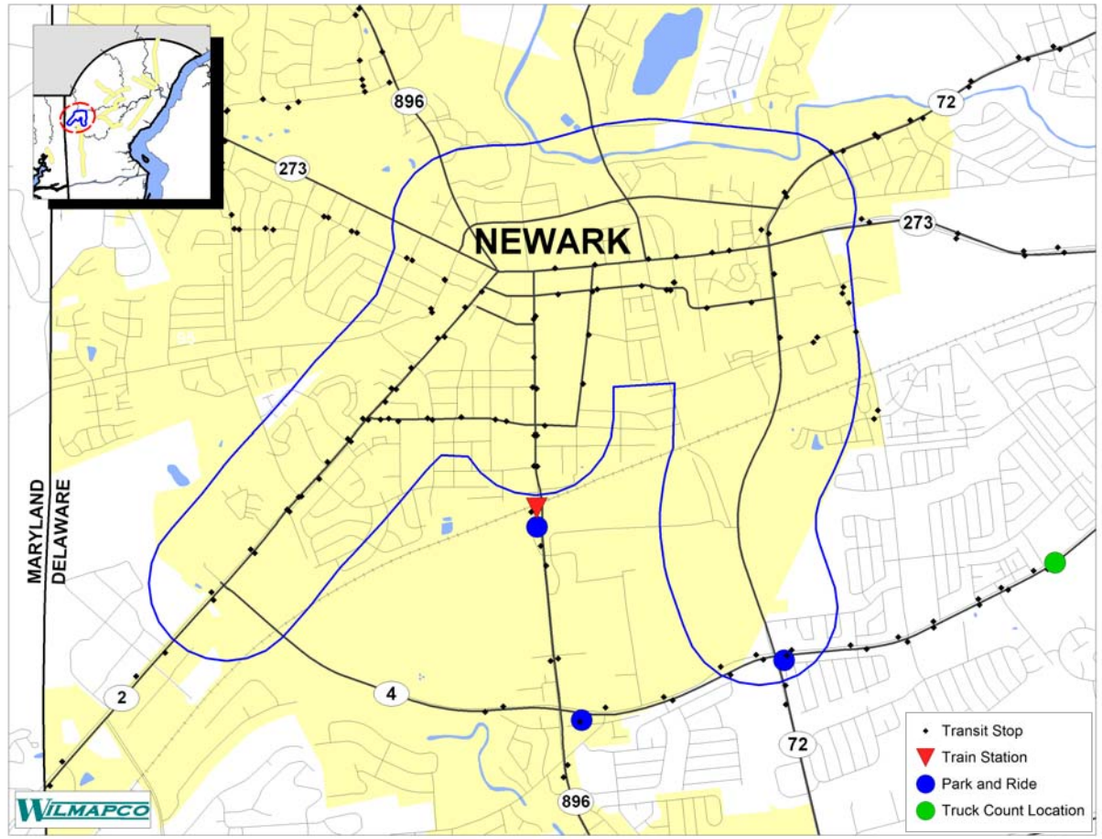
* AADT = Average Annual Daily Traffic

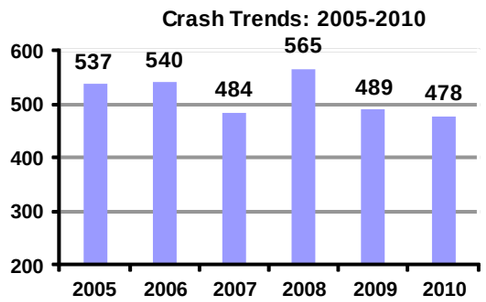
** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #2, SR 896

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	21,289 - 48,799	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	44.7%	2010
Average Transit Peak Headway (AM/PM)	41 minutes / 44 minutes	2008
Number of Park and Rides and % Usage	2; 77.5%	2010
Daily Truck % at Select Locations # (Shown on map in green)	6.4%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	0.68	2010
Gross Employment Density (per acre)	0.93	2010
Percent within an EJ*** Area	0.0%	2000
Percent within a TJ**** Area	0.0%	2000
Major Activity Center	City of Newark; Glasgow	

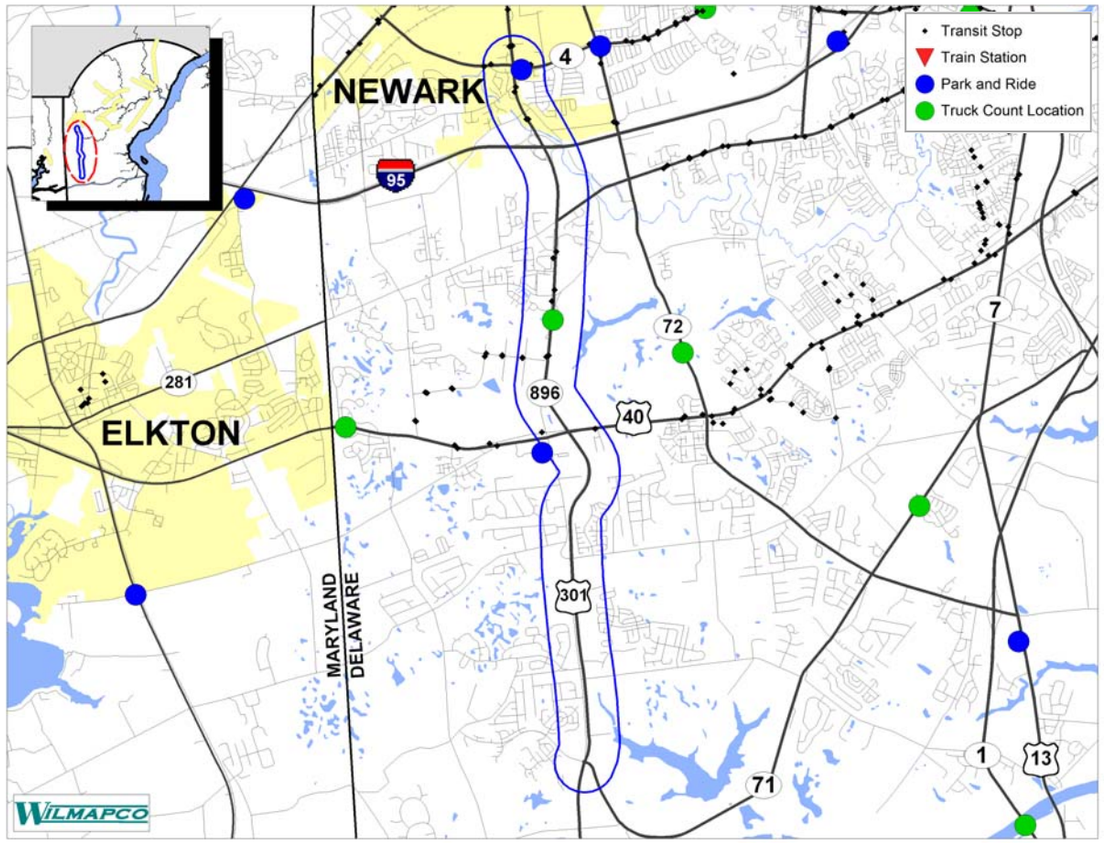
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	2145 (27.3% increase)	2010
Gross Employment Change (2005-2010)	-2884 (-20.4% decrease)	2010
AADT Change (2005-2010)	2005 - 30,929 2010 - 35,163 (13.7% increase)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-38.54 PM-35.64mph 2011: AM-36.62 PM-35.79mph (AM-5% decrease, PM-1.3% decrease)	2011

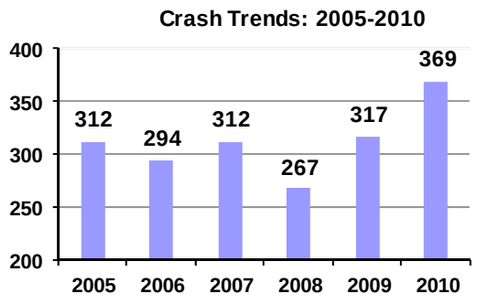
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #3, SR 273

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	19,078 - 49,616	2010
Type of Facility(ies)	Other Principal Arterial	
Average Transit Routes V/C** Ratio	43.1%	2010
Average Transit Peak Headway (AM/PM)	44 minutes / 74 minutes	2008
Number of Park and Rides and % Usage	1; 28.5%	2010
Daily Truck % at Select Locations # (Shown on map in green)	2.3%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	1.88	2010
Gross Employment Density (per acre)	2.54	2010
Percent within an EJ*** Area	22.3%	2000
Percent within a TJ**** Area	0.0%	2000
Major Activity Center	Christiana Mall; New Castle	

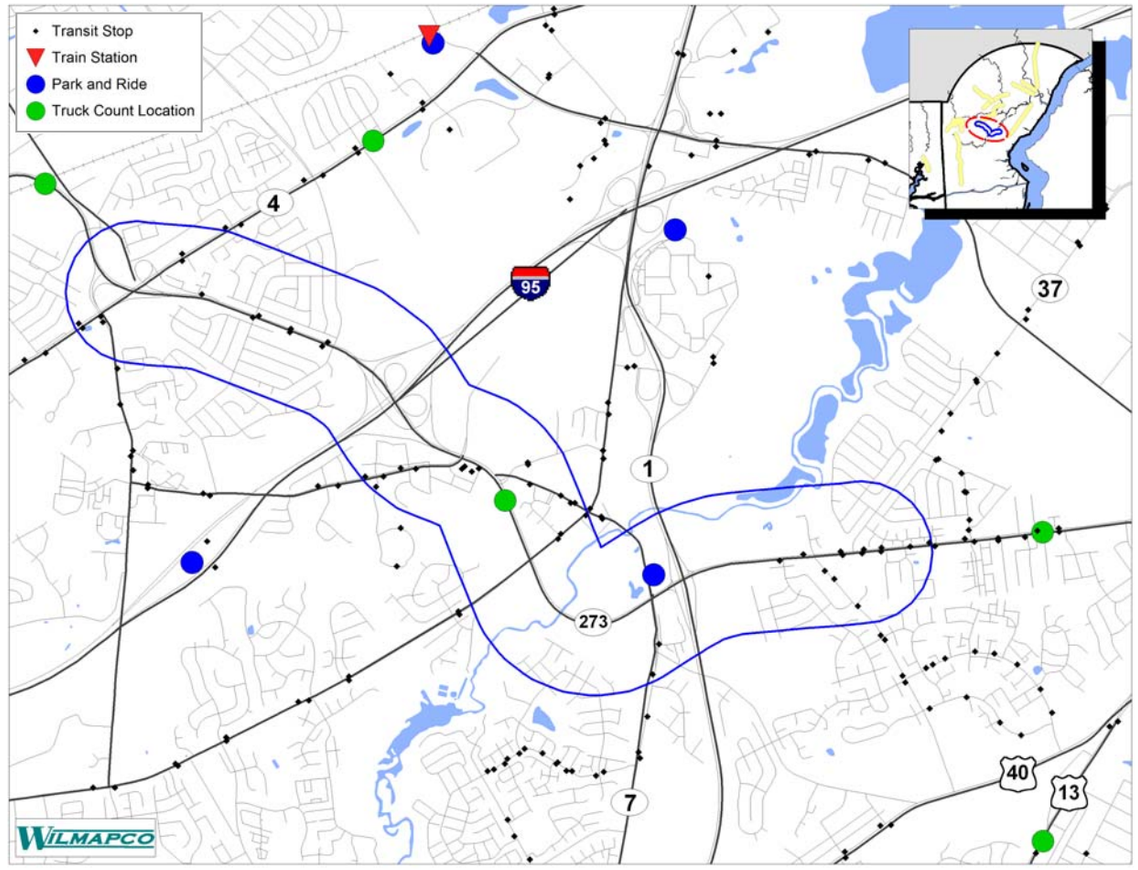
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	-140 (-0.8% decrease)	2010
Gross Employment Change (2005-2010)	-1994 (-7.9% decrease)	2010
AADT Change (2005-2010)	2005 - 46,720 2010 - 37,688 (19% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-33.26 PM-27.4mph 2011: AM-27.85 PM-23mph (AM-16.3% decrease, PM-16% decrease)	2011

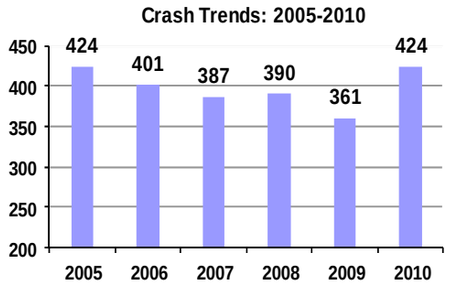
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #4, SR 4

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	15,396 - 53,990	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	50.8%	2010
Average Transit Peak Headway (AM/PM)	35 minutes / 35 minutes	2008
Number of Park and Rides and % Usage	1; 79.0%	2010
Daily Truck % at Select Locations # (Shown on map in green)	3.0%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	1.27	2010
Gross Employment Density (per acre)	2.95	2010
Percent within an EJ*** Area	0.0%	2000
Percent within a TJ**** Area	6.3%	2000
Major Activity Center	Christiana Mall	

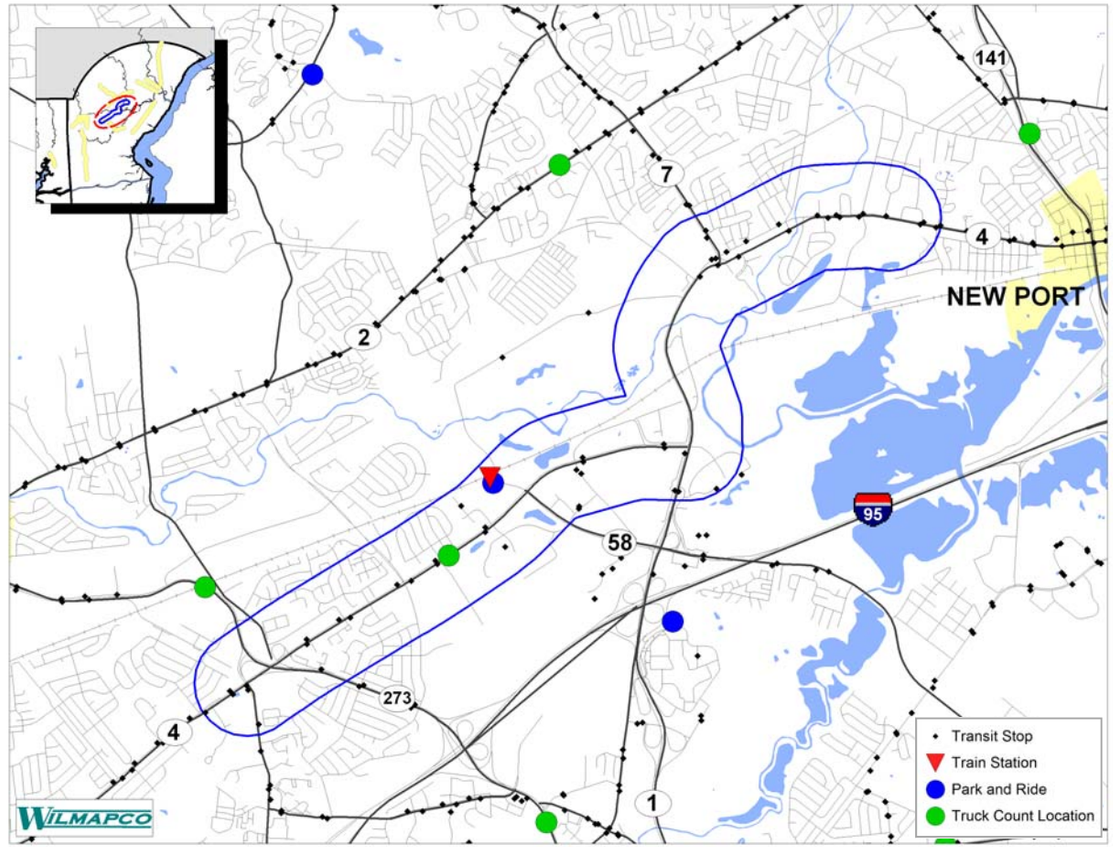
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	-588 (-5.1% decrease)	2010
Gross Employment Change (2005-2010)	-2898 (-10.5% decreae)	2010
AADT Change (2005-2010)	2005 - 29,596 2010 - 27,863 (5.9% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-29.93 PM-24.42mph 2011: AM-30.93 PM-24.47mph (AM-3.4% increase, PM-0.2% increase)	2011

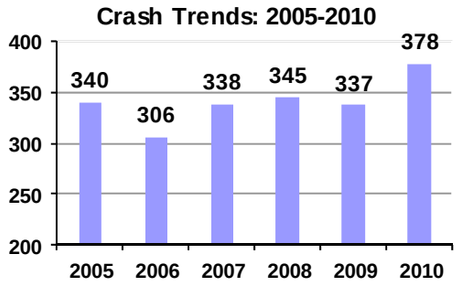
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #5; Kirkwood Highway

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	40,411 - 53,761	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	68.2%	2010
Average Transit Peak Headway (AM/PM)	27 minutes / 33 minutes	2008
Number of Park and Rides and % Usage	2; 15.5%	2010
Daily Truck % at Select Locations # (Shown on map in green)	2.8%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	2.21	2010
Gross Employment Density (per acre)	1.80	2010
Percent within an EJ*** Area	6.5%	2000
Percent within a TJ**** Area	16.1%	2000
Major Activity Center	Kirkwood Hwy	

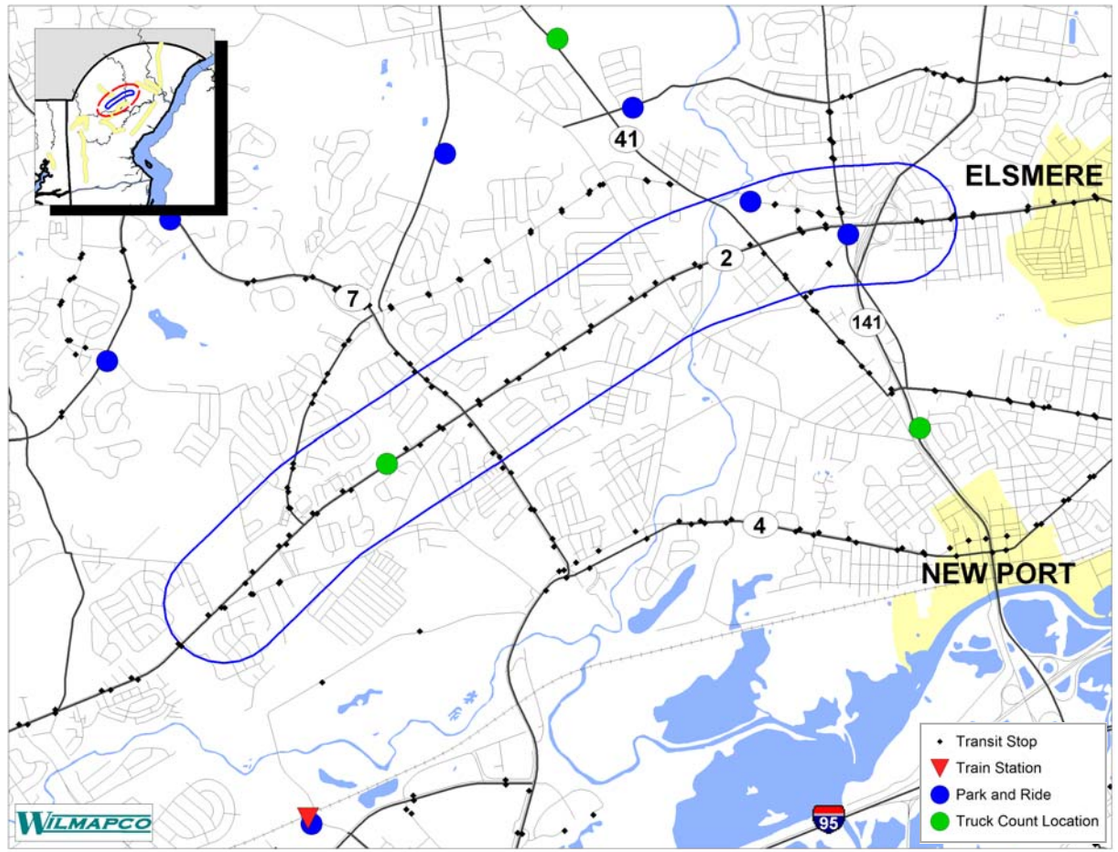
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	-293 (-2.5% decrease)	2010
Gross Employment Change (2005-2010)	-1420 (-11.3% decrease)	2010
AADT Change (2005-2010)	2005 - 49,369 2010 - 45,335 (8.2% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-30.38 PM-22.2mph 2011: AM-28.45 PM-30.97mph (AM-6.4% decrease, PM-39.5% increase)	2011

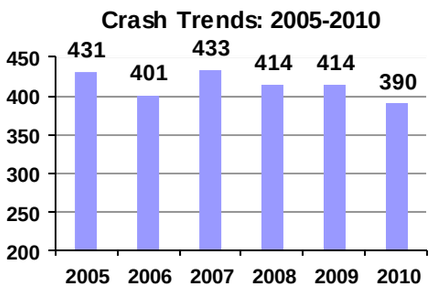
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #6, SR 48, Lancaster Pike

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	18,147 - 29,537	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	41.3%	2010
Average Transit Peak Headway (AM/PM)	31 minutes / 32 minutes	2008
Number of Park and Rides and % Usage	1; 0.0%	2010
Daily Truck % at Select Locations # (Shown on map in green)	2.9%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	2.93	2010
Gross Employment Density (per acre)	5.64	2010
Percent within an EJ*** Area	64.1%	2000
Percent within a TJ**** Area	54.0%	2000
Major Activity Center	City of Wilmington	

Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	97 (0.8% increase)	2010
Gross Employment Change (2005-2010)	-361 (-1.5% decrease)	2010
AADT Change (2005-2010)	2005 - 21,663 2010 - 24,256 (12% increase)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-15.77 PM-17.64mph 2011: AM-17.18 PM-17.65mph (AM-9% increase, PM-0.1% increase)	2011

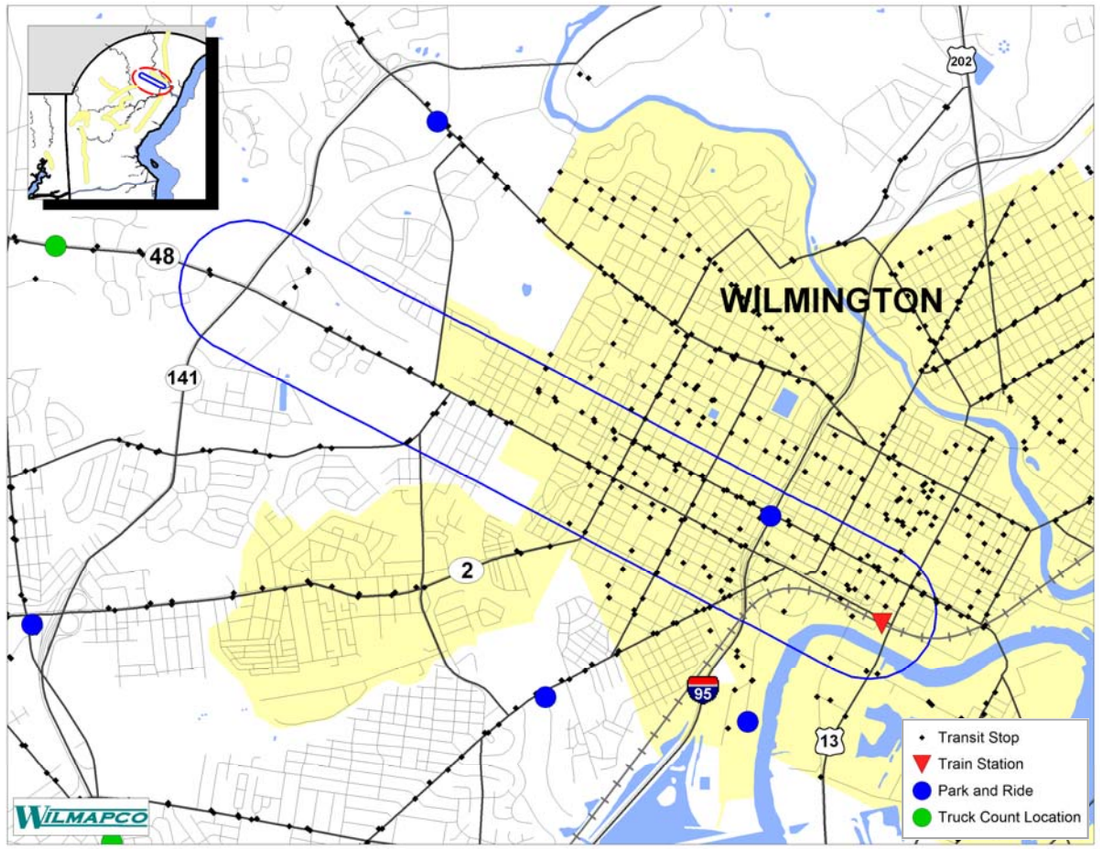
* AADT = Average Annual Daily Traffic

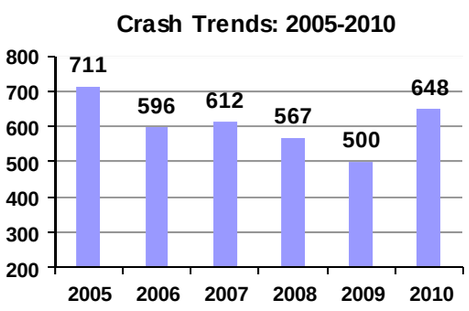
** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #7, SR 52, Pennsylvania Ave.

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	10,388 - 28,284	2010
Type of Facility(ies)	Minor Arterial, Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	43.3%	2010
Average Transit Peak Headway (AM/PM)	27 minutes / 25 minutes	2008
Number of Park and Rides and % Usage	0; 0.0%	2010
Daily Truck % at Select Locations # (Shown on map in green)	3.5%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	5.31	2010
Gross Employment Density (per acre)	16.40	2008
Percent within an EJ*** Area	50.6%	2000
Percent within a TJ**** Area	46.6%	2000
Major Activity Center	City of Wilmington	

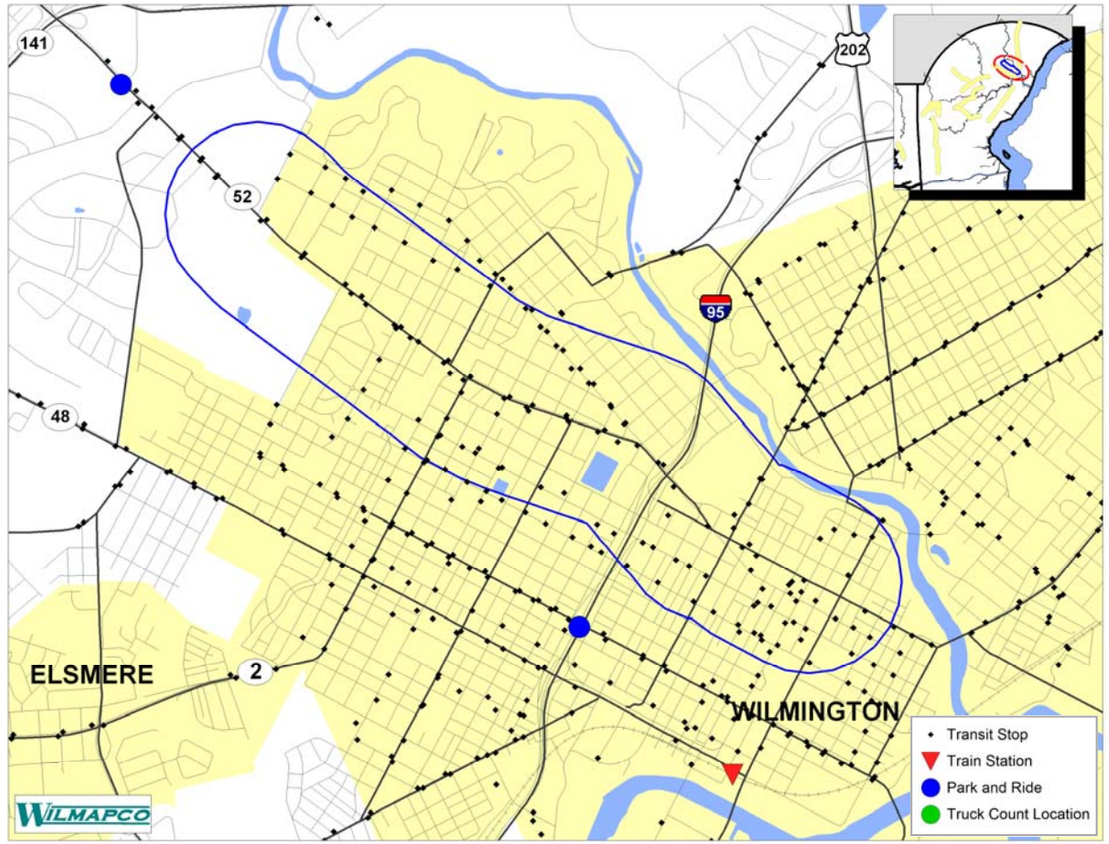
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	163 (1.3% increase)	2010
Gross Employment Change (2005-2010)	-2549 (-6.4% decrease)	2010
AADT Change (2005-2010)	2005 - 25,395 2010 - 18,492 (27.2% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-16.73 PM-17.05mph 2011: AM-17.1 PM-17.98mph (AM-2.2% increase, PM-5.5% increase)	2011

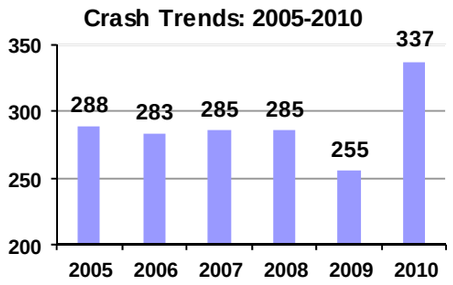
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #8, US 202

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	8,395 - 53,139	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	38.3%	2010
Average Transit Peak Headway (AM/PM)	30 minutes / 35 minutes	2008
Number of Park and Rides and % Usage	2; 11.0%	2008
Daily Truck % at Select Locations # (Shown on map in green)	4.2%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	1.57	2010
Gross Employment Density (per acre)	3.23	2010
Percent within an EJ*** Area	32.1%	2000
Percent within a TJ**** Area	24.0%	2000
Major Activity Center	City of Wilmington; Concord Pike	

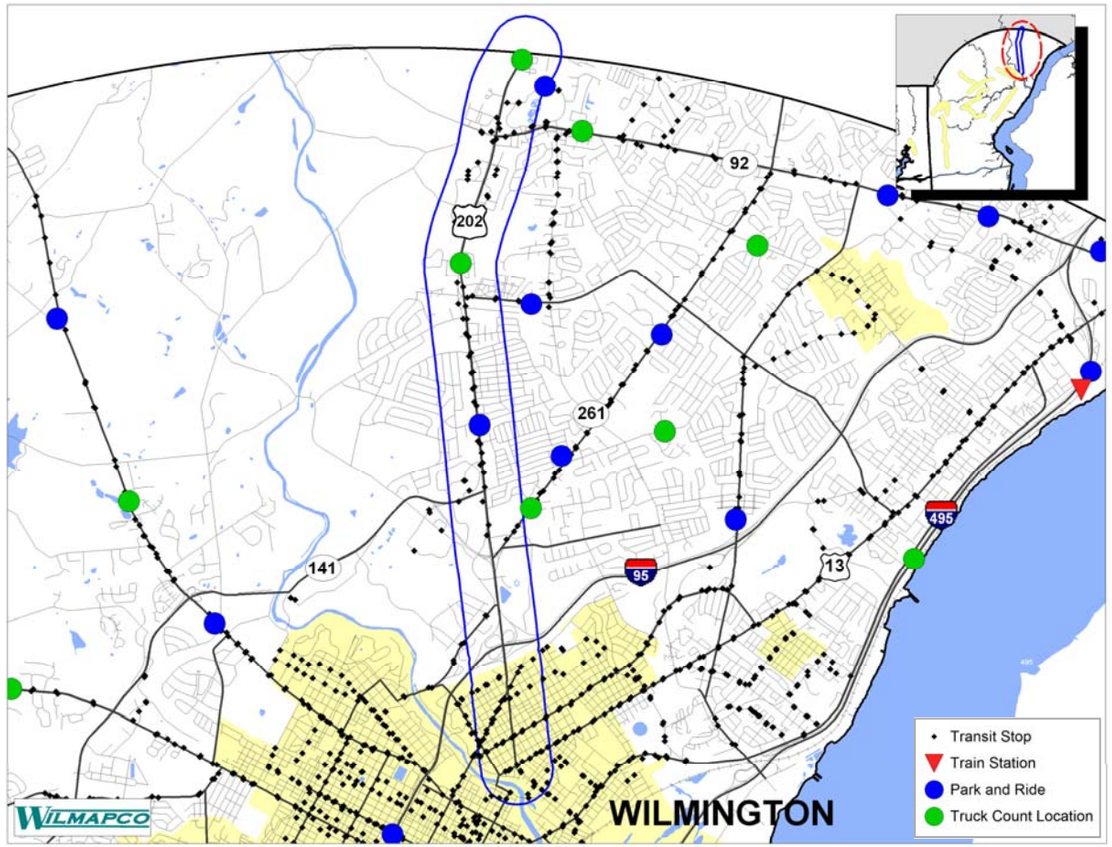
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	55 (0.4% increase)	2010
Gross Employment Change (2005-2010)	-2309 (-6.7% decrease)	2010
AADT Change (2005-2010)	2005 - 35,768 2010 - 34,721 (2.9% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-28.02 PM-25.47mph 2011: AM-30.3 PM-31.72mph (AM-8.1% increase, PM-24.5% increase)	2011

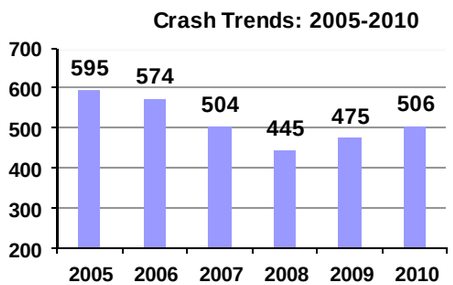
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #9, US 13

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	21,041 - 77,852	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	49.8%	2010
Average Transit Peak Headway (AM/PM)	31 minutes / 30 minutes	2008
Number of Park and Rides and % Usage	0;0%	2010
Daily Truck % at Select Locations # (Shown on map in green)	6.4%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	1.23	2010
Gross Employment Density (per acre)	2.71	2010
Percent within an EJ*** Area	13.7%	2000
Percent within a TJ**** Area	0.0%	2000
Major Activity Center	City of New Castle; New Castle Airport; Rt 13 & 40	

Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	-230 (-1.86% decrease)	2010
Gross Employment Change (2005-2010)	-2264 (-8.0% decrease)	2010
AADT Change (2005-2010)	2005 - 60,081 2010 - 49,152 (18.1% decrease)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-38.84 PM-29.58mph 2011: AM-28.84 PM-32.98mph (AM-25.8% decrease, PM-11.5% increase)	2011

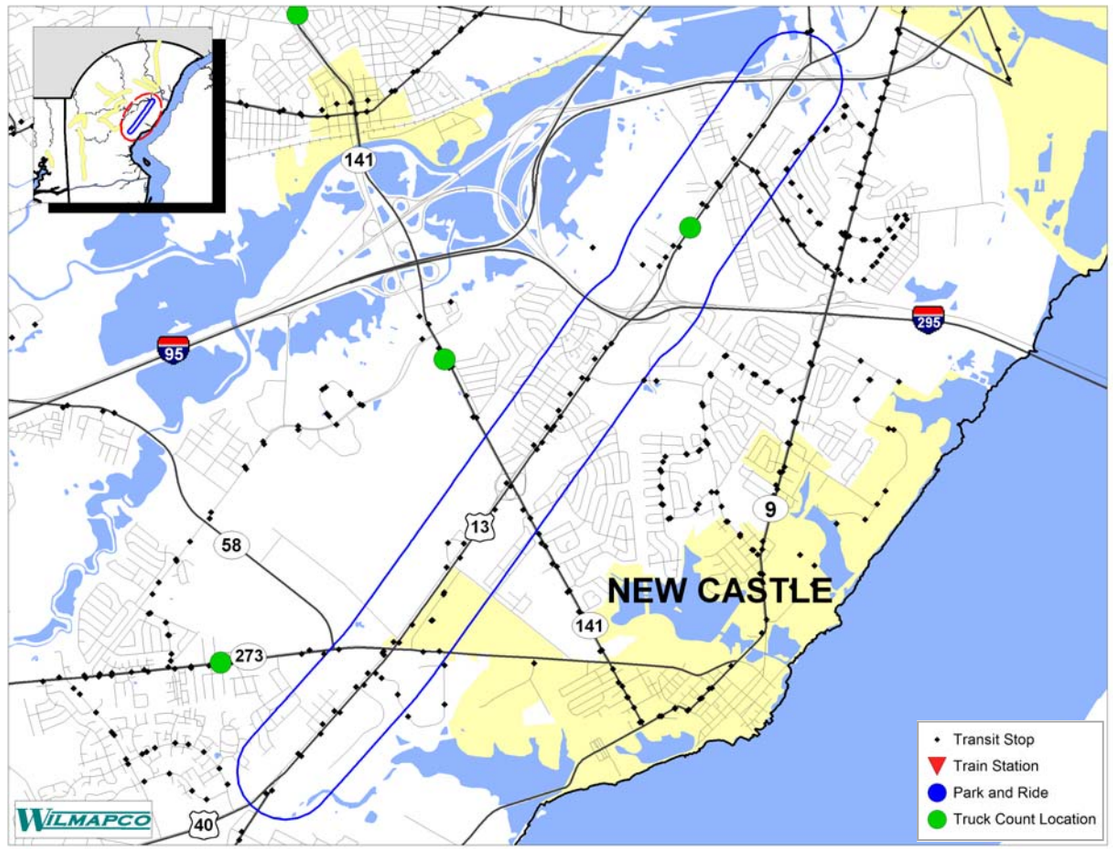
* AADT = Average Annual Daily Traffic

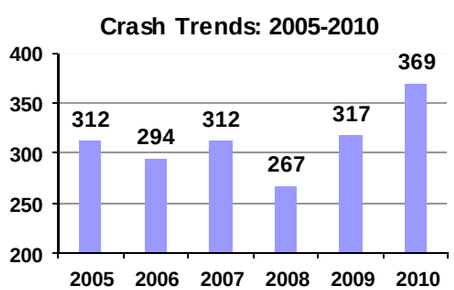
** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #10, Limestone Rd.

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range	27,647 - 38,085	2010
Type of Facility(ies)	Other Principal Arterial	2008
Average Transit Routes V/C** Ratio	39.9%	2010
Average Transit Peak Headway (AM/PM)	30 minutes / 17 minutes	2008
Number of Park and Rides and % Usage	1; 72%	2010
Daily Truck % at Select Locations # (Shown on map in green)	2.8%	2010

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	1.73	2010
Gross Employment Density (per acre)	1.05	2010
Percent within an EJ*** Area	0.0%	2000
Percent within a TJ**** Area	0.0%	2000
Major Activity Center	Marshallton; Pike Creek; Rt 7	

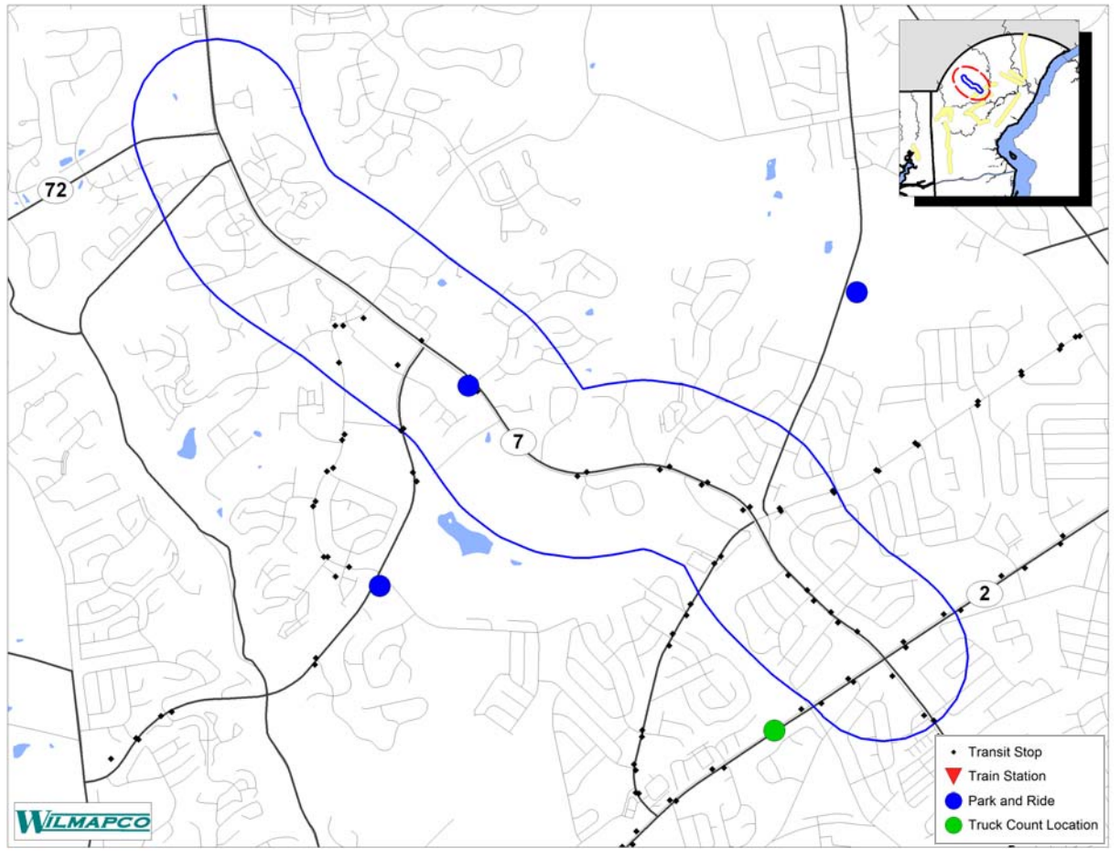
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	183 (0.96% increase)	2010
Gross Employment Change (2005-2010)	-1659 (-12.8% decrease)	2010
AADT Change (2005-2010)	2005 - 33,459 2010 - 33,501 (0.13% increase)	2010
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-30.15 PM-26.71mph 2011: AM-27.88 PM-27.89mph (AM-7.5% decrease, PM-4.4% increase)	2011

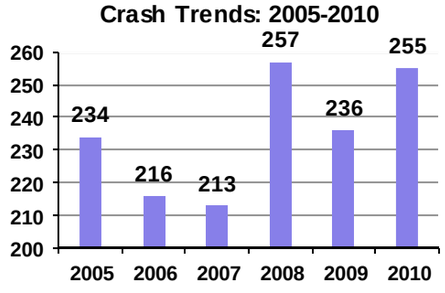
* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher





Source: DelDOT, WILMAPCO 2012. Includes all reported crashes along all arterials/freeways located within the boundary of the identified corridor. Included crashes at all intersections.

CMS Corridor #11, Town of Elkton

Transportation Inventory		
Measure	Statistic(s)	Data Year
AADT* Range (volume)	16,701 - 18,981	2009
Type of Facility(ies)	Arterial	2008
Average Transit Routes V/C** Ratio	23.1%	2007
Average Transit Peak Headway (AM/PM)	33 minutes / 46 minutes	2008
Number of Park and Rides and % Usage	N/A	N/A
Daily Truck % at Select Locations # (Shown on map in green)	18.9%	2007

Demographics		
Measure	Statistic(s)	Data Year
Gross Household Density (per acre)	0.55	2010
Gross Employment Density (per acre)	2.02	2010
Percent within an EJ*** Area	32.8%	2000
Percent within a TJ**** Area	0.0%	2000
Major Activity Center	City of Elkton	

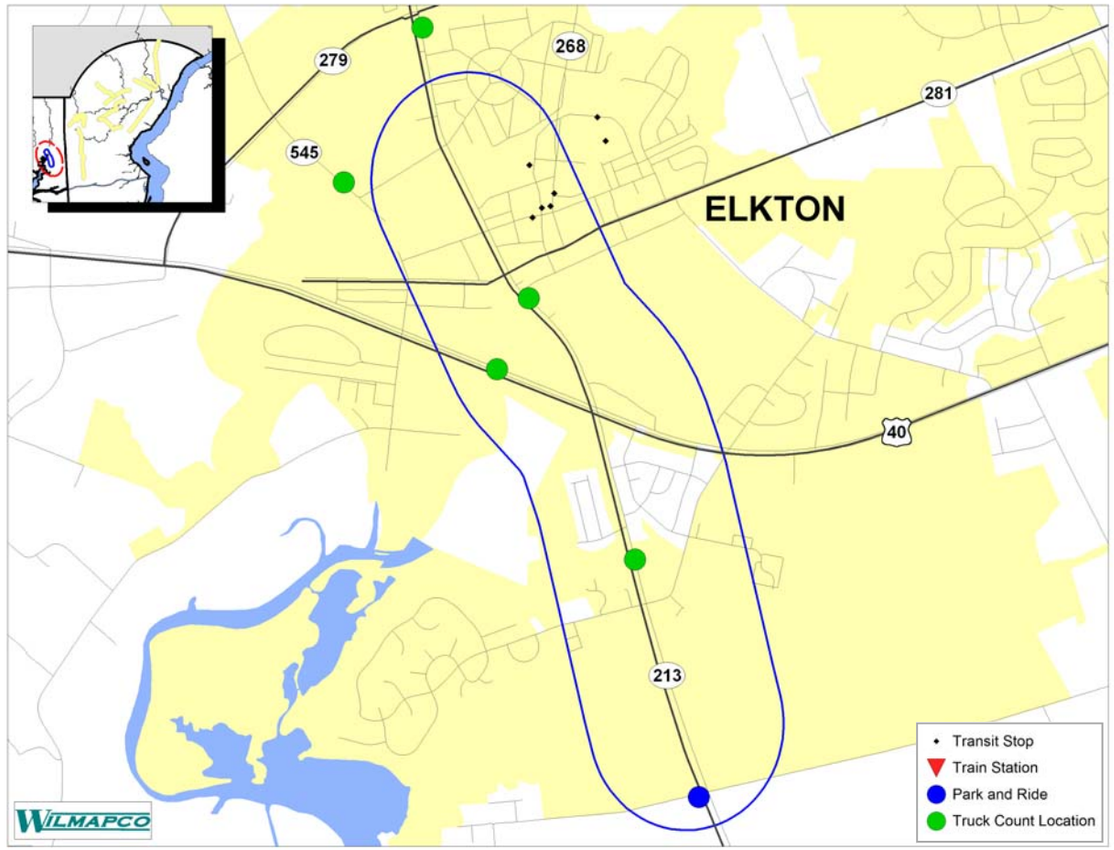
Trends		
Measure	Statistic(s)	Data Year
Gross Household Change (2000-2010)	215 (7.1% increase)	2010
Gross Employment Change (2005-2010)	-35 (-.3% decrease)	2010
AADT Change (volume) (2004-2009)	2004 - 18,361 2009 - 18,202 (.87% decrease)	2009
Avg. Peak Travel Speed Change (2005-2011)	2005: AM-28.9 PM-26.84mph 2011: AM-28.28 PM-25.2mph (AM-2.1% decrease, PM-6.1% decrease)	2011

* AADT = Average Annual Daily Traffic ** V/C = Volume to Capacity

*** EJ = Environmental Justice (low income and minority neighborhoods)

**** TJ = Transportation Justice (elderly, disabled and zero car household neighborhoods)

FHWA classifications 5 and higher



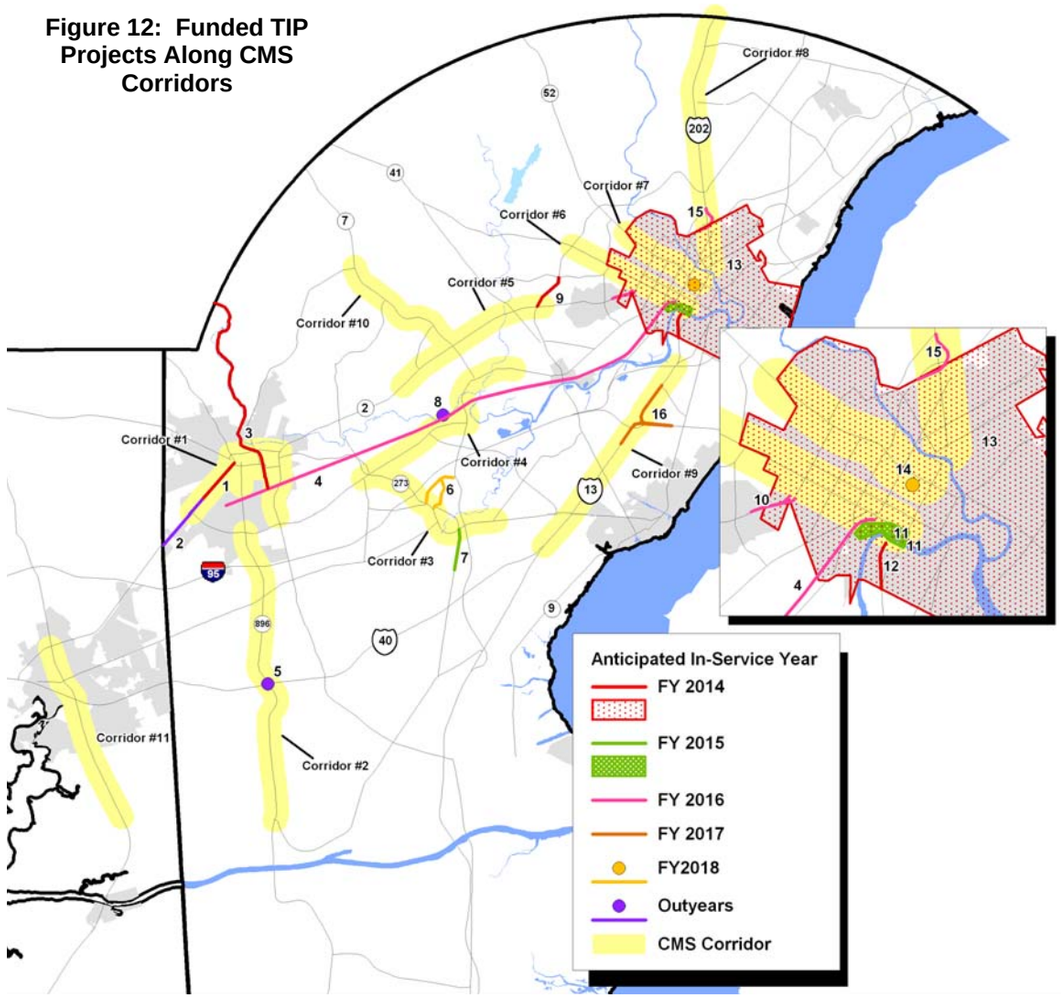
Programmed Projects Along Identified CMS Corridors

Figure 12 shows the location of projects that aim to address congestion currently programmed in the Transportation Improvement Plan (TIP) from fiscal year 2013 to 2017. Only management and expansion projects are shown, all preservation projects are excluded from this list. **Table 7** gives a corridor-by-corridor summary of the programmed projects, with overall costs and projected in-service year. For future updates on the TIP and the projects along CMS corridors, please check the WILMAPCO website at: www.wilmapco.org.

Table 7: FY 2013-2017 Funded TIP Projects Along CMS Corridors (funding x $1,000)

CMS Corridor	MAP ID	Project Name	Mitigation Strategy	Anticipated Inservice Year	Total Funding FY 2013	Total Funding FY 2014 to 2018
#1	1	Elkton Road: Casho Mill Rd to Delaware Ave, Reconstruction, Improve intersection	4-1	2014	$7,563,916	$0
#1	2	Elkton Road: MD Line to Casho Mill Rd, Reconstruction, Intersection Improvements	4-1	Outyears	$0	$0
#1	3	Pomeroy Trail, Construction of Bicycle & Pedestrain Pathway	2-9 & 2-10	2014	$1,865,000	$0
#1,4,6	4	Third Rail Track Expansion, Newark to Wilmington	2-1& 2-3	2016	$5,127,151	$25,922,614
#2	5	US 40 and 896 interchange - Grade Separated Intersection	5-2	Outyears	$0	$6,000,000
#3	6	Road A/SR 7, Widening & reconfiguration of intersections	4-1& 5-1	2018	$620,000	$13,200,000
#3	7	SR 7: Newtown Road to SR 273, Widen from 2 to 4 lanes	5-1	2015	$4,805,630	$3,102,815
#4	8	Churchman's Crossing, Fairplay Station - Parking Expansion	3-4	Outyears	$0	$14,252,000
#5	9	SR 141:Kirkwood Hwy to Faulkland Rd, Construct 4-Lane Arterial	5-1	2014	$320,000	$0
#6	10	S Union Street, SR 2: Railroad Bridge to Sycamore St, Sidewalk & Curb Replacement	2-8 & 2-10	2016	$290,000	$4,400,000
#6	11	Wilmington Riverfront - AAA Parking Garage	3-4	2015	$50,000	$50,000
#6	12	Market Street Safety Improvements	4-1&4-4	2014	$1,453,713	$0
#6,7,8	13	Wilmington Signal Improvements, Phase II	4-3	2014	$2,600,000	$0
#7	14	Wilmington Transit Hub	2-2, 2-3 & 2-5	2018	$300,000	$11,680,000
#8	15	I-95 and US 202 Interchange, Widening of Ramp	5-1	2016	$11,692,000	$17,653,905
#9	16	I-295 Improvements, from I-295 to US 13		2017	$150,000	$5,200,000
#10	----	No projects currently scheduled	----	----	----	----
#11	----	No projects currently scheduled	----	----	----	----
				TOTAL COST:	$36,837,410	$101,461,334

Figure 12: Funded TIP Projects Along CMS Corridors



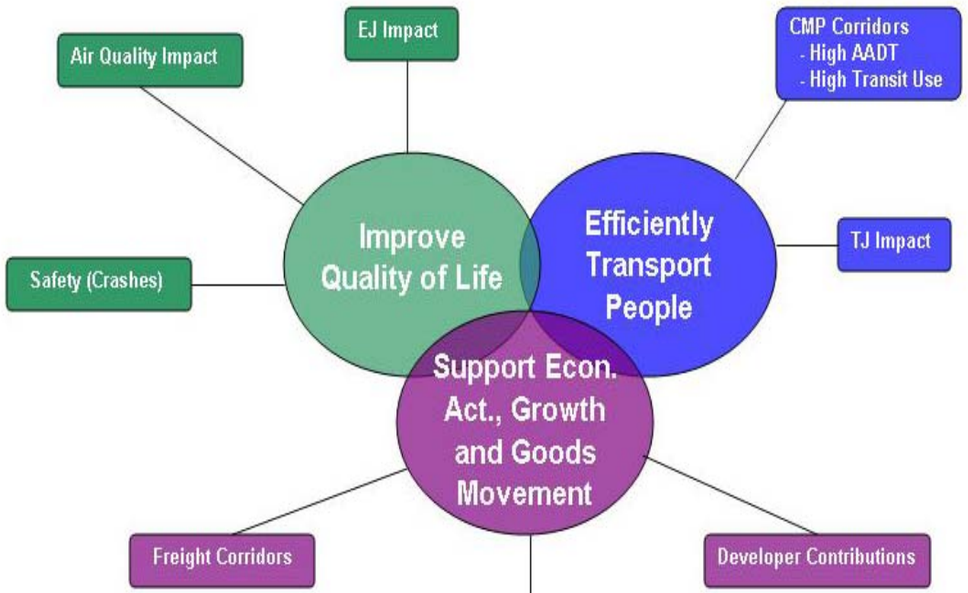
* Refer back to page 11 for a detailed list of mitigation strategies.

CMS and the Project Prioritization Process

Spurred by a plethora of unfunded transportation projects in our 2030 Regional Transportation Plan (RTP) and the desire for more transparency in project selection, WILMAPCO developed a technical process to score—and ultimately help rank—projects for funding. Known as the "Project Prioritization Process," transportation projects are scored against criteria tied to the overall goals of our RTP—Improve Quality of Life, Transport People and Goods, and Support Economic Growth and Activity.

As shown in **Figure 13**, measures such as a project's impact on air quality, sensitive neighborhoods (Environmental and Transportation Justice), or location along a bottlenecked freight route are considered. Projects receive points if they support these criteria, or can have points deducted if they do not. For example, a major commuter rail project would receive the maximum number of points for air quality, as it would promise to reduce automobile emissions. By contrast, an interstate interchange project located in a low-income/minority neighborhood would receive negative points for Environmental Justice, as it would introduce noise, pollution and traffic into the community.

Figure 13: Prioritization Process & Criteria



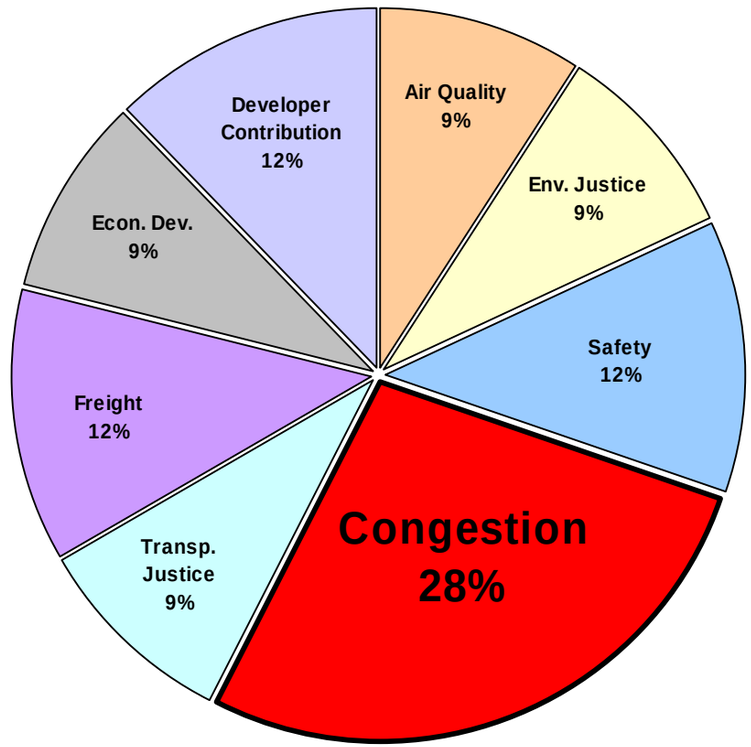
CMP= Congestion Management Process
AADT= Average Annual Daily Traffic
TJ = Transportation Justice (elderly, disabled and zero-car household neighborhoods)
EJ = Environmental Justice (low-income/minority neighborhoods)

A project's presence within an identified CMS corridor can boost its score greatly. Projects within a CMS corridor automatically receive points. They are then qualified to receive additional points if the traffic volumes are high and/or if the capacity of the location's fixed-route transit service is too. Shown in **Figure 14**, CMS is the single most heavily-weighted factor in the prioritization process.

After technical scores are calculated, qualitative considerations may be introduced to adjust a project's final ranking. These include the urgency of the project, or its cost-effectiveness.

For a more detailed overview of the WILMAPCO Prioritization Process with full point breakdowns, please visit: www.wilmapco.org/RTP.

Figure 14: Weight Distribution of Prioritization Criteria



CMS and the Project Prioritization Process (continued)

Putting the scoring system into practice, **Table 8** lists the technical scores of projects in the FY 2013-2017 Transportation Improvement Program (TIP) which fell within a CMS corridor. The TIP is a four-year funding program with over $1.2 billion in transportation projects. The table also lists projects eligible for Congestion Mitigation and Air Quality (CMAQ) funding. Below is a breakdown of the congestion-based scoring criteria used in the adopted WILMAPCO prioritization process.

Prioritization Scoring Results for Congestion Based Criteria

Proximity to a Identified Corridor
2pts.—Project within a CMS corridor identified by the CMS Subcommittee
1pt.—Road segment with LOS E or F but outside of identified CMS corridors

Additional Bonus Criteria—Only Applies to Projects that meet the above criteria
Average Annual Daily Traffic (AADT) - If project is in the CMS, then calculate additional points:
4pts.—Greater than 60,000 AADT
3pts.—40,000–60,000 AADT
2pts—20,000-40,000 AADT
0pts.—Less than 20,000 AADT

Transit Usage - Transit Load Factor by segment based on the average number of riders vs. the number of available seats.
3pts.—Greater than 35% capacity
2pts.—25–35% capacity
1pt.—15–25% capacity
0pts.—Less than 15% capacity

Table 8: Top FY 2013-17 TIP Projects Based on CMS Criteria from the WILMAPCO Prioritization Process

PROJECT	Type	CMS Corridor	CMS AADT	CMS Transit	Total
I-295 Westbound: US 13 - I-95	Expressway	2	4	3	9
SR 1, Tybouts Corner to SR 273	Expressway	2	4	3	9
Rail: Newark to Wilmington Track Expansion	Transit	2	4	3	9
Wilmington Riverfront: Christina River Bridge	Collector	1	4	3	8
I-295 Improvements: Bridges	Expressway	2	3	3	8
SR 2: S. Union Street	Arterial	2	2	3	7
Transit Vehicle Replacement and Refurbishment, New Castle County	Transit	2	2	3	7
Rail Improvements: Fairplay Station Parking	Transit	2	2	3	7
Wilmington DART Bus Hub	Transit	2	2	2	6
US 40: US 40/SR 896 Grade Separated Intersection	Arterial	2	2	1	5
Road A /SR 7	Expressway	2	2	1	5
US 40: US 40/SR 72 Intersection, including Del Laws Rd.	Arterial	1	2	1	4
SR 2, Elkton Rd., Maryland State Line to Casho Mill Rd.	Arterial	2	2	0	4
Transit Vehicle Expansion, NCC	Transit	1	2	1	4
Rail: Newark Regional Transit Center (Newark Train Station)	Transit	1	2	1	4
City of New Castle: SR9/6th St/3rd St.	Arterial	1	0	2	3
Tyler McConnell Bridge, SR141: Montchanin Rd. to Alapocas Rd.	Bridge	1	2	0	3
Transit Vehicle Expansion: SR 141	Transit	1	2	0	3
US 301: MD Line - SR 1, and Spur	Expressway	1	1	0	2
SR 9: 3rd St. to Heald	Arterial	0	0	0	0
US 13, Philadelphia Pike, Claymont Renaissance Plan Implementation	Arterial	0	0	0	0
City of New Castle: SR 9/Delaware St./Harmony St.	Arterial	0	0	0	0
US 40: Eden Square Connector	Arterial	0	0	0	0
SR 9, River Rd. Area, Dobbinsville	Arterial	0	0	0	0
Garasches Lane	Collector	0	0	0	0
SR 72: SR 71 - McCoy Rd	Collector	0	0	0	0
Possum Park Rd. at Old Possum Park Rd.	Collector	0	0	0	0
I-95 & SR 141 Interchange	Expressway	0	0	0	0
Southern New Castle County Improvements: N412A: Hyetts Corner - Lorewood	Local	0	0	0	0
Southern New Castle County Improvements: Jamison Corner Rd. Relocated at Boyd's Corner	Local	0	0	0	0
Southern New Castle County Improvements: Lorewood Grove Rd.: N412A - SR 1	Local	0	0	0	0
Southern New Castle County Improvements: Cedar Lane Rd.: Marl Pit - Boyd's Corner	Local	0	0	0	0
Westown: Wiggins Mill Rd., Green Giant Rd. to St Annes Church Rd.	Local	0	0	0	0
Southern New Castle County Improvements: Boyd's Corner Rd.: Cedar Ln - US 13	Local	0	0	0	0
Aeronautics, New Castle County Airport Terminal Improvements	Other	0	0	0	0
Mid County DMV	Other	0	0	0	0
New Castle Industrial Track: s. of Christina River - Riverwalk	Bike/Ped	0	0	0	0
Bicycle, Pedestrian: Washington St., New Castle: Basin Rd. to SR 9	Bike/Ped	0	0	0	0
Grubb Road Pedestrian Improvements: Foulk Rd. to Naamans Rd.	Bike/Ped	0	0	0	0
C & D Canal Trail	Bike/Ped	0	0	0	0
Claymont Train Station	Transit	0	0	0	0
Transit Vehicle Expansion: Paratransit	Transit	0	0	0	0
Rideshare Program, statewide	Transit	0	0	0	0

SECTION #4: SYSTEM MONITORING

Mean Peak Travel Speed Changes

The third step in the development of the CMS, the task of monitoring the system, tracks the effectiveness CMS recommendations and allows us to see where new problems might arise. This section features a series of data analyses of demographic, traffic, and planning initiatives to help decision makers get a sense of how changing conditions impact our network.

In addition to the CMS, WILMAPCO produces a Regional Progress Report every two years. This document analyzes a series of quantifiable congestion measures that relate back to the Regional Transportation Plan (RTP), and are consistent with the CMS. It tracks measures such as AADT, the addition of infrastructure to help alleviate congestion (i.e., ITS), and transit LOS changes. It also tracks the funding of such projects in relation to other types of improvements. Progress Reports can be accessed here:

Figures 15 and **16** identify arterial roads with travel speeds that have changed significantly over the past seven years. As the maps illustrate, many segments of highway have seen either a 25 percent increase or decrease in travel speed. To minimize the effect of any possible data collection errors or isolated events (ex. accident, construction, etc.) average travel speeds from 2004 and 2005 were compared against 2010 and 2011.

Figure 15: AM Peak Travel Speed Changes 2004—2011*

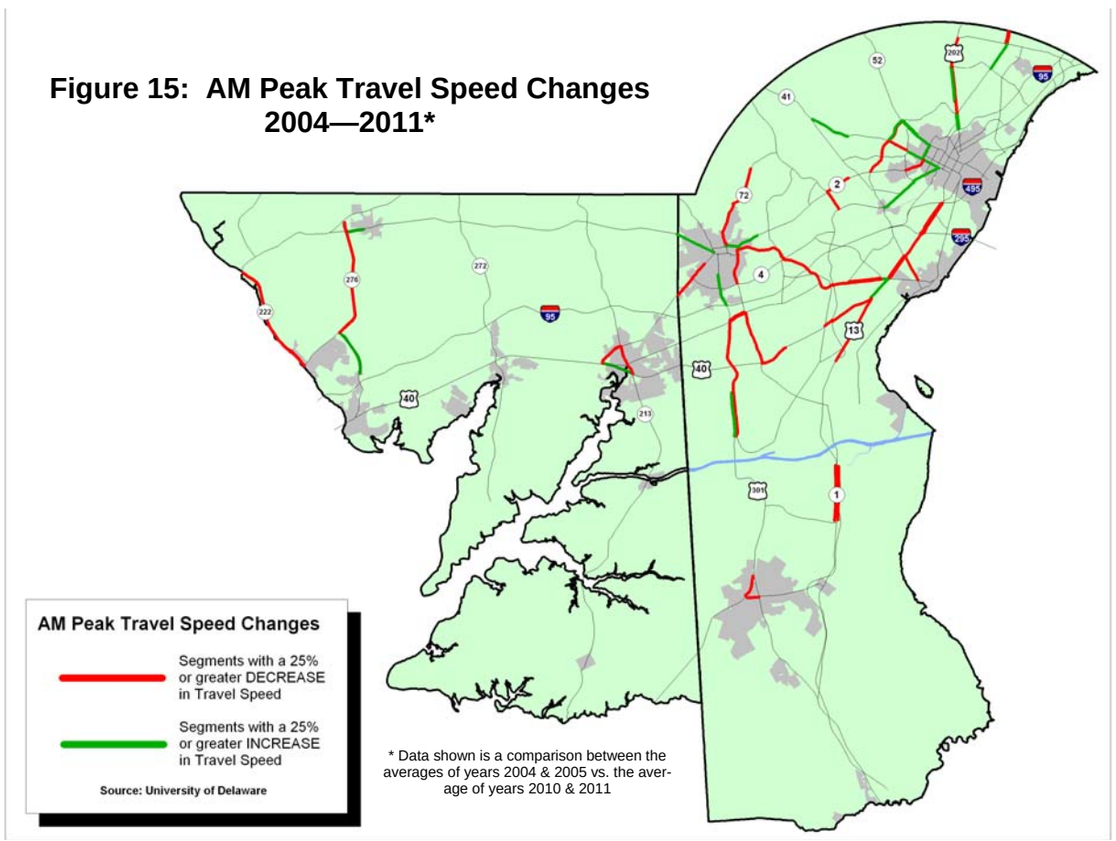
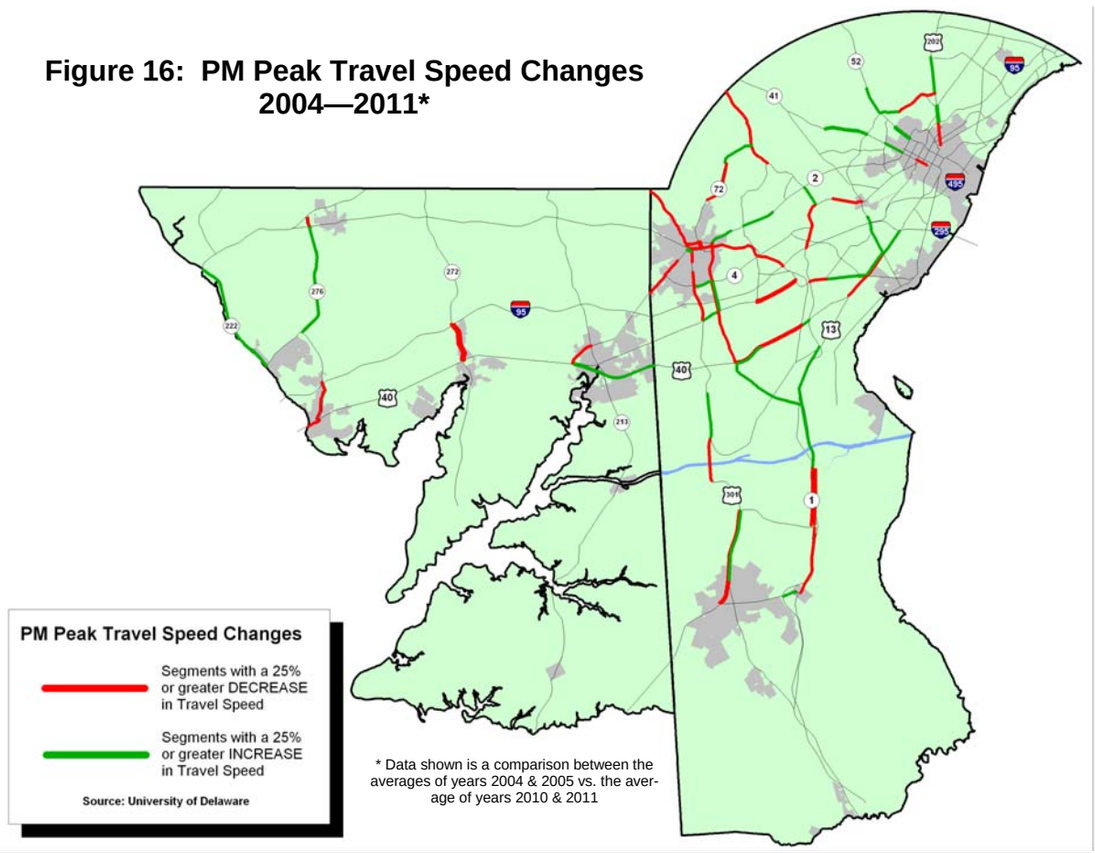


Figure 16: PM Peak Travel Speed Changes 2004—2011*



Intersection Crash Trends

With reliable historical crash data now available, WILMAPCO has the ability to begin tracking the crash trends in the region. **Figure 17** shows the average annual trends over the past 6 years and which locations have seen a significant increase or decrease in total crashes. In time, this data will be a useful tool in measuring the effectiveness of improvements meant to reduce vehicle crashes.

Table 9: Locations with Significant Changes in Crashes 2005-2010

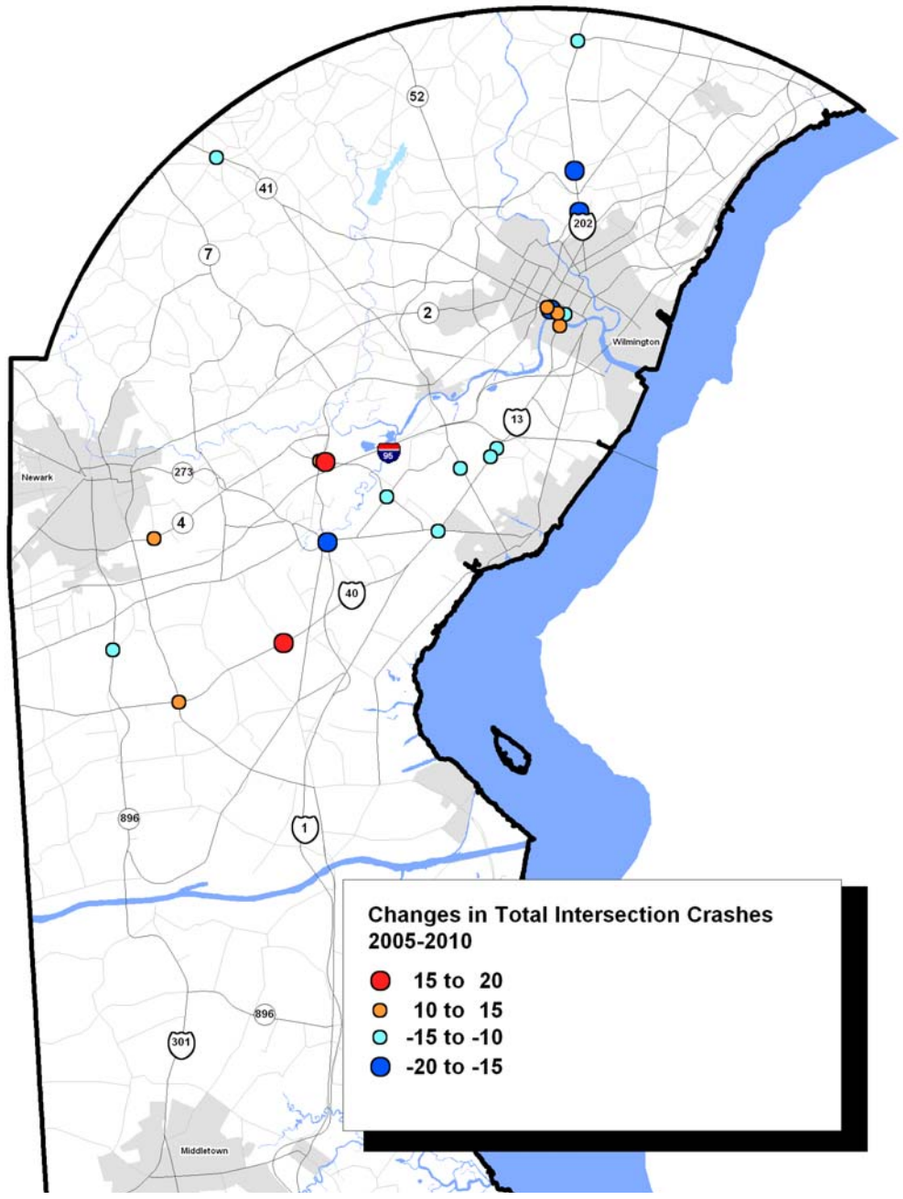
Sites with Largest Decreases

Location	Intersection	Average Annual Crashes 2005/2006	Average Annual Crashes 2009/2010	Total Change
6	SR 273 & SR1 NB off ramp	27	11	16
1	US 40 & Walther Rd	13	29	16
2	SR 58 & Geoffery Blvd	9	24	15
4	Market St & Front St	13	27	14

Sites with Largest Increases

Location	Intersection	Average Annual Crashes 2005/2006	Average Annual Crashes 2009/2010	Total Change
7	Walnut St & 2nd St	20	5	-15
9	US 202 & Murphy Rd/Powder Mill Rd	38	22	-16
8	US 202 & Augustine Cuttoff	25	7	-18
3	M.L.King Blvd & West St	23	4	-19

Figure 17: Changes in Total Crashes 2005—2010



Traffic Volume Changes

Figure 18 shows the locations of all Automatic Traffic Recorders in Cecil and New Castle Counties. **Table 10** shows the raw comparison of traffic volumes at these locations between 2000 and 2011, illustrating trends in traffic volumes. From these data it is apparent that Center and Core investment areas are, logically, home to the heaviest traffic volumes. Recent changes in volume vary, depending on location.

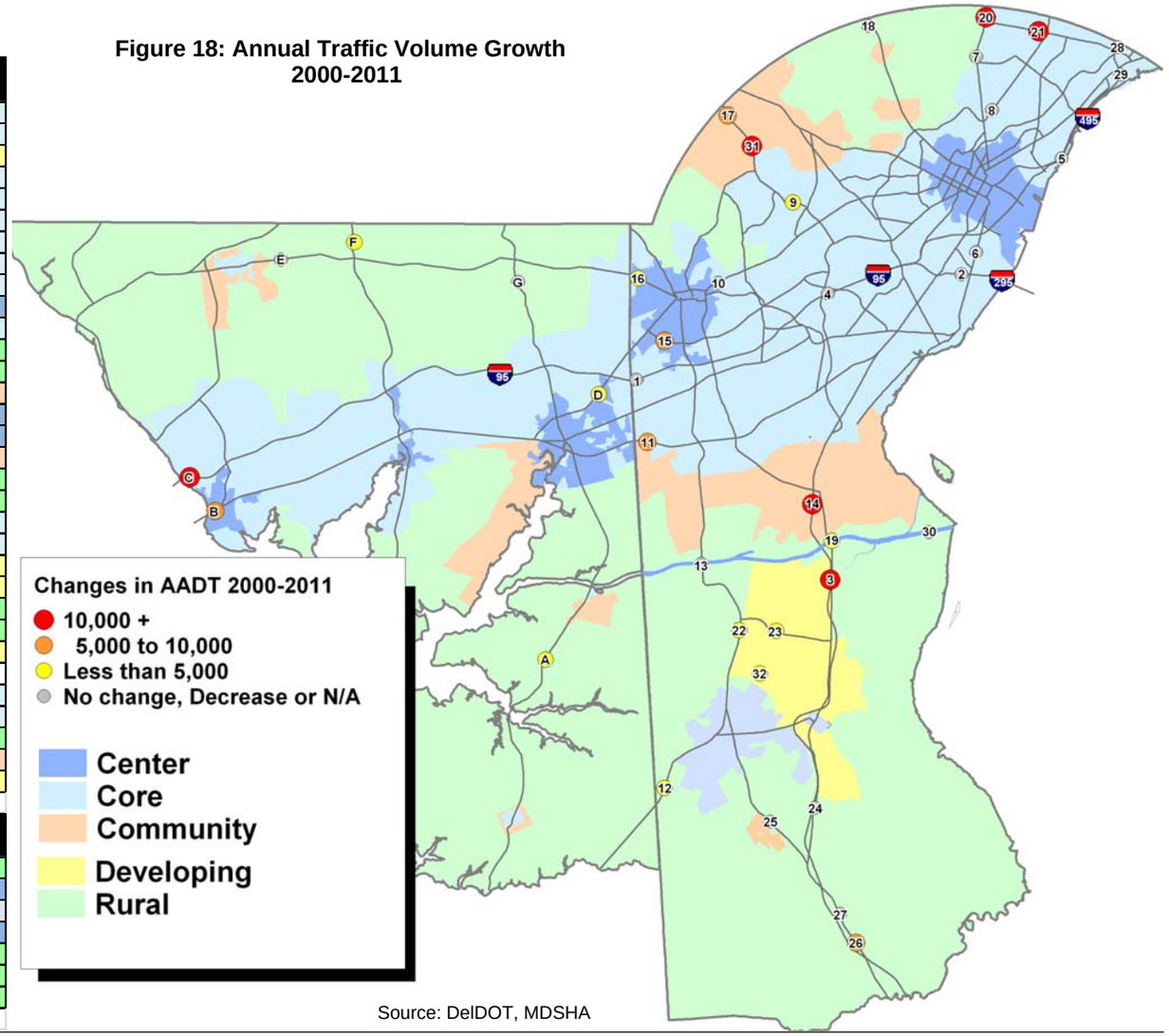
Table 10: Daily Traffic Volume Growth 2000-2011

Site	New Castle	Road Type	TIA	2000 AADT	2011 AADT	AADT Change 00-11	AADT % Change 2000-2011
1	I-95 @ Toll Plaza	Interstate	Core	72,399	69,715	-2,684	0
2	I-295, Del. Mem. Br.	Interstate	Core	100,485	91,896	-8,589	-8.5%
3	SR 1 at Biddles Corner Toll Plaz	Principal Arterial	Developing	0	48,337	48,337	N/A
4	I-95, east of SR 7	Interstate	Core	145,889	N/A	N/A	N/A
5	I-495, near Blvd Body Shop	Interstate	Core	61,169	73,574	12,405	20.3%
6	SR 9, North of I-295	Minor Arterial	Core	19,469	16,272	-3,197	-16.4%
7	US 202, near Widner College	Principal Arterial	Core	49,303	49,080	-223	-0.5%
8	SR 261, N. of Blue Ball	Principal Arterial	Core	15,288	12,461	-2,827	-18.5%
9	SR 7, North of Milltown Rd.	Principal Arterial	Core	36,350	36,902	552	1.5%
10	SR 2, East of Windy Hills	Principal Arterial	Center	34,303	28,567	-5,736	-16.7%
11	US 40 near MD Border	Principal Arterial	Core	25,876	28,768	2,892	11.2%
12	US 301, west of Middletown	Principal Arterial	Rural	13,601	15,470	1,869	13.7%
13	SR 896, Summit Bridge	Principal Arterial	Rural	26,902	21,601	-5,301	-19.7%
14	US 1 Bridge @ C& D Canal	Principal Arterial	Community	0	81,184	81,184	#DIV/0!
15	SR 4 at Chrysler Entrance	Principal Arterial	Center	20,881	24,985	4,104	19.7%
16	SR 273, near MD border	Minor Arterial	Center	8,700	8,760	60	0.7%
17	SR 7, near PA border	Principal Arterial	Community	12,637	15,729	3,092	24.5%
18	SR 52, near PA border	Principal Arterial	Rural	11,102	10,960	-142	-1.3%
19	US 13, St. Georges Bridge	Minor Arterial	Rural	6,889	9,266	2,377	34.5%
20	US 202 North of Naamans Rd.	Principal Arterial	Core	35,698	44,010	8,312	23.3%
21	SR 92, East of US 202	Principal Arterial	Core	17,683	28,720	11,037	62.4%
22	US 301 south of NC 15	Principal Arterial	Developing	20,730	21,208	478	2.3%
23	SR 896 East of Mt Pleasant Rd.	Principal Arterial	Developing	10,010	11,971	1,961	19.6%
24	US 13 North of Blackbird Rd.	Principal Arterial	Rural	42,273	13,332	-28,941	-68.5%
25	SR 71, North of US 13	Minor Arterial	Rural	7,575	6,476	-1,099	-14.5%
26	US 13, N. of Blackbird	Principal Arterial	Developing	17,799	22,291	4,492	25.2%
27	SR 1, N. of KC Border	Principal Arterial	Rural	52,356	42,577	-9,779	-18.7%
28	I-95, near Naamans Rd	Interstate	Core	39,742	39,193	-549	-1.4%
29	I-495, near Naamans Rd	Interstate	Core	61,169	48,337	-12,832	-21.0%
30	DE 9 @ Reedy Point Bridge	Minor Arterial	Rural	1,632	1,235	-397	-24.3%
31	SR 7 S. of Little Baltimore	Principal Arterial	Community	21,928	28,508	6,580	30.0%
32	NC 427 N. of NC429	Major Collector	Developing	2,485	4,297	1,812	72.9%

Site	Cecil	Road Type	TIA	2000	2011	AADT Change 00-11	AADT % Change 2000-2011
A	MD 213 North of Cayots Corner R	Minor Arterial	Rural	9,894	10,019	125	1.3%
B	US 40 @ Cecil/ Harford Line	Principal Arterial	Center	25,006	28,177	3,171	12.7%
C	I-95 @ Harford/Cecil Line	Interstate	Core	69,850	81,723	11,873	17.0%
D	MD 279 South of I-95*	Minor Arterial	Center	12,375	12,532	157	1.3%
E	MD 273 East of Rising Sun*	Minor Arterial	Rural	6,400	6,010	-390	-6.1%
F	MD 272 @ PA Line*	Minor Arterial	Rural	6,125	6,851	726	11.9%
G	MD 213 South of MD 273*	Minor Arterial	Rural	5,225	5,131	-94	-1.8%

* Not a permanent counter location

Figure 18: Annual Traffic Volume Growth 2000-2011



Source: DelDOT, MDSHA

Freight/Truck Volumes

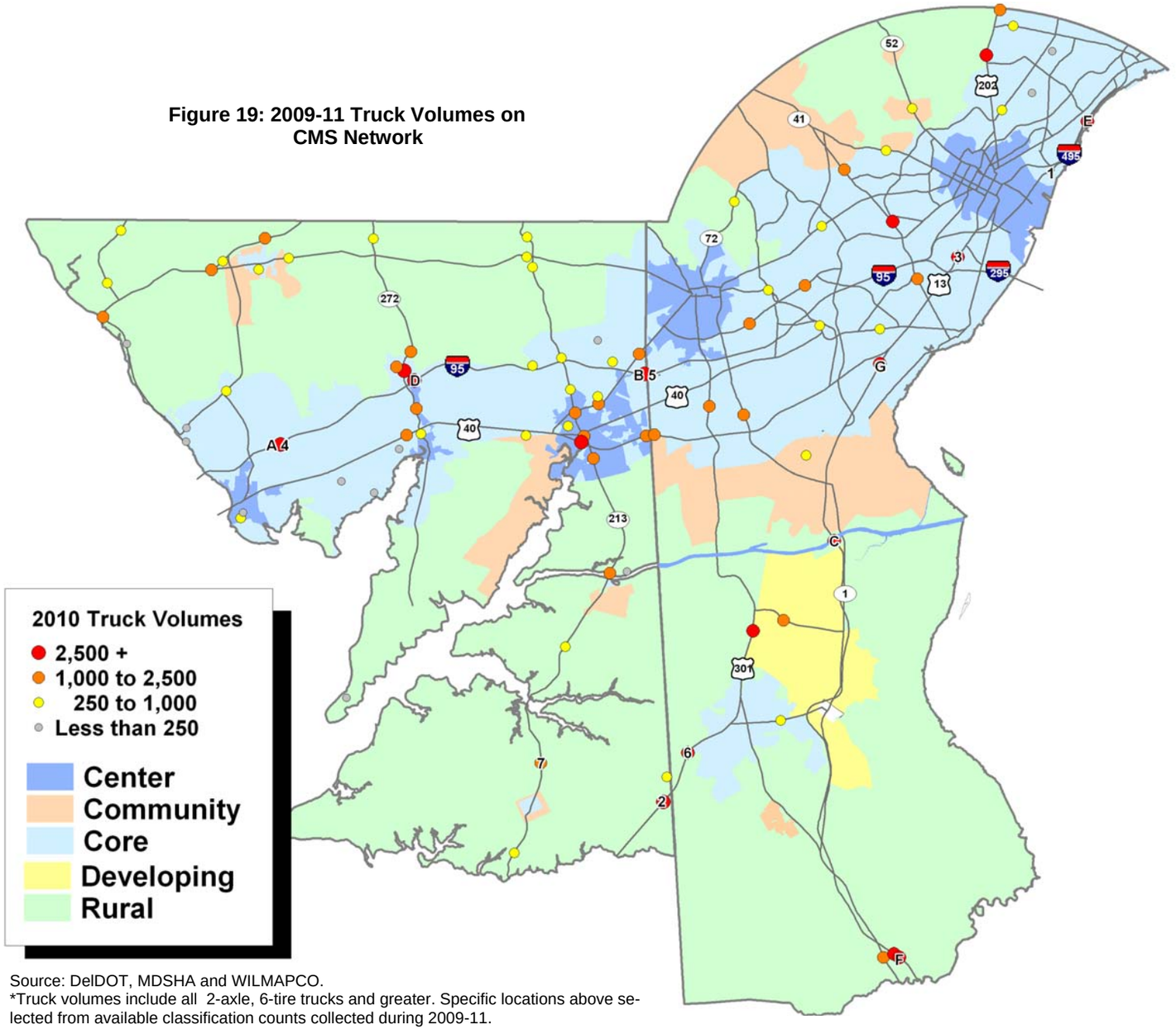
Freight activity is important to our economy and helps to maintain our current standard of living. However, trucks contribute to congestion and disrupt the flow of traffic. As **Figure 19** indicates, Interstates currently carry the bulk of the truck movements, along with SR 1, SR 896, US 13 and US 301. There are also several other arterials that carry a notable volume of trucks. **Table 11** lists volumes at key locations around our region in 2009-11.

Table 11: 2009-11 Truck AADT and Percentages at Selected Locations*

Map #	Location	Daily Truck Volume
A	I-95 near Perryville	17,936
B	I-95 at MD/DE State Line	17,420
C	SR1 at the C&D Canal	8,209
D	I-95 near MD272	8,137
E	I-495 near Boulevard Body Shop	6,217
F	SR 1 at Paddock Rd. Smyrna	4,033
G	US 13 South of 13/40 Split	3,641

Map #	Location	Daily Truck Volume	Truck %
1	Hay Rd. East of I-495	119	29%
2	US 301 at MD/DE State Line	2,670	25%
3	Terminal Ave. West of I-495	482	21%
4	I-95 near Perryville	17,936	22%
5	I-95 at MD/DE State Line	17,420	21%
6	US 301 West of Middletown	2,876	20%
7	SR213 N. of Cecilton Warwick Rd.	1,066	20%

Figure 19: 2009-11 Truck Volumes on CMS Network



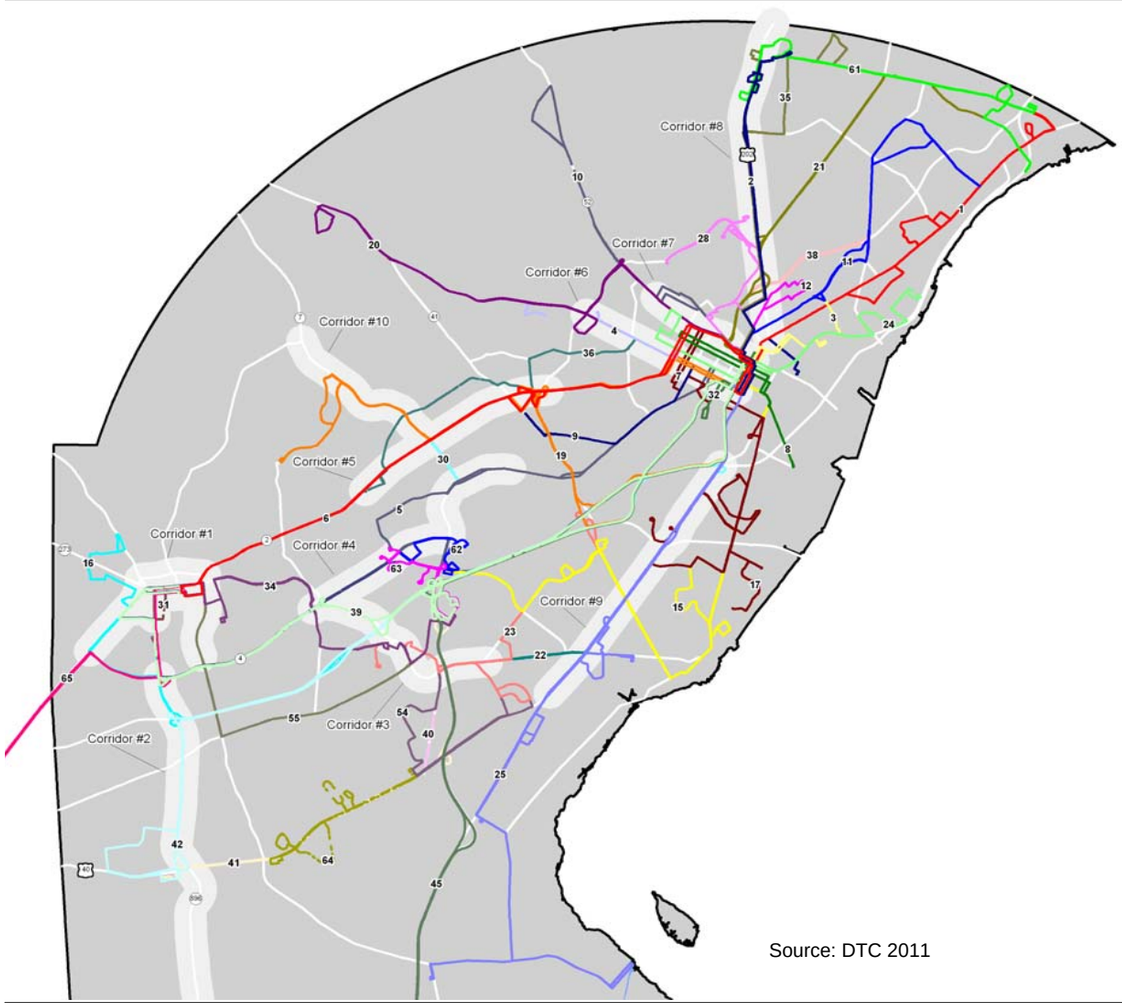
Source: DelDOT, MDSHA and WILMAPCO.
*Truck volumes include all 2-axle, 6-tire trucks and greater. Specific locations above selected from available classification counts collected during 2009-11.

SECTION #5: CONGESTION MITIGATION ACTIVITIES

Transit Ridership

Below is an inventory and brief analysis of the ridership trends of all fixed transit routes in New Castle County. **Figure 20** shows the locations of the routes and **Table 12** gives a route-by route breakdown of annual ridership changes since 2001 and the 2010 load factor for each. Overall, ridership has increased by 12% since 2001. Routes showing the greatest ridership growth were routes 5 (Maryland Ave), route 55 (Old Baltimore Pike), Route 301 (Inter-County Service), and route 6 (Kirkwood Highway). Routes with the heaviest declines were the Route 11 (Washington Street/Marsh Road), the Route 8 (8th and 9th Streets) and the Route 10 (Delaware Avenue/Kennett Pike).

Figure 20: DTC Fixed Bus Routes



Source: DTC 2011

Table 12: Transit Ridership Analysis 2001-2010

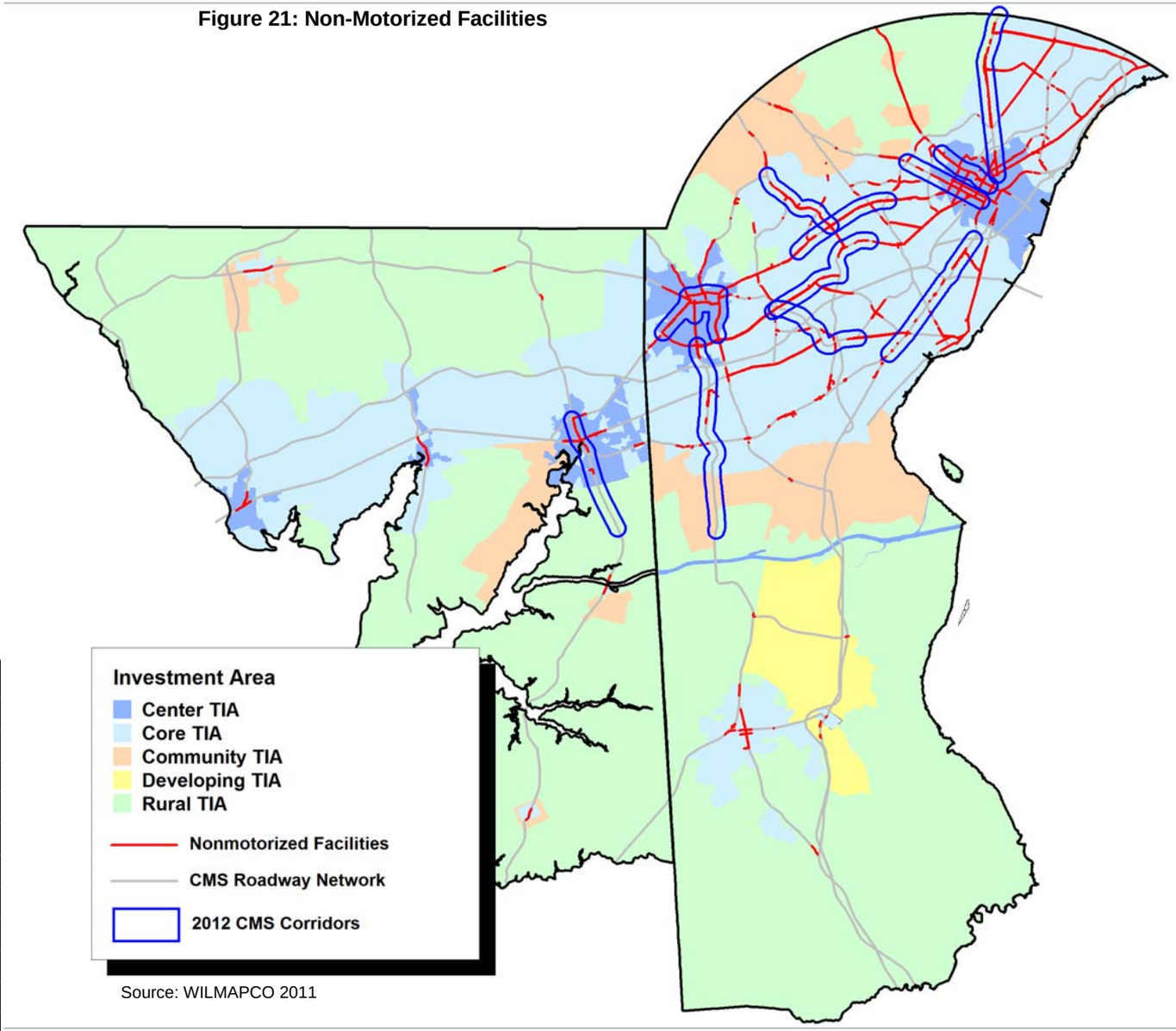
2001 - 2010 Ridership Analysis							October 2010 Ridership Data			
Route	Name	FY 2001	FY 2010	FY 01-10 Change	FY 01-10 % Change	CMS Corridor Impacted	Total Monthly Trips	Bus Capacity	Monthly Seating Capacity	Load Factor
1	Philadephia Pike	734,447	791,758	57,311	8%	6,7 & 8	2,590	40	103,600	72%
2	Concord Pike	293,897	306,015	12,118	4%	6,7 & 8	1,150	40	46,000	69%
3	26th Street/Lea Boulevard	146,512	171,831	25,319	17%	6,7 & 8	1,108	40	44,320	44%
4	W. 4th St./ Lancaster Ave	566,139	586,454	20,315	4%	6 & 7	2,783	40	111,320	49%
5	Maryland Ave	527,160	613,080	85,920	16%	4, 6 &7	2,258	40	90,320	59%
6	Kirkwood Highway	651,520	744,848	93,328	14%	1, 5, 6, 7 & 10	2,158	40	86,320	80%
7	DuPont/Clayton St/Riverfront	0	26,092	26,092	N/A	6 & 7	414	40	16,560	14%
8	8th St. and 9th St.	215,457	130,545	(84,912)	-39%	7	1,612	40	64,480	23%
9	Boxwood Rd/Broom St/Vandever Ave	243,926	263,061	19,135	8%	5, 6, 7 & 8	1,222	40	48,880	52%
10	Delaware Ave/Kennett Pike	190,390	137,259	(53,131)	-28%	6 & 7	1,344	40	53,760	25%
11	Washington St./Marsh Rd.	333,244	253,472	(79,772)	-24%	6,7 & 8	1,783	40	71,320	34%
12	Baynard Boulevard	234,439	187,675	(46,764)	-20%	6,7 & 8	1,806	40	72,240	25%
15	New Castle Ave	428,968	489,335	60,367	14%	6,7 & 9	1,698	40	67,920	72%
16	Newark Express	63,867	40,704	(23,163)	-36%	1, 2, 3, 6, 7 & 9	299	40	11,960	44%
17	Dunleith/Holloway Terr/ Health & S.S. Campus	156,740	165,270	8,530	5%	6,7 & 9	1,164	40	46,560	32%
19	Pike Creek Valley (wkday)	142,672	128,957	(13,715)	-10%	5, 6, 7, 9 &10	782	40	31,280	44%
20	Lancaster Pike	80,236	75,075	(5,161)	-6%	6 & 7	644	40	25,760	30%
21	Foulk Road	106,720	114,879	8,159	8%	6,7 & 8	874	40	34,960	30%
22	Wilton/DuPont Highway	303,679	324,503	20,824	7%	3, 6, 7 & 9	1,153	40	46,120	67%
23	University Plaza/Corporate Commons	98,318	110,254	11,936	12%	3, 6,7 & 9	807	40	32,280	25%
24	Governor Printz Boulevard	389,242	468,578	79,336	20%	6 & 7	1,911	40	76,440	60%
25	Delaware City/DuPont Hwy	196,045	243,589	47,544	24%	6,7 & 9	1,237	40	49,480	51%
27	New Castle Industrial Parks/Christiana Mall	0	0	0	N/A	N/A	276	40	11,040	4%
28	A.I. DuPont Hospital/Nemours Clinic	60,110	68,545	8,435	14%	6,7 & 8	646	40	25,840	23%
30	Limeston Rd/Stanton	8,272	13,927	5,655	68%	4, 5, 6, 7, 9 &10	184	40	7,360	23%
31	Newark Trolley	2,763	9,746	6,983	253%	1	713	26	18,538	6%
32	Wilmington Trolley	100,335	98,817	(1,518)	-2%	6 & 7	2,078	26	54,028	19%
33	Christiana Mall - Newark	410,232	406,970	(3,262)	-1%	1, 3, 4, 6, 7 & 9	1,643	40	65,720	60%
34	Marrows Rd/Christiana Mall	31,176	77,572	46,396	149%	1, 3, 4, 6, 7 & 9	368	40	14,720	84%
35	Concord Pike/Shipley Road	118,523	140,468	21,945	19%	6,7 & 8	598	40	23,920	55%
36	Milltown Rd./Faulkland Rd.	88,764	80,502	(8,262)	-9%	5, 6, 7, & 10	667	40	26,680	31%
38	Arden Express	N/A	6,081	N/A	N/A	6,7 & 8	46	40	1,840	44%
39	Chestnut Hill Rd Express	N/A	45,247	N/A	N/A	1, 2, 3, 4, 6, 7 & 9	230	40	9,200	41%
40	Glasgow/US Highway 40	199,074	226,313	27,239	14%	2, 3, 6, 7 & 9	982	40	39,280	59%
41	US Highway 40 Express	18,155	88,161	70,006	386%	2, 3, 6, 7 & 9	230	40	9,200	53%
42	Glasgow Express	13,716	37,355	23,639	172%	2, 3, 6, 7 & 9	276	40	11,040	44%
45	Wilmington-Odessa P & R	N/A	25,878	N/A	N/A	3, 6, 7 & 9	138			
54	Christinana Mall/Wilton	38,072	114,387	76,315	200%	3, 6,7 & 9	927	40	37,080	29%
55	Wilminton/Old Baltimore Pike	4,488	126,943	122,455	2729%	1, 2, 3, 6, 7 & 9	936	40	37,440	35%
43	Middletown - Odessa	0	16,542	16,542	N/A	N/A	1,173	26	30,498	10%
61	Namaans Rd.	0	25,923	25,923	N/A	8	506	26	13,156	23%
62	Churchmans Shuttle East	18,984	10,688	(8,296)	-44%	4	575	26	14,950	5%
63	Churchmans Shuttle West	21,984	6,323	(15,661)	-71%	4	575	26	14,950	4%
64	US Highway 40 Feeder	3,853	26,372	22,519	584%	N/A	598	26	15,548	13%
65	Newark/Elkton	3,923	9,015	5,092	130%	1	276	26	7,176	23%
301	Wilminton/Dover Intercounty	88,029	172,610	84,581	96%		736	47	34,592	56%
		7,334,072	8,207,619	796,341	12%					

Non-Motorized Facilities

Figure 21 is an inventory of sidewalks, crosswalks, footpaths and dedicated bike lanes along the CMS network. Its inclusion into the CMS is important as it gives us insight into the location of these facilities and if they have been maximized as a method of congestion mitigation. Using these data, we can determine which corridors are lacking these facilities, making them targets for new projects.

This dataset gives a concise view of where existing facilities are located along all roads associated with the CMS network. Several corridors have very good coverage, such as Corridors #1 and 7, which are over 90% complete. Other like corridors #2, #3 and #10 are below 20%

Figure 21: Non-Motorized Facilities



Source: WILMAPCO 2011

Table 13: Completeness of Non-motorized facilities

Corridor	Total Length (mi)	Non-Motor Length (mi)	% Complete
1	12.3	11.87	97%
2	14.4	2.16	15%
3	7.84	1.52	19%
4	10.2	5.2	51%
5	7.9	6.27	79%
6	6.18	4.04	65%
7	4.4	4.01	91%
8	12.28	6.86	56%
9	6.42	4.82	75%
10	10.7	2.06	19%
11	9.5	2.22	23%

Intelligent Transportation Systems (ITS)

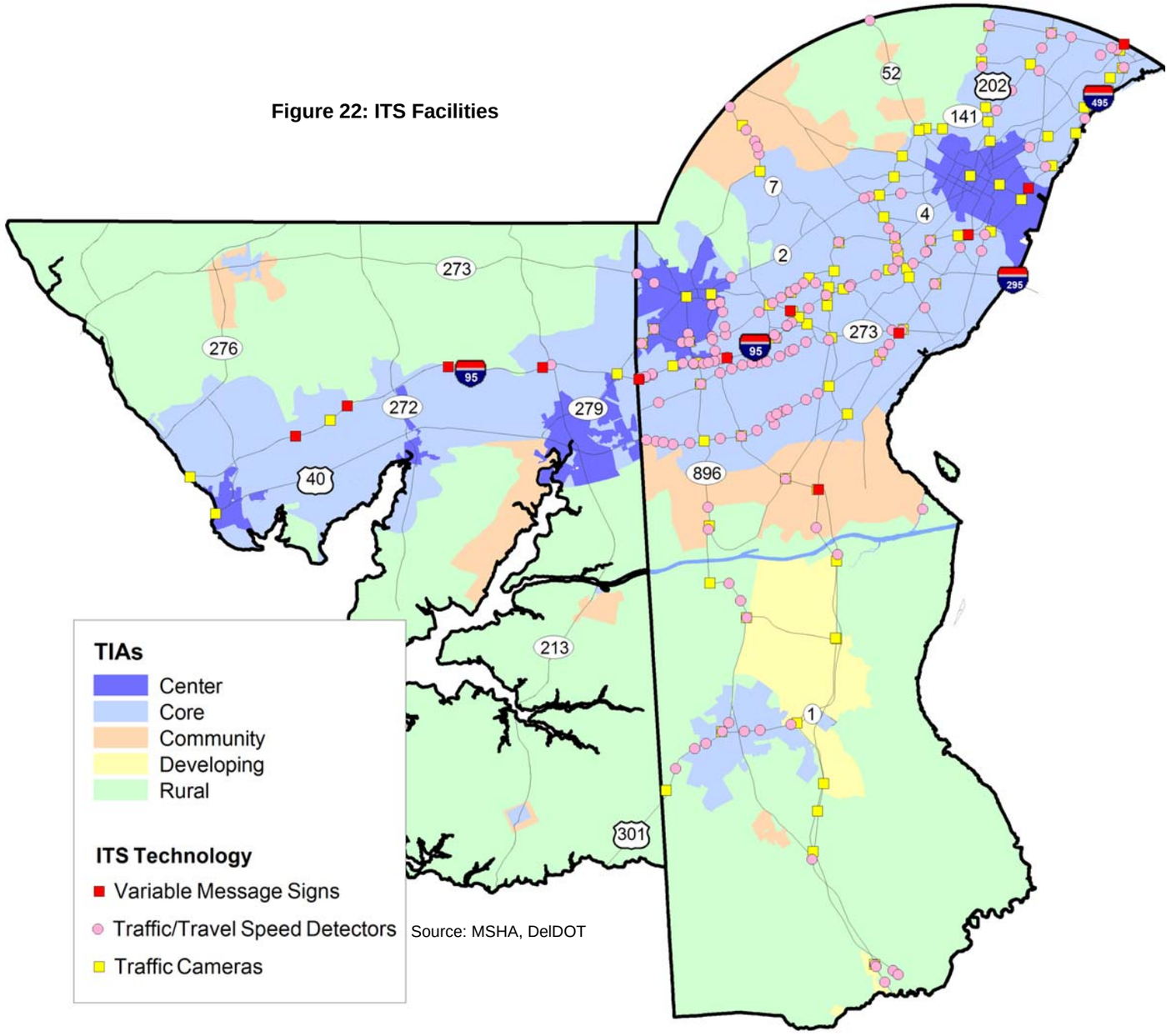
Looking closely at the congestion mitigation toolbox, ITS plays a vital role in the solution for traffic congestion. Many of the ITS strategies deal with the *management* of traffic capacity, not ways to increase it. As a result, most corridors have these strategies checked off as solutions to congestion. The value of ITS technology is in the fact that it can improve a roadway's performance without costly roadway expansion. It also has several methods to deal with non-recurring congestion. On average, every minute saved in response time to an incident saves up to five minutes in traffic delay.

Figure 22 shows the inventory of the major components of ITS in the WILMAPCO region over the past several years. **Table 14** below reflects changes since the 2004 CMS Summary was produced.

Table 14: ITS Infrastructure 2003-2011

	2003	2005	2011
New Castle County			
Variable Message Signs	8	9	8
Live Traffic Cameras	50	54	80
Real Time Traffic/Travel Speed Detectors	N/A	N/A	310
Cecil County			
Variable Message Signs	4	4	4
Live Traffic Cameras	N/A	N/A	4

Figure 22: ITS Facilities



MTag/ EZ Pass Usage

E-ZPass technology helps alleviate congestion along our region's tolled highways. E-ZPass lanes have the ability to process between 1,200-1,800 cars per hour for each lane, depending on whether they are a traditional or high speed facility. As indicated in the graph, E-ZPass use has steadily increased since 2004. It is most popular amongst those traveling along Delaware's SR 1.

Figure 23: EZ Pass/ MTag Percent Usage

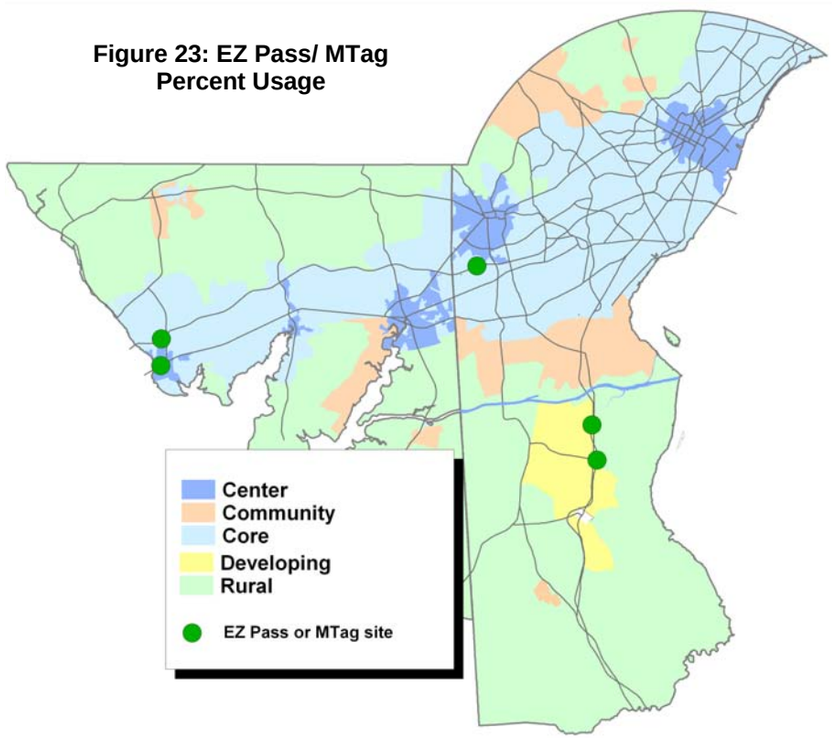
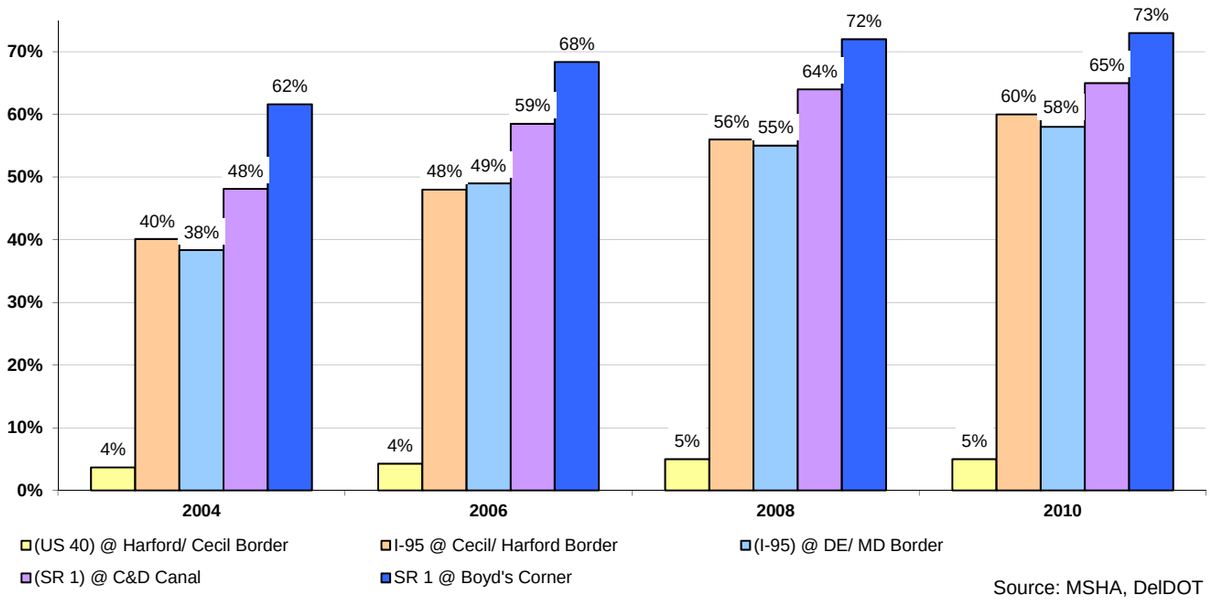


Figure 23: EZ Pass/ MTag Percent Usage 2004-2010



Source: MSHA, DelDOT

Table 15: EZ Pass/MTag Usage 2000-2010

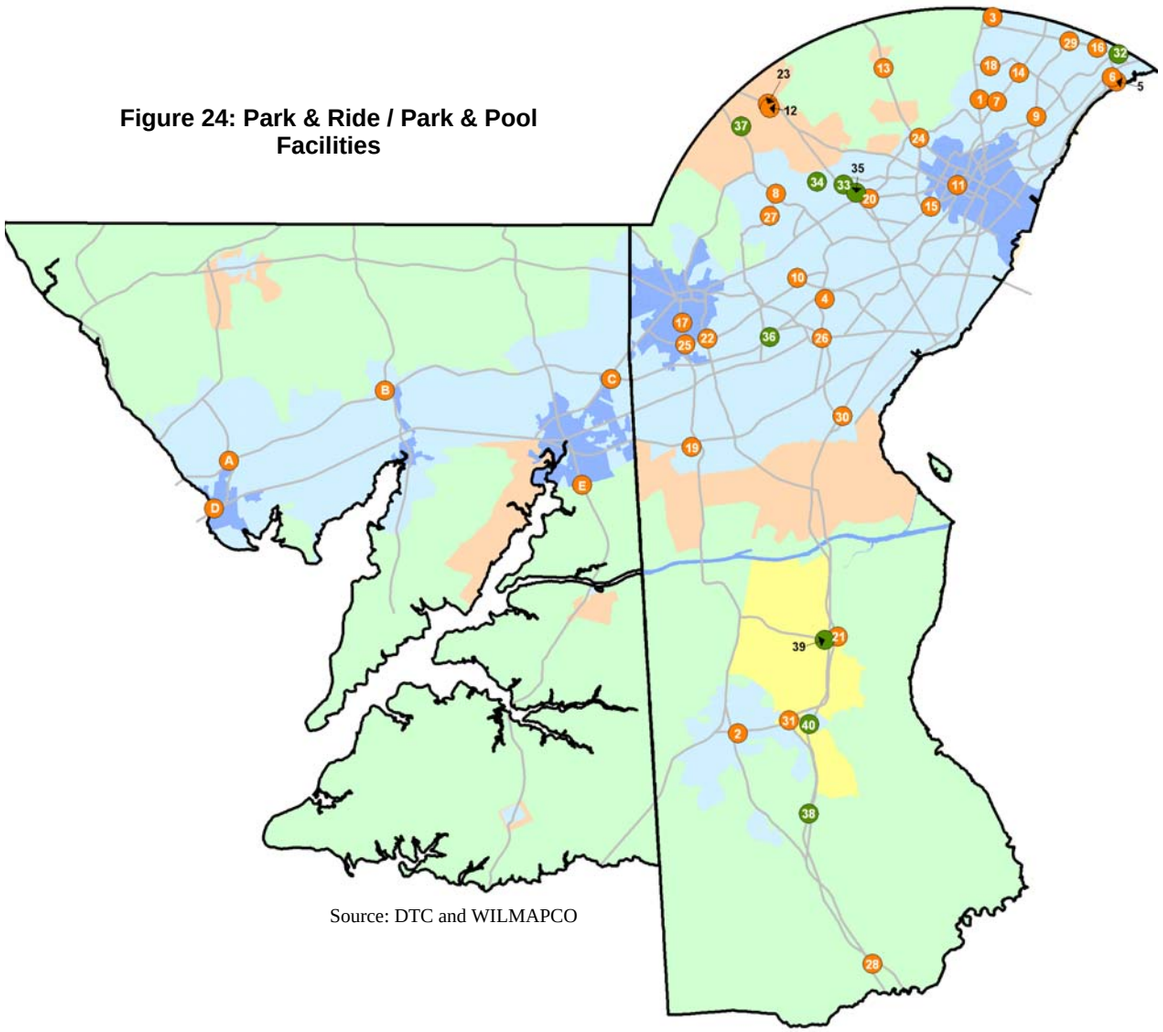
(US 40) @ Harford/ Cecil Border	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total vehicle transactions			5,010,878	5,228,100	5,531,071	5,529,465	5,601,839	5,562,114	5,556,973	5,036,466	4,988,036
Number EZ Pass Transactions			145,917	209,639	202,382	205,169	238,184	262,740	299,510	220,720	236,613
Pct of EZ Pass use			2.9%	4.0%	3.7%	3.7%	4.3%	4.7%	5.4%	4.4%	4.7%
I-95 @ Cecil/ Harford Border											
Total vehicle transactions			14,949,210	14,828,990	14,986,637	14,801,147	14,773,775	14,842,639	14,657,347	14,768,993	14,850,698
Number EZ Pass Transactions			4,567,752	5,352,631	6,008,840	6,418,386	7,128,841	7,888,469	8,173,837	8,572,725	8,901,546
Pct of EZ Pass use			30.6%	36.1%	40.1%	43.4%	48.3%	53.1%	55.8%	58.0%	59.9%
(I-95) @ DE/ MD Border											
Total vehicle transactions	26,138,474	26,724,378	27,633,113	N/A	28,552,993	28,410,738	27,526,665	27,110,032	26,409,640	25,811,851	25,542,005
Number EZ Pass Transactions	3,235,464	5,340,630	7,326,045	N/A	10,945,631	12,478,121	13,484,293	14,073,109	14,421,810	14,558,212	14,809,381
Pct of EZ Pass use	12.4%	20.0%	26.5%	N/A	38.3%	43.9%	49.0%	51.9%	54.6%	56.4%	58.0%
(SR 1) @ C&D Canal											
Total vehicle transactions	5,938,886	11,076,013	12,657,004	N/A	14,475,021	15,706,927	16,588,612	17,685,997	16,801,975	16,319,658	17,009,550
Number EZ Pass Transactions	1,384,332	3,557,060	5,041,189	N/A	6,961,653	8,596,449	9,705,886	10,827,054	10,670,044	10,542,608	11,023,800
Pct of EZ Pass use	23.3%	32.1%	39.8%	N/A	48.1%	54.7%	58.5%	61.2%	63.5%	64.6%	64.8%
SR 1 @ Boyd's Corner											
Total vehicle transactions	297,181	651,638	791,954	N/A	1,483,531	1,917,263	2,025,950	2,017,020	1,996,344	1,842,604	1,837,506
Number EZ Pass Transactions	64,822	177,705	272,123	N/A	913,933	1,230,059	1,385,333	1,457,701	1,445,724	1,332,976	1,347,065
Pct of EZ Pass use	21.8%	27.3%	34.4%	N/A	61.6%	64.2%	68.4%	72.3%	72.4%	72.3%	73.3%

Source: MSHA, DelDOT

Park & Ride / Park & Pool Lot Inventory

Figure 25 shows an inventory of all designated Park & Ride/Park & Pool facilities in the region and their location relative to the Transportation Investment Areas (TIAs). Park & Rides are defined as locations where drivers can access transit or meet for a carpool or vanpool. Park and Pools are lots that are not currently served by transit, but are available for car/vanpools. Included in **Table 16** is a breakdown of spaces available and the average percent of capacity utilized since 2006. Over the period, 447 new park and ride spaces and three new locations have been added to the region. New Park & Ride locations have added 336 spaces while 111 additional spaces have been added due to expansion of existing locations. In order to get a more comprehensive usage analysis for the park and ride facilities, WILMAPCO began a work task in FY 2006 to collect annual usage data for New Castle County locations.

Figure 24: Park & Ride / Park & Pool Facilities



Source: DTC and WILMAPCO

Table 16: Park & Ride / Park & Pool Facilities 2006-2011

		Location	2006			2011			Actual Change	Percent Change
		New Castle County	Spaces	Usage	Capacity	Spaces	Usage	Capacity	2006-2011	2006-2011
Park and Ride	1	Aldersgate Church, 2313 Concord Pike	75	22	29%	75	13	17%	-9	-41%
	2	Bethesda United Methodist, Middletown	20	19	95%	20	16	80%	-3	-16%
	3	Brandywine Town Center	500	28	6%	500	2	0%	-26	-93%
	4	Christiana Mall, Newark, DE	200	194	97%	200	200	100%	6	3%
	5	Claymont Train Station	501	423	84%	577	479	83%	56	13%
	7	Concord Presbyterian, 1800 Fairfax Boulevard	20	32	160%	20	44	220%	12	38%
	8	Faith Baptist, 4210 Limestone Road	50	49	98%	50	35	70%	-14	-29%
	9	Faith Presbyterian, 700 Marsh Road	35	28	80%	35	18	51%	-10	-36%
	10	Fairplay Station	138	198	143%	248	188	76%	-10	-5%
	11	Fourth and Jackson Streets	50	N/A	N/A	50	N/A	N/A	N/A	N/A
	12	Hockessin Memorial Hall, Rte 41 and Yorklyn Rd	20	8	40%	20	18	90%	10	125%
	13	Lower Brandywine Presbyterian, Old Kennett Rd	20	1	5%	20	1	5%	0	0%
	14	Lutheran Church of the Good Sheperd, Foulk Rd	35	11	31%	35	13	37%	2	18%
	15	Maryland Ave and Germay Dr/Germay Industrial Park	50	22	44%	50	1	2%	-21	-95%
	16	Naamans and Carpenter Roads	18	0	0%	18	1	6%	1	N/A
	17	Newark Train Station	285	263	92%	285	234	82%	-29	-11%
	18	North Baptist, 3318 Silverside Road	10	1	10%	10	1	10%	0	0%
	19	Peoples Plaza, Rt 896 & 40	50	22	44%	50	49	98%	27	123%
	20	Prices Corner/ Centerville Road	158	59	37%	158	37	23%	-22	-37%
	21	DE 1 and Pole Bridge Rd. (New Boyd's Corner)	116	30	26%	116	57	49%	27	90%
	22	Route 72 and Chestnut Hill Rd. Scottfield	20	0	0%	20	2	10%	2	NA
	23	Route 41/First Union Bank, Hockessin	40	36	90%	40	18	45%	-18	-50%
	24	Route 52 and Route 100	57	16	28%	57	30	53%	14	88%
	25	Route 896 and Route 4, Newark	180	91	51%	180	125	69%	34	37%
	26	Routes 7 and 273	165	60	36%	165	51	31%	-9	-15%
	27	Skyline United Methodist, Newark	40	6	15%	40	3	8%	-3	-50%
	28	Smyrna Rest Stop US 13 & SR 1	20	43	215%	70	67	96%	24	56%
	29	Trinity Presbyterian, 112 Darley Road & Naamans	20	2	10%	20	5	25%	3	150%
	30	Tybouts Corner, Route 13 and Hamburg Road	96	35	36%	96	29	30%	-6	-17%
	31	Odessa Park and Ride (DE 1and DE 299)	194	78	40%	194	100	52%	22	28%
	41	US 13/DTC Mid-County	N/A	N/A	N/A	47	18	38%	N/A	N/A
	42	Frawley Stadium	N/A	N/A	N/A	570	167	29%	N/A	N/A
Park and Pool	32	I-95 and Naaman's Road - Tri State Mall	105	4	4%	105	0	0%	-4	-100%
	33	Brandywine Springs Park**	100	7	7%	100	1	1%	-6	-86%
	34	Delcastle Recreation Center*, **	500	10	2%	500	7	1%	-3	-30%
	35	Greenbank Park, Route 41, Wilmington*	150	2	1%	150	12	8%	10	500%
	36	I-95 Service Plaza, Newark**	104	39	38%	104	87	84%	48	123%
	37	Lantana Square, SR 7 and Valley Road**	20	3	15%	20	0	0%	-3	-100%
	38	Pine Tree Corner, Route 13, Townsend**	43	22	51%	43	14	33%	-8	-36%
	39	Route 13 and Route 896, Odessa (Old Boyd's	30	14	47%	N/A	N/A	N/A	N/A	N/A
	40	Route 13 and Wallace Road, Odessa(South	20	0	0%	20	0	0%	0	N/A
		Subtotal New Castle County	**4,255**	**1,878**	**44%**	**5,078**	**2,143**	**42%**		

* Claymont Train Station Overflow parking values have been collapsed into the Claymont Train Station category

		Location	2006			2011			Actual Change	Percent Change
		Cecil County	Spaces	Usage	Capacity	Spaces	Usage	Capacity	2006-2011	2006-2011
Park and Ride	A	I-95 @ MD 222	40	32	79%	70	31	44%	-1	-3%
	B	I-95 @ MD 272	17	6	32%	17	12	71%	6	100%
	C	I-95 @ MD 279	25	4	16%	25	5	18%	1	25%
	D	MD 213 @ Frenchtown Road	18	1	3%	18	3	14%	2	200%
	E	Perryville Train Station (TO BE ADDED)	175	175	100%	175	175	100%	0	0%
		Subtotal Cecil County	**275**	**218**	**79%**	**305**	**226**	**74%**		

Future Actions/Next Steps

The CMS is a document which is constantly being improved as better data becomes available. Over the years, a pair of recommendations have been made by members of the CMS subcommittee for inclusion in the document.

- **Incorporate Cecil County Crash data into the system performance.** Data will now be available from 2011 to begin using in a similar fashion that occurs in New Castle County

- **Work with state DOTs to better coordinate data needed to conduct better analysis of completed congestion mitigation projects.** Examine the effects (positive or negative) it had. Using travel time, volume/capacity, crash statistics and other data sources, begin to more accurately measure true benefits of transportation improvements. For example, as part of the CMP, a document should be created to review recently competed projects to gauge which ones have had a greater impact on reducing congestion.

- **Continued expansion of capacity-based and delay based LOS analysis.** Continue efforts to analyze all intersection turning movement counts with both LOS methods to allow for continued coordination with DelDOT TMC in determining operational/capital options for deficient intersections.

- **Incorporate archived TMC data into arterial performance measurement.** Using the detector data collected by the numerous sites, better peak period traffic volumes can be obtained. This data can be used to begin to better understand the peak period traffic volumes along the CMS network.

Other UPWP Data Collection Activities

Each year, the Unified Planning Work Program (UPWP) outlines numerous types of data for use in the CMS document. The following items below are being addressed in the FY 2010 UPWP that will have direct benefits to the development of the CMS.

- **Travel Time Data Collection:** Runs will continue in New Castle County (funded through DelDOT) and in Cecil County. The travel time runs will collect travel speed and delay data on major roadways in our region and will serve as a primary input into the WILMAPCO Congestion Management System (CMS).

- **Park & Ride/Park & Pool Usage Statistics:** As part of our partnership with the University of Delaware, all park & ride/pool locations in the New Castle will be counted four times annually (January, March, July and October) to determine the average daily usage of these facilities.

- **Intersection turning movement counts:** This task will include turning movement counts (vehicle volumes at identified intersections during peak morning and evening periods to ascertain overall intersection level of service ratings) and other traffic data collection, as needs are identified. The data collected will serve as input into the WILMAPCO Congestion Management System (CMS) and other analyses. For a detailed list of intersection to be counted and methodology used in FY 2009, see Appendix B.

- **Freeway Interchange ramp counts.** Data collection on all Interstate 95 ramps for use in the Freeway Operations Analysis, a stand-alone operations assessment of the Freeway/Interstate system.

This page has been intentionally left blank

Appendix

Appendix A: Glossary

Appendix B: Intersection Database

Appendix C: Intersection Operational Analysis and Improvement Options Analysis for Priority Intersections—New Castle County

Appendix D: Traffic Responsive Signalization (TRS) Priorities

Appendix E Regional Crash Analysis

Appendix F: WILMAPCO CMS Resolution

Appendix A: Glossary

AADT or Annual Average Daily Traffic – The estimate of typical daily traffic on a road segment for all days of the week, Sunday through Saturday, over the period of one year.

Access – The facilities and services that make it possible to get to any destination, measured by the availability of physical connections (roads, sidewalks, etc.), travel options, ease of movement, and nearness of destinations.

CMS or Congestion Management System - A process for evaluating the level of congestion on the region's transportation system, and for identifying strategies which will reduce this congestion.

Conformity – An assessment of the compliance of any transportation plan, program, or project with air quality improvement plans. The conformity process is defined by the Clean Air Act.

CTP or Capital Transportation Program - The program devised by the state of Delaware to determine and prioritize transportation capital investments. These needs and cost estimates are updated annually in the program. This process is coordinated with WILMAPCO in the development of its TIP, or Transportation Improvement Program.

CTP or Consolidated Transportation Program – The program devised by the state of Maryland to determine and prioritize transportation capital investments. These needs and cost estimates are updated annually in the program. This process is coordinated with WILMAPCO in the development of its TIP, or Transportation Improvement Program.

DelDOT or Delaware Department of Transportation - DelDOT provides the transportation network throughout Delaware, including design, construction and maintenance of roads and bridges, highway operations and operation of DART First State.

DTC or Delaware Transit Corporation – Operates “DART First State”, statewide multimodal and specialized transportation services throughout the State of Delaware.

Demographic Trends - Trends regarding population, such as size, growth, density, distribution and vital statistics.

FHWA or Federal Highway Administration – The agency of the U. S. Department of Transportation that funds surface transportation planning and programs, primarily highways.

FTA or Federal Transit Administration – The agency of the U.S. Department of Transportation that funds surface transportation planning and programs, primarily transit.

Functional Classification – A hierarchical system of categorizing streets and roads on the basis of the way they are used, the volumes of traffic they carry, and the way they function within the context of the overall transportation system.

FY or Fiscal Year – WILMAPCO’s yearly accounting period begins July 1 and ends the following June 30. Fiscal years are denoted by the calendar year in which they end. The federal fiscal year is October 1-September 30. The MDOT and DelDOT fiscal year runs concurrent with WILMAPCO’s.

GIS or Geographic Information Systems – GIS is a system of computer software, hardware and data to help manipulate, analyze and present information that is tied to a spatial location.

Greenways - Interconnecting paths designed to accommodate bicycle and pedestrian uses. Greenways link our natural areas and make them accessible to our communities. The Lower Susquehanna Greenway, the East Coast Greenway, and the Delaware Coastal Heritage Greenway are examples.

Infrastructure - The physical structure of a community, such as roads, sidewalks, sewers, rail lines, and bridges.

Intelligent Transportation Systems (ITS) - Technologies that improve the management and efficiency of our transportation system, such as electronic toll collection, timed traffic signals and on-board navigation systems.

Intermodal – Those issues or activities which involve or affect more than one mode of transportation, including transportation connections, choices, cooperation and coordination of various modes. Also known as "multimodal". The term "mode" is used to refer to and to distinguish from each other the various forms of transportation, such as automobile, transit, ship, bicycle and walking.

Land Use – Activities and structures on the land, such as housing, shopping centers, farms, and office buildings.

MdTA or Maryland Transportation Authority - The Authority is responsible for managing, operating and improving the State's toll facilities.

Metropolitan Planning Organization (MPO) – The organization required by the federal government, designated by states, and operated by local officials for developing transportation programs in urban areas of 50,000 or more people. The MPO for our region is WILMAPCO.

MTA or Maryland Mass Transit Administration - The MTA provides a network of transit, rail and freight services.

Mobility – The movement of people or goods throughout our communities and across the region. Mobility is measured in terms of travel time, comfort, convenience, safety and cost.

Park-and-Ride – Lots in outlying areas where people can park and then use transit, carpool, or vanpool for the remainder of their trip.

Pipeline Process – Used by DelDOT to keep track of projects and to help move them from idea state to implementation.

ROW or Right of Way Acquisition – An abbreviation used in the WILMAPCO TIP.

Regional Transportation Plan (RTP)– A blueprint to guide the region's transportation for the next 25 years. Federal law requires the RTP to be updated every four years (in areas that do not meet air quality standards) to ensure that the plan remains current and effective at achieving the goals. Formerly known as the Metropolitan Transportation Plan (MTP).

SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. The second, and most recent, transportation re-authorization legislation. Enacted into law in July of 2005, the bill authorizes $284 billion of federal funding through 2009. Replaces ISTEA and TEA-21.

SHA or (Maryland) State Highway Administration - As part of the Maryland Department of Transportation (MDOT), SHA is responsible for more than 16,000 lane miles of interstate, primary and secondary roads and more than 2,500 bridges.

Special Use Lanes – Lanes on heavily congested roadways that are used exclusively by carpools, vanpools, buses or any vehicle that transports multiple passengers; also called High Occupancy Vehicle (HOV) lanes.

TAC or Technical Advisory Committee – An advisory committee to the Council that represents federal, state, and local planning agencies in Delaware and Maryland. The TAC is responsible for overseeing the technical work of WILMAPCO staff and developing recommendations to the Council on projects and programs.

TEA-21 – The acronym for the 1998 federal Transportation Equity Act for the 21st Century. Replaced ISTEA, but continued and expanded ISTEA's restructured programs for all modes of transportation. It provides guidelines to authorize federal funding of transportation projects.

TIP or Transportation Improvement Program – A program that lists all federally funded projects and services in the WILMAPCO region, covering a period of four years. It is developed annually in cooperation with MDOT, DelDOT and affected transit operators.

Traffic Calming – Design techniques to decrease the speed and volume of vehicle traffic on streets, while still providing vehicle circulation in an area. Techniques include speed bumps, landscaping and roundabouts.

Transit – Passenger service provided to the public along established routes. Paratransit is a variety of smaller, often flexibly scheduled and routed transit services serving the needs of persons that standard transit would serve with difficulty or not at all.

Transportation Investment Areas (TIA) – Areas for future investments in transportation which will match transportation investments to land use needs.

UPWP or Unified Planning Work Program – A plan, developed by WILMAPCO, that **g**uides all transportation planning activities in the WILMAPCO region.

VMT or Vehicle Miles of Travel – A standard areawide measure of travel activity, calculated by multiplying average trip length by the total number of trips.

Wilmington Area Planning Council (WILMAPCO) – The MPO for Cecil County, Maryland and New Castle County, Delaware.

Appendix B– Intersection Database

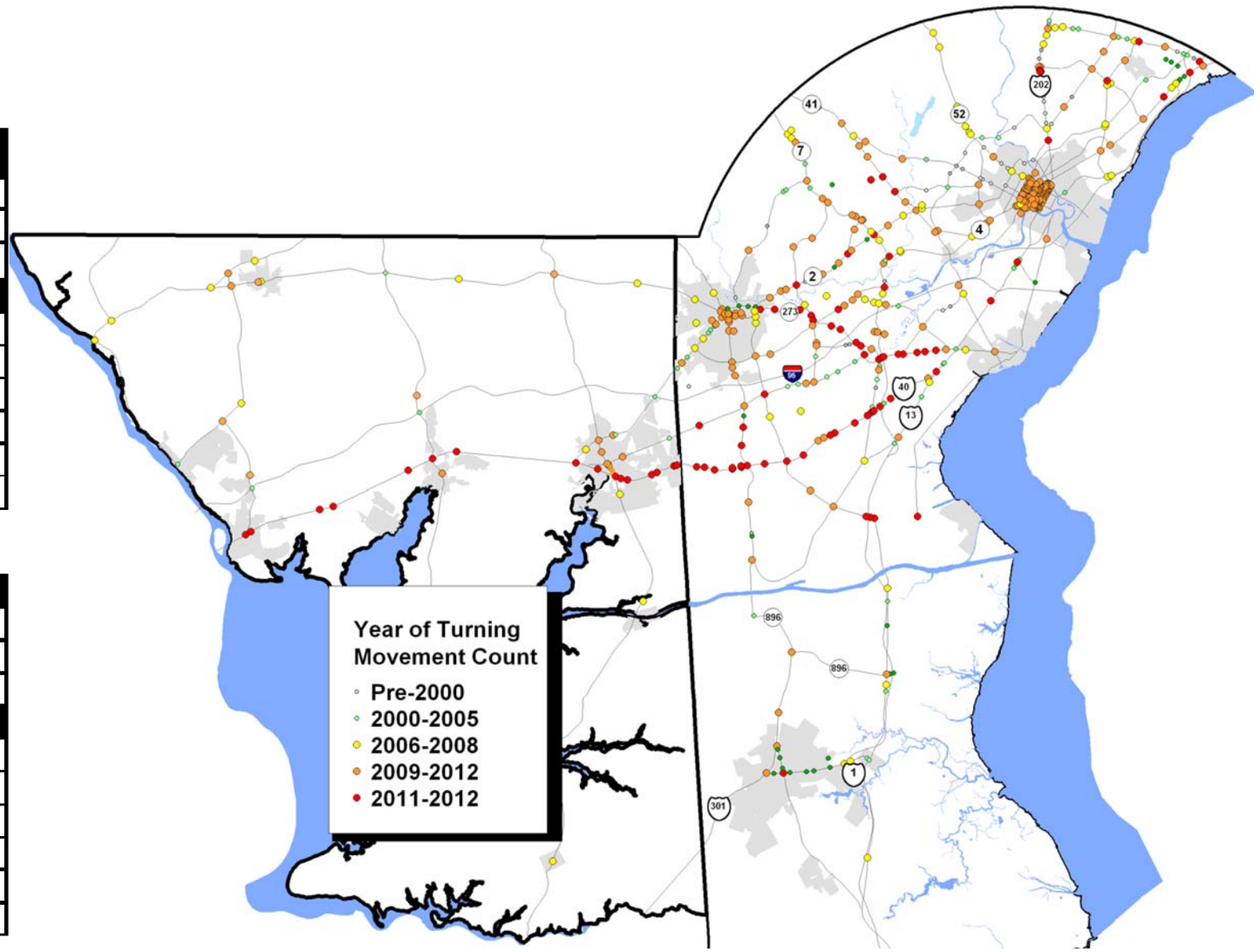
In order to keep an up-to-date database of key intersections along the CMS network, WILMAPCO has increased funding to collect Level of Service data on several locations on an annual basis. Intersections will be counted based on criteria from the DOT Traffic Impact Study (TIS) policy. Counts occur from 6-9am and from 4-6pm on a Tuesday, Wednesday or Thursday. Counts would be submitted to DelDOT for LOS calculation. In addition, counts of pedestrians and heavy trucks would also be completed. Also, separate counts of right-turn-on-red counts would be collected (as opposed to right-turn movements). The image below is a summary of our data collection efforts to date. In the FY 2013 Unified Planning Work Program, funds have been set aside to count the older sites.

New Castle County

Total Signalized Intersections in database	785	
Intersections with LOS Data (Delay)	458	58%
Intersections with LOS Data (Volume)	150	19%
Year of Counts		
2011-2012	73	9%
2009-2010	229	29%
2006-2008	62	8%
2000-2005	75	10%
pre-2000	40	5%
no data	306	39%

Cecil County

Total Signalized Intersections in database	43	
Intersections with LOS Data (Delay)	43	100%
Intersections with LOS Data (Volume)	0	0%
Year of Counts		
2011-2012	10	23%
2009-2010	13	30%
2006-2008	13	30%
2000-2005	7	16%
pre-2000	0	0%
no data	0	0%



Appendix C– Intersection Operational Analysis

The table to the right shows the LOS data for each intersection that was included in the Intersection Operational Analysis. The analysis was conducted in two parts:

1. Using delay-based LOS analysis, all intersections that were showing an LOS of “E” or “F” in the AM or PM peak were identified

2. Of those that were identified, a capacity –based LOS analysis was performed to determine the amount of capacity remains at that intersection.

“Delay –Based” Intersection Level of Service

LOS	Delay Measure
A	under 10 seconds
B	10-20 seconds
C	20-35 seconds
D	35-55 seconds
E	55-80 seconds
F	over 80 seconds

“Volume-Based” Intersection Level of Service

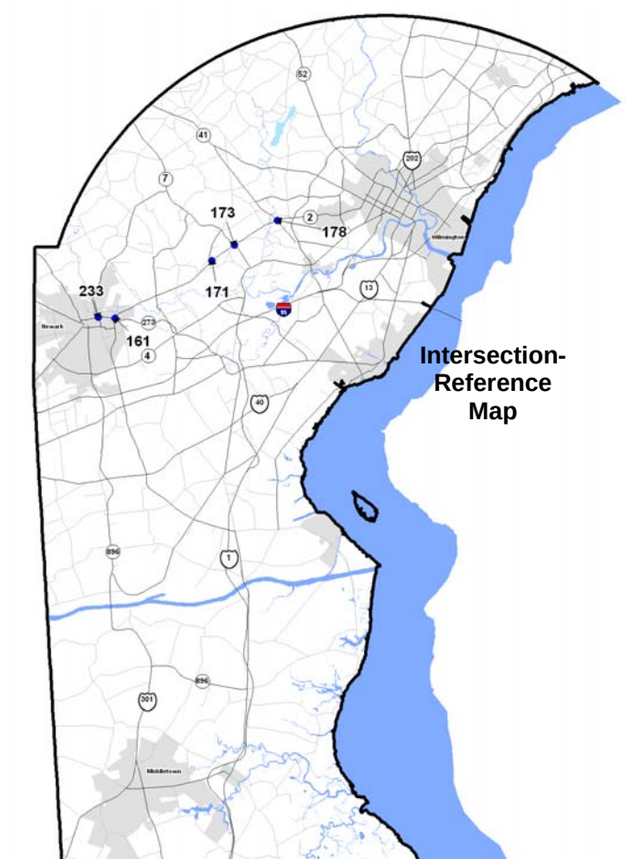
Level of Service Critical Movement Summation (CMS)
LOS A Less than 1,000 vehicles/hour
LOS B 1,000 to 1,150 vehicles/hour
LOS C 1,151 to 1,300 vehicles/hour
LOS D 1,301 to 1,450 vehicles/hour
LOS E 1,451 to 1,600 vehicles/hour
LOS F More than 1,600 vehicles/hour

	Delay Year Count	LOS Determined Through Delay-Based Analysis (i.e. Synchro)		Volume Year Count	LOS Determined Through Volume-Based Analysis (Critical Movement Summation)		
Intersection	Delay Year Count	AM Delay LOS	PM Delay LOS	Vol. Year Count	AM Volume LOS	PM Volume LOS	Notes
SR 2 & Cleveland Ave.	2012	F	F	2010	E	D	**Intersections are showing either AM/PM LOS of "E" of "F" using both LOS methods. For improving LOS, these intersections will require significant reductions in demand through the intersection and/or capital improvements.**
Cleveland Ave. & Paper Mill Rd./ N. Chapel St.	2005	E	F	2010	B	E	
Foulk Rd. & Murphy Rd.	2010	E	C	2010	C	E	
SR 896 & Welsh Tract Rd.	2009	D	E	2009	C	E	
SR 273 & Harmony Rd.	2011	F	F	2011	E	E	
SR 273 & Chapman Rd (Eagle Run)	2011	F	F	2011	E	E	
SR 2 & Milltown Rd.	2010	D	F	2010	B	E	
SR 7 & Milltown Rd.	2010	F	F	2010	C	F	
SR 7 & Skyline Dr.	2010	D	F	2010	C	F	
SR 48 & Hercules Rd.	2009	D	E	2009	D	F	
SR 7 (Limestone Rd) & SR 4 (Main St.) Stanton	2011	D	E	2011	D	F	
SR 2 & SR 41	2010	F	F	2010	F	F	
SR 896 & Old Baltiomore Pk.	2010	F	F	2010	F	F	
US 13 & Bacon Ave/Boulden Blvd.	2011	F	F	2011	F	F	
SR 41 & Faulkland Rd.	2011	E	E	2011	D	B	**Intersections are bordering on a deficient level of capacity if traffic growth continues. While not immediately needed, some modest improvements can be warranted.**
SR 273 & Old Balt. Pike	2011	E	D	2011	D	C	
US 202 & Silverside Rd.	2009	C	E	2009	A	D	
SR 261 (Foulk Rd.) & Silverside Rd.	2010	D	E	2010	B	D	
SR 4 & Salem Church Rd.	2010	E	D	2010	B	D	
SR 4 & Samoset Dr.	2010	F	F	2010	B	D	
SR 896 (Glasgow Ave.E) & Porter Rd.	2010	D	E	2010	B	D	
SR 896 (S. College Ave.) & Corporate Blvd. (GBC	2011	C	F	2011	B	D	
SR 273 & Main St.	2008	F	E	2010	B	D	
SR 273 & Old Ogletown Rd./Paradise Ln.	2012	F	F	2012	B	D	
SR 2 (Kirkwood Hwy) & SR 7 (Limestone Rd.)	2011	E	E	2011	C	D	
SR 273 & Brownleaf Dr.	2012	F	F	2012	C	D	
SR 2 & SR 100	2009	D	E	2009	A	A	**Intersections which can function at LOS "C" or better through proper signal timing / phasing. No significant capital improvements are needed unless traffic conditions change significantly.**
Milltown Rd. &Mc Kennans Church Rd.	2010	F	E	2010	A	A	
SR 273 &Marrows Rd.	2012	D	E	2012	A	A	
SR 273 & Lowes Entrance	2012	F	F	2012	A	A	
New Castle Ave. & Terminal Ave.	2009	F	F	2009	A	A	
US 13 & Boyds Corner Rd.	2010	F	C	2010	A	A	
SR 273 & Churchmans Rd.	2010	C	E	2012	A	A	
SR 273 & White Clay Center Dr.	2012	F	F	2012	A	A	
Foulk Rd. & Grubb Rd.	2010	E	E	2010	A	B	
SR 896 & Hillside Rd.	2010	E	F	2010	A	B	
SR 7 & SR 72	2010	F	E	2010	A	B	
US 202 (SB) & Garden of Eden Rd.	2009	E	E	2009	A	B	
SR 7 & Linden Hill Rd.	2010	E	E	2010	B	B	
SR 273 & Appleby Rd.	2011	F	F	2011	B	B	
US 202 & Foulk Rd.	2008	F	D	2010	B	B	
SR 273 (W. Main St.) & Hillside Rd.	2009	E	E	2010	B	B	
SR 92 / Naamans Rd. & Foulk Rd.	2010	D	F	2010	A	C	
SR 72 & E Delaware Ave	2008	E	F	2010	A	C	
SR 4 & Churchman's Rd.	2010	E	F	2010	A	C	
PENNSYLVANIA AVE & UNION ST	2008	D	E	2010	A	C	
SR 2 & Possum Park Rd.	2009	C	F	2009	B	C	
SR 896 & Four Seasons Parkway	2011	C	E	2011	B	C	
LInden Hill Rd. & Polly Drummond Rd.	2010	E	F	2010	C	C	
SR 273 & Airport Rd.	2011	F	F	2011	C	C	
SR 7 & SR 273	2011	E	E	2011	C	C	
SR 273 & Browns Lane	2012	F	D	2012	C	C	
SR 72 & Old Balt. Pike	2011	E	F	2011	C	C	

Appendix C– Intersection Operational Analysis– Potential Improvement Options

The table to the right contains a breakdown of a detailed analysis conducted on each intersection that was shown to have an AM/PM peak hour LOS of "E" or "F" and have an LOS of "D" or worse in either the AM/PM peak hour when measured using the capacity based analysis. Where applicable, the intersections were studied to look for possible configuration changes or additional lanes in order to improve the intersection.

Also added to each intersection is the demand overage for each intersection with a peak period LOS of D or worse. The purpose is to illustrate the total number of trips that need to be reduced during the peak hour in order to achieve an LOS of C.

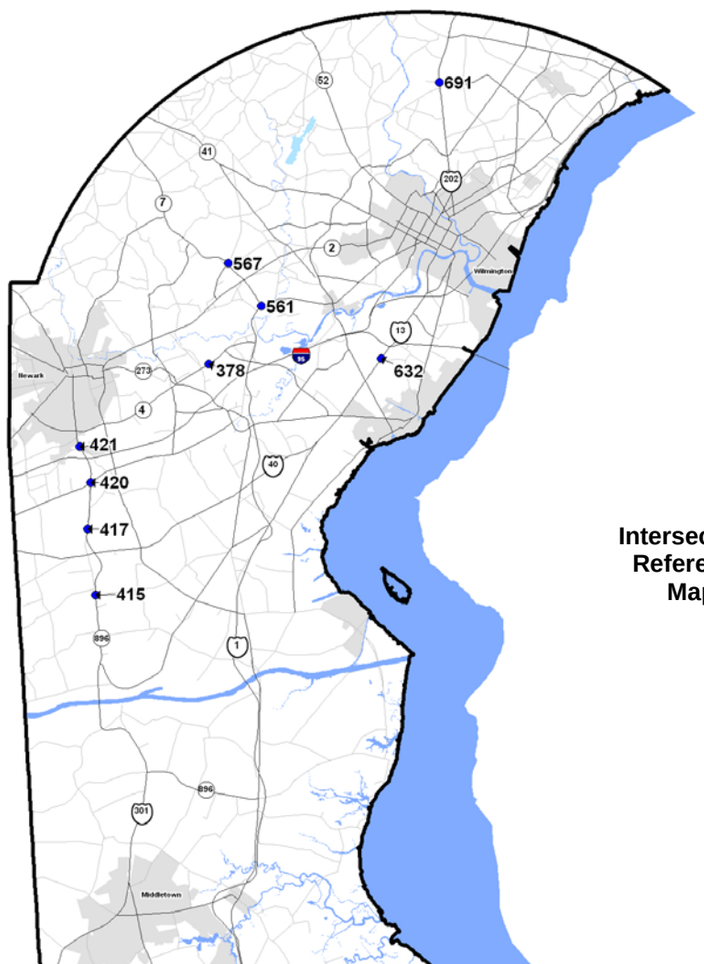


Improvement Options Analysis for Priority Intersections—New Castle

Map ID #	PERMIT #	INTERSECTION	EXISTING VOLUME LOS		DEMAND OVERAGE		IMPROVED VOLUME LOS		OPTIONS	COMMENTS
			AM	PM	AM	PM	AM	PM		
233	N432T	Cleveland Ave & Paper Mill Rd/ N Chapel St	B	E	-	151	B	D	1. Provide dual left turn lanes for EB Cleveland Avenue vehicles turning on to Paper Mill Road.	
							B	D	2. Remove the low volume Margaret Street phase (one way in only on Margaret).	2. Margaret Street vehicles can exit from two other locations (Creek View Road on to Paper Mill Rd) and (Dean Drive to Christopher Lane to Cleveland Avenue). However, vehicles can only turn right from Creek View Road.
							B	E	3. Provide 2 thru lanes for EB Cleveland Avenue.	3. Due to variations in peak period traffic volumes, WB Cleveland Avenue is the critical movement in the PM peak hour and addding EB lanes does not improve the PM LOS.
							B	C	4. Provide 2 thru lanes for WB Cleveland Avenue.	4. Due to variations in peak period traffic volumes, EB Cleveland Avenue is the critical movement in the AM Peak and addding WB lanes does not improve the AM LOS. However, this movment is currently a LOS B and does not require improvement.
161	N422T	SR-2 & Cleveland Ave	F	F	334	315	D	D	1. Provide dual left turn lanes for NB vehicles on SR 2 turning on to Cleveland Avenue.	DSTEP project recommended another option to restripe Cleveland Ave, which would provide LOS E/D (AM/PM).
							D	C	2. Provide a channelized right turn lane for EB vehicles on Cleveland Avenue.	
							C*	B*		* If both improvements are made
171	N152	SR-2 & Milltown Rd	B	E	-	202	B	D	1. Provide dual left turn lanes for EB SR 2 vehicles turning left on to Milltown Rd	1. Left turn volumes exceed 300 VPH in both peak periods.
							B	C	2. Provide 3 thru lanes for WB SR 2	2. Adding a 3rd thru lane in the EB direction provides a modest benefit in the AM (LOS B to LOS A) but no benefit in the PM peak.
173	N165	SR-2 (Kirkwood Hwy) & SR-7 (Limestone Rd)	C	D	-	73	B	C	1. Provide 3 thru lanes for NB & SB direction.	1. Intersection already has dual left turns all the way around and 3 thru lanes on Kirkwood Hwy (DE 2).
178	N162	SR-2 & SR-41	F	F	368	456	C	C	1. Provide 4 thru lanes in EB & WB direction (currently 3 thru), 3 left turn lanes SB, 2 thru lanes SB, 1 thru lane NB (currently shared L/LT)	1. Trying to pick and choose the improvements to get to a LOS D did not work because something that helped in the AM did not help in the PM and vice versa. So all improvments are shown in one CMS.

Appendix C– Intersection Operational Analysis– Potential Improvement Options

The table to the right contains a breakdown of a detailed analysis conducted on each intersection that was shown on page A-6 to have an AM/PM peak hour LOS of “E” or “F” and have an LOS of “D” or worse in either the AM/PM peak hour when measured using the capacity based analysis.



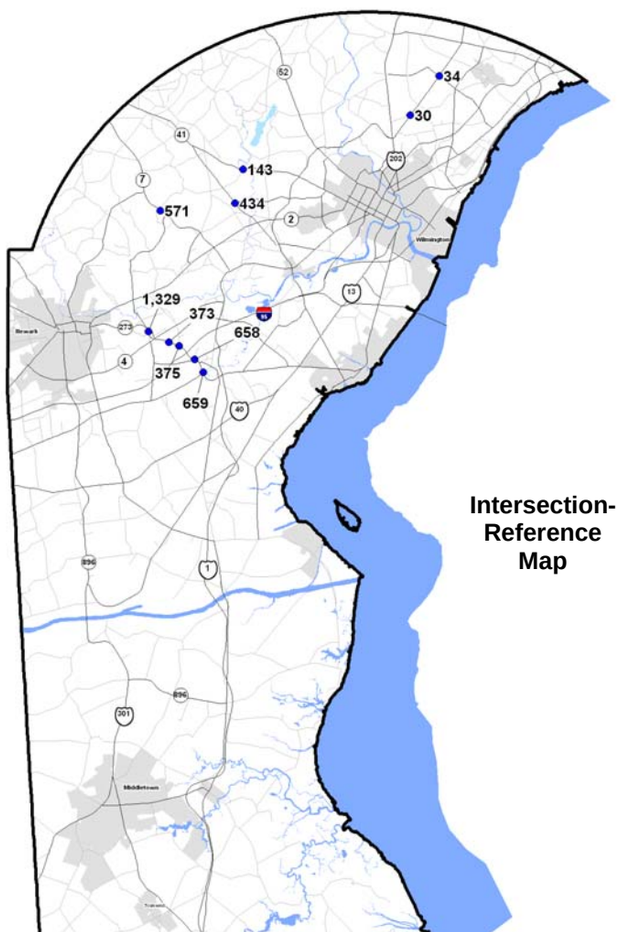
Intersection-Reference Map

Improvement Options Analysis for Priority Intersections—New Castle

Map ID #	PERMIT #	INTERSECTION	EXISTING VOLUME LOS		DEMAND OVERAGE		IMPROVED VOLUME LOS		OPTIONS	COMMENTS
			AM	PM	AM	PM	AM	PM		
434	N268	SR-41 & Faulkland Rd	D	B	11	-	C	B	1. Provide 2 thru lanes for EB Faulkland Rd (T/TR) current alignment is TR.	
34	N147	SR-261 (Foulk Rd) & Silverside Rd	B	D	-	125	A	C	1. Provide channelized right turns for NB & SB Foulk Rd.	
30	N236	SR-261 (Foulk Rd) & Murphy Rd/Wilson Rd	C	E	-	205	C	C	1. Provide a channelized right turn lane for SB DE 261 (Foulk Rd).	1. On Foulk Road the right turns are made from a shared thru/right lane in both directions. Providing a channelized right turn for SB DE 261 (Foulk Rd) would provide a benefit to the PM peak period.
							B	E	2. Provide a channelized right turn lane for NB DE 261 (Foulk Rd).	2. Providing a channelized right turn for NB DE 261 (Foulk Rd) would provide a benefit to the AM peak period (LOS C to LOS B), but does not improve the PM peak period.
*	N423T	**SR-273/Main St & SR-72	B	D	-	39	B	C	1. Provide 3 thru lanes for NB direction.	* Duplicate ID # assigned, new ID number needed. ** After reviewing location with UD and WILMAPCO, determined this is the intersection of DE72, DE 273 (Ogletown Rd and Main St)
1329	N590	SR-273 & Old Ogletown Rd/Red Mill Rd	B	D	-	122	A	C	1. Provide dual left turns for SB movement, exceeds 300 VPH in both peak periods.	
373	N315	SR-273 & Brownleaf Dr	C	C	-	-	-	-	1. Using the CMS method both peak periods are a LOS C.	
375	N337	SR-273 & Harmony Rd	D	E	121	155	B	C	1. Provide 3 thru lanes in each direction for SR 273.	1. This section of SR 273 has an AADT approaching 50,000. Immediately adjacent to I-95, adding a lane in only one direction would not provide a benefit since the critical movement would always be the direction that hadn’t been widened.
658	N367	SR-273 & Chapman Rd (Eagle Run)	E	E	160	242	C	C	1. Provide 3 thru lanes in each direction for SR 273.	1. This section of SR 273 has an AADT approaching 50,000. Immediately adjacent to I-95, adding a lane in only one direction would not provide a benefit since the critical movement would always be the direction that hadn’t been widened.
							D	E	2. Change lane assignment to triple left turn for Chapman Rd.	
659	N351	DE-273 & Old Baltimore Pk	C	C	-	-	-	-	1. Using the CMS method both peak periods are a LOS C.	
143	N157	SR-48 & Hercules Dr	D	F	12	305	D*	A	1. Provide 2 thru lanes for WB SR 48.	* Does not improve AM LOS since this is not the critical movement.
571	N261	SR-7 & Skyline Dr	C	F	-	337	B	C	1. Provide 1 thru lane in EB & WB direction (both approaches currently have L/LT lane assignment)	

Appendix C– Intersection Operational Analysis– Potential Improvement Options

The table to the right contains a breakdown of a detailed analysis conducted on each intersection that was shown on page A-6 to have an AM/PM peak hour LOS of “E” or “F” and have an LOS of “D” or worse in either the AM/PM peak hour when measured using the capacity based analysis.



Intersection-Reference Map

Improvement Options Analysis for Priority Intersections—New Castle

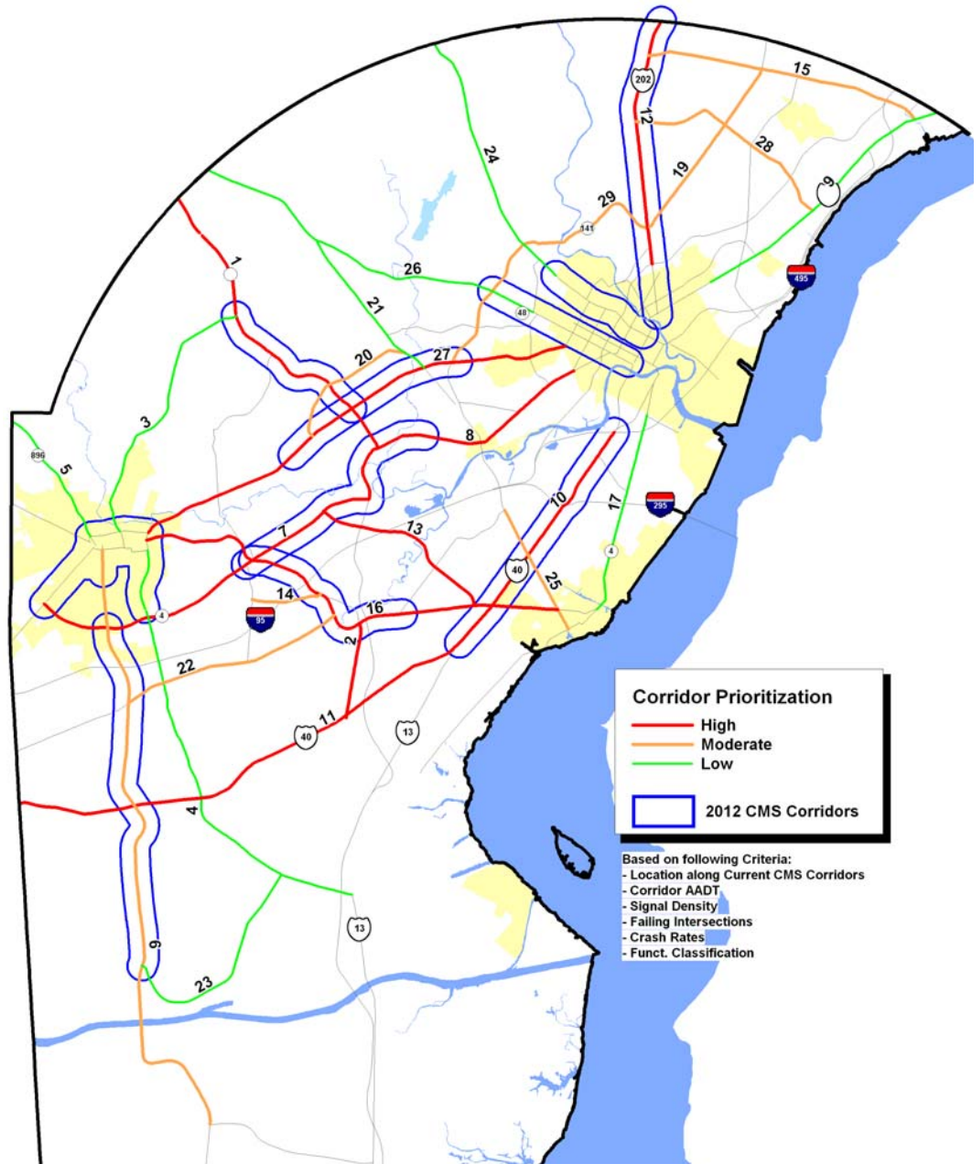
Map ID #	PERMIT #	INTERSECTION	EXISTING VOLUME LOS		DEMAND OVERAGE		IMPROVED VOLUME LOS		OPTIONS	COMMENTS
			AM	PM	AM	PM	AM	PM		
567	N233	SR-7 & Milltown Rd	C*	D*	-	30	-	-		*AM & PM CMS were completed for this intersection using updated counts (10/28/2010) as part of the Newport Viaduct project. The LOS reported using these updated counts (AM - C & PM - D) removed this intersection from the Major Modifications list.
561	N366	SR-7 & SR 4	C	E	-	205	B	D	1. Provide 3 thru lanes in WB direction.	1. Adding an additional WB lane may be possible by restriping existing roadway since there are 3 thru lanes on DE 4/7 WB past this intersection.
378	N465	SR-4 & Samoset Dr	B	D	-	95	A	B	1. Provide 3 thru lanes in EB & WB direction.	1. No improvement on any minor approaches was substantial enough to reduce the LOS to below a D.
421	N434T	SR-896 & Welsh Tract Rd	C	E	-	155	C	D	1. Provide dual left turn lanes for NB SR 896 vehicles turning left on to Welsh Tract Road.	1. There are two receiving lanes which quickly taper to a single lane which immediately crosses a bridge.
							B	C	2. Provide 3 thru lanes for SB SR 896.	2. This section of SR 896 has an AADT greater than 30,001. With close proximity to I-95, SB is critical movment in both peak periods.
420	N188	SR-896 & Old Baltimore Pk	F	F	406	403	D	D	1. Provide 3 thru lanes in NB & SB direction and 1 thru lane in the WB direction (currently L/LT)	1. Providing 3 thru lanes in NB & SB direction by itself was not enough to reduce LOS to a D in either AM or PM peak periods.
							F	E	2. Analyzed as 8 - phase operation.	2. Did not improve either peak to a LOS D.
							E	F	3. Change lane assignment to triple left turn for Old Baltimore Pike EB.	3. Did not improve either peak to a LOS D.
417	N489	SR-896 (S College Ave) & Corporate Blvd (GBC DR)	B	D	-	95	A	B	1. Provide 3 thru lanes in NB & SB direction.	
415	N454	SR-896 & Glasgow Ave E/Porter Rd	B	D	-	6	A	C	1. Change WB lane assignment to L/T	1. Current lane assignment for WB movement is L-LT. The thru movement is higher than the left turns in both peak periods.
632	N217	US-13 & Bacon Ave/Boulden Blvd	F	F	391	370	D	D	1. Provide 4 thru lanes in NB & SB direction.	1. No improvement on any minor approaches was substantial enough to reduce the LOS to a D.
691	N102	US-202 NB & Silverside Rd	A	D	-	65	A	C	1. Provide 3 thru lanes on Silverside.	

Appendix D: Traffic responsive Signalization Priorities

Through a joint effort with the DelDOT Traffic Management Center (TMC) and WILMAPCO, a technical exercise was performed to look at which corridors are priorities for applying Traffic Responsive Signalization technology. The CMS network was analyzed using traffic signal density, average traffic volumes, crashes, and failing signals to create a prioritized list of corridors for the TMC to consider for TRS implementation.

Traffic responsive signalization is a method of signal management that uses advanced technology to adjust timing to meet the needs of current traffic volume. The signals used in this method optimize signal timing according to traffic volume in each direction. Sensors are used to detect vehicular traffic in a certain direction at a particular point and an algorithm is used to predict when and where the traffic will be. The signal controller utilizes these algorithms to adjust the length of green time to allow the maximum amount of vehicles through the intersection. This method can react to fluctuating traffic volume in order to reduce congestion.

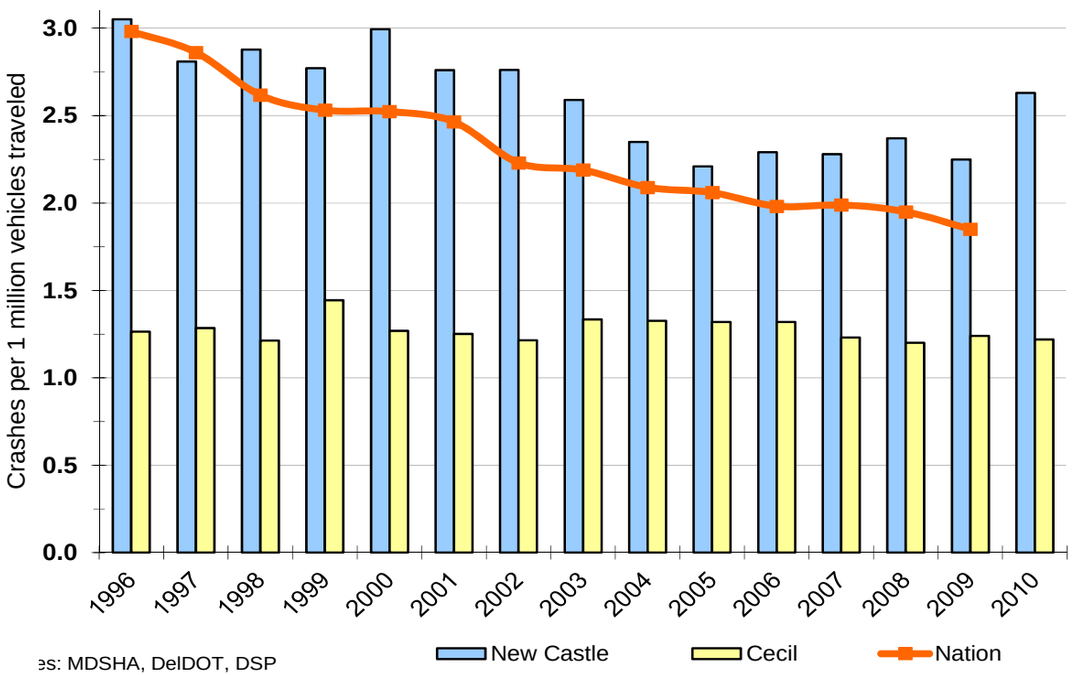
ID	Route	Segment limits	Segment Length	Road Type (FC)	Avg AADT	# Signals	Signals/ mile	# Failing Intersections (LOS E or F in AM or PM)	Crashes/ Mile	AADT Rank	Signal Rank	Crash Rank	Int. Fail Rank	Overall	Priority
12	US 202	Wilmington Line to PA line	5.1	Principal Arterial	51,261	23	4.5	8	193	2	2	2	2	0	High
27	SR 2 (Kirkwood Highway)	Newark to Wilmington Line	9.54	Principal Arterial	35,200	32	3.4	12	181	3	7	3	1	1.5	High
8	SR 4	SR 7 to Wilmington Line	5.79	Principal Arterial	23,239	37	6.4	2	159	11	1	5	14	5.75	High
2	SR 7	SR 273 to US 40	1.93	Minor Arterial	25,732	7	3.6	2	177	9	4	4	14	5.75	High
16	SR 273	SR 273(Newark) to SR 141	9.4	Principal Arterial	30,781	25	2.7	5	156	6	15	6	5	6	High
10	US 13	South of Wilmington, I-495 to US 40 split	5.25	Principal Arterial	65,238	16	3.0	2	222	1	11	1	14	6.75	High
7	SR 4	Elkton Rd. to SR 7	7.48	Principal Arterial	23,214	20	2.7	3	128	12	15	9	7	8.75	High
11	US 40	MD line to US 13 split	9.93	Principal Arterial	33,251	23	2.3	3	149	5	21	7	7	10	High
1	SR 7	SR 4 Split to PA Line	6.65	Principal Arterial	28,670	21	3.2	1	126	8	10	10	20	10	High
13	Churchmans Rd.	SR 4 to SR 273	3.89	Minor Arterial	15,536	14	3.6	2	123	21	4	12	14	10.75	High
25	SR 141	SR 37 to SR 9	2.76	Principal Arterial	16,341	10	3.6	1	133	17	4	8	20	11.25	Moderate
15	SR 92 (Naamans Rd.)	US 202 to US 13	5.7	Principal Arterial	23,395	20	3.5	1	109	10	7	15	20	13	Moderate
29	SR 141	SR 2 to US 202	6.00	Principal Arterial	28,722	12	2.0	6	63	7	22	24	3	13	Moderate
22	Old Baltimore Pike	SR 896 to SR 273	4.62	Minor Arterial	16,550	12	2.6	2	118	16	18	13	14	13.25	Moderate
19	Foulk Rd.	US 202 to Naaman's Road	3.99	Minor Arterial	15,972	11	2.8	3	81	19	14	19	7	13.75	Moderate
14	Chapman Rd.	Salem Church Rd. to SR 273	1.43	Minor Arterial	11,269	5	3.5	2	112	26	7	14	14	14.25	Moderate
28	Silverside Rd	US 202 to US 13	4.56	Minor Arterial	16,213	12	2.6	3	76	18	18	22	7	14.25	Moderate
20	Milltown Rd.	SR 2 to SR 41	2.94	Minor Arterial	34,021	6	2.0	1	124	4	22	11	20	14.25	Moderate
6	SR 896	South of Newark to Boyd's Corner	12.92	Principal Arterial	22,433	23	1.8	6	78	13	25	21	3	14.5	Moderate
21	SR 41	PA line to SR 2	6.15	Minor Arterial	15,098	15	2.4	3	79	22	20	20	7	15.25	Low
4	SR 72	South of Newark to US 13	9.06	Minor Arterial	18,194	17	1.9	3	95	15	24	16	7	15.5	Low
26	SR 48	SR 41 split to Wilmington border	4.83	Principal Arterial	18,531	8	1.7	4	55	14	27	26	6	16.25	Low
9	US 13	North of Wilmington to PA line	5.89	Minor Arterial	11,656	22	3.7	0	90	25	3	17	27	18	Low
18	SR 299	US 301 to US 13	3.71	Minor Arterial	6,969	11	3.0	0	85	28	11	18	27	19	Low
17	SR 9	Terminal Ave. to Chesnut St.	4.17	Minor Arterial	15,696	12	2.9	1	73	20	13	23	20	19	Low
3	SR 72	North of Newark	5.61	Minor Arterial	11,719	10	1.8	3	34	24	25	27	7	20.75	Low
24	SR 52	Wilmington border to PA line	5.51	Principal Arterial	14,968	15	2.7	1	60	23	15	25	20	20.75	Low
5	SR 896	North of Newark	2.92	Minor Arterial	11,179	3	1.0	1	25	27	28	29	20	25	Low
23	SR 71	US 13 to SR 896	4.73	Major Collector	2,792	2	0.4	0	32	29	29	28	27	28.25	Low



Appendix E: Crash Trends

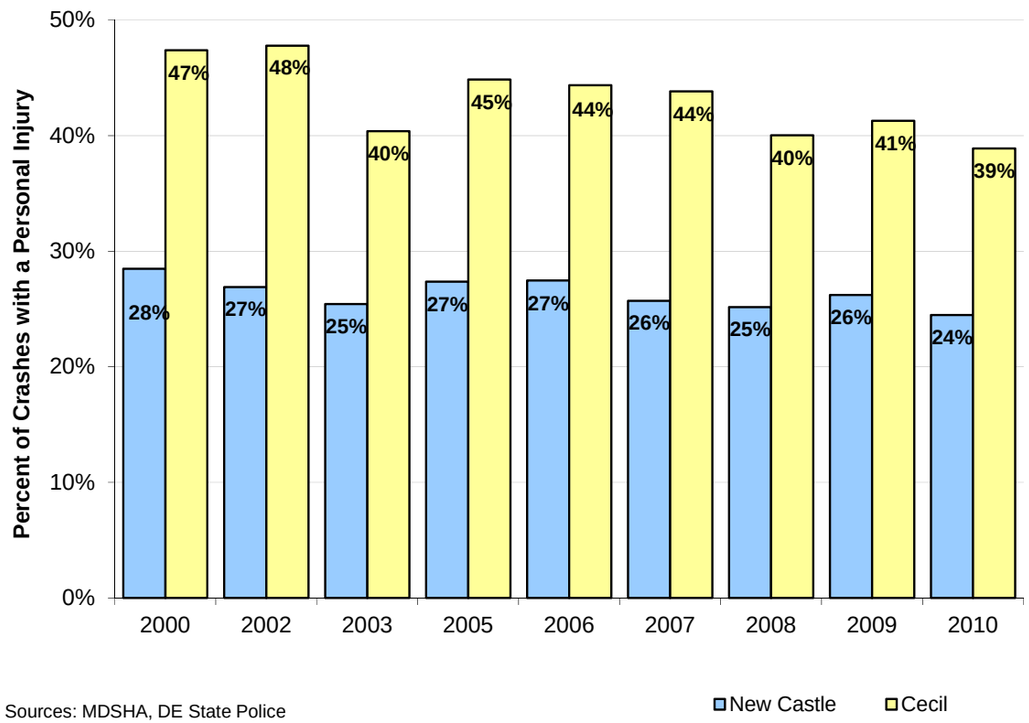
New this year to the CMS is the incorporation of crash statistics. According to the FHWA, roughly 1/4 of all congestion is caused by traffic incidents. Automobile crashes can dramatically change the performance of the roadway, affecting both travel speeds and throughput volumes. These incidents, defined as “non-recurring” congestion, contribute significantly to travel time delays. Accidents significantly reduce remaining capacity on freeway segments, well beyond the physical blockage of lanes. This research found that an accident blocking one of three freeway lanes resulted in a mean capacity reduction of 63 percent, while an accident blocking two of three freeway lanes resulted in a mean capacity reduction of 77 percent[1]. Even minor lane-blocking incidents can have significant impacts on traffic if they are not removed quickly. But their impacts are accentuated during peak traffic hours. If a lane is blocked when traffic flow is at or near the capacity of a facility, the queue of traffic that accumulates behind the incident will not dissipate after the incident is removed until the traffic flow into the queue decreases—in other words, until the peak period ends. Thus a standing queue of traffic may exist for several hours, depending on when the incident occurred, how many lanes were blocked, and how long the blockage lasted.

Annual Crash Rate Trends 2000-2010



es: MDSHA, DelDOT, DSP

Personal Injury Crash Trends 2000-2010



Sources: MDSHA, DE State Police

Appendix F– WILMAPCO CMS Resolution

Wilmington Area Planning Council

850 Library Avenue, Suite 100
Newark, Delaware 19711
302-737-6205; Fax 302-737-9584
From Cecil County: 888-808-7088
e-mail: wilmapco@wilmapco.org
web site: www.wilmapco.org

RESOLUTION
BY THE WILMINGTON AREA PLANNING COUNCIL (WILMAPCO)
TO ADOPT THE WILMAPCO 2012 CONGESTION MANAGEMENT SYSTEM (CMS) SUMMARY

WHEREAS, the Wilmington Area Planning Council (WILMAPCO) has been designated the Metropolitan Planning Organization (MPO) for Cecil County, Maryland and New Castle County, Delaware by the Governors of Maryland and Delaware, respectively; and

WHEREAS, the United States Department of Transportation (USDOT) Regulations of the Moving Ahead for Progress in the 21st Century Act (MAP-21) which require that MPOs with over 200,000 population, in cooperation with participants in the planning process, produce a document to satisfy the Congestion Management Process (CMP) requirements; and

WHEREAS, a CMS Subcommittee of the Technical Advisory Committee was formed in November 2000, following the WILMAPCO Council's recommendation, and met on a regular basis to develop the 2012 WILMAPCO CMS Summary; and

WHEREAS, the WILMAPCO CMS is a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet State and local needs; and

WHEREAS, the WILMAPCO CMS includes methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of congestion, identify and evaluate alternative actions, provide information supporting the implementation of actions, and evaluate the efficiency and effectiveness of implemented actions; and

WHEREAS, the WILMAPCO CMS provides an appropriate analysis of all reasonable (including multimodal) travel demand reduction and operational management strategies for the corridor in which a project that will result in a significant increase in capacity for single occupant vehicles (adding general purpose lanes to an existing highway or constructing a new highway) is proposed;

NOW, THEREFORE, BE IT RESOLVED that the Wilmington Area Planning Council adopts the WILMAPCO 2012 Congestion Management System Summary, as presented.

September 6, 2012
Date:

Joseph L. Fisona, Chairperson
Wilmington Area Planning Council

WILMAPCO
Partners with you in transportation planning